



Perch Lake Lake Management Plan

October 2016

Project Sponsors

St. Croix County, WI

Town of St. Joseph

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Public Opinion Survey

University of Wisconsin River Falls

Lake Water Quality Modeling

University of Wisconsin Stevens Point

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Introduction

This comprehensive lake management plan establishes strategic direction for the management of Perch Lake. The St. Croix County Community Development Department initiated the project with guidance from the Wisconsin Department of Natural Resources (DNR). Unlike many other lakes for which a management plan is developed, a Perch Lake management organization does not exist. Instead, there are many individuals and groups who care about the lake and have an interest in its management. As a result, lake and community residents representing a variety of groups, local governments, and business made up the advisory committee. Staff from the Wisconsin Department of Natural Resources (DNR) and St. Croix County provided guidance for plan development. The advisory committee identified priority issues of concern and recommended management actions to address these issues. A Lake Planning Grant from the DNR funded the lake management plan with grant match contributed by St. Croix County, the Town of St. Joseph, Friends of Perch Lake, and the St. Croix County Sportsmen's Alliance.

Perch Lake is a small but highly valued public water resource with exceptional water quality. It is a state Outstanding Resource Water with a 2-story fishery that is enjoyed by lake residents and thousands of annual visitors to the lake. St. Croix County's Homestead Park encompasses over half of its shoreline and about one third of the lake's watershed. Additional visitors reach the lake via a public boat landing on the south end. There are only about ten residences around the lake.

Plan Scope

The plan presents information about Perch Lake water quality, fisheries, and aquatic plants. Most information was available from DNR studies. A public opinion survey and a lake water quality model were completed as part of the planning process. The plan is written to meet WDNR requirements for lake management planning to establish eligibility for Wisconsin Lake Protection Grants (NR 191.45). The planning period is from 2017 through 2026. Results of ongoing evaluation and monitoring and availability of new management information will likely lead to adaptations in plan actions as the plan is implemented.

A Vision for the Future of Perch Lake

Perch Lake is a clean, clear, cold water lake. The lake provides safe, tranquil recreational experiences for visitors and residents with little impact on the lake's natural beauty, fish, and wildlife.

Lake Management Goals

The following goals will guide Perch Lake management actions:

Goal: Maintain Perch Lake's exceptional clear, cold water.

Goal: Protect and improve aquatic and shoreline habitat.

Goal: Maintain and enhance natural scenic beauty.

Goal: Prevent aquatic invasive species introduction and contain and control existing AIS.

Goal: Balance recreational use with preservation of the natural lake environment.

Needs Assessment

Concerns of Lake and Watershed Residents and Lake Users

Concerns of lake and watershed residents and lake users were gathered in a variety of ways. These included a public meeting in the summer of 2015, a public opinion survey, 5 advisory committee meetings, and public draft plan review.

Lake and Watershed Resident Survey

In October 2015, the UW River Falls Survey Research Center (SRC) mailed surveys to all 62 owners of private property in the Perch Lake watershed. The full survey report is included as Appendix A. The SRC received 30 useable mail responses. An additional 5 surveys were completed over the telephone. The net response rate was 56%.

The degree of participation in lake activities is summarized in Figure 1 below. Walking on trails and swimming are the most frequent lake activities followed by enjoying scenery and wildlife, and spending time with family.

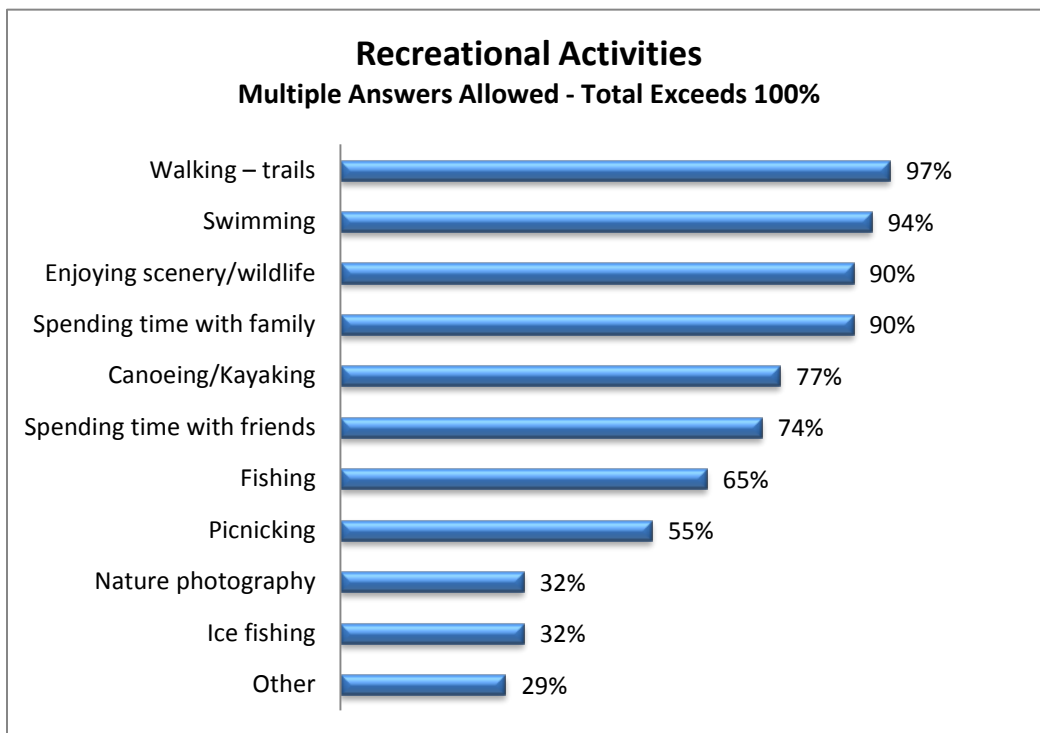


Figure 1. Survey Response: Recreational Activity Participation at Perch Lake

Respondents were given a list of five items that could detract from their enjoyment of Perch Lake and asked to indicate the frequency at which each happens in their experience. Poor regulatory enforcement and crowding at the boat launch were the most frequent problems, with about a third of respondents saying these two issues are problematic often or always. About one in five respondents said excessive weed growth or noise from other lake users is a problem often or always. Only 3% of respondents said that poor water quality is often or always a problem.

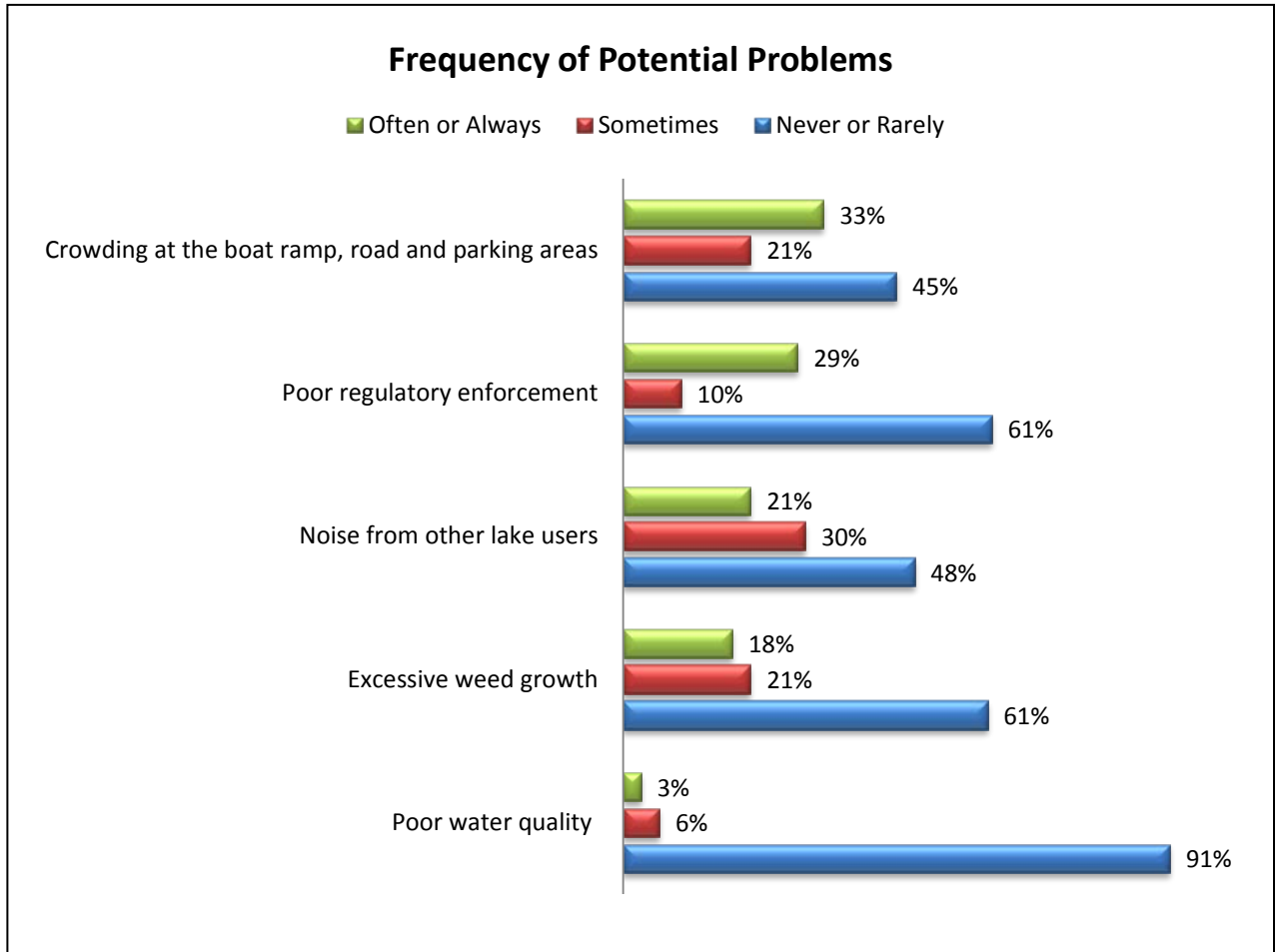


Figure 2. Public Opinion Survey Results: Frequency of Potential Problems on Perch Lake

Additional survey results are reported throughout this plan.

Lake Management Plan Advisory Committee

The advisory committee met four times from March through September 2016 to identify lake management concerns, learn more about priority lake issues, and develop lake management goals, objectives, and actions. The advisory committee priority concerns are reflected in the goals and objectives in this plan. The committee considered the survey results in developing the plan goals.

Public Review

The draft plan will be available for public comment on the St. Croix County and Town of St. Joseph (<http://www.townofstjoseph.com/>) websites beginning October 12, 2016 with comments accepted through October 31, 2016. The plan also will be available for review at the St. Joseph Town Hall during regular business hours.

Lake Overview

Perch Lake (WBIC: 2488300) is located in S28 and 29, R19W, T30N in the town of St. Joseph in St. Croix County, Wisconsin. The lake and its watershed are in the St. Croix River Basin. Perch Lake covers 50 acres¹ with a maximum depth of 63 feet. Depths vary with water levels which can fluctuate greatly in this seepage lake (with no inlet or outlet). A map of the lake location is included as Figure 3, and a lake contour map is included as Figure 4.

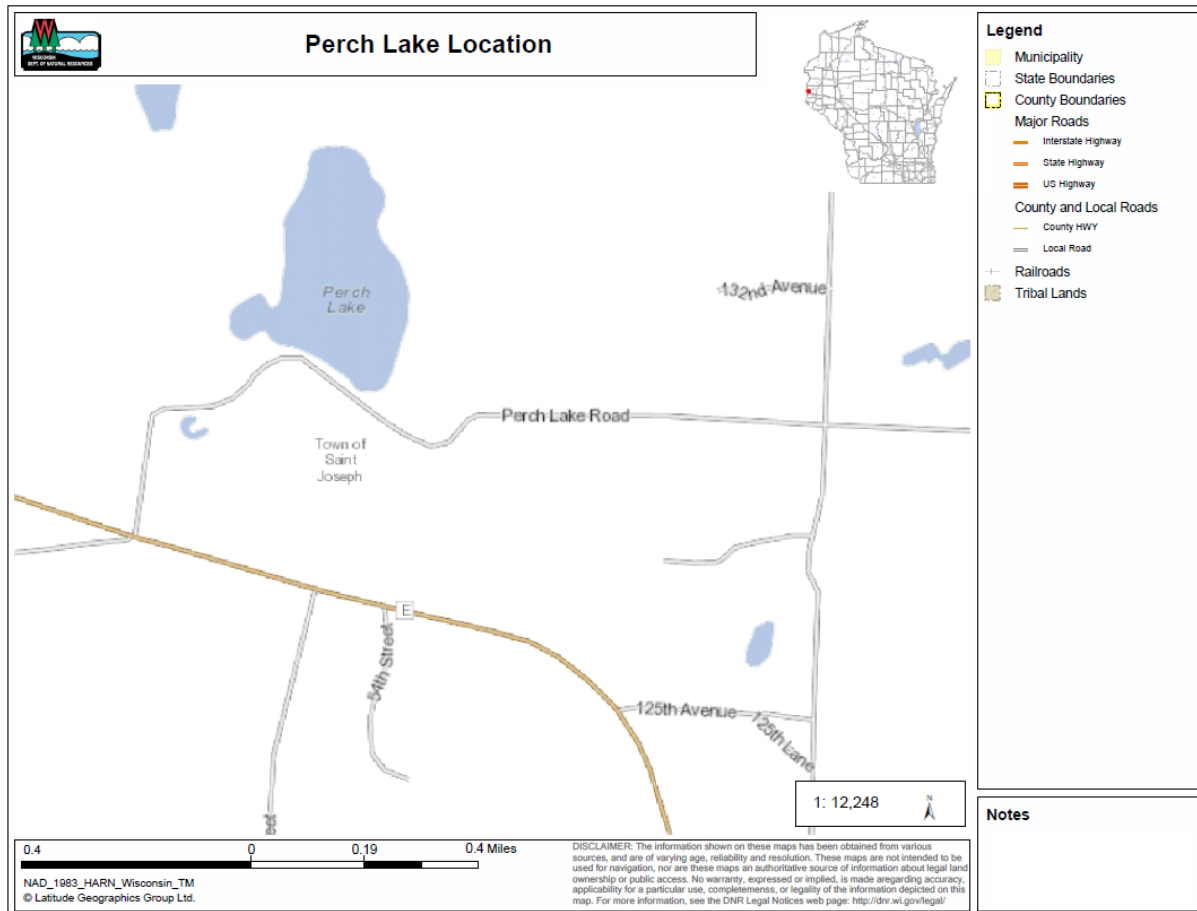


Figure 3. Perch Lake Location

¹ Digitized from 2015 aerial photo. Personal communication Brett Budrow, St. Croix County. May 2016.

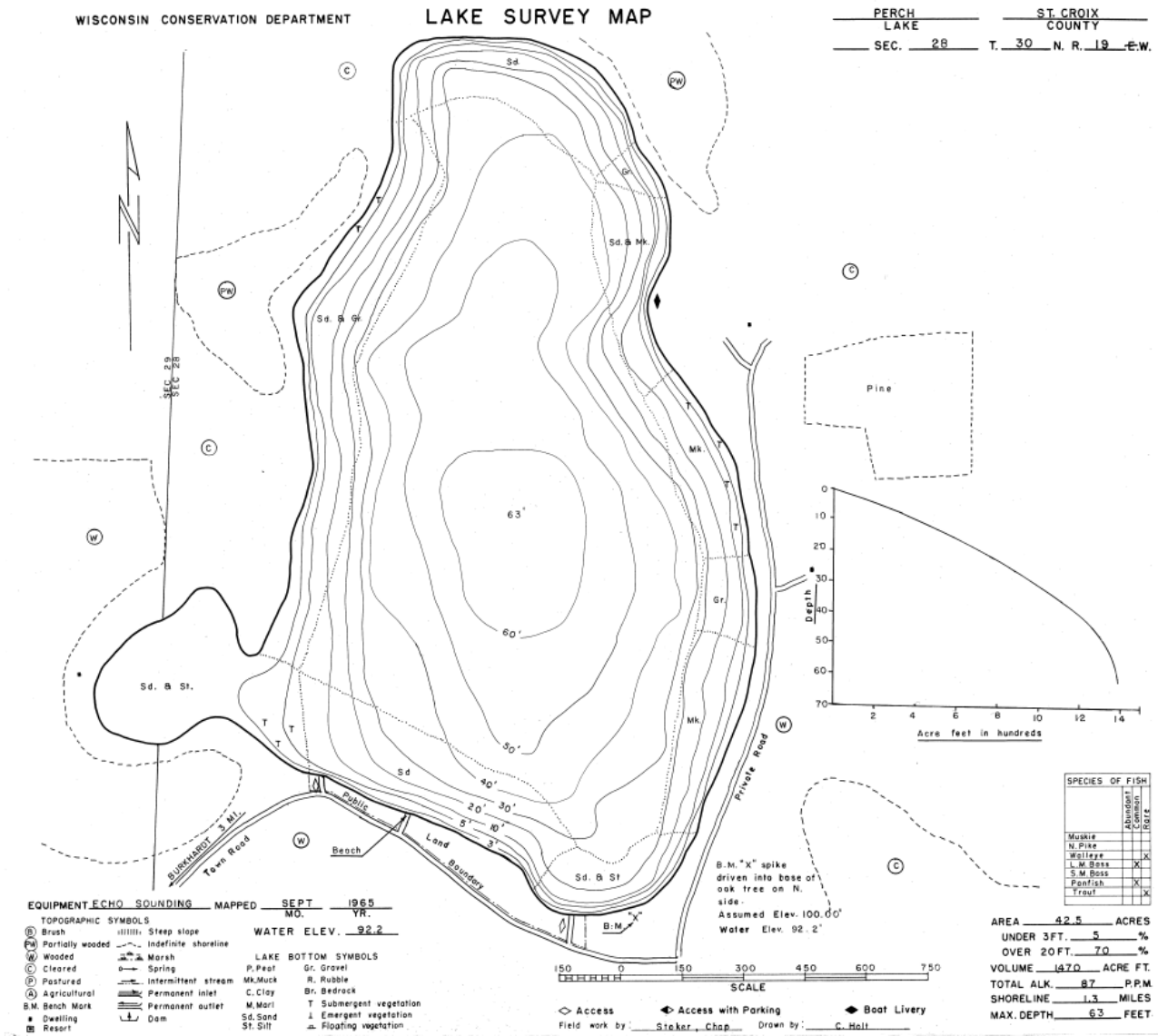


Figure 4. Perch Lake Contour Map

Lake Use

Most current lake use comes from visitors to either St. Croix County Homestead Parklands at the north end of the lake or the Town of St. Joseph Boat Landing at the south end. Gas motors are not allowed on the lake according to town ordinance (Chapter 123).

