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# **AQUATIC PLANT MANAGEMENT PLAN**

**Osprey Lake**

**Osprey Lake Property Owners Association**

**August 2021**

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### **Acknowledgements:**

Members of the Osprey Lake Property Owners Association who contributed to discussions and recommendations presented in this plan.

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## Executive Summary

Osprey Lake is an exceptionally beautiful lake, home to many species of birds, game fish, and a diverse aquatic plant community. Unfortunately, invasive Eurasian watermilfoil *Myriophyllum spicatum* (EWM) has become established in Osprey Lake, threatening its biodiversity, recreation, and overall health. As such, management of EWM is necessary to protect this valuable resource and maintain its status as a high-quality waterbody. An integrated management approach that relies on a combination of manual and chemical control methods is recommended to continue for Osprey Lake.

The general public and the Osprey Lake Property Owners Association, Inc. (OLPOA) take an active role in managing the lake, and their mission “is to advocate, monitor and act for the protection, environmental and recreational preservation and enhancement of the quality of Osprey Lake, its shoreland and watershed areas located in Sawyer County, Wisconsin, and to respond to issues pertaining thereto as deemed relevant by the membership.” Therefore, the primary goal of this plan is to protect Osprey Lake’s ecosystem and native plant community for the benefit of all lake users through management efforts to control EWM.

This goal will be accomplished through the following objectives:

1. **EWM Management.** Limit the spread of EWM through environmentally responsible methods to benefit the native plant community while maintaining EWM at manageable levels.
2. **Education and Awareness.** Continue to educate property owners and lake users on aquatic invasive species through public outreach and education programs to help contain EWM within the lake and prevent its spread further in the lake, as well as to other waterbodies.
3. **Research and Monitoring.** Develop a better understanding of the lake and the factors affecting lake water quality through continued and expanded monitoring efforts.
4. **Adaptive Management.** Follow an adaptive management approach that measures and analyzes the effectiveness of control activities and modify the management plan as necessary to meet goals and objectives.

## **Aquatic Plant Management Summary**

We recommend the continuation of a combination of chemical and manual control methods to curb the spread of EWM in Osprey Lake and prevent it from dominating the lake. The overall goal of this Aquatic Plant Management (APM) Plan is to protect this outstanding resource from degradation by maximizing prevention of new invasions and through the containment and control of existing aquatic invasive species while maintaining recreational use of the lake.

This plan supports sustainable practices to protect, maintain and improve the native aquatic plant community, the fishery, and the recreational and aesthetic values of the lake as described in the goals of the OLPOA. This plan is intended to be a living document that will be evaluated annually to determine if it is meeting stated goals and community expectations, and can it be revised if necessary. The OLPOA sponsored the development of this APM Plan aided by a WDNR Directed Studies program.

APM plans developed for northern Wisconsin lakes are evaluated according to Northern Region APM Strategy goals developed by the WDNR (Appendix A). APM plans and the associated management permits (chemical or harvesting) are reviewed by the WDNR. Additional review may be completed by the Voigt Intertribal Task Force (VITF) in cooperation with the Great Lakes Indian Fish and Wildlife Commission (GLIFWC). WDNR aquatic plant management planning guidelines, the Northern Region Aquatic Plant Management Strategy, and the goals of the OLPOA in conjunction with the current state of the lake formed the framework for the development of this APM Plan.