The watershed public opinion survey asked questions about lake use. Two-thirds of respondents view Homestead Park as an enhancement to their recreational experience at Perch Lake. Nearly half of respondents said the boat landing detracts from their recreational experience at Perch Lake. However, there was little agreement regarding what to do about the landing aside from increasing law enforcement patrols.

Homestead Parklands

Homestead Parklands is an 80 acre county park and a prominent feature of the Perch Lake shoreline and watershed. In 1996 St. Croix County purchased 67 acres from the Seim family forming the basis of Homestead Parklands. The Seims owned the land for over 100 years. Part of the land was farmed through the 1960's. A private park and campground with beach, roads, and other facilities was developed beginning in the 1930's. In 1997 the county purchased the Onstott property to the south, completing Homestead Parklands.²

St. Croix County established a conservation easement on the portion (9.2 acres) of the Onstott property not included in Homestead Parklands in 1998, and then resold the property. The easement includes restrictions for building of structures and removal of vegetation in steep areas closest to the lake. Some vegetative disturbance is allowed in this zone to allow access to the lake. In areas further from the lake, structure heights were limited and construction site erosion plans were required. The area furthest from the lake with existing structures included limits for the number of animals and a requirement for a vegetative filter strip below where animals are present. A WDNR Lake Protection Grant provided a portion of the funds for the property and conservation easement purchases.

The park land management plan guided development and management of the park. The goal of the land management plan was to protect and improve the health and diversity of its natural resources while providing opportunities for county residents to enjoy recreation activities that are compatible with its high quality resources. Park facilities and roads were located where they would have the least impacts from erosion and sedimentation. Infiltration areas were created to capture water which flows toward the lake. Restoration of native plant communities such as oak savanna, prairie, woodland, and shoreland, and control of invasive species were emphasized in the plan.³

Park facilities now include a handicapped fishing pier, shoreline fishing access, swimming beach, picnic areas, canoe and boat rental, playground, and trails for hiking and cross-country skiing. SCUBA divers use the lake for recreation and training. There are four educational kiosks in the park. A park map is included as Figure 5.⁴

² St. Croix County Outdoor Recreation Plan 2013.

³ Land Management Plan for Homestead Parklands. 1998.

⁴ St. Croix County Outdoor Recreation Plan. 2013.

The park is staffed with one full time and six seasonal staff. Staff members are present at the park from May 1 through October 31. Park visitation is limited by the number of parking spaces available which total 71. On warm summer days, park capacity is frequently reached, and potential visitors are turned away. St. Croix County Parks Department vehicle entry fee is \$8 per day or \$28 annually.⁵

Table 1. Homestead Parklands Visitation⁴

	2013	2014	2015
Vehicles	10,829	10,964	13,090
Estimated Visitors	37,901	38,375	45,816

The Friends of Perch Lake is a non-profit 501(C)(3) organization of volunteers dedicated to providing environmental educational opportunities and the eventual development of a learning and reception center at Homestead Parklands. The group distributes an annual newsletter which is available on line.⁶

⁵ Personal communication. Justin Townsend, St. Croix County Park Manager. 2016.

⁶ http://www.friendsofperchlake.com/about_us.html

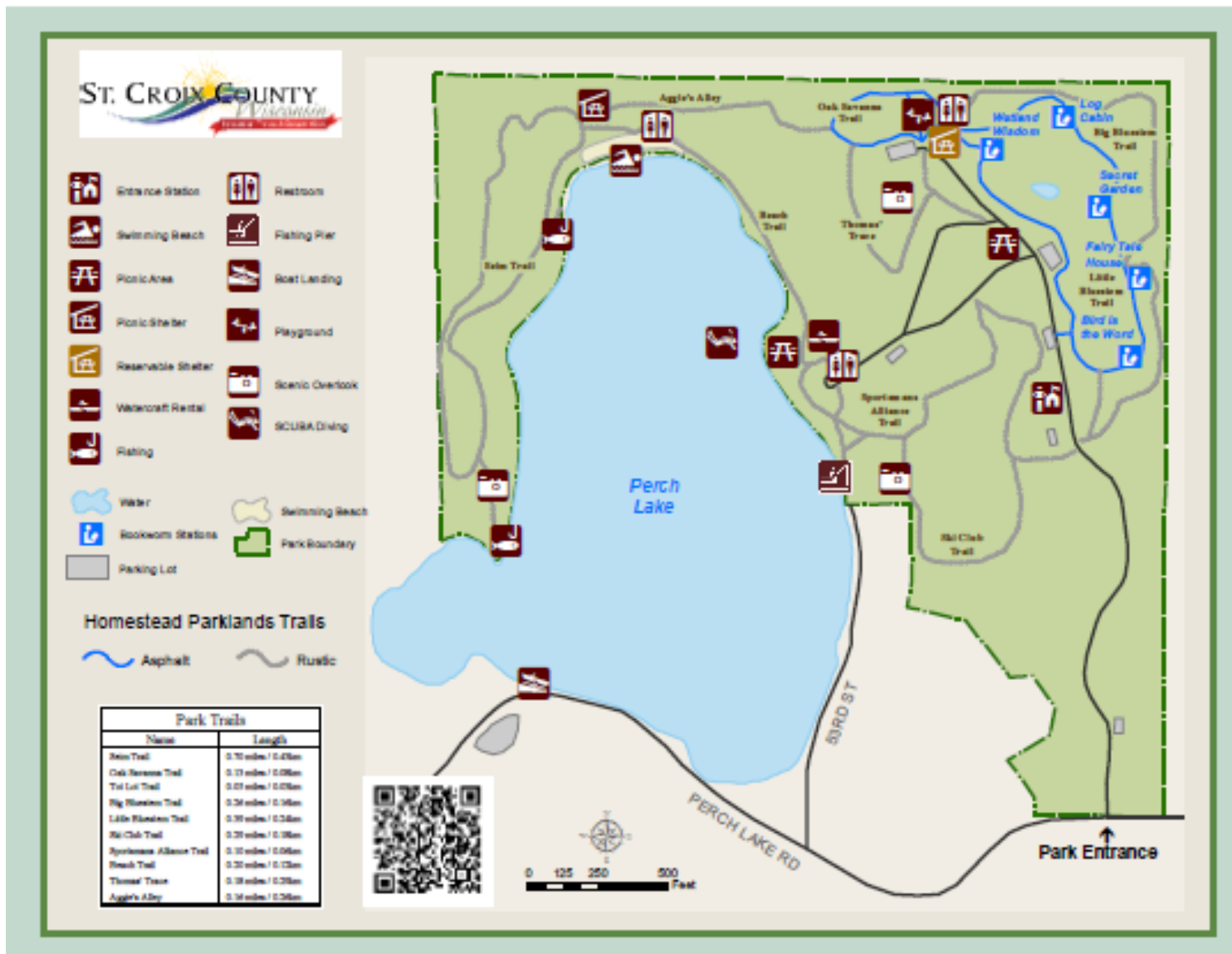


Figure 5. Homestead Parklands Map

Town of St. Joseph Boat Landing

The boat landing is at the south end of the lake (Figure 5). A parking area owned by the Town is located just across Perch Lake Road about 280 feet to the southwest. Parking is not allowed along Perch Lake Road. Although counts are not available, lake residents report heavy summer use for swimming, picnicking, launching watercraft, and socializing. There is no charge to use the boat landing or parking area.



Figure 6. Summer Use at the Boat Landing

The boat ramp is in close proximity to the road, and the road right-of-way extends to the lake. Due to high water in the past the town road was raised substantially resulting in a very steep, unpaved (gravel) boat access within the town road right-of-way. These conditions make launching a boat directly from a car/trailer unit difficult or impossible without 4 wheel drive. The public opinion survey illustrated largely divided opinions among watershed residents regarding boat landing improvements. Boat landing users are not included in these results. The highest level of agreement was for regular patrol by law enforcement (64% agree) and using fines and citations to enforce illegal parking (58% agree). Half of respondents agreed with providing more amenities such as garbage cans and bathrooms and designating the boat landing as carry-in only.

There was no majority opinion with respect to abandoning the current boat landing and constructing a boat landing at a different location. The largest percentage (44%) agreed, but this was less than a majority. The remaining opinions were equally split between those who favored a new site (28%) and those who had no opinion (28%).

About half of respondents said they disagree with providing more signage to prohibit illegal parking, while 33% agreed and 20% had no opinion.

The Town of St. Joseph Parks, Recreation, and Trail Committee generally meets at 6 p.m. on the third Wednesday of each month at the St. Joseph Town Hall.

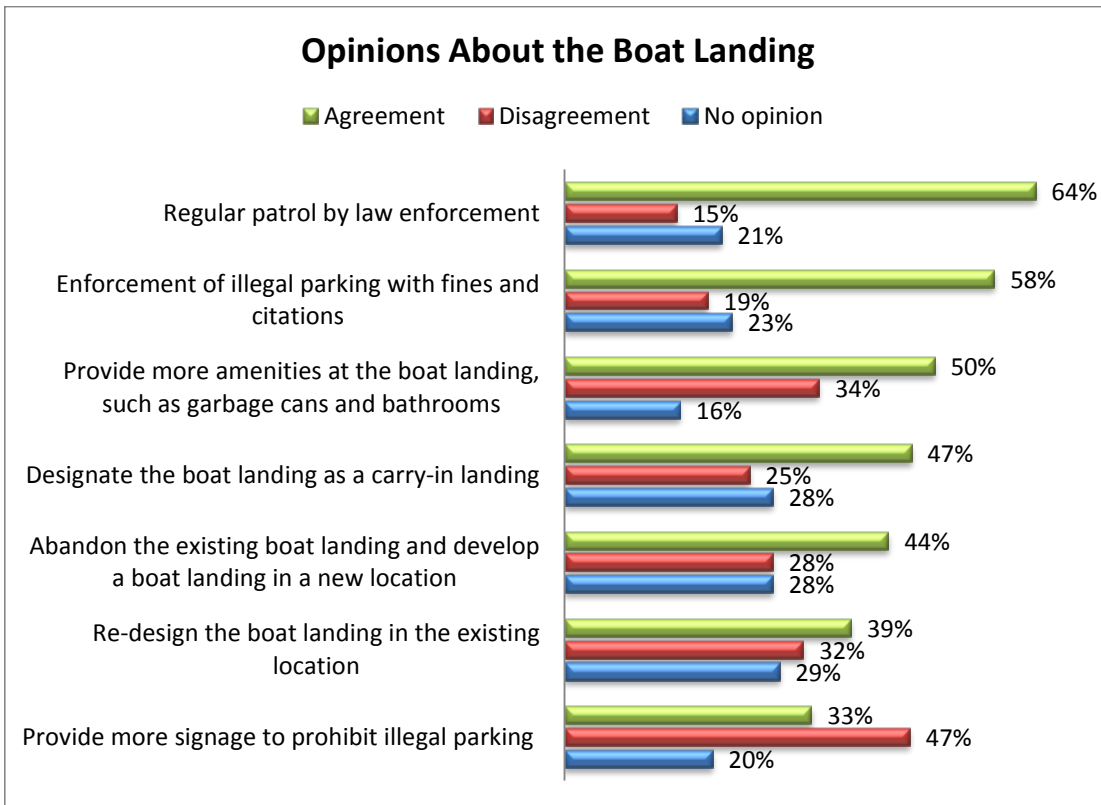


Figure 7. Watershed Owner Opinions Regarding the Boat Landing

Water Quality Information

Historical Information

Lake sediment cores provide historical information about land use and impacts to the lake from these uses over many decades. Results of a sediment core taken from Perch Lake were reported in 2012. Analysis of core results suggests that phosphorus concentrations at the present time are similar to historical levels, and perhaps just slightly higher. Phosphorus is the limiting nutrient that governs algae growth in most Wisconsin lakes.

Lake Monitoring Results

Little water quality monitoring data is available for Perch Lake. Volunteers collected data in 1991-1993, 1995, 2004, and 2007 with only secchi depth consistently collected. Results showed generally good to excellent water quality.⁷

The 2014 WDNR aquatic plant management report noted a decrease in the maximum rooting depth and the percent of the littoral zone with vegetation from previous surveys. The report suggests that declining depth of plant growth may have resulted from decreased water clarity caused by increased runoff from above average rainfall in 2014.⁸

Recent water sample results found the lake to have very low phosphorus and chlorophyll levels as shown in Table 2. Chlorophyll is an indicator of algae growth. The average total phosphorus during this recent monitoring period was .006 mg/L. Past growing season averages were similar with .0074 mg/L in 1993, .0106 mg/L in 1995 and .010 mg/L in 2004 (Figure 8). These values would classify Perch Lake as an oligotrophic or low-nutrient lake with a very low amount of algae growth.

Table 2. Perch Lake Total Phosphorus (P) and Chlorophyll (Chla) (2015 and 2016)

Date	Total P (mg/L)	Chla (ug/L)
8/27/2015	<0.005	2.36
9/10/2015	0.006	3.08
9/29/2015	0.006	2.32
10/22/2015	0.005	2.90
<hr/>		
5/27/16	0.008	1.87
6/20/16	0.01	8.90
7/25/16	<0.005	3.60
8/23/16	0.008	5.99
AVERAGE	.006	3.88

It is strongly recommended that Perch Lake volunteers participate in Wisconsin DNR Citizen Lake Monitoring. Secchi monitoring can be conducted beginning in 2016 and expanded

⁷ Wisconsin Department of Natural Resources. Citizen Lake Monitoring Data. <http://dnr.wi.org/lakes/CLMN/>

⁸ WDNR. July 2015.

monitoring including total phosphorus and chlorophyll can hopefully be added to the citizen monitoring program for Perch Lake in 2017.

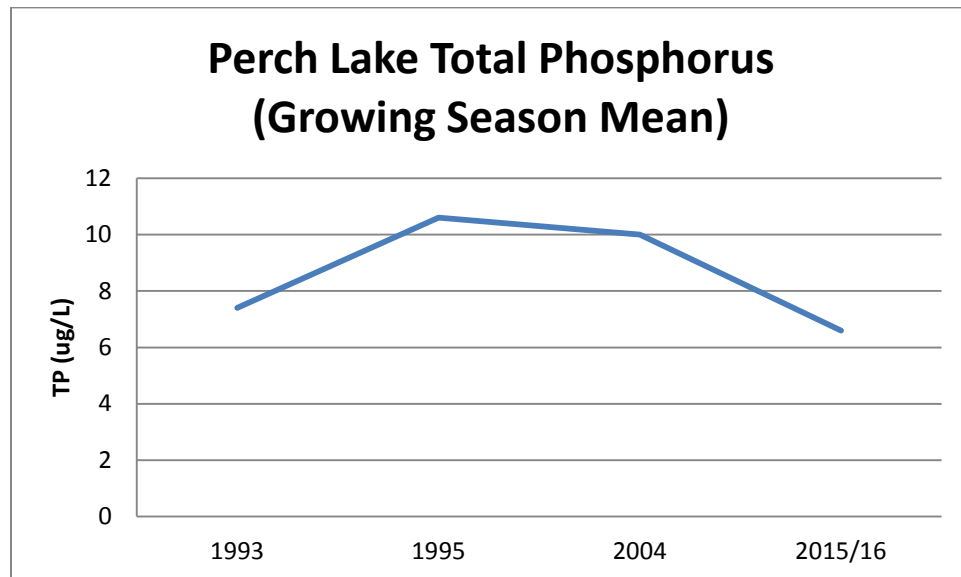


Figure 8. Perch Lake Total Phosphorus

For those unfamiliar with lake management related to water quality, Appendix C. *Understanding Lake Information* is recommended reading.

Lake Levels

High lake levels may influence lake water quality. In previous periods of high water levels, there was increased shoreline erosion (such as during the inventory for the St. Croix Lakes Priority Watershed project). High water levels also led to changes in road height near the Town of St. Joseph boat landing and increases in trail height along the lakeshore in Perch Lake Homestead Parklands. As water levels change, niche habitat can be provided for Eurasian water milfoil.

Ongoing lake level monitoring is recommended to better understand lake water quality trends. St. Croix County currently has permanent water level recorders installed in Perch Lake.

Watershed

Paul McGinley from the University of Wisconsin – Stevens Point Center for Watershed Science and Education modeled phosphorus in Perch Lake as part of this lake management plan. In order to better understand existing lake nutrient levels and potential influences on future water quality, they developed water and phosphorus budgets and modeled lake conditions.

The Perch Lake watershed - the surface area that drains to the lake - is about 140 acres. It is illustrated in Figure 9. Land cover in the watershed is described in Table 3. Land cover determines how much runoff flows to the lake and the levels of nutrients that are carried. Phosphorus loading estimates from the Perch Lake watershed are extremely low.

An advisory committee member raised concerns about the impact recreational use might have on lake water quality. Perch Lake Homestead Park encompasses most of the recreational land in the watershed. The park development included stabilization of eroded areas and restoration of natural vegetation. So in this respect, the Perch Lake watershed has low loading rates because the recreational area has precluded other types of development which may have had greater negative impacts on the lake.