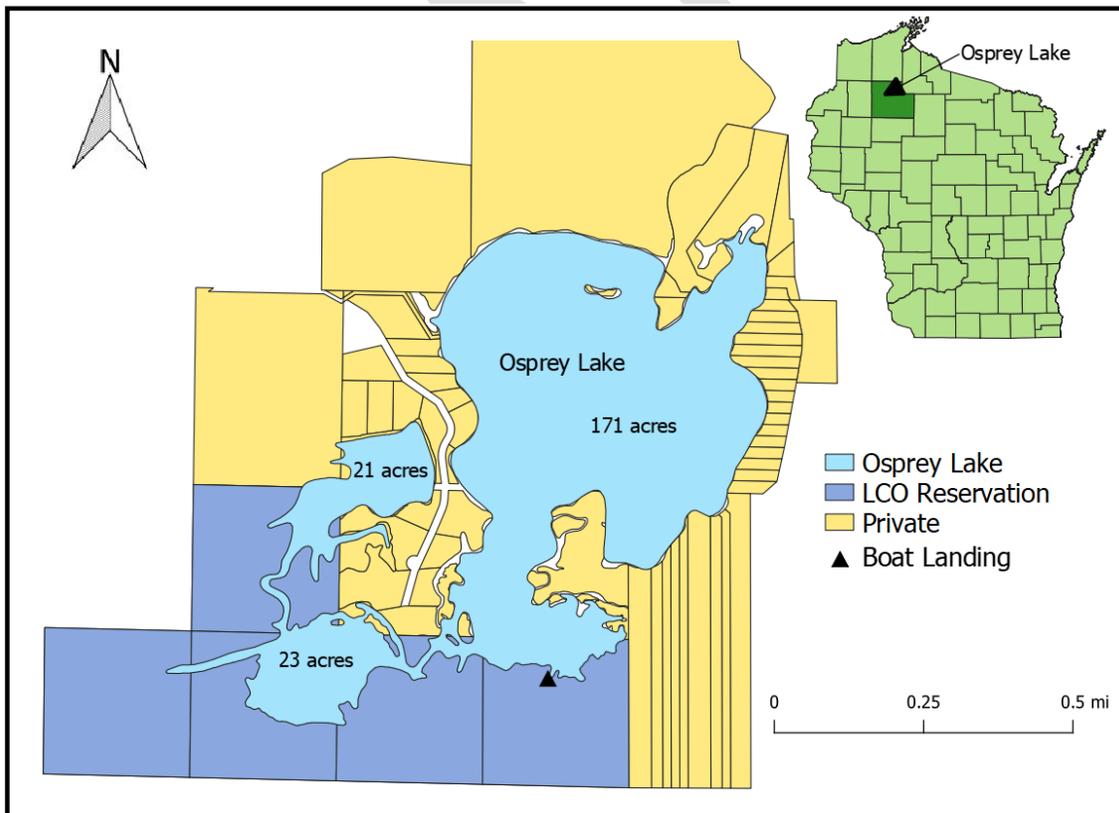
### **Public Input**

## Lake Information

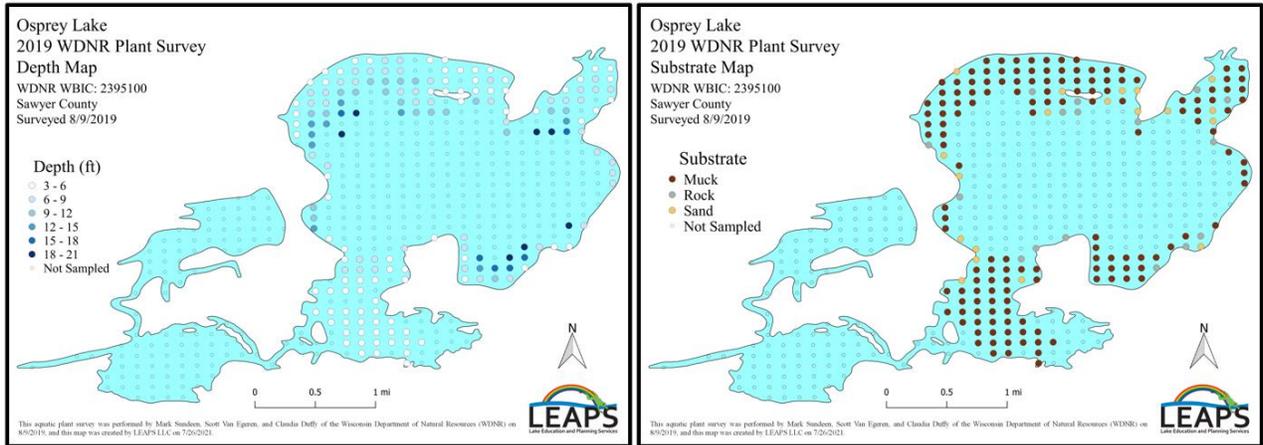
### Background

Osprey Lake (WBIC 2395100) is a clear, soft-water, seepage lake located in Sawyer County near Hayward, Wisconsin (Figure 1). The lake has a surface area of approximately 214 acres, a maximum depth of 32 feet, and an average depth of 12 feet (Figure 2). Osprey Lake primarily has mucky to sandy substrate with some rocky areas (Figure 2). Water quality data collected by the LCO Conservation Department has determined that Osprey Lake is a borderline mesotrophic to oligotrophic lake (clear water, low productivity, and no recreational use impairments). Aquatic vegetation is abundant, supporting a fishery of musky, northern pike, walleye, bass, and panfish. The two sub-basins (21 and 23 acres) of Osprey Lake, located west of the lake and connected by small channels during periods of high water, can only be accessed by non-motorized boats due to dense floating and emergent vegetation (Figure 1).

The southern portion of Osprey Lake falls within the Lac Courte Oreilles Band of Lake Superior Chippewa Indians Reservation and is considered a unique and significant water resource by the Lac Courte Oreilles Band of Lake Superior Chippewa Indians (LCO) and the Wisconsin Department of Natural Resources (WDNR). The LCO Tribe maintains a public boat landing at the south end of the lake and utilizes the lake for spearing walleye (Figure 1).



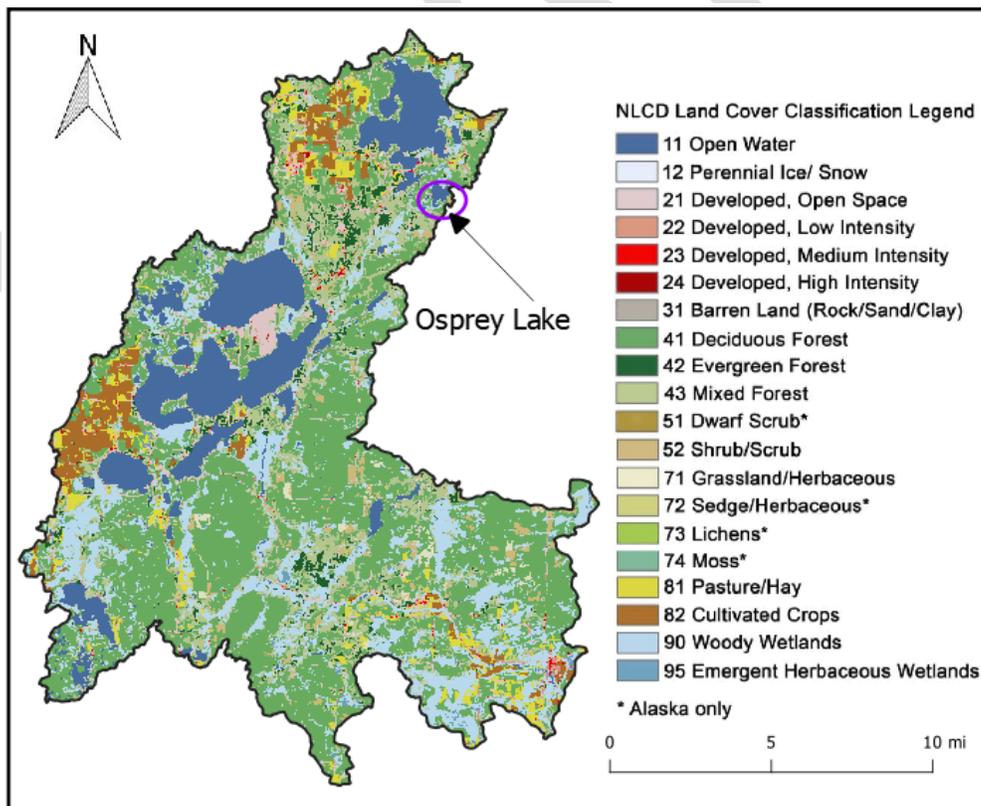
**Figure 1. Location and land ownership of Osprey Lake, Sawyer County, Wisconsin**