Table 3. Perch Lake Watershed Land Cover and Phosphorus Loading

Land Cover	Acres	% of Land	Est. P Loading/Acre	Total P Loading
Agriculture	3.80	2.7	0.28	1.1
Forest	104.68	75.0	0.02	2.1
Grassland	5.89	4.2	0.02	0.1
Linear Edge Features	1.24	0.8	0.52	0.6
Pastures	1.05	0.7	0.28	0.3
Savanna/Shrubs	5.60	4.0	0.02	0.1
Residential	17.29	12.4	0.52	9
Totals	139.55	100.00%		13.3

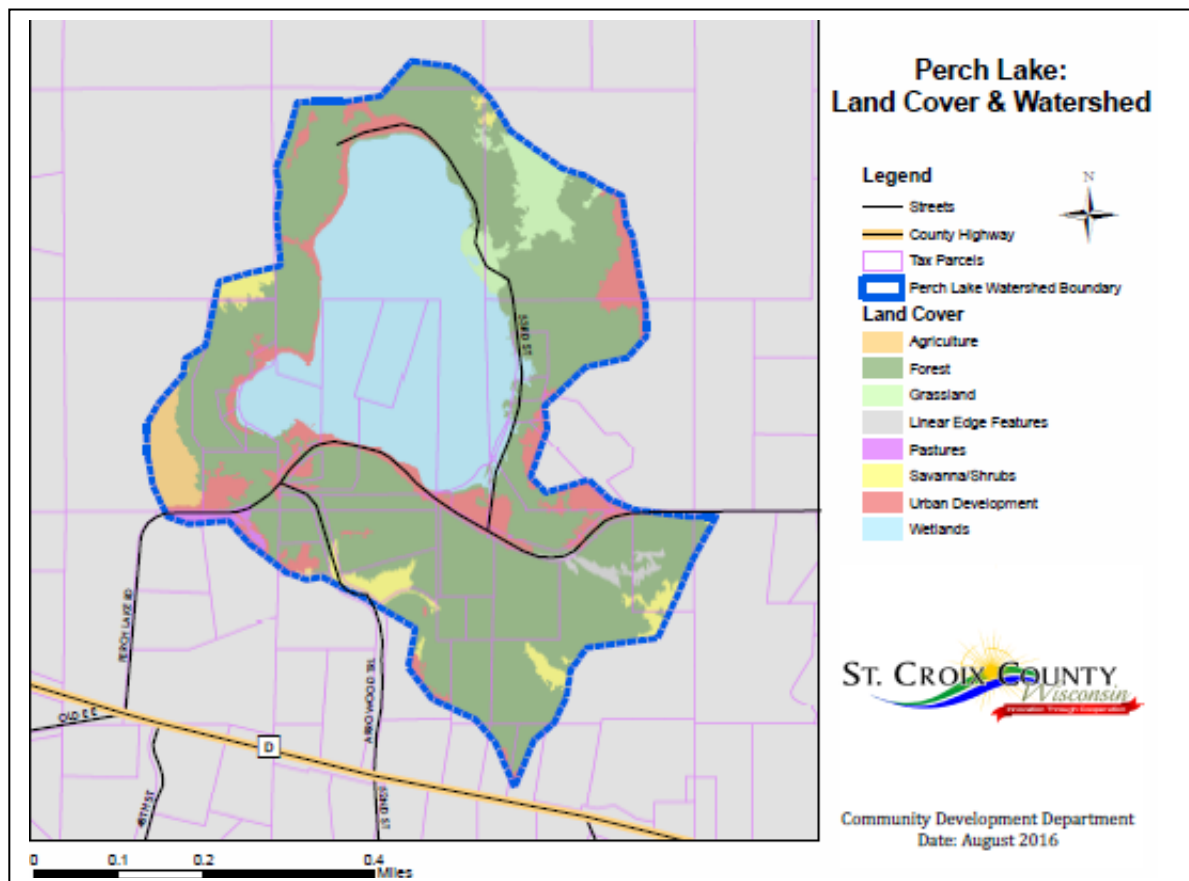


Figure 9. Perch Lake Watershed

Another recreation concern raised is the lack of restroom facilities at the town boat landing which may lead to people urinating in the lake. This could be a water quality concern. McGinley estimated there could be as much as an additional 2 pounds of phosphorus entering the lake from this source.⁹

The area of contributing groundwater is larger than the surface water watershed as shown in Figure 10. In fact, the water quality model estimates that more nutrients come from groundwater than surface water. Table 4 summarizes phosphorus contributions to Perch Lake.

Table 4. Phosphorus Loading to Perch Lake

Watershed	13	lb/year
Groundwater	58	lb/year
Atmospheric	16	lb/year

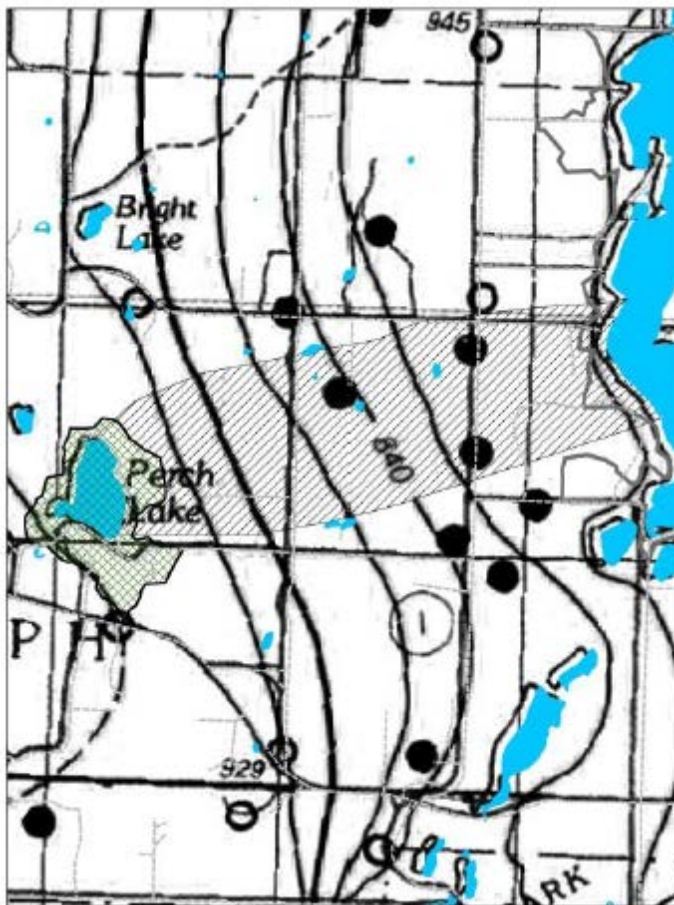


Figure 10. Perch Lake surface water (crosshatch) and groundwater (simple hatch) contributing areas. The background is the water table contours from Borman (1976).

⁹ 500 mg/l (Rubio-Rincon et al., 2014. Seawater for phosphorus recovery from urine. Desalination 348:49-56.)
 Assumptions: (0.5 liter/person)*(0.5 g/liter, that's 500 mg/l)*(20 people/day)*(180 day/year) = 900 gram/year or ~ 2 pounds P per year.

Water Quality Modeling

The water quality model allows predictions of lake water quality based on changes to watershed loading. Perch Lake water quality is currently excellent with low nutrient levels. As described previously, measured total phosphorus in 2015/16 averaged .006 mg/L (6.6 micrograms / L). The water quality model predicted very small changes with either decreases or increases in watershed loading. These predicted changes all result in a low nutrient or oligotrophic lake with very clear water.

Table 5. Predicted Changes in In-Lake Phosphorus with Watershed Changes

Watershed Loading	-20%	-10%	0	+10%	+20%	+30%	+40%	+50%
In-lake TP¹⁰	-3%	-2%	0	+1%	+2%	+4%	+5%	+7%
Predicted TP (ug/L) based on 2015/16 Ave.	6.4	6.5	6.6	6.7	6.7	6.8	6.9	7.0

¹⁰ Using predicted percentage changes with Seepage Settling Velocity Approach from Ianaiev and McGinley. 2016.

St. Croix Lake Cluster Priority Watershed Project

The St. Croix Lakes Cluster Priority Watershed Project plan was completed in 1997, and funding was available through 2009. Funding provided support for technical assistance and installation of best management practices to meet plan goals.

Best management practices installed:¹¹

Homestead Park

Shoreline Stabilization: \$60,000

Shoreland Habitat Restoration: \$1,490

Mackmiller Property

Shoreland Habitat Restoration, \$5,706

Town of St. Joseph Boat Landing/Gavin

Water Diversions/Culverts and Fence

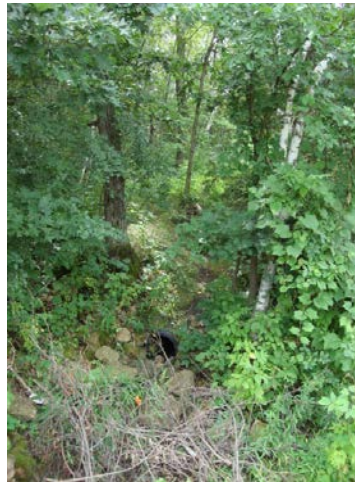


Figure 11. Hillside before and after water diversion and fence were installed at the boat landing

¹¹ Priority watershed tracking spreadsheet. St. Croix County.

Natural Communities

The Perch Lake Parklands Management Plan provides a background of natural communities and soils in the watershed. John Curtis identified western St. Croix County as the Oak Savanna Area-"Oak Openings Subtype" in *Vegetation of Wisconsin*. The oak savanna vegetation community includes scattered groves and small groups of bur oaks (*Quercus macrocarpa*) with an understory of prairie grasses and flowering plants. Curtis notes that in this region of Wisconsin, the "oak openings" landscape also included groves or woodlands of black oaks (*Quercus velutina*) particularly on sandy soils. Typical grass species in the oak openings included big bluestem, little bluestem, and sideoats gramma. Typical flowers included leadplant, prairie coreopsis, bergamot, and a variety of asters and sunflowers.

The oak savanna landscape was historically maintained by regular fires. Many of these were natural, set by lightning in dry grasses. Fires were also set by native peoples. In lower areas, on cooler north slopes, and on the lee side of lakes and wetlands, fires burned less frequently and woodlands grew more thickly. These oak woodlands included black, white, and bur oaks with a variety of understory shrubs, ferns, and flowering plants including hazelnut, juneberry, grey dogwood, Virginia creeper, wild geranium, wild sasparilla, Pennsylvania sedge, bracken fern, and woodland sunflower.¹²

Soils and Slopes

Watershed soils include the Burkhardt-Chetak-Sattre complex (sandy loam), Chetak-Onamia complex (sandy loam), and Emmert loamy sand.¹³ These soils are well drained to excessively drained. Disturbance can easily cause erosion on these soils. They require protection during construction and permanent vegetative cover to prevent erosion. These soils infiltrate runoff easily, but are limited for septic field use, as water and pollutants can rapidly move through the soil to lakes and other water bodies.¹⁴

The watershed contains large areas with slopes greater than 20 percent (Figure 12). Such slopes are highly limited for development. The St. Croix County General Zoning Ordinance requires the following when construction or land disturbance activities occur on:

- Slopes 12 to 19% affecting more than 10,000 square feet
 - ✓ Erosion control plan
- Slopes 20 to 24.9% or slopes 25 to 29.9% (public improvements only)
 - ✓ Erosion control plan
 - ✓ Stormwater management plan (performance standards described in Wisconsin Administrative Code NR 151 must be submitted and recorded with the St. Croix County Register of Deeds)
- Slopes 25% or greater with the slope measured over a horizontal distance of 50 feet (except public improvements to 29.9%)
 - ✓ Construction and land disturbance prohibited.

¹² Land Management Plan for Homestead Parklands. 1998.

¹³ <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

¹⁴ Land Management Plan for Homestead Parklands. 1998.

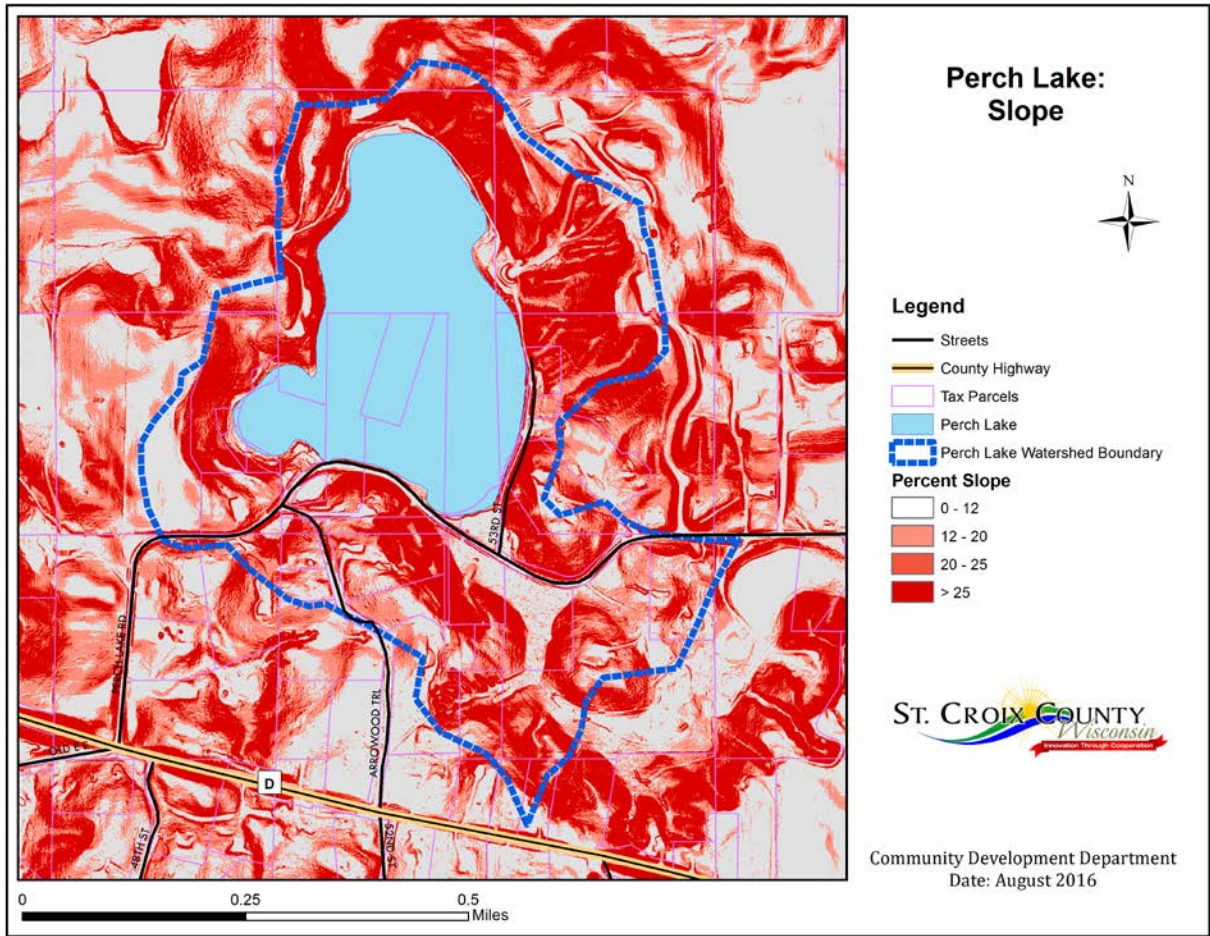


Figure 12. Perch Lake Watershed Slope Map

Water Quality Protection Tools

Regulations

Regulations that apply to new development and re-development provide opportunities for water quality protection and improvement.

The advisory committee reviewed potential development within the watershed, and identified properties that might be available for redevelopment. This information is available for project implementation.

St. Croix County Ordinances

http://www.co.saint-croix.wi.us/index.asp?Type=B_LIST&SEC={D1648D84-3ECE-4FC7-85BC-D55386B8D210}

Chapter 13. Land Division

The St. Croix County Land Division ordinance has more restrictive stormwater requirements than state NR151 requirements. There are no current plans for revisions.

Chapter 17. Zoning

Growth management funds provide opportunity to revise entire zoning code and incorporate MIDS (minimum impact development standards used in MN). Provisions that protect lakes might be incorporated into general zoning standards rather than shoreland standards.

Subchapter 1. General Provisions

Subchapter 2. General Zoning

The zoning ordinance includes limitations and requirements for construction on steep slopes as described previously. Stormwater standards in the ordinance are from NR 151.12. They include post-construction performance standards for new development and redevelopment

Total Suspended Solids

80% TSS for new development

40% TSS for redevelopment

Peak Discharge

Pre and post development (2-year, 24-hour storm)

Infiltration (Residential)

25% of the 2-year storm

Shoreland Zoning

Changes to state regulations require updates to shoreland zoning provisions. These changes will limit lake protection currently in the county ordinance.

- June 2016 update planned to address boathouses

- October 2016 update planned to reflect limits instituted by the State of WI in Act 55 and Act 167

Town of St. Joseph Ordinances

<http://www.ecode360.com/SA1784>

Chapter 168. Subdivision of Land

The ordinance establishes a 3-acre minimum lot size.

Chapter 149. Roads, driveways and trails erosion and sediment control and right of way construction

Conservation Easements

A conservation easement is a restriction placed on a piece of property to protect its associated natural resources. Conservation easements can have provisions to restrict development and protect vegetation on the shoreline and in the uplands, among other provisions, in order to protect its associated natural resources. They can be donated or purchased. Easements can be held by land trust organizations or government entities. Conservation easements are a tool that can be used for permanent water quality protection for Perch Lake.