**Figure 2. Osprey Lake depth and bottom substrate (WDNR, 2019)**

### Watershed Land Cover

A watershed is an area of land from which water drains to a common surface water feature such as a stream, lake, or wetland. Osprey Lake is part of the Couderay River watershed with an inlet stream that flows from Little Round Lake and an outlet stream that flows into Lac Courte Orielles Lake. The watershed is mostly forested with some large wetland complexes and some land used for crops and hay (Figure 3). Within 500 feet of the lake is mostly forest and wetlands with a low amount of development.



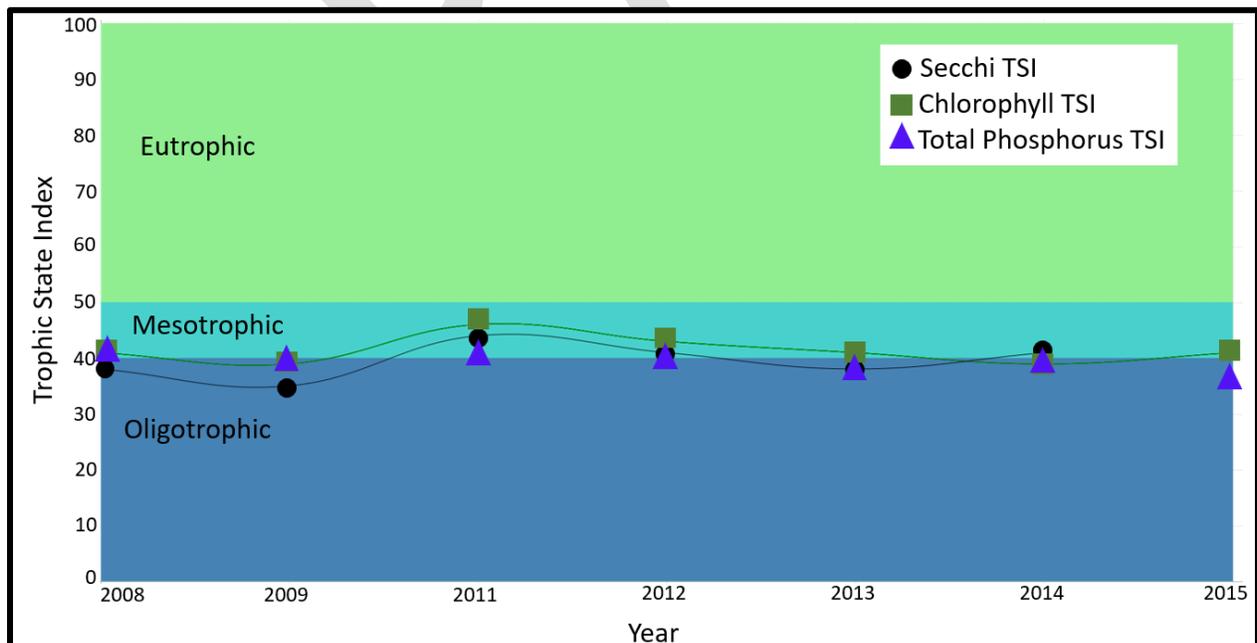
**Figure 3. Couderay River watershed land cover (NLCD, 2016)**

## Trophic Status

In Osprey Lake, water quality measurements of chlorophyll-*a* (Chl-*a*), and total phosphorus (the nutrient that supports aquatic life), and water clarity (using a Secchi disk) were collected from 2005-2018. The Carlson's Trophic Status Index (TSI; Carlson, 1977), a commonly used measurement of water quality, uses these data to determine the trophic status of the lake as a proxy for water quality. The TSI of Osprey Lake was averaged at 40, which is borderline between mesotrophic (moderate levels of nutrients and relatively clear) and oligotrophic (nutrient-poor and clear; Figure 4).

The specific measurements of water quality and trophic status in Osprey Lake have fluctuated over time. Secchi depth (a measure of water clarity) in Osprey Lake is available from 2008-2014, excluding 2010. Secchi depths ranged from 10 to 18 feet with an overall average of 13.7 feet, which classifies Osprey Lake as an oligotrophic system. Chlorophyll-*a* in those same years ranged from 0.73 to 7.6  $\mu\text{g/L}$ , averaging 2.74  $\mu\text{g/L}$  (trophic state value 45), which classifies Osprey Lake as a mesotrophic lake (Figure 4). Total phosphorus has ranged from 8  $\mu\text{g/L}$  to 23  $\mu\text{g/L}$  and averages 12.6  $\mu\text{g/L}$ , which classifies the lake as borderline meso to oligotrophic. More information can be found at: <https://dnr.wi.gov/lakes/waterquality/Station.aspx?id=10039031>.