The Town of St. Joseph Comprehensive Plan (Draft September 2016) identifies Natural Resource Corridors north and west of Perch Lake. The Town Subdivision Ordinance includes use of conservation easements and set asides to protect these areas now called Preservation Residential areas. In Preservation Residential areas, primary conservation areas (168.18(a)) are required to be set aside from development and be preserved through deed restrictions, conservation easements or other permanent conservation restrictions, limiting their use and development.

Best Management Practice Installation

Restoration of natural shorelands and reduction of runoff from shoreland property is included in many lake management plans to meet goals of restoring habitat next to the water and reducing runoff of nutrients and sediment from waterfront properties. A range of management actions are available to implement including the following:

- Information and Education
- Demonstration Projects
- Recognition
- Technical and Design Assistance
- Incentives such as Cost Sharing Installation

Areas of potential erosion and runoff concern were identified by advisory committee members. These sites could be reviewed and corrected during initial plan implementation. Watershed survey results indicated that residents are willing to consider installation of best management practices. Three-fourths of respondents are likely or very likely to install best management practices on their property to maintain or improve Perch Lake water quality.

Perch Lake Fishery

There are a variety of game fish in Perch Lake. Trout are abundant and panfish and largemouth bass are common. Perch Lake is a 2-story fishery with game fish in warmer, upper waters and trout in cold, deeper water. According to WDNR fisheries biologist Marty Engel, panfish growth is somewhat slower than normal but past records show quality sized fish are present. Bass growth is slow with small bass overly abundant. Although bass growth is slow, some of the largest bass surveyed in the county come from Perch Lake. Bass over 14 inches are scarce.¹⁵

The WDNR stocks rainbow trout in Perch Lake annually. Stocking data in Table 6 below includes year and, in some cases, length and type of fish stocked.

Table 6. WDNR Rainbow Trout Stocking

Year	Age Class	Number	Average Length (In)
2014	YEARLING	2,838	9.37
2013	YEARLING	2,061	9
2012	YEARLING	1,500	9
2011	YEARLING	1,750	9.2
2010	YEARLING	5,400	9.5
2009	ADULT (BROODSTOCK)	229	12
2009	LARGE FINGERLING	3,300	6.2
2009	YEARLING	912	9.2
2008	YEARLING	4,480	9.1
2007	YEARLING	4,180	9.8
2006	YEARLING	3,868	9.13
2003	YEARLING	6,925	8.17
2002	YEARLING	4,006	8.73
2001	YEARLING	3,500	8.4
2000	YEARLING	2,625	9
1999	YEARLING	4,079	9.15
1998	YEARLING	3,500	8.7
1997	YEARLING	3,500	9.5
2011	ADULT (BROODSTOCK)	169	16.7
1996	YEARLING	2,000	9.3
1995	YEARLING	1,400	9.3
1994	YEARLING	3,500	7.8
1993	YEARLING	5,790	9.5

¹⁵ Marty Engel. Review notes to lake management plan. April 2016.

Table 6. Rainbow Trout Stocking (Continued)

Year	Age Class	Number	Average Length (In)
1992	YEARLING	3,500	9
1990	YEARLING	6,500	9
1989	YEARLING	3,500	7
1988	YEARLING	3,500	7
1987	YEARLING	16,050	7.67
1986	YEARLING	3,500	7.5
1985	YEARLING	3,500	11
1984	YEARLING	3,500	9
1983	YEARLING	3,500	9
1982	ADULT	750	
1982	YEARLING	1,750	
1981	YEARLING	3,500	
1980	YEARLING	5,000	
1979	YEARLING	3,500	
1978	YEARLING	3,500	
1977	ADULT	370	
1977	YEARLING	3,500	
1976	YEARLING	3,500	
1975	YEARLING	3,500	
1974	YEARLING	3,500	9
1973	YEARLING	3,500	9
1972	YEARLING	3,500	9

Aquatic Plants

Native aquatic plants provide important functions in lakes. They provide a diversity of habitats, help maintain water quality, stabilize shorelines, sustain fish populations, and support common lakeshore wildlife such as loons and frogs.¹⁶

Aquatic plants grow deeply in Perch Lake because of very clear water. Plant surveys in 2012 – 2014 found plants growing to a maximum depth of 19 to 23 feet. Between 72 and 85 percent of the littoral zone of the lake (the area where plants grow) was vegetated. Most of this vegetation was submergent (under the lake surface) and growing in mucky sediments. Since the lake drops off steeply except for along the south shore, vegetation is found in a narrow zone around the lake.

Aquatic Plant Surveys

Aquatic plant surveys were conducted according to standard point intercept methods in 2012, 2013, and 2014. The report provides a species list and maps and statistics for each species. Littoral zone information includes the percentage of plants at each depth zone and sediment types. The report also provides community assessment results compared to other lakes in the North Central Hardwoods region and the state of Wisconsin.

Report conclusions (verbatim from report discussion):

- Perch Lake has an average aquatic plant community compared to Wisconsin lakes and lakes in the North Central Hardwood region.
- Twenty-four species were found over the three surveys. *Potamogeton robbinsii* was the dominant species during all surveys. *Myriophyllum spicatum* (EWM) was subdominant in 2012 and 2013 and *Brasenia schreberi* was subdominant in 2014.
- Four sensitive species were found during the surveys; *Potamogeton illinoensis*, *P. robbinsii*, *P. zosteriformis* and *Ranunculus aquatilis*.

The WDNR completed aquatic plant surveys using transects (rather than the point intercept method) in 1993 and 2004. Plants grew to 21 feet during these surveys. Changes observed in the plant community included declines of five sensitive species, disappearance of emergent plants (which subsequently were found in 2012-2014 surveys), and loss of three submergent plant species. Fluctuating water levels, declining water clarity, and the introduction of Eurasian water milfoil (EWM) were given as potential reasons for these changes. DNR staff located EWM for the first time in Perch Lake in 2004. EWM was not common, and where found, it grew in low densities.¹⁷

¹⁶ *Through the Looking Glass*. Borman et al. 1997.

¹⁷ WDNR. 2005.

Invasive Species¹⁸

When non-native plants, animals, or pathogens rapidly take over a new location and alter the ecosystem, they are considered invasive species. Invasive species can sometimes take over and spread rapidly and widely causing major harm to the native ecosystem or humans. One of the reasons that invasive species are able to succeed is that they lack natural predators and competitors. Without these checks and balances, they are able to reproduce rapidly and out-compete native species.

Invasive species can alter ecological relationships among native species and can affect ecosystem function, economic value of ecosystems, and human health. Humans have created conditions where plants and animals can aggressively invade and dominate natural areas and water bodies in three ways:

- introducing exotic species (from other regions or countries);
- disrupting the delicate balance of native ecosystems by changing environmental conditions -- e.g., stream sedimentation, ditching, building roads or restricting or eliminating natural processes such as fire; and
- spreading invasive species through various methods:
 - moving watercrafts between waterbodies without removing invasive plants and animals;
 - carrying seeds of invasive plants on footwear or pet fur;
 - mowing along roadsides;
 - importing firewood and leaving in campgrounds;
 - driving and biking with invasive seeds in tire treads.

The net result of invasive species spread is a loss of diversity of native plants and animals. About 42 percent of the species on the Federal Threatened or Endangered species lists are at risk, primarily because of invasive species.

Eurasian Water Milfoil

Eurasian water milfoil is an invasive, submersed aquatic plant native to Europe, Asia, and northern Africa. It is the only non-native milfoil in Wisconsin. Eurasian water milfoil grows best in mucky sediments. It has a history of becoming dominant in nutrient-rich lakes, although this pattern is not universal. In less productive lakes, it is restricted to areas of nutrient-rich sediments. It is an opportunistic species that prefers highly disturbed lake beds, lakes receiving nitrogen and phosphorous-laden runoff, and heavily used lakes.

Once established in an aquatic community, milfoil reproduces from shoot fragments and stolons (runners that creep along the lake bed). As an opportunistic species, Eurasian water milfoil is adapted for rapid growth early in spring, and can form a dense leaf canopy that shades out native aquatic plants. Its ability to spread rapidly by fragmentation and effectively block out sunlight needed for native plant growth often results in single-species stands. These stands of Eurasian

¹⁸ Information from the Wisconsin Department of Natural Resources web site: <http://dnr.wi.gov/topic/Invasives>

milfoil provide only a single habitat and can disrupt predator-prey relationships by fencing out larger fish and reduce the number of nutrient-rich native plants available for waterfowl.

Dense stands of Eurasian water milfoil also inhibit recreational uses like swimming, boating, and fishing. Cycling of nutrients from sediments to the water column by Eurasian water milfoil may lead to deteriorating water quality and algae blooms in infested lakes.¹⁹

Eurasian Water Milfoil Control

Milfoil weevils were raised by Beaver Creek Reserve and stocked into Perch Lake in 2013 and 2014 as a biocontrol tool for EWM. During this time, volunteers raised over 20,000 weevils and put them into Perch Lake. 2014 records showed weevil damage evident in 22-42% of stem samples collected in EWM beds, depending on bed. Weevils were present at a rate of 0.24 N/stem. Control has been documented (Newman) at as low as 0.22 N/stem. EWM had decreased significantly in 2014. 2015 samples are still being processed and vouchered.²⁰

Current plans are for WDNR Water Resources staff to continue to conduct aquatic plant surveys on an annual basis to monitor the effectiveness of the milfoil weevils as a biocontrol of EWM. It is not certain how long this support will continue.

¹⁹ Taken from WDNR, 2008 <http://www.dnr.state.wi.us/invasives/fact/milfoil.htm>

²⁰ Thorstenson, Amy. Golden Sands Resource Conservation & Development Council, Inc. *Email communication*. November 2015.

Preventing Invasive Species

There are five major methods to prevent invasive species: education to lake users, Clean Boats Clean Waters program, landing surveillance cameras, lake monitoring, and a rapid response strategy for any new invasive species.

Education to Lake Users

Education efforts focus on identification and prevention of new invasive species. Activities might include aquatic invasive species (AIS) information presented at annual meetings and workshops, signage at the public landings and private boat launch areas, lake maps and brochures with AIS messages, and web site and newsletter information.

Clean Boats Clean Waters (CBCW) Program

Clean Boats Clean Waters educators provide boaters with information on the threat posed by Eurasian Milfoil and other invasive species. They offer tips on how to keep boats, trailers, and equipment free of aquatic hitchhikers. They also collect information on boater behavior, concerns, and knowledge of existing local and state laws related to anti-AIS measures.

Landing Surveillance Cameras

Some lake organizations use video cameras at public landings to record landing activity. Videos are reviewed, and if watercraft are launched with vegetation attached, action is taken. Violations of a state rule which prohibits transporting and launching boats and trailers with vegetation attached can be enforced by local law enforcement officers. The camera also serves as a reminder for boaters to check their equipment.

Lake Monitoring

The objective of lake monitoring is to look for new invasive species. Monitoring for invasive species is generally focused around boat landings and other areas of high public use. Trained volunteers or consultants may complete the monitoring. Divers may be used. It is critical to complete aquatic invasive species visual surveys when algae growth is low and visibility is good.

Rapid Response for New Invasive Species

The activity is intended to control any new invasive species that are found in the lake. Rapid response protocols include the following:

- monitoring for invasive species
- education of lake residents and visitors
- contacts to confirm invasive species identification
- procedures for notification
- plans for removal and control
- funding contingencies and grants.

Invasive species information is available on the DNR website <http://dnr.wi.gov/invasives>.

Perch Lake Implementation Plan

Plan Timeframe

This plan covers a ten year time frame. As new knowledge is acquired and events unfold, it will be updated as appropriate.

Implementation Plan Updates

An implementation plan table is found in the following section. The implementation plan or work plan details how action steps will be carried out over the next two year period. A coordinating committee will guide plan implementation. The coordinating committee will update this implementation plan annually in June to keep actions and budgets current.

Coordinating Committee

The Coordinating committee will be initiated and supported by St. Croix County Homestead Park Manager w/assistance from Town of St. Joseph Parks Committee. Initiate and support means: convene meetings, maintain member contacts, develop agenda, select location, and schedule meetings.

Meeting Logistics

- Meet at least quarterly, to every other month
- Coordinate with St. Joseph Parks Committee meetings (3rd Wed. of the month)
- Meet at Town Hall or Homestead Park

Membership

- Include Advisory Committee members and St. Croix County Sportsmen's Club, others?

Funding Plan Implementation

The implementation tables later in this section list potential funding sources for plan implementation.

Grant Sources

The DNR Lake Management Grant Program has two main types of lake management grants: planning and lake protection grants. Lake planning grants are available at two scales – large scale up to \$25,000 and small scale up to \$3,000. Applications are due each year on December 10th. DNR lake protection grants for plan implementation have a maximum grant amount of \$200,000. These grants are due each year by February 1st. Plan activities will be eligible for lake protection grant funds following approval by the DNR.

DNR Lake Planning Grants (up to 67% state share)

Large scale – up to \$25,000

Small scale – up to \$3,000

Applications due December 10th

These grant applications could proceed without final plan approval.

DNR Lake Protection Grants (up to 75% state share)

Up to \$200,000

Requires DNR approval of tasks in the comprehensive plan (allow 60 days)

Applications due February 1st

Aquatic Invasive Species Grants

Department of Natural Resources Aquatic Invasive Species (AIS) grants are available to assist in funding some of the action items in the implementation plan such as plant surveys and weevil monitoring. Grants provide up to 75 percent funding. Applications for AIS control activities are accepted each year with postmark deadline of February 1. Applications for AIS prevention, education, and planning are accepted each year with a postmark deadline of December 10.

Communicating with Watershed Residents

From a list of seven methods, public opinion survey respondents were asked to choose their two most preferred ways to receive information about planning and management activities for Perch Lake. Traditional mail was the most preferred and was chosen by three-fourths of respondents. E-mail messages and meetings were in a statistical tie for second place with 37% and 34% respectively.

A mailing list of watershed residents is available from the survey. There is no practical means to maintain an email list at the present time.

Vision Statement

Perch Lake is a clean, clear, cold water lake. The lake provides safe, tranquil recreational experiences for visitors and residents with little impact on the lake's natural beauty, fish, and wildlife.

Goal: Maintain Perch Lake's exceptional clear, cold water.

Objective A: Allow no net degradation of Perch Lake water quality as measured by no increases in total phosphorus and algae growth.

A comprehensive record of in lake phosphorus and chlorophyll is not available for Perch Lake. 2015/16 mean summer surface TP was 6.6ug/L.

Objective B: Minimize runoff and erosion that carry nutrients, sediment, and other pollutants to the lake.

1. Action: Review St. Croix County and Town of St. Joe ordinances and make recommendations for changes to protect Perch Lake water quality. Low Impact Design standards (LIDs) are recommended for updates to Town and County ordinances. St. Croix County is conducting a comprehensive review of ordinances beginning in 2016, and the advisory committee can encourage water quality protection in these revisions.
2. Action: Identify sites where runoff and erosion are a concern. Implement strategies to control erosion, infiltrate and clean runoff, and control nutrients and sediments. (Examples include where overhead lines are cleared, review of boat landing parking lot stormwater management, road near boat landing, other sites identified on the watershed map.)
3. Action: Encourage consideration of conservation easements to protect undeveloped land (also applies to habitat and natural scenic beauty goals).

Evaluation:

Monitor water clarity (secchi), total phosphorus, and Chla through the WDNR Citizen Lake Monitoring Program. *(Need volunteers, first year will be secchi only St. Croix County will obtain total phosphorus and Chla data in 2016.)*

Monitor lake levels. Updated monitoring equipment including a rain gauge may be needed.

Goal: Protect and improve aquatic and shoreline habitat.

Objective A: Maintain the 2-story fishery with native bass and panfish in shallow areas and stocked trout in cold, oxygenated deep water.

1. Action: Consider implementing a 14-18 inch protected slot size limit (bag limit 3) on bass. Such a regulation would allow harvest of numerous small bass while protecting large bass that can help reduce panfish populations and improve panfish growth rates. (WDNR)

Potential Action: Encourage riparian owners to create woody habitat in the water by leaving fallen trees along shorelines and exposed beach areas.

Evaluation: WDNR (fisheries staff) will conduct comprehensive fishery surveys on a rotational basis. The last fish survey in May 2016 evaluated age and growth of panfish. The survey will be repeated about once every 8 years using a statewide monitoring protocol to show trends and document changes. This data is used to determine if specific fisheries goals are being met. (WDNR)

Objective B: Maintain a buffer of native, unmown vegetation at least 35 feet inland along the shoreline.

2. Action: Develop and implement standards for vegetation management along riparian roads including a policy for the Town of St. Joseph and recommendations for private landowners. Address invasive species removal, road safety, water quality protection, and natural beauty.
3. Action: Provide support for terrestrial invasive species identification and control in shoreland buffer areas.
4. Action: Provide guidance for establishment and maintenance of native vegetation in shoreland buffer areas.

Objective C: Minimize disturbance to native aquatic plant communities.

5. Action: Provide guidance for limiting removal of native plants. Hand removal methods to be used in some circumstances.

Evaluation: Complete point intercept aquatic plant survey monitoring.

Goal: Maintain and enhance natural scenic beauty.

Definition of natural scenic beauty: *Views to and from the lake are tranquil, featuring wildlife, natural vegetation, and clear water. Where development occurs, minimal or screened views of structures are preferred.*

Objective A: Promote the natural character of the lake to maintain and restore the quality of its natural resources.

1. Action: Education activities such as fact sheets and web sites.

Objective B: Naturally revegetate disturbed areas.

2. Action: Provide guidance for native species establishment in upland areas.

Objective C: Maintain undeveloped natural areas.

3. Action: Explain shoreland vegetation protection regulations and rationale.

Objective D: Preserve and enhance the opportunity to observe the beauty of the night sky

4. Action: Encourage behavior: If you install lights, use those that reduce glare in shoreland area.

Goal: Prevent aquatic invasive species introduction and contain and control existing AIS.