The rich plant community of Osprey Lake provides many beneficial functions to the lake. The plant community helps maintain its clear water status by limiting the amount of nutrients that can be used by algae (a key determinant in pushing Osprey Lake towards becoming more mesotrophic). It also supports a productive game fish community by sheltering young, small fish and providing ambush opportunities for game fish species like northern pike *Esox lucius*. The native plants also help protect the shoreline of Osprey Lake from erosion by absorbing and mitigating waves before they can reach the vulnerable shore. Overall, maintaining the health of the plant community of Osprey Lake is critical in maintaining the quality of the water and the quality of the lake as a whole.



**Figure 4. Osprey Lake Trophic Status Index from 2008-2015**

## **Oxygen**

Dissolved oxygen is essential for the survival of most aquatic animals, just like atmospheric oxygen is essential for most terrestrial animals. Surface waters (also called the epilimnion) exchange oxygen with the atmosphere and are usually oxygen-rich. In deeper lakes, or smaller lakes that are generally sheltered from prevailing winds, the water in the lake stratifies (or separates) into distinct zones during the summer months, impacting water quality and affecting biota. These zones are the epilimnion (usually oxygen-rich surface waters), the thermocline (the layer separating the surface and bottom waters), and the hypolimnion (oxygen-depleted bottom waters).

In most cases, a lake does not remain in a stratified state year-round. Monitoring data indicates that Osprey Lake is dimictic, meaning that at least twice a year (spring and fall) stratification is replaced by a mixing event called “overtturn” or “turnover” where all waters in the lake (top and bottom) naturally mix, recharging levels of dissolved oxygen and distributing necessary nutrients throughout the water in the lake. Smaller and often limited “mixing” events can occur in the summer months due to large storm events or heavy recreational use. Monitoring data for Osprey Lake show that hypoxia (low oxygen) regularly occurs at depths below 21 feet during summer months (June-September).

## **Public Use**

Osprey Lake is used for a wide range of recreational activities, including:

- Fishing for panfish species, bass, northern pike, musky, and walleye
- Using nonmotorized boats while photographing or viewing nature
- Using motorized boats for recreational enjoyment of the lake
- Swimming

There is one public boat landing on the lake, located on the south end of the lake on the LCO Tribal Reservation (Figure 1).

These activities in Osprey Lake can all be hindered by EWM. Additionally, Osprey Lake may serve as a source point of EWM to other waterbodies if boats and trailers are not properly inspected. Therefore, management of this invasive species is necessary to allow full recreational use of the lake and prevent further spread into un-infected lakes.

## **Fisheries and Wildlife Habitat**

The fishery on Osprey Lake is managed by two organizations, the LCO Tribe and the Wisconsin Department of Natural Resources. The fishery supports largemouth bass, northern pike, smallmouth bass, walleye, musky, and panfish. There is great spawning habitat for northern pike, musky, bass and some limited areas for walleye spawning. Currently, there is a large population of largemouth bass and high numbers of northern pike. The growth rate of panfish in the lake is below average. A potential cause may be increased fishing pressure on predator fish reducing the number of smaller fish preyed upon each year (P. Christel, personal comm.).

Osprey Lake is being managed for walleyes. There is currently a walleye stocking program being implemented to determine if numbers can be raised enough to sustain a walleye fishery. On September 16, 2010 an electrofishing survey was done by the WI Department of Natural Resources to determine numbers of young walleye. Relatively low densities of walleye were found in the fall survey (3.2 young-of-year walleye/mile; J. Krahn, personal comm.). The walleye found in the survey most likely represent fish that were stocked the previous year and not a naturally reproducing population (J. Krahn, personal

|  
comm.). Bluegills and largemouth bass were common during the survey and northern pike were observed.

Osprey Lake is surrounded by exceptional wildlife habitat. The lake is considered an Area of Special Natural Resource Interest (ASNRI) by the WDNR. The forested areas surrounding the lake provide habitat for many animal species. Additionally, the wetlands along and near the lake provide high quality habitat for many birds and other species.

The relatively low density of homes and human disturbance on the lake make it attractive to wildlife. An eagle's nest is located on the island in the north part of the lake. Overall, with the predominantly natural shoreline that is found on the lake, the area is excellent wildlife and fishery habitat.

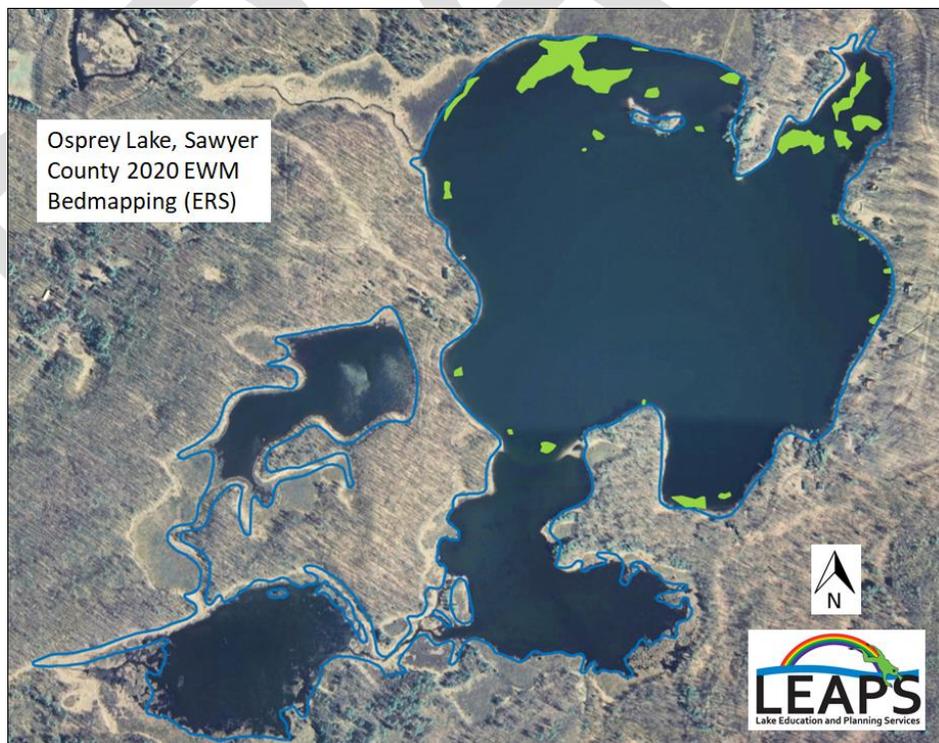
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## Need for Management