Objective A: Keep new aquatic invasive plant and animal species out of Perch Lake. Priority species of concern: rusty crayfish, zebra mussels, water lettuce, water hyacinth, starry stonewort

1. Action: Distribute information regarding AIS prevention steps at Homestead Park and the boat landing (brochures for Homestead kiosk and signs).
2. Action: Distribute information regarding AIS prevention and identification (including photos of EWM and priority AIS species) to lake and watershed residents via direct mail and web references.
3. Action: Coordinate training and volunteer participation in Clean Boats, Clean Waters education and monitoring at the boat landing (*St. Croix County can provide support to a volunteer, but not coordinate the program*)

Objective B: Rapidly respond to the introduction of aquatic invasive species.

4. Action: Complete annual point intercept aquatic plant surveys (which provide random screening for invasive species). (*WDNR, funding may not be available in the future*)
5. Action: Encourage and organize volunteers to complete training to monitor for aquatic invasive species. (*Beaver Creek Reserve, St. Croix River Association, WDNR, St. Croix County, St. Croix Scuba, volunteers*)
6. Action: Follow and annually update an AIS rapid response strategy (see Appendix B) (*St. Croix County*)

Objective C: Monitor Eurasian water milfoil growth.

7. Action: Conduct annual point intercept aquatic plant survey. (*WDNR, funding may not be available in the future*)

Objective D: Assess effectiveness of control with weevils.

8. Action: Annual weevil surveys (*WDNR, funding may not be available in the future*)

Objective E: Maintain EWM at low frequency of occurrence.

9. Action: Control Eurasian water milfoil through hand pulling if weevils are not successful. WDNR to provide guidance on when hand removal is appropriate. Do not hand pull prior to annual weevil monitoring.

Goal. Balance recreational use with preservation of the natural lake environment.

Objectives:

- A. Preserve and enhance public access at designated areas.
- B. Enhance public safety.
- C. Reduce crowding and noise at the boat landing.

1. Action: Review and update town ordinances to address public safety, crowding, and noise at the public boat landing.
2. Action: Encourage the town board to support enforcement at the public boat landing. *Do this either by contracting with St. Croix County Sheriff or adding town constable(s). The Sheriff explained that county resources could be focused as the town wishes with a contract in place. Without a contract they do not have the ability to enforce town ordinances. A contract could also increase Sheriff Department presence in the area.*

Priorities recommended for enforcement (listed in order, top priorities in bold, existing ordinances listed):

- **Disorderly conduct (10) (Chapter 141)**²¹
 - **No loudness (7) (Chapter 141)**
 - **Underage drinking (5) (Chapter 74)**²²
 - **No parking (5) (Chapter 183)**²³
 - No alcohol (4) (Chapter 74)
 - No loitering (4) (Chapter 74)
 - Speed limit (3)
 - No gas motors (2) (Chapter 123)²⁴
3. Action: Improve public access by replacing steps from boat landing parking area to the road.
 4. Action: Maintain garbage cans at the boat landing parking area.
 5. Action: Continue discussions between Town of St. Joseph, St. Croix County, St. Croix County Alliance, lake users, and lake residents regarding potential improvements to the boat landing and parking area. Gather input from lake users to aid this discussion.

²¹ Town of St. Joseph Ordinance Chapter 141. Public Parking Lots and Boat Launches addresses disorderly conduct and noise.

²² Town of St. Joseph Ordinance Chapter 74. Activities on Town Property. Article I. Alcoholic Beverages and Controlled Substances.

²³ Town of St. Joseph Ordinance Chapter 183. Vehicles and Traffic Article I. Parking (183-3-D)

²⁴ Town of St. Joseph Ordinance. Chapter 123. Lakes and Waterways. Article III. Perch and Furgers Lake (No operation of motor boats.)

Note: Additional improvements to the boat landing and parking area were not recommended by a majority of the advisory committee, but there was limited input from lake users.

Objective D: Limit negative impacts to water quality from recreational use.

6. Action: Consider recreational impacts to water quality and natural beauty when management decisions regarding public land are made for the lake. Can a recreational carrying capacity be established for the lake?

Objective E: Maintain Perch Lake as a 2-story fishery with stocked rainbow trout for recreational opportunities.

7. Action: Continue WDNR trout stocking (approximately 3500 stocked annually (WDNR))

Rainbow trout are not native to Perch Lake, therefore stocking is listed as a recreational item. Because long term survival of rainbow trout is somewhat limited, Perch Lake is managed as a put and take trout fishery which allows for liberal harvest before these fish are lost to natural mortality. There is no size limit, and the bag limit is 5.

OUTREACH AND EDUCATION SUMMARY

To Lake and Watershed Residents

Mailings and websites (preferred delivery from survey)

To Lake Visitors

Info at Homestead Park and the Boat Landing

METHODS

- Lake management plan and plan summary (make available)
- Fact sheets and brochures
- Web pages and links (Town of St. Joseph, St. Croix County, Friends of Perch Lake)
- Town of St. Joseph newsletter (2X/year)
- Training (Aquatic Invasive Species)

MESSAGES

- How to preserve and enhance habitat for wildlife: shoreland buffers, tree drops/fish sticks, etc.
- How to establish native species in upland areas
- How to remove native aquatic plants by hand (limited to 30 foot corridor around dock)
- Explain shoreland vegetation protection regulations and rationale
- Encourage behavior: If you install lights, use those that reduce glare in shoreland area.
- AIS prevention steps (at Homestead Park and the boat landing)
- AIS prevention and identification (to watershed residents via direct mail and web references)

SPECIAL PROJECTS (listed under individual goals)

- Provide support for terrestrial invasive species identification and control in shoreland buffer areas.
- Provide guidance for establishment and maintenance of native vegetation in shoreland buffer areas.

Table 7. Implementation Charts

IMPLEMENTATION CHART 2017-2018						
Goal: Maintain Perch Lake's exceptional clear, cold water.						
Objective A: Allow no net degradation of Perch Lake water quality as measured by no increases in total phosphorus and algae growth. 2015/16 GSM = 6.6 ug/L TP						
Objective B: Minimize runoff and erosion that carry nutrients, sediment, and other pollutants to the lake.						
Actions¹	Timeline	\$ Estimate	Vol. Hours (annually)	Responsible Parties/ Partners²	Funding Sources	Comments
1. Review St. Croix County and Town of St. Joe ordinances and make recommendations.						Initiated in planning process including potential development map.
a. Review St. Croix County ordinances for water quality protection: create stormwater ordinance, investigate opportunities in zoning ordinance.	RFQ: August 2016 Complete end of 2018	\$500,000		SCC Community Development	St. Croix River Crossing Growth Management Funding	Encourage LID ³ standards. Identify and incorporate standards to protect water quality by reducing loading to background levels.
b. Incorporate LID standards into Town of St. Joseph ordinances.	End of 2017	\$1,500	200	Town of St. Joseph Planning Commission Town Board	Town of St. Joseph	Encourage LID standards. Coordinate with County
2. Identify sites where runoff and erosion are a concern and implement strategies.						
a. Review mapped concerns identified by adv. committee. b. Further analyze potential sites using LIDAR data and on-site inventory. c. Recommend BMPs. d. Design and installation to be determined.	Fall/winter 2016/17 2017			St. Croix County Land Conservation Department and Land Information staff	Covered by existing staff	

¹ See previous pages for action item detail. Estimates are for annual budgets once implementation begins.

²WDNR = Wisconsin Department of Natural Resources

³ LID = Low Impact Development

IMPLEMENTATION CHART 2017-2018

Goal: Maintain Perch Lake's exceptional clear, cold water.

Objective A: Allow no net degradation of Perch Lake water quality as measured by no increases in total phosphorus and algae growth. 2015/16 GSM = 6.6 ug/L TP

Objective B: Minimize runoff and erosion that carry nutrients, sediment, and other pollutants to the lake.

Actions¹	Timeline	\$ Estimate	Vol. Hours (annually)	Responsible Parties/ Partners²	Funding Sources	Comments
e. Review boat landing parking lot runoff and identify potential stormwater BMPs.	End of 2017	\$2,000	50	Town of St. Joseph Parks Town Board	Town of St. Joseph WDNR SSLP ⁴ for planning WDNR HL Grants for BMPs	
3. Encourage conservation easements to protect undeveloped land.						Use stormwater standards in conservation easements.
a. Conservation Design Development allows use of easements.				St. Croix County		
b. Incorporate conservation easements to protect Natural Resource Corridors in subdivision ordinance.				Town of St. Joseph		
c. Identify monitoring and enforcement procedures for conservation easements.				St. Croix County Town of St. Joseph		
<u>Evaluation:</u> Participate in WDNR Citizen Lake Monitoring Program. Request waiver for early start of TP and Cla monitoring (per Buzz).				St. Croix County	SSLP Grant for temp and O2 monitor purchase	Volunteers: Sharona Erickson and Pat Collins May need monitoring device
<u>Evaluation:</u> Monitor lake levels.				St. Croix County		May need updated equipment including rain gauges

⁴ SSLP = Small Scale Lake Planning Grant, HL = Healthy Lakes Grant

IMPLEMENTATION CHART						
Goal: Protect and improve aquatic and shoreline habitat.						
Actions⁵	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties Partners⁶	Funding Sources	Comments
Objective A: Maintain the 2-story fishery with native bass and panfish in shallow areas and stocked trout in cold, oxygenated deep water.						
1. Consider implementing a 14-18 inch protected slot size limit (bag limit 3) on bass.	2020	NA	NA	WDNR Fisheries	NA	Requires WDNR and public approval process
Evaluation: Conduct comprehensive fishery surveys on a rotational basis.	2016 2024	\$500 per event	NA	WDNR Fisheries	Sport Fish Restoration	As funding allows
Objective B: Maintain a buffer of native, unmown vegetation at least 35 feet inland along the shoreline.						
2. Develop and implement standards for vegetation management along riparian roads.						
a. Investigate standards/ best management practices for Perch Lake Road Develop a plan.	Winter 2016/17	\$?	50	Town of St. Joseph (consultant)	WDNR SSLP or LLP ⁷	Address rip rap, invasive species, tree growth County may be able to provide suggestions and review by invasive species coordinator or highway department.
3. Provide support for terrestrial invasive species identification and control in shoreland buffer areas.	Ongoing			St. Croix County Invasive Species Coordinator	St. Croix County Grants?	<i>Invasive species control in park may provide an opportunity for education of residents.</i>

⁵ See previous pages for action item detail. Estimates are for annual budgets once implementation begins.

NA= Not applicable

Highlighted actions address education and outreach to watershed residents.

⁶WDNR = Wisconsin Department of Natural Resources

⁷ SSLP = Small Scale WNDNR Lake Planning Grant, LLP = Large Scale WNDNR Lake Planning Grant

IMPLEMENTATION CHART 2017-2018

Goal: Maintain Perch Lake's exceptional clear, cold water.

Objective A: Allow no net degradation of Perch Lake water quality as measured by no increases in total phosphorus and algae growth. 2015/16 GSM = 6.6 ug/L TP

Objective B: Minimize runoff and erosion that carry nutrients, sediment, and other pollutants to the lake.

Actions ¹	Timeline	\$ Estimate	Vol. Hours (annually)	Responsible Parties/ Partners ²	Funding Sources	Comments
4. Provide guidance for establishment and maintenance of native vegetation in shoreland buffer areas.						INCLUDE IN EDUCATION/OUTREACH EFFORTS
<u>Objective C:</u> Minimize disturbance to native aquatic plant communities.						
5. Provide guidance for homeowner management of native aquatic plants.						INCLUDE IN EDUCATION/OUTREACH EFFORTS
<u>Evaluation:</u> Complete point intercept aquatic plant survey monitoring.				WDNR Coordinating Committee if Consultant needed	WDNR AIS AEPP WDNR SSLP	DNR funding may not continue. Consultant monitoring may be required in the future

IMPLEMENTATION CHART

Goal: Maintain and enhance natural scenic beauty.

Objective A: Promote the natural character of the lake to maintain and restore the quality of its natural resources.

Objective B: Naturally revegetate disturbed areas.

Objective C: Maintain undeveloped natural areas.

Objective D: Preserve and enhance the opportunity to observe the beauty of the night sky

Actions⁸	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties⁹	Funding Sources	Comments
1. Complete education activities such as fact sheets and web sites.						INCLUDED IN EDUCATION/OUTREACH EFFORTS
2. Provide guidance for native species establishment in upland areas.						INCLUDE IN EDUCATION/OUTREACH EFFORTS
3. Explain shoreland vegetation protection regulations and rationale.						INCLUDE IN EDUCATION/OUTREACH EFFORTS
4. Encourage behavior: If you install lights, use those that reduce glare in shoreland area.						INCLUDE IN EDUCATION/OUTREACH EFFORTS

⁸ See previous pages for action item detail. Estimates are for annual budgets once implementation begins. Highlighted actions highlighted address education and outreach to watershed residents.

⁹WDNR = Wisconsin Department of Natural Resources

IMPLEMENTATION CHART						
Goal: Prevent aquatic invasive species introduction and contain and control existing AIS.						
Actions²²	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties²³	Funding Sources	Comment
Objective A: Keep new aquatic invasive plant and animal species out of Perch Lake.						
1. Distribute information regarding AIS prevention steps at Homestead Park and the boat landing (kiosk to be developed).				St. Croix County Homestead Park Manager		INCLUDE IN EDUCATION/OUTREACH EFFORTS
2. Distribute information regarding AIS prevention and identification to watershed residents via direct mail and web references.						INCLUDE IN EDUCATION/OUTREACH EFFORTS
3. Coordinate Clean Boats, Clean Waters education and monitoring at the boat landing				Need lead volunteer coordinator. St. Croix County can provide support.		WDNR grants available.
Objective B: Rapidly respond to the introduction of aquatic invasive species.						
Objective C: Monitor Eurasian water milfoil growth.						
4. Complete annual point intercept aquatic plant surveys (also action #7).	Summer	NA	0	WDNR Coordinating Committee if Consultant needed	WDNR AIS AEPP Grant WDNR SPL Grant	WDNR, funding may not be available in the future
5. Encourage and organize volunteers to complete training to monitor for aquatic invasive species.	Summer			Beaver Creek Reserve, St. Croix River Association, WDNR, St. Croix County		Beaver Creek Reserve support may not be available in the future
6. Follow and update the AIS rapid response strategy.	Annually update			St. Croix County Homestead Park Manager		

IMPLEMENTATION CHART						
Goal: Prevent aquatic invasive species introduction and contain and control existing AIS.						
Actions²²	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties²³	Funding Sources	Comment
<u>Objective D:</u> Assess effectiveness of control with weevils.						
8. Complete annual weevil surveys.	July	NA		WDNR	WDNR AIS AEPP Grant WDNR SPL Grant	Funding may not be available in the future
<u>Objective E:</u> Maintain EWM at low frequency of occurrence.						
9. Control Eurasian water milfoil through hand pulling if weevils are not successful. WNDR to identify when needed.	August		40	Volunteers WDNR		Do not hand pull prior to annual weevil monitoring

IMPLEMENTATION CHART						
Goal: Balance recreational use with preservation of the natural lake environment.						
Actions¹⁰	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties¹¹	Funding Sources	Comments
<u>Objectives:</u>						
A. Preserve and enhance public access at designated areas.						
B. Enhance public safety.						
C. Reduce crowding and noise at the boat landing.						
1. Review and update town ordinances.	2018			Town of St. Joseph St. Croix County Sheriff		Updating ordinances based on comprehensive plan
2. Encourage the town board to support enforcement at the public boat landing.	2018	\$25,000 (entire Town)		Town of St. Joseph Town Board		Contract with St. Croix County Sheriff
3. Improve public access by replacing steps from boat landing parking area to the road.	2017			Town of St. Joseph Parks, Recreation, and Trail Committee		Meeting 9/27/16
4. Continue discussions regarding the public boat landing and parking area.	Ongoing			Town of St. Joseph Parks, Recreation, and Trail Committee St. Croix County St. Croix County Alliance		
5. Maintain garbage cans at the boat landing parking area.	2017			Town of St. Joseph Town Board		Meeting 9/27/16

¹⁰ See previous pages for action item detail. Estimates are for annual budgets once implementation begins.

¹¹WDNR = Wisconsin Department of Natural Resources

IMPLEMENTATION CHART

Goal: Balance recreational use with preservation of the natural lake environment.

Actions ¹⁰	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties ¹¹	Funding Sources	Comments
<u>Objective D:</u> Limit negative impacts to water quality from recreational use.						
6. Consider recreational impacts to water quality and natural beauty when planning decisions are made.				St. Croix County Parks Division Town of St. Joseph Parks		As park plans are developed and implemented
<u>Objective E:</u> Maintain Perch Lake as a 2-story fishery with stocked rainbow trout for recreational opportunities.						
7. Continue WDNR trout stocking.				WDNR Fisheries		As supply is available

IMPLEMENTATION CHART						
PROJECT COORDINATION AND OUTREACH AND EDUCATION						
Actions¹²	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties¹³	Funding Sources	Comments
Initiate and support a Perch Lake Management Plan Coordinating Committee.	Quarterly		100	St. Croix County Homestead Park Manager		Continue Plan Advisory Committee Involvement
Compile information about Perch Lake.	2017			Town of St. Joseph Park Committee		
Develop verbal history of Perch Lake.	2017			Coordinating Committee		
Provide fact sheets and brochures.		\$500				
a. Develop information to address Perch Lake messages for distribution at locations below.				St. Croix County (sponsor) Consultant project	SSLP	
b. Homestead Park				St. Croix County Park Manager		
c. Develop and stock a kiosk at the Perch Lake Boat Landing.				Town of St. Joseph Parks Department		Could Conservation Groups help?
d. Select and stock brochures at the St. Croix County Community Development						

¹² See previous pages for action item detail. Estimates are for annual budgets once implementation begins.