Aquatic plants provide habitat for fish and other aquatic organisms, serve as food sources for waterfowl and other wildlife, stabilize the shoreline, and work to improve clarity by absorbing excess nutrients from the water. They are the foundation of a lake and key indicators of the lake's health. Thus, maintaining Osprey Lake's native community while treating invasive EWM is critical to maintaining a healthy lake.

Osprey Lake's plant community is relatively sensitive compared to most other lakes in the region. This lake regularly has 7 extremely high-value species. The water clarity and quality they depend on for survival also makes them dependent on continued landowner stewardship to maintain the lake's nearly pristine conditions.

Osprey Lake's clear, soft water provides ideal habitat for several species. In the sandy, mucky main basin of the lake, common waterweed *Elodea canadensis*, slender naiad *Najas flexilis*, fern-leaf pondweed *Potamogeton robinsii*, and water celery *Valisneria americana* dominate. Osprey Lake's shallow, small sub-basins have are highly dense (to the point of being unable to drive a motorized boat through them) with floating leaf species like white water lily *Nymphaea odorata*, spatterdock *Nuphar variegata*, and watershield *Brasenia schreberi*, as well as multiple bladderwort species. EWM can be found in larger, dense beds in several locations, and in smaller more isolated beds around the lake including the north shore, northwest bay, and in high boat traffic navigation areas (Figure 5). Because the location of EWM hinders landowners from using the lake and is in locations that may hinder general boat traffic, a combination of continued herbicide treatments and hand removal provides the best compromise between maintaining the high quality of the lake while also protecting recreational use.



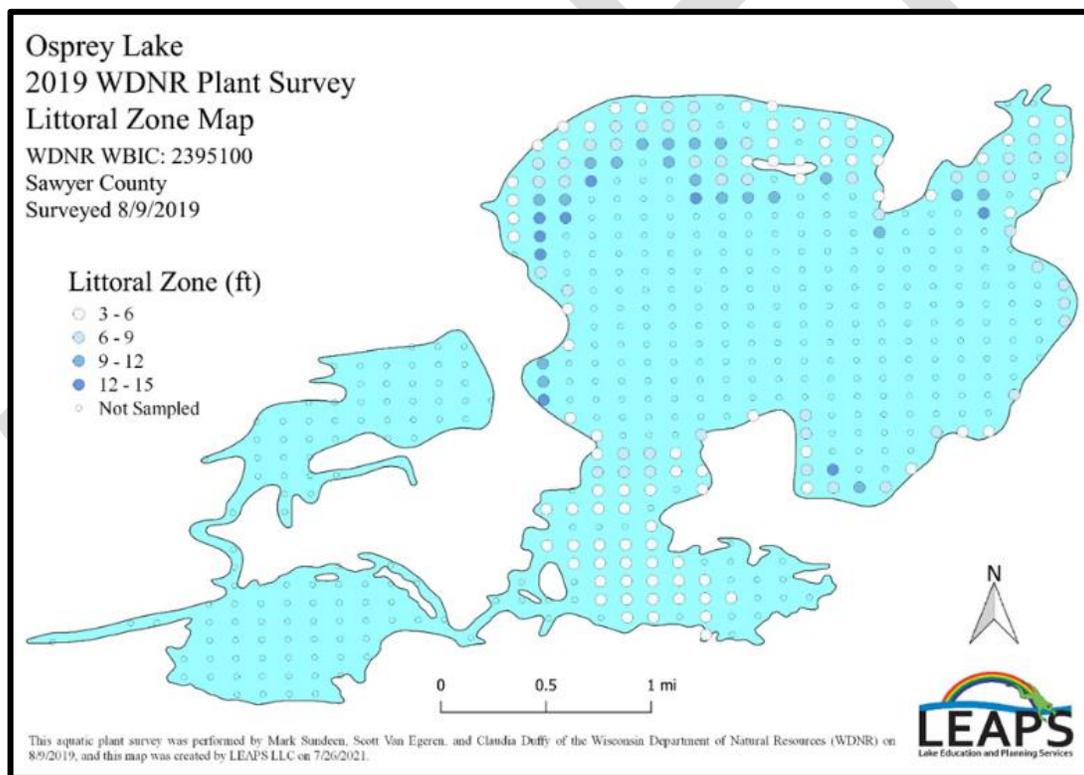
**Figure 5. EWM beds in Osprey Lake, Sawyer County, Wisconsin**

## Warm-water Point-intercept Macrophyte Survey Results

### Current Status

In the latest whole lake point-intercept survey completed by the WI-DNR in 2019, only points in the larger main basin were sampled. Of the 427 sample points in the main basin, 173 had aquatic plant growth and 206 points were shallower than the deepest point with vegetation. For the main basin of Osprey Lake, the littoral, or plant growing zone (considered to be water  $\leq 21$ ft) covers about 82 of the 171 acres of the lake. In 2020, EWM covered 4.26 acres or a little more than 5% of that area (Figure 5). EWM can be found in most places in the lake with a firm, mucky bottom in depths from 3-10 feet (Figure 5).