¹³WDNR = Wisconsin Department of Natural Resources

IMPLEMENTATION CHART						
PROJECT COORDINATION AND OUTREACH AND EDUCATION						
Actions¹²	Timeline	\$ Estimate (annually)	Vol. Hours (annually)	Responsible Parties¹³	Funding Sources	Comments
Distribute a newsletter. a. Provide articles for the newsletter to address plan messages.	2X each year	\$250		Town of St. Joseph Clerk St. Croix County (sponsor) Consultant project	SSLP	
Provide information and links on web sites: a. Develop information and find links to address plan messages b. Town of St. Joseph c. Friends of Perch Lake d. St. Croix County Community Development	As needed		4	St. Croix County (sponsor) Consultant project Town of St. Joseph Clerk	SSLP Town of St. Joseph	

Appendix A. Public Opinion Survey Results

Perch Lake Watershed Property Owners Survey

****Please return by November 3, 2015****

Please completely fill the “bubble” that corresponds to your selection.

Like this: Not like this:

Water Quality and Resource Management – Perch Lake

1. Do you own waterfront property on Perch Lake?

Yes	No
34%	66%

2. In your opinion, which statement best describes the current water quality in Perch Lake?

Not sure	Poor	Fair	Good	Excellent
11%	0%	6%	46%	37%

3. In general, how do you feel the water quality of Perch Lake has changed in the past 5 to 10 years?

Improved	Stayed the Same	Declined	Not Sure
3%	46%	26%	26%

4. How much impact does Perch Lake’s water quality have on your perceived economic value of the lake?

No impact	Little impact	Not sure	Some impact	Major impact
0%	6%	14%	29%	51%

Coarse woody habitat is valuable for fish and other lake organisms and is defined as trees, or portions of, that have fallen into the lake and can be either attached or lying on the bottom.

5. In your opinion, does the current amount of coarse woody habitat in Perch Lake provide adequate habitat for fish and other aquatic organisms?

Not sure	Yes	No
51%	29%	20%

6. How important is it for you to see wildlife (ducks, geese, songbirds, frogs, turtles) when you use Perch Lake?

Not at all important	Slightly important	No Opinion	Moderately important	Very important
0%	3%	6%	20%	71%

7. How likely are you to install Best Management Practices (e.g., shoreline buffer, rain gardens, infiltration trenches or native plantings of prairie flowers/grasses) on your property to maintain or improve the water quality of Perch Lake?

Very unlikely	Unlikely	Not sure	Likely	Very likely
6%	3%	16%	38%	38%

8. How often do you have your septic system inspected by a qualified plumber? (This is not the same as having the septic tank pumped every three years. Inspection is not a requirement.)

Never	Every 1-5 yrs.	Every 6-10 yrs.	Every 11-15 yrs.	Every 16+ yrs.
19%	72%	3%	3%	3%

9. Please indicate your level of agreement with the following statements?

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
Aquatic invasive species and non-native organisms are spreading in Perch Lake and displacing or otherwise threatening native organisms.	3%	6%	44%	26%	21%
Aquatic invasive species have a negative impact on the aesthetics of Perch Lake.	3%	9%	18%	41%	29%
I'm concerned about the damage Eurasian water milfoil can do to the ecology of the lake.	0%	6%	21%	38%	35%
Invasive species should be controlled whenever possible.	0%	3%	15%	29%	53%
I would like more information about how to control invasive species	6%	6%	31%	31%	25%
I would like more information about how to identify invasive species.	3%	9%	22%	47%	19%
Native aquatic plants are important for maintaining a healthy lake ecosystem.	0%	0%	6%	47%	47%
I dislike all aquatic plants along my shoreline property.	31%	28%	38%	3%	0%
Removal of aquatic plants improves water quality.	21%	41%	29%	9%	0%
Property owners on Perch Lake have a responsibility to try to improve the lake ecology.	3%	0%	9%	54%	34%
Users of Perch Lake have a responsibility to try to improve the lake ecology.	0%	9%	9%	49%	34%
Shoreland restoration projects improve the aesthetics of Perch Lake.	0%	6%	17%	49%	29%
Runoff from impervious surfaces that can enter the lake has a negative effect on the water quality on Perch Lake.	0%	6%	11%	37%	46%

10. How adequately do you feel the present land use regulations protect the WATER QUALITY in Perch Lake?

Very inadequately	Inadequately	Not sure	Adequately	Very adequately
3%	14%	49%	26%	5%

With a small watershed, water quality in Perch Lake can change very rapidly due to land use changes in the watershed.

11. Please indicate your level of agreement with the following actions to maintain or improve water quality in Perch Lake?

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
Higher standards for stormwater and erosion control	3%	3%	20%	51%	23%
Mandatory vegetative buffer for all lakefront properties	0%	18%	29%	29%	24%
Required regular septic system inspection (not just septic tank being pumped)	3%	14%	17%	40%	26%
All development must contain all runoff from impervious surfaces based on establish or new standard	0%	6%	11%	43%	40%

Recreational Use – Perch Lake

12. Please rate your overall recreational experiences on Perch Lake.

Not applicable	Very poor	Poor	Fair	Good	Very good
9%	0%	0%	6%	40%	46%

13. In which of the following activities do you participate on Perch Lake? (● Mark all that apply)

68%	Spending time with friends	32%	Ice fishing	88%	Enjoying scenery/wildlife
82%	Spending time with family	73%	Canoeing/Kayaking	53%	Picnicking
83%	Swimming	86%	Walking – trails	31%	Nature photography
57%	Fishing	29%	Other, specify <u>See Appendix B</u>		

14. How often do the following activities or issues detract from your enjoyment of Perch Lake?

	Never	Rarely	Sometimes	Often	Always
Crowding at the boat ramp, road and parking areas	21%	24%	21%	21%	12%
Excessive weed growth	33%	15%	30%	12%	9%
Noise from other lake users	24%	36%	21%	15%	3%
Poor regulatory enforcement	42%	19%	10%	19%	10%
Poor water quality	55%	36%	6%	3%	0%

15. To what extent does Homestead Park affect the overall quality of your Perch Lake experience?

Greatly detracts	Somewhat detracts	Little or no effect	Somewhat enhances	Greatly enhances
6%	15%	12%	12%	55%

16. To what extent does the Perch Lake boat landing affect the overall quality of your Perch Lake experience?

Greatly detracts	Somewhat detracts	Little or no effect	Somewhat enhances	Greatly enhances
27%	21%	33%	15%	3%

17. Please indicate your level of agreement with the following potential actions at the boat landing.

	Strongly disagree	Disagree	No opinion	Agree	Strongly agree
Provide more amenities at the boat landing, such as garbage cans and bathrooms	19%	16%	16%	34%	16%
Designate the boat landing as a carry-in landing	16%	9%	28%	44%	3%
Abandon the existing boat landing and develop a boat landing in a new location	13%	16%	28%	19%	25%
Re-design the boat landing in the existing location	23%	10%	29%	29%	10%
Provide more signage to prohibit illegal parking	23%	23%	20%	27%	7%
Enforcement of illegal parking with fines and citations	6%	13%	23%	29%	29%
Regular patrol by law enforcement	12%	3%	21%	36%	27%

Communication Preferences

18. What are your TWO most preferred ways to receive information on planning and management activities for Perch Lake? (Mark • 2 only)

40%	Meetings	76%	Mailings	17%	Websites	10%	Lake organizations
3%	Workshops	13%	Newspaper	42%	E-mail	0%	Do not wish to receive additional information

19. Please use the space below to add any other comments about Perch Lake.

See Appendix B

Thanks for completing the survey!

**Please return the completed survey in the postage-paid envelope provided by November 3, 2015 to:
 Survey Research Center
 124 Regional Development Institute
 University of Wisconsin – River Falls
 410 S. 3rd St.
 River Falls, WI 54022-9989**

Appendix B. Rapid Response for Early Detection of Aquatic Invasive Species

Definition: Aquatic Invasive Species (AIS) are non-native plant and animal species that can out-compete and overtake native species damaging native lake habitat and sometimes creating nuisance conditions. AIS currently in Perch Lake include Eurasian Water Milfoil (EWM) and curly leaf pondweed (CLP). Additional AIS threaten the lake and will be monitored for throughout the lake by volunteers and at selected points in an annual WNDR survey.

1. Conduct volunteer monitoring (St. Croix Scuba, others?) throughout the lake. If a suspected plant is found, contact the Site Coordinator for Homestead Park.
2. Direct lake residents and visitors to contact the Site Coordinator for Homestead Park if they see a plant in the lake they suspect might be an aquatic invasive species. Direct mail and links to web pages will provide plant photos and descriptions, contact information, and instructions for monitoring for volunteers and lake and watershed residents. Signs at the public boat landing and signs and brochures at Homestead Park will instruct visitors in proper AIS prevention measures.
3. If a volunteer locates a likely AIS, instructions will request that the volunteer record the location of suspected AIS using GPS, if available, or mark the location with a small float.

If a plant:

- a. Take a digital photo of the plant in the setting where it was found (if possible). Then collect 5 to 10 intact specimens. Try to get the root system, and all leaves as well as seed heads and flowers when present. Place in a zip lock bag with no water. Place on ice and transport to refrigerator.
- b. Inform Site Coordinator for Homestead Park

If an animal other than a fish:

- a. Take a digital photo of the animal in the setting where it was found (if possible). Then collect up to five specimens. Place in a jar with water; put on ice and transport to refrigerator. Transfer specimen to a jar filled with rubbing alcohol (except for Jellyfish – leave in water).
- b. Inform Site Coordinator for Homestead Park.

4. The Site Coordinator for Homestead Park will tentatively confirm identification of plant or animal AIS then

If a plant:

- a. Fill out plant incident form <http://dnr.wi.gov/lakes/forms/3200-125-plantincident.pdf>
- b. Contact WDNR staff, then deliver collected plants to the WDNR (1300 West Clairemont, Eau Claire, WI 54701) as soon as possible (or to the location they specify).

If an animal:

- a. Be sure the suspected [invasive species](#) has not been [previously found on the waterbody](#)
- b. Fill out form [3200-126 – Aquatic Invasive Animal Incident Report](#)

5. If identification is positive the Site Coordinator for Homestead Park will:

- a. Inform the person who reported the AIS.
- b. Mark the location of AIS with a more permanent marker.

6. Wisconsin DNR may also identify AIS during an aquatic plant point intercept survey. When a new AIS introduction is confirmed.

- a. The Site Coordinator for Homestead Park will post a notice at the public landing and park and provide a notice for the St. Croix County and Town of St. Joseph websites. Notices will inform residents and visitors of the approximate location of AIS and provide appropriate means to avoid its spread.

7. Determine the extent of the AIS introduction (St. Croix County in cooperation with WDNR). Divers may be used. If small amounts of AIS are found during this assessment, divers may be directed to identify locations with GPS points and hand pull plants found. All plant fragments will be removed from the lake when hand pulling.

8. Select a control plan in cooperation with the WDNR, Homestead Park Site Manager, Town of St. Joseph, and lake owners. The goal of the rapid response control plan will be eradication of the AIS.

Control methods may include hand pulling, use of divers to manually or mechanically remove the AIS from the lake bottom, application of herbicides, and/or other effective and approved control methods.

9. Implement the selected control plan including applying for the necessary permits. Regardless of the control plan selected, it will be implemented by persons who are qualified and experienced in the technique(s) selected.
10. St. Croix County or the Town of St. Joseph funds may be used to pay for any reasonable expense incurred during the implementation of the selected control plan, and implementation will not be delayed by waiting for WDNR to approve or fund a grant application.
11. St. Croix County or the Town of St. Joseph will work with the WDNR to confirm, as soon as possible, a start date for an Early Detection and Rapid Response AIS Control Grant. Thereafter, the entity shall formally apply for the grant.
12. Frequently inspect the area of the AIS to determine the effectiveness of the treatment and whether additional treatment is necessary (responsible party to be determined in control plan).
13. Review the procedures and responsibilities of this rapid response plan on an annual basis. (St. Croix County)

EXHIBIT A²⁷

AIS VOLUNTEERS

St. Croix Scuba

Terry Nooner: (phone)
twnooner@aol.com

Others?

ST CROIX COUNTY

Site Coordinator for Homestead Park

Justin Townsend: (715) 549-6515
justin.townsend@co.saint-croix.wi.us

AIS Coordinator

Director

TOWN OF ST. JOSEPH

Town Chairman

Tom Spaniol: (715) 222-6235
chair@townofstjoseph.com

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

AIS Coordinator, AIS Identification

Jodi Lepsch: (715) 838-8385
Jodi.Lepsch@wisconsin.gov

Permits, AIS Identification and Notice

Scott Provost: 715-421-7881
scott.provost@Wisconsin.gov

Grants, AIS Identification and Notice

Buzz Sorge: 715-839-3794
Patrick.Sorge@Wisconsin.gov

DIVERS

St. Croix Scuba

Terry Nooner: (phone)
twnooner@aol.com

²⁷ This list will be reviewed and updated each year.

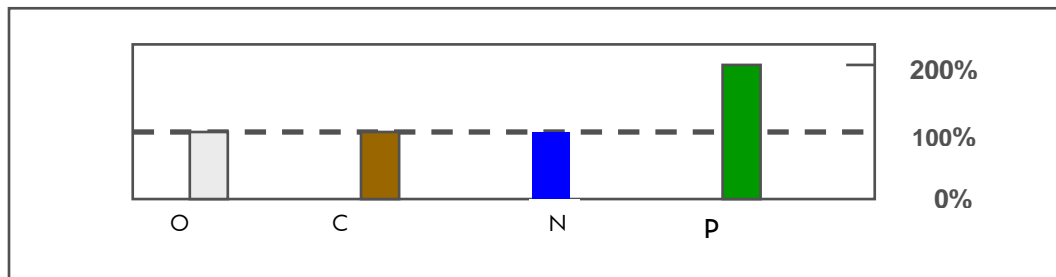
Appendix C. Understanding Lake Information

To help understand the water quality study results in this plan, an introduction of limnology - the study of lakes - follows.

Importance of Phosphorus

The two nutrients of greatest interest in lakes are nitrogen and phosphorus. Both are required for plant and algae growth, but phosphorus is the most common limiting nutrient in lakes.

“Limiting” means that of all nutrients available, phosphorus will be the first to run out and therefore limit plant growth. Therefore, increasing phosphorus can result in increases in plant and algae growth. Because algae absorb phosphorus directly from the water column, they will often respond most dramatically to increases in phosphorus availability.



This graph shows the resultant algae growth by adding 0.05 micrograms per liter (ppb) of each nutrient in an unproductive (low nutrient) lake²⁸. As can be observed in the graph, in a phosphorus-limited lake, raising the phosphorus by 0.05 micrograms per liter can double the algae growth while there is no increase with addition of the other nutrients. In a lake setting, increasing phosphorus content by 1 pound can result in 500 pounds of algae growth.

Aquatic plants will also respond to increases in phosphorus, but many are rooted and absorb the phosphorus from the sediment. As a result, they may not reflect increases in phosphorus concentrations in the water as quickly (except for plants such as coontail which doesn't need to root).

Forms of Phosphorus

Phosphorus usually exists in the form of phosphate (PO_4^{-3}). Phosphate can exist in various forms: organic, inorganic, soluble, and insoluble. The first important form is referred to as soluble reactive phosphorus (SRP) - a common form of phosphorus in fertilizers. This form is dissolved readily in the water and is immediately available for plant and algae growth.

The second important form is total phosphorus (TP). This is the measurement of all forms of phosphorus in the water. Total phosphorus is important because it reflects the amount of phosphorus potentially available for plant and algae growth. Phosphorus has a propensity to bind to sediments. If an increased amount of sediment is introduced in a lake, the TP will most likely rise as well. Phosphorus can also be contained in the tissue of microorganisms and algae

²⁸ From *Water on the Web*. University of Minnesota. 2008.

which would also be reflected in TP. A high TP value does not necessarily indicate immediate algae growth, since some or much of the total phosphorus may not be in the usable, SRP form.

If a large amount of the TP in runoff to the lake is SRP, it is most likely coming from sources such as sewage, fertilizers, and manure. If the TP has very little SRP in it, then most of the phosphorus is in other forms such as those tied to sediment or present in plant tissue.

Phosphorus in an unusable form must be converted by biological or chemical reactions before it is available as SRP.

Sources of Phosphorus

Phosphorus can come from many sources. Any tissue or waste from living or once living organisms can be a source of phosphorus. Therefore, any human or animal waste (from septic systems and manure) contains phosphorus. Any leaves or grass clippings can also contain phosphorus. Decomposition of dead plants and animals releases phosphorus.

As mentioned earlier, phosphates tend to bind to sediment. Whether water carrying sediment runs directly from the land into the water, or is carried in streams to the lake, it is a source of phosphorus. High levels of erosion can create significant phosphorus loads.

Phosphorus is also concentrated in raindrops. Raindrops pick up dust and other particulate matter in the air and deposit the phosphorus into the lake as precipitation. In many lakes, this can be a significant source of phosphorus, especially in more pristine lakes that receive little phosphorus from other sources.

As precipitation hits the land around the lake (the watershed), some of the rain will infiltrate into the soil and some will run-off. As the water runs off of the land, it can pick up sediments, dead and living matter, and dissolved forms of phosphorus. When this water reaches the lake, it brings the phosphorus with it. The amount of rain, soil type, the topography, and the degree of vegetative cover will affect the concentration of phosphorus carried in runoff water. When the land is covered with forest, the soil is more stable. The raindrops dissipate and infiltrate into the soil, and therefore, the runoff volume and phosphorus content is low. On the contrary, a row crop field such as a cornfield will not dissipate the raindrops, and the exposed soil will be much less stable. This results in increased erosion and runoff volume and therefore, higher phosphorus concentration and higher phosphorus loads into the lake.

Another source of phosphorus in a lake is the release from the lake bottom sediments. As decomposers break down the dead organic matter in the lake bottom sediment, phosphorus is released. Much of the sediment in lakes will bind phosphorus just as on land. The major contributor to this binding is iron. When iron is in high enough oxygen conditions, it has a +3 charge and therefore binds the phosphate (which has a -3 charge) forming an insoluble particle and remaining in the sediment. When the oxygen content decreases, the iron is reduced to a +2 charge, becomes soluble, and tends to release the phosphate ions. As a result, the sediment can release very large amounts of phosphorus into the water column. Phosphorus release occurs at a threshold of low dissolved oxygen – referred to as anoxia - of 1 mg/l or less. The length of time the sediment is anoxic and the size of the area that goes anoxic determines the amount of

phosphorus released. Release of phosphorus from lake bottom sediment is one component of the lake's internal load.

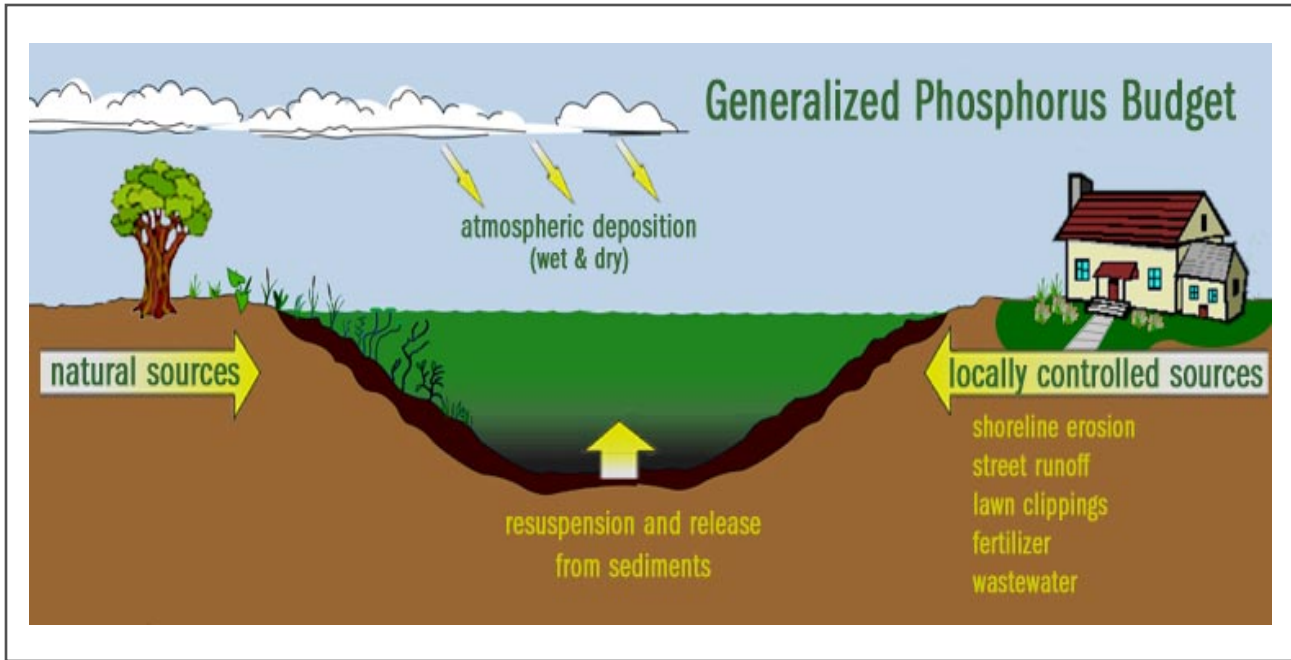
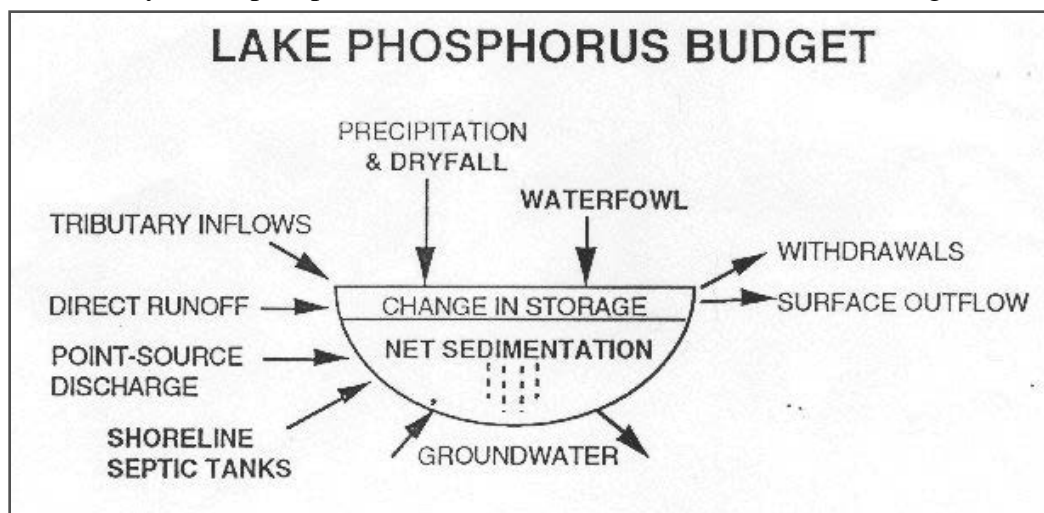


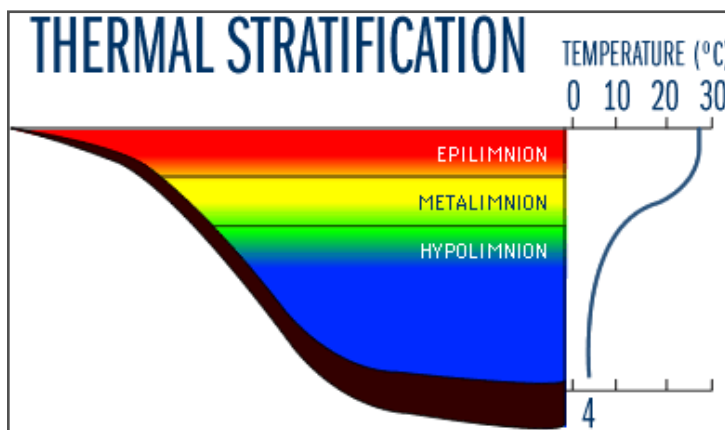
Figure obtained from "Water on the Web" (www.waterontheweb.org) an educational website of the University of Minnesota.

A summary of the phosphorus sources and losses are outlined in the diagram below.²⁹



In many cases, a lake will stratify during the summer months. When a lake stratifies, the colder water stays on the bottom (hypolimnion) of the lake while the warmer water remains on the surface (epilimnion). If this stable situation remains, the lake water does not mix. The phosphorus released from the bottom sediment (where low oxygen levels occur) remains in the hypolimnion until the lake turns over in the fall. If the lake is weakly stratified, the lake may mix prior to the fall turnover. With anoxic conditions that release phosphorus, phosphorus will be mixed into the water column where it is available for uptake by algae.

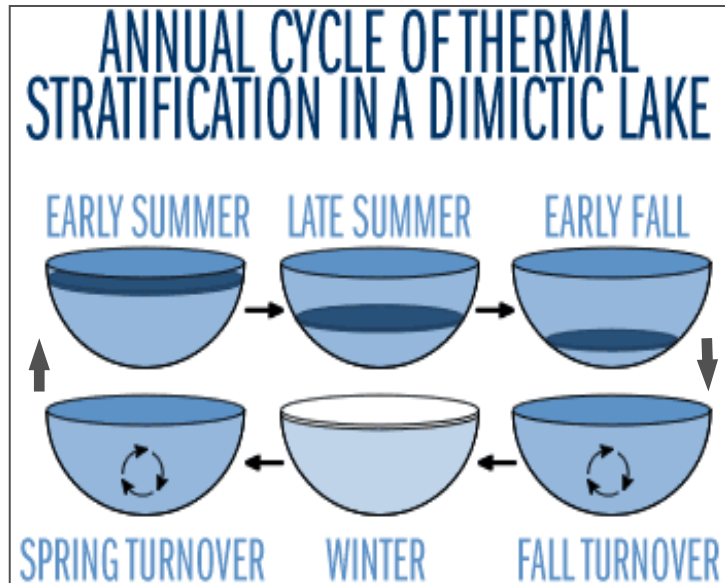
Photosynthesis and wave action are major contributors of oxygen to a lake. However, when a lake stratifies, there is no opportunity for oxygen to get to the bottom of the deep portions of the lake. On the bottom, microorganisms will use and deplete the oxygen during respiration. If the lake does not mix and has no photosynthesis, the lake will tend to reach anoxic conditions. The rate of stratification and the rate of respiration (from breaking down organic matter) will determine how early in the summer the lake will go into anoxia on the bottom.



As the water cools in the fall, that water becomes denser and sinks, mixing the lake. This process is called fall turnover. When the lake freezes, the ice floats. In the spring when the ice melts, the

²⁹ From *Water on the Web*. University of Minnesota. 2008.

cold water sinks, again mixing the lake (spring turnover). If anoxic conditions occurred during the summer months, a phosphorus load will usually be released in the water column during fall turnover.



Trophic State

Trophic state describes the productivity of a lake. The least productive lakes are oligotrophic. The most productive lakes are referred to as eutrophic. Those in the middle are called mesotrophic. The more nutrients available in a lake, the more productive the lake will be. If a watershed with little runoff and phosphorus loading surrounds a lake, the water will tend to have low phosphorus levels. This will result in limited plant and algae growth, causing it to be classified as an oligotrophic lake.

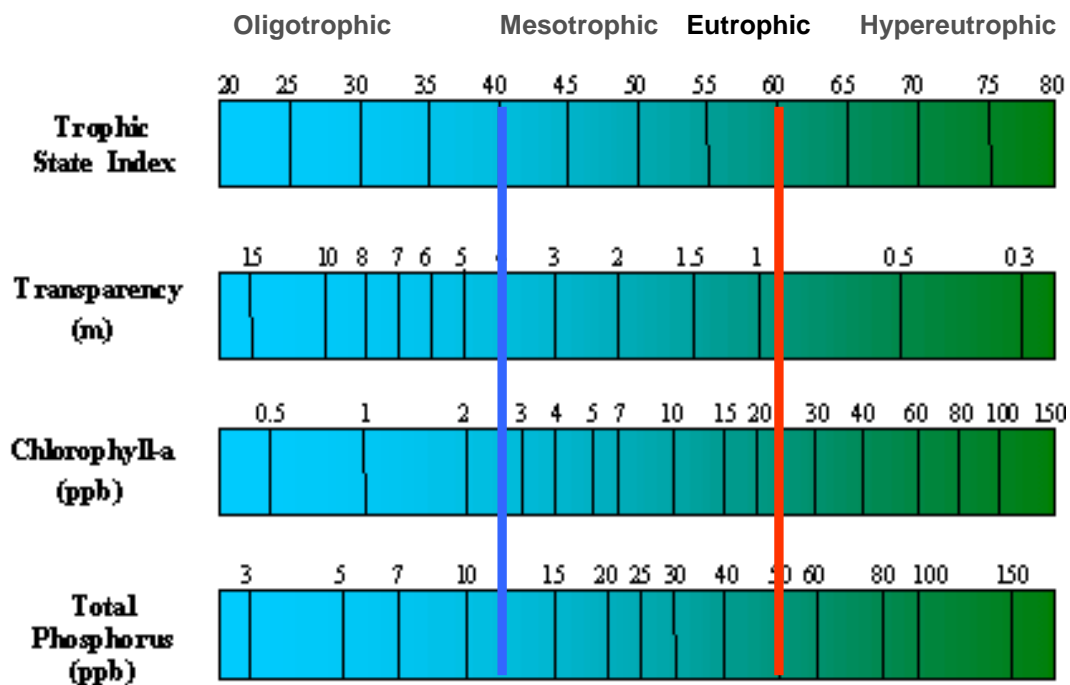
Trophic state (the Carlson Trophic State Index) can be based upon three measurements: total phosphorus, secchi depth, and chlorophyll a. If the phosphorus is high, the algae will grow more, resulting in high chlorophyll a and reduced water clarity. Water clarity is measured by the secchi disk reading. If there is limited phosphorus, the water will have little algae growth, and therefore low chlorophyll a readings and high secchi depths.

This table shows the Carlson Trophic State value in the left column and the characteristics of each lake type in the right column.

Index Value

Trophic State and Description

<40	Oligotrophic: clear water; high hypolimnetic O ₂ year-round but possible anoxia in the deeper hypolimnion part of year
40-50	Mesotrophic: moderately clear water; possible hypolimnetic anoxia in summer and/or under ice. Fully supportive of all swimmable /aesthetic uses; possible cold-water fishery
50-60	Mildly eutrophic: decreased secchi; anoxic hypolimnion; possible heavy aquatic plant growth; warm-water fishery; supportive of all swimmable /aesthetic uses but “threatened”
60-70	Eutrophic: blue-green algal dominance with scums possible; extensive aquatic plant growth; not supportive of all beneficial uses
>70	Hypereutrophic: heavy blooms and scums in summer likely; dense “weed” beds; hypereutrophic; possible fish kills; fewer plant beds due to high algae; not supportive of many beneficial uses



Management of Phosphorus

Some sources of phosphorus can be managed very effectively, while other sources cannot be managed. Atmospheric deposition is not manageable since it is carried from other locations and deposited via rain. However, when sources of phosphorus are from the watershed, various management options are available. Any practice that can reduce runoff and retain the water or infiltrate the water into the soil is very beneficial. Because phosphorus is tied to sediment, phosphorus loading can be reduced by preventing water with sediment and dissolved phosphorus from making its way into the lake. If the water is infiltrated, it will return to the water table, and the soil it filters through will remove the phosphorus. Land cover with significant vegetation will slow the runoff of water and help reduce phosphorus loading.

For these reasons, restoring areas that contain exposed soil, have vegetation with very shallow root structure, or are prone to erosion and the release of sediment can significantly reduce phosphorus loading. Many agricultural and lawn care practices involve fertilizing with soluble phosphorus. As a result, these areas can greatly increase phosphorus loading. However, if the water runoff can be reduced by planting buffers of taller vegetation or changing agricultural practices to grow crops such as grasses, the phosphorus can be retained and not reach the lake as readily.

Impervious surfaces are those that do not allow water to soak in and result in increased runoff. Roads, driveways, roofs, sidewalks and parking lots are all examples of impervious surfaces. Large amounts of sediment, and therefore phosphorus, are carried to the lake when significant impervious surfaces are present. If that water can be slowed, or better yet, infiltrated into the soil, the loading can be significantly reduced.



In this photo, a sediment plume is very evident. Notice the degree of development and the large amount of impervious surfaces.

Septic system malfunctioning can also cause loading of phosphorus. A typical septic system relies on the soil's ability to retain the nutrients from human waste by infiltrating the water in a

drain field. If the system is not functioning properly and lacks the infiltration and ultimate phosphorus removal, the nutrients can reach the lake. Holding tanks that do not leak and are routinely pumped can reduce failure and therefore phosphorus inputs.

Appendix D. Related Plans, Regulations, and Ordinances

St. Croix County

A summary of St. Croix County ordinances from the county web site is included below.

Land Division

The Community Development Department is required to administer the [Land Division ordinance](#) in order to regulate and control subdivision development within St. Croix County. There are two types of land divisions - Certified Survey Maps (CSM's) - 4 lots or less and considered minor subdivisions. A major subdivision is a plat of 5 lots or more.

If you are intending to either sell or purchase property, please contact the Community Development office to insure that the correct procedures are being followed to create a legal lot. A [surveyor](#) will draft your map and assist in the subdivision process.

Applications are due the first Monday of every month. The Technical Review Committee, made up of staff, will hold two meetings per month to process and approve [applications](#).

Sanitary Program – Private On-site Wastewater Treatment System

A [State sanitary permit](#) is required for the installation of a private on-site wastewater treatment system (POWTS) and may only be submitted by a [licensed plumber](#). A [County sanitary permit](#) is required for the repair, reconnection, or rejuvenation of a POWTS or for the installation of non-plumbing sanitation (i.e. privy, composting toilet, etc).

A sanitary permit is required prior to obtaining a building permit from the Town. Staff will conduct at least one inspection for all work requiring a sanitary permit.

The proper maintenance of a POWTS is essential to ensure the longevity of your private sewage system and to avoid premature failure. When obtaining a sanitary permit you are required to submit a signed [agreement](#) indicating that as the property owner, you will maintain your septic system properly and report this maintenance to the Community Development Office.

Zoning

[Special Exception](#) permits are required for a use that is listed as a “Special Exception” within a zoning district. A list of possible special exceptions are included in the St. Croix County Zoning Ordinance under each [Zoning District](#). A special exception request is reviewed by the [Board of Adjustment](#). It is strongly recommended the applicant meet with staff to discuss the request before an application is submitted. Applications are due the first Monday of the month.

[Variances](#) allow development that is inconsistent with the dimensional standards contained in the ordinance. Variances cannot be issued to approve uses that are inconsistent with the ordinance. The Board of Adjustment is authorized by statute to

grant variances to the strict terms of the Land Use Ordinance only when certain criteria exist. It is the applicant's responsibility to prove that those criteria exist at the site and that a variance can be granted. Staff should be contacted if you believe you have a valid request for a variance. Applications are due the first Monday of every month.

Non-Metallic Mining

Non-metallic mining is part of the [Special Exception](#) permit process, but it has its own St. Croix County Ordinance, [Chapter 14 Non-metallic mining](#). A [Non-metallic Mining Supplemental Information Sheet](#) is helpful in filling out the permit application.