The plant community of Osprey Lake can be subdivided into four distinct zones (emergent, shallow submergent, floating-leaf, and deep submergent) with each zone having its own characteristic functions in the lake ecosystem. Depending on the local bottom type (sand, rock, sandy muck, or nutrient-rich organic muck), these zones often had somewhat different species present. The steeply sloping bed of Osprey Lake causes the littoral zone to be relatively small; this confines each plant zone to relatively narrow areas (Figure 2; Figure 6).



**Figure 6. Littoral zone of Osprey Lake**

In shallow areas, emergent plants prevent erosion by stabilizing the lakeshore, breaking up wave action, providing a nursery for baitfish and juvenile gamefish, offering shelter for amphibians, and giving waterfowl and predatory wading birds, like herons, a place to hunt. These areas also provide important habitat for invertebrates like dragonflies and mayflies. Over firm sandy muck, tight to the shoreline

(especially in the channel connecting to the main basin) the emergent community contains Robbins' spikerush *Eleocharis robbinsii*, pipewort *Eriocaulon aquaticum*, and brown-fruited rush *Juncus pelocarpus*. In bays with more organic muck, these species are replaced by arrowhead *Sagittaria* sp. (especially along the north shore), and water bulrush *Schoenoplectus subterminalis* (in the southern bay of the main basin).

Just beyond the emergent plant species, the lakebed becomes more mucky, supporting a different array of species. These shallow areas (generally less than 6 feet in depth) are dominated by the floating-leaf species watershield, white-water lily, and spatterdock. The protective canopy cover these species provide is often utilized by panfish and bass. Other pondweed species that may produce floating leaves in this zone included large-leaf pondweed *Potamogeton amplifolius*, variable pondweed *Potamogeton gramineus*, and floating-leaf pondweed *Potamogeton natans*.

Growing in gaps in the floating-leaf canopy and among the dominant pondweeds, scattered patches of water marigold *Bidens beckii*, muskgrass *Chara* sp., common waterweed *Elodea canadensis*, slender naiad, variable pondweed *Potamogeton gramineus*, and fern-leaf pondweed are found. The roots, shoots, and seeds of all these species are heavily utilized by waterfowl for food, and they also provide important habitat for the lake's fish throughout their life cycles, as well as a myriad of invertebrates like scuds, dragonfly and mayfly nymphs, and snails.

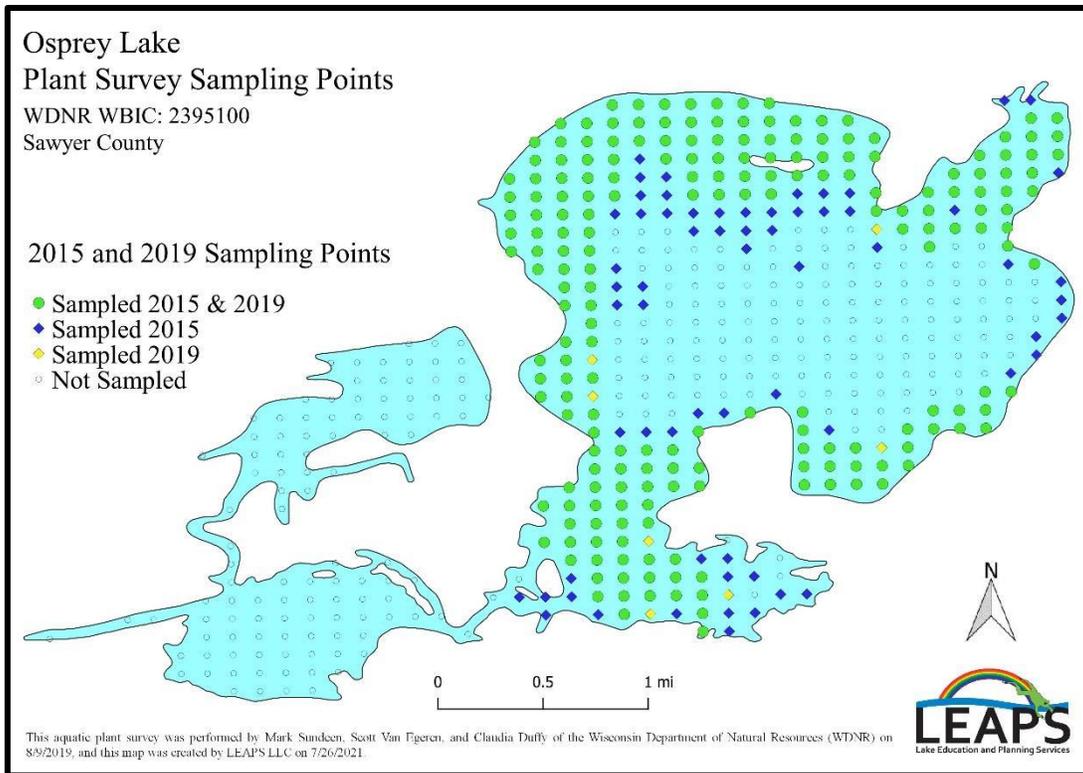
Floating amongst the shallow-submergent and floating-leaf species, large numbers of carnivorous bladderworts can be encountered. Rather than drawing nutrients up through roots like other plants, these carnivores trap zooplankton and minute insects in their bladders, digest their prey, and use the nutrients to further their growth. This group includes flat-leaf bladderwort *Utricularia intermedia* and common bladderwort *Utricularia vulgaris* in Osprey Lake. Floating-leaf and shallow submergent species generally disappear on Osprey Lake in water over 6-7ft deep. In these deeper submergent areas, muskgrass, common waterweed, and fern-leaf pondweed dominate the plant community and often form dense beds. Predatory fish like musky, northern pike, and walleye are often found along the edges of these deep-water beds waiting in ambush.

## Comparison of Native Macrophyte Species in 2006, 2015, and 2019

In each year of surveying Osprey Lake, dense vegetation and varying water levels have changed the number of points that can be sampled. In 2006, 319 of 535 possible points designated by the WDNR were sampled; in 2015, 267 of 535 possible points were sampled; and in 2019, 210 of 535 possible points were sampled (Table 1; Figure 7). Most notably, the two shallow sub-basins of Osprey Lake were not sampled in any year due to the dense floating vegetation that make navigation with a motor boat impossible. Point locations for 2006 are not available, and all data for 2006 and 2015 are from the Osprey Lake 2015 Aquatic Plant Survey and Comparison to 2006 Survey Report by Dan Tyrolt of the LCO Conservation District (Tyrolt, 2015). Plant survey data from 2019 are taken from the WDNR point intercept survey results.

**Table 1. Osprey Lake aquatic plant survey summary statistics**

<b>SUMMARY STATS:</b>	<b>2006</b>	<b>2015</b>	<b>2019</b>
Total number of points sampled	319	267	210
Total number of sites with vegetation	208	237	173
Total number of sites shallower than maximum depth of plants	292	260	206
Frequency of occurrence at sites shallower than maximum depth of plants	71.2	91.15	83.98
Simpson Diversity Index	0.93	0.93	0.91
Maximum depth of plants (ft)	25.0	23.0	21.0
Number of sites sampled using rake on Rope (R)	88	124	33
Number of sites sampled using rake on Pole (P)	191	142	172
Average number of all species per site (shallower than max depth)	2	2.87	2.18
Average number of all species per site (veg. sites only)	1.48	3.15	2.60
Average number of native species per site (shallower than max depth)	1.8	2.71	2.16
Average number of native species per site (veg. sites only)	1.48	3.15	2.58
Species Richness	35	33	33
Species Richness (including visuals)	37	37	33



**Figure 7. Points sampled in 2015 and 2019 Osprey Lake PI surveys**

In 2006, muskgrass, common waterweed, and fern-leaf pondweed were the three most common species (Table 2). They were present at 31.25%, 28.36%, and 27.88%, of survey points with vegetation respectively, and collectively, they accounted for 87.5% of the total relative frequency. During the 2015 survey, fern-leaf pondweed, muskgrass, and water celery were the most common species (Table 2; Table 3). Present at 37.97%, 30.38%, and 29.54% and 33.72% of sites with vegetation, they accounted for 97.89% of the total relative frequency. In the 2019 survey, slender naiad, water celery, and fern-leaf pondweed were the three most common species and were present at 38.15%, 37.57%, and 31.2% of survey points with vegetation, respectively (Table 3; Table 4).

**Table 2. Change in species presence from 2006 to 2015**

<b>Species</b>	<b>2006</b>	<b>2015</b>	<b>+/-</b>
Eurasian watermilfoil	present	present	---
Creeping spikerush	present	0	no change
Cattail	present	present	no change
Muskgrass	65	72	---
Common waterweed	59	38	-
Fern-leaf pondweed	58	90	+
Bushy pondweed	51	3	-
Nitella	40	57	+
Small pondweed	39	12	-
Variable pondweed	28	61	+
Water celery	18	70	+
Clasping-leaf pondweed	17	3	-
Water marigold	15	19	+
Flat-stem pondweed	14	0	-
White water lily	13	41	+
*Water bulrush	13	30	+
Sagittaria sp.	11	3	-
Needle spikerush	10	9	---
Floating-leaf pondweed	10	28	+
Watershield	9	39	+
*Dwarf watermilfoil	9	0	-
Northern watermilfoil	7	1	-
Large-leaf pondweed	7	25	+
Spatterdock	6	12	+
Water stargrass	4	3	-
Common bur-reed	4	2	-
Coontail	3	0	---
Aquatic moss	3	17	+
*Flat-leaf bladderwort	2	44	+
Freshwater sponge	2	4	+
Robbins spikerush	1	6	+
*Pipewort	1	2	+
Water smartweed	1	1	-
Pickerelweed	1	2	+
White-stem pondweed	1	7	+
Soft stem bulrush	1	2	+
Filamentous algae	0	42	+
Bottle brush sedge	0	present	no change
Small duckweed	0	present	---
*Narrow-leaved bur-reed	0	1	+
Short-stem bur-reed	0	1	+