Enforcement

When a violation of the Land Use Ordinance is discovered, staff will take all possible measures to rectify the problem. Individuals who feel that a violation of a Land Use Ordinance exists may file a complaint. Submit as much supporting evidence (i.e. photos, documents, etc.) as possible in support of the complaint.

Please be advised that under Wisconsin's Public Records Law, Wis. Stats. §19.31, et al., the [complaint](#) and supporting evidence will be available for public review upon request. Only in an exceptional case may access be denied.

Town of St. Joseph

<http://www.ecode360.com/SA1784>

Chapter 168. Subdivision of Land

The ordinance establishes a 3-acre minimum lot size.

Chapter 149. Roads, driveways and trails erosion and sediment control and right of way construction

Chapter 141. Public Parking Lots and Boat Launches (Addresses disorderly conduct and noise.

Chapter 74. Activities on Town Property. Article I. Alcoholic Beverages and Controlled Substances.

Chapter 183. Vehicles and Traffic Article I. Parking (183-3-D)

Chapter 123. Lakes and Waterways. Article III. Perch and Furgers Lake (No operation of motor boats.)

Appendix E. References

- Bonestroo Rosene Anderlik & Associates. *Land Management Plan for Homestead Parklands on Perch Lake*. St. Croix County Parks Department. August 1998.
- Garrison, Paul. *Bass and Perch Lake Sediment Cores*. Wisconsin Department of Natural Resources. 2012.
- Ianaiev, Vadym and Paul McGinley. *Modeling Phosphorus in Bass Lake and Perch Lake, St. Croix County, Wisconsin*. Center for Watershed Science and Education. University of Wisconsin Stevens Point.
- Mares, Anna. *Aquatic Plant Survey of Perch Lake, St. Croix Co.* Beaver Creek Reserve Citizen Science Center. 2013.
- St. Croix County Community Development Department. St. Croix County Parks Division. *St. Croix County, Wisconsin Outdoor Recreation Plan*. January 2013.
- St. Croix County Parks. *Perch Lake Forest and Prairie Stewardship Plan*. April 8, 2002.
- Thorstenson, Amy. Golden Sands Resource Conservation & Development Council, Inc. *Email communication*. November 2015.
- Wisconsin Conservation Department. *Perch Lake Survey Map*. 1965.
- Wisconsin Department of Natural Resources. *Aquatic Plant Community of Perch Lake St. Croix County, Wisconsin 2012-2014*. July 2015.
- Wisconsin Department of Natural Resources. *Aquatic Plant Community of Perch Lake St. Croix County, Wisconsin 2012*. May 2013.
- Wisconsin Department of Natural Resources. *Changes in the Aquatic Plant Community of Perch Lake, St. Croix County 1993-2004*. December 2005.
- Wisconsin Department of Natural Resources. *Citizen Lake Monitoring Data*. Collected 1991-1993, 1995, 2004, 2007.
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- Wisconsin Department of Natural Resources. *The Diversity, Density and Distribution of Aquatic Plants in Perch Lake, St. Croix County, WI*. March 1995.
- Wisconsin Department of Natural Resources. *Fish Stocking Data 1972-2014*.
- Wisconsin Department of Natural Resources. Wisconsin Department of Agriculture, Trade and Consumer Protection, St. Croix County Land Conservation Department and

Polk County Land Conservation Department. *Nonpoint Source Control Plan for the St. Croix County Lakes Cluster Priority Watershed Project*. April 1997.

Appendix F. Reference Document Summaries

Bonestroo Rosene Anderlik & Associates. *Land Management Plan for Homestead Parklands on Perch Lake. St. Croix County Parks Department. August 1998.*

The goal of the land management plan is to protect and improve the health and diversity of its natural resources, while providing opportunities for County residents to enjoy recreation activities that are compatible with its high quality resources. The plan reviews the history of the land and its natural features.

A series of “issues” are identified within the plan. They are copied verbatim here. These issues may provide ideas and direction for the lake management plan.

Site Context

- *Maintain the natural character of the park and the quality of its natural resources as the surrounding land develops.*
- *Provide buffers to protect the character of the park and protect park neighbors from the impacts of users.*
- *Identify key views within the park and toward the landscape outside that allows visitors to experience the character and history of the site and surrounding landscape.*

Natural Features

- *Protect the current water quality of Perch Lake by controlling the impacts of park and watershed development. Implement strategies to control erosion, infiltrate and clean runoff, and control nutrients and sediments, as park facilities are developed, and as they are maintained for the long term.*
- *Restore current critical erosion sites to stop existing sedimentation, and prevent a reoccurrence of these conditions.*
- *Consider options for restoring more natural shorelines and controlling erosion where roads have been raised along the lake.*

Fish Communities/Fishing

- *Maintain the current high water quality and habitat quality of the lake, to maintain the quality of the fishery.*
- *Maintain existing angler access, and expand shorefishing opportunities, particularly for children, families, and handicapped anglers.*

Aquatic Plant Communities

- *Maintain and enhance the quality of aquatic plant communities in Perch Lake. Minimize disturbance to these communities as park facilities are developed, and replant areas disturbed for road development or other facilities as needed to maintain existing communities and prevent the introduction of invasive exotic species.*

- *Educate anglers about Eurasian water milfoil. Enlist their cooperation in inspecting fishing equipment to prevent the spread of milfoil to Perch Lake.*
- *Maintain a buffer of native, unmown vegetation around the lake shore, at least 30 feet in width, to protect water quality and habitat. Avoid use of phosphorus fertilizers on lawn areas that drain to the lake.*

Terrestrial Communities

- *Restoration of native plant communities such as oak savanna, prairie and woodlands would help to control erosion on slopes and enhance wildlife habitat. Restoration would also allow park visitors to view and learn about historic communities that are now rare in the region. Restoration may also be beneficial for some species of native wildlife, such as grassland birds, whose habitat is rapidly disappearing.*
- *Control of invasive exotic species such as buckthorn would improve the health of the woodlands in the park and open the understory to provide a better trail experience for park users.*
- *Plans for plant community restoration should consider methods for erosion control as restoration is implemented, and impacts of restoration and management activities on park neighbors.*

Wildlife Habitat

- *Strategies for managing plant communities and development of park facilities should maintain and enhance wildlife habitat.*
- *Development of park facilities should consider leaving some larger blocks of habitat relatively undisturbed, to maintain quality habitat as the landscape around the park is increasingly fragmented by development.*

These issues, along with the park's natural and historic features and results of a public meeting and user survey, guide facility development plans for the park. Park facilities and roads are located where they have the least impacts from erosion and sedimentation. Infiltration areas are created to capture water which flows toward the lake.

A park master plan was laid out including cost estimates and options for phasing. Phasing recommendations included taking advantage of priority watershed and other funding options available at that time. The master plan included site development of facilities: trails, roads, parking lots, beach, playgrounds, shorefishing access; erosion control; and habitat restoration.

Garrison, Paul. *Bass and Perch Lake Sediment Cores*. Wisconsin Department of Natural Resources. 2012.

The results from the sediment cores taken from Bass and Perch lakes in St. Croix Co. are described below. In both lakes, the diatom community indicates that phosphorus concentrations at the present time are similar to historical levels (assuming that the bottom sample represents presettlement concentrations). The diatom community in Perch Lake has undergone a floristic

change which suggests that nutrient levels are slightly higher now. This is primarily indicated by an increase in *Asterionella formosa*. There is some discussion in the literature that this diatom may respond to increased nitrogen more than phosphorus. Also the increase in planktonic diatoms in Perch Lake may indicate a slight increase in nutrients. The model does not seem sensitive to detect this small change in nutrients. Although many lakes with shoreline development have experienced an increase in macrophyte growth this is not evident in either lakes. In fact the diatom group that indicates this change (benthic *Fragilaria*) actually declines from the bottom to the top in both lakes. This decline is probably the result of a slight increase in productivity of the planktonic diatoms.

St. Croix County Community Development Department. St. Croix County Parks Division. St. Croix County, Wisconsin Outdoor Recreation Plan. January 2013.

The outdoor recreation plan includes a section dedicated to Homestead Parklands on Perch Lake. The county purchased 67-acres of the park from the Seim family, who had owned the land for over 100 years, in 1996. After a 1997 county purchase of the Onstott property to the south, the park totaled 80 acres. The Seim property was farmed through the 1960s. A private park and campground with beach, roads, and other facilities were developed beginning in the 1930s. The Onstott property had been grazed.

Perch Lake is the central feature of the park. Facilities include a handicapped fishing pier, shoreline fishing access, swimming beach, picnic areas, canoe and boat rental facilities, playground, and trails for hiking and cross-country skiing. SCUBA divers use the lake for recreation and training. There are four educational kiosks in the park.

The park is staffed with one full time and six seasonal staff. Staff are present at the park from May 1 through October 31.

The land management plan (see Bonestro above) adopted by the county in 2000, outlined park improvements. Through the date of this plan (January 2013), about 85% of park improvements were completed. Remaining improvements were planned to be completed as part of the outdoor recreation plan. St. Croix County Parks completed the Perch Lake Forest and Prairie Stewardship plan in 2002. This plan outlined detailed direction for habitat improvements for the park. Additional tasks to be completed are listed in the Outdoor Recreation Plan.

Update: Homestead Park Action Plan (2013). Actions completed at the park since 2013 include maintenance of playground surface materials and cutting red pines as part of restoration efforts (Justin Townsend, September 16, 2015).

St. Croix County Parks. *Perch Lake Forest and Prairie Stewardship Plan. April 8, 2002.*

The plan includes maps and descriptions of various woodland and open old field areas of the park. Management recommendations are made for each area to meet owner objectives.

Landowner Objectives

- Grow and sell timber products following sound forest management practices.
- Maintain a diverse mixture of tree species.
- Provide habitat for a variety of wildlife species.
- Harvest the woodland in an environmentally friendly way.
- Encourage conversion to red maple and other hardwoods where possible.
- Keep oak trees healthy and actively growing.
- Maintain water quality of Perch Lake at peak public use of the park.
- Restore prairie and oak savanna to pre-settlement conditions as future outdoors-environmental learning classroom.

Thorstenson, Amy. Golden Sands Resource Conservation & Development Council, Inc. *Email communication. November 2015.*

In 2012-2014 volunteers raised over 20,000 weevils for Eurasian water milfoil control and put them into Perch Lake. 2014 records showed weevil damage evident in 22-42% of stem samples collected in Eurasian water milfoil beds, depending on bed. Weevils were present at a rate of 0.24 N/stem. Control has been documented (Newman) at as low as 0.22 N/stem. 2015 samples are still being processed and vouchered.

Wisconsin Conservation Department. *Perch Lake Survey Map. 1965.*

Contour map of Perch Lake.

Wisconsin Department of Natural Resources. *Aquatic Plant Community of Perch Lake St. Croix County, Wisconsin 2012-2014. July 2015.*

Aquatic plant surveys were conducted according to standard point intercept methods in 2012, 2013, and 2014. The report provides a species list and maps and statistics for each species. Littoral zone information includes percentage of plants at each depth zone and sediment types. The report provides community assessment results compared to other lakes in the North Central Hardwoods region and the state of Wisconsin.

Report conclusions (verbatim from report discussion):

- Perch Lake is a deep lake with a narrow littoral zone throughout most of the lake. The southern shore of the lake has a more gradual slope than the rest of the lake. The littoral

zone of the lake is dominated by muck sediments.

- Perch Lake has an average aquatic plant community compared to Wisconsin lakes and lakes in the North Central Hardwood region based on FQI¹ and AMCI² values.
- The maximum depth of vegetation ranged from 19 to 23 feet. This depth of vegetation indicates clear water conditions. Between 72 and 85 percent of the littoral zone has been vegetated. Submergent vegetation was the dominant growth type.
- Twenty-four species were found over the three surveys. *Potamogeton robbinsii* was the dominant species during all surveys. *Myriophyllum spicatum* (EWM) was subdominant in 2012 and 2013 and *Brasenia schreberi* was subdominant in 2014.
- Four sensitive species were found during the surveys; *Potamogeton illinoensis*, *P. robbinsii*, *P. zosteriformis* and *Ranunculus aquatilis*.
- Two invasive species have been found in Perch Lake, *Myriophyllum spicatum* (EWM) and *P. crispus*³. Milfoil weevils were raised by Beaver Creek Reserve and stocked into Perch Lake in 2013 and 2014 as a biocontrol management tool for EWM. EWM had decreased significantly in 2014.
- 2014 experienced above average rainfall. This may have led to a decrease in water clarity due to increased run-off. The decrease in water clarity would have decreased the depth of light penetration. This may be the reason for the decrease in the maximum rooting depth and the percent of the littoral zone with vegetation. All significant changes in individual species populations were decreases in 2014.
- Water resources staff from the WDNR will continue to conduct aquatic plant surveys on an annual basis to monitor the effectiveness of the milfoil weevils as a biocontrol of EWM.

¹ Floristic Quality Index

² Aquatic Macrophyte Community Index

³ Curly leaf pondweed

Wisconsin Department of Natural Resources. *Changes in the Aquatic Plant Community of Perch Lake, St. Croix County 1993-2004.* December 2005.

The WDNR completed aquatic plant transect surveys in 1993 and 2004. Conclusions emphasized in the report:

Plants grow to 21 feet in Perch Lake. *Potamogeton robbinsii* was the dominant species in 2004. *Najas flexilis* was dominant in 1993. Changes observed in the plant community included declines of five sensitive species, disappearance of emergent plants (which subsequently were found in 2012-2014 surveys), and loss of three submergent plant species. Fluctuating water levels, declining water clarity, and the introduction of Eurasian water milfoil were given as potential reasons for these changes. DNR located Eurasian water milfoil for the first time in Perch Lake in 2004. EWM was not common, and where found, it grew in low densities.

Recommendations from the Report:

- Continue to limit Perch Lake to electric motor use only.
- Survey the lake for milfoil weevils.
- Develop a EWM control strategy as part of an aquatic plant management plan.
- Expand lakeshore buffers, install stormwater practices and use only zero phosphorus fertilizer on waterfront property.
- Investigate restoring emergent plant beds. (emergent plants were found in subsequent surveys)

Wisconsin Department of Natural Resources. *Citizen Lake Monitoring Data.* Collected 1991-1993, 1995, 2004, 2007.

Frequency of data collected and parameters analyzed varied. Only Secchi depth was consistently collected. July and August TSI ranges showed general decline from 1991 to 2007 with values in oligotrophic to near mesotrophic range.

Wisconsin Department of Natural Resources. *The Diversity, Density and Distribution of Aquatic Plants in Perch Lake, St. Croix County, WI.* March 1995.

Reports the results of the first WDNR aquatic plant survey of Perch Lake completed in 1993. Uses transect methods. Results are also reported in the 2005 WNDR aquatic plant report where 2004 and 1993 survey results are compared.

Perch Lake has a diverse aquatic plant population including species sensitive to environmental change.

Wisconsin Department of Natural Resources. *Fish Stocking Data 1972-2014.*

The WDNR stocked rainbow trout in Perch Lake from 1972-2014. Stocking data includes year and, in some cases, length/type of fish stocked. Rainbow trout have been stocked frequently in Perch Lake, generally at least once per year although some years are skipped and sometimes there are multiple stockings in a given year.

Wisconsin Department of Natural Resources. Wisconsin Department of Agriculture, Trade and Consumer Protection, St. Croix County Land Conservation Department and Polk County Land Conservation Department. *Nonpoint Source Control Plan for the St. Croix County Lakes Cluster Priority Watershed Project. April 1997.*

Includes results of watershed inventories and outlines available technical and financial assistance for best management practices. Lake to watershed ratio is 1:9. During inventory there were record high water levels flooding timber and roads.

Perch Lake is a 2-story fishery with coldwater portion managed for rainbow trout.

Project funding was available through 2009

Perch Lake Watershed

Land Use	Acres	Percentage of Watershed
Crop	29	8
Pasture	63	18
Natural Area	25	7
Wetland	3	<1
Forest	125	36
Developed	47	14
Open Water	51	15
Total	343	100

Perch Lake Inventoried Phosphorus Load

Nonpoint Source	P Load (lbs.)	% of Total
Uplands	8	4
Gullies	6	3
Shoreline	83	41
Residential	15	7
Precipitation	11	6
Groundwater	78	39
Total	201	100

Goals for Perch and Bass Lake

Maintain and enhance current good water quality conditions

Protect and improve shallow water and terrestrial habitat along shoreline

Protect and enhance existing aquatic plant beds

Protect and restore wetland habitat (but no prior converted wetlands in the watershed)

Maintain or moderately improve the fishery

Objectives

Reduce phosphorus runoff from residential areas by 50%

Reduce phosphorus from shoreline erosion by 75%

Protect groundwater by installing best management practices

Best management practices installed: *(from tracking spreadsheet)*

\$60,000 spent on shoreline stabilization, \$1490 shoreland habitat at Homestead Park

Mackmiller property, shoreland habitat restoration, \$5,181 and \$525

Wisconsin Department of Natural Resources Lakes Pages

<http://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2488300>

Perch Lake (WBIC: 2488300) is a 45 acre lake located in the Town of St. Joseph in St. Croix County. The maximum lake depth is 63 feet. Trout are abundant and panfish and largemouth bass are common.

ST. CROIX COUNTY: Bass, Perch, Squaw, Baldwin Pine Lakes Management Plan-Phase 1 (1995)

ST. CROIX COUNTY: Bass, Perch, Squaw, Baldwin Pine Lake Management Planning-Phase 2 (1995)

1) Create display-size plan maps and graphics. 2) Rewrite county zoning ordinances with improved administrative procedures and an expanded list of available zoning districts to match the planning policy areas established by the plan. 3) Develop new town level zoning maps with appropriate zoning districts, in digital and hard copy format. 4) Develop a Citizen's Guide. 5) Prepare a final report which will include the tasks listed above. 6) The grantee will disseminate information to the public by newsletter mailings, entire report mailings, public meetings, a comprehensive management plan, and a Community Workshop Series.