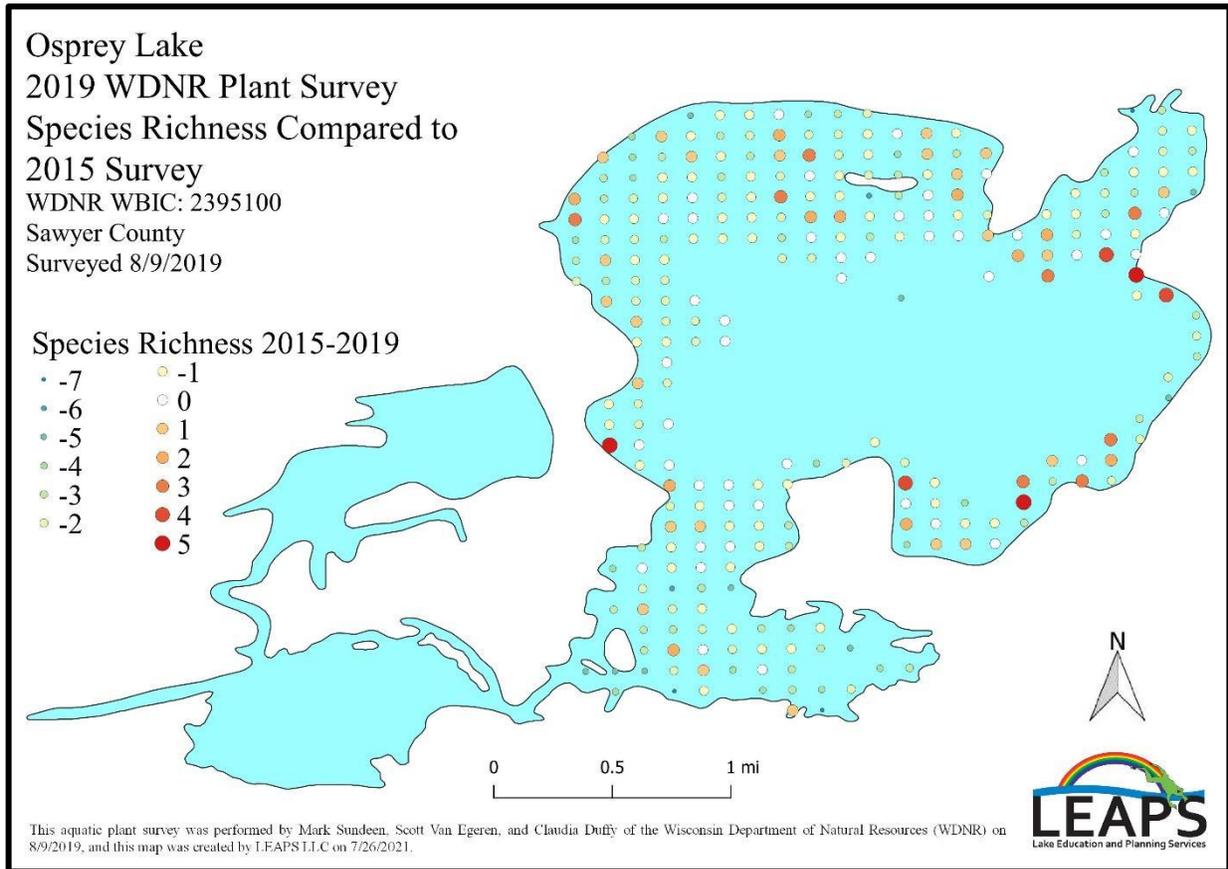
**Table 3. Change in species presence from 2015 to 2019**

Species	2015	2019	+/-
Eurasian watermilfoil	present	present	---
Bottle brush sedge	present	0	no change
Cattail	present	0	no change
Robbins pondweed	90	54	-
Muskgrass	72	52	-
Water celery	70	65	-
Variable pondweed	61	22	-
Nitella	57	10	-
*Flat-leaf bladderwort	44	6	-
Filamentous algae	42	3	-
White water lily	41	10	-
Watershield	39	11	-
Common waterweed	38	32	-
*Water bulrush	30	18	-
Floating-leaf pondweed	28	12	-
Large-leaf pondweed	25	10	-
Water marigold	19	12	-
Aquatic moss	17	12	-
Spatterdock	12	11	-
Small pondweed	12	6	-
Needle spikerush	9	0	-
White-stem pondweed	7	1	-
Robbins spikerush	6	3	-
Freshwater sponge	4	1	-
Water stargrass	3	3	no change
Brown-fruited rush	3	1	-
Bushy pondweed	3	0	-
Clasping-leaf pondweed	3	12	+
Sagittaria sp.	3	2	-
*Pipewort	2	1	-
Pickerelweed	2	0	-
Soft stem bulrush	2	0	-
Common bur-reed	2	0	-
Northern watermilfoil	1	0	-
Water smartweed	1	0	-
*Narrow-leaved bur-reed	1	1	no change
Short-stem bur-reed	1	0	-
*Spiny hornwort	0	1	+
*Dwarf watermilfoil	0	2	+
Slender naiad	0	66	+
Leafy pondweed	0	2	+
Long-leaf pondweed	0	1	-
Spiral-fruited pondweed	0	1	+
*Vasey's pondweed	0	1	+
Flat-stem pondweed	0	5	+
Common bladderwort	0	6	-

**Table 4. Change in species presence from 2006 to 2019**

<b>Species</b>	<b>2006</b>	<b>2019</b>	<b>+/-</b>
Eurasian watermilfoil	present	present	---
Slender naiad	0	66	+
Water celery	18	65	+
Robbins pondweed	58	54	-
Muskgrass	65	52	-
Common waterweed	59	32	-
Variable pondweed	28	22	-
*Water bulrush	13	18	+
Water marigold	15	12	-
Aquatic moss	3	12	+
Floating-leaf pondweed	10	12	+
Clasping-leaf pondweed	17	12	-
Watershield	9	11	+
Spatterdock	6	11	+
Nitella	40	10	-
White water lily	13	10	-
Large-leaf pondweed	7	10	+
Small pondweed	39	6	-
*Flat-leaf bladderwort	2	6	+
Common bladderwort	0	6	+
Flat-stem pondweed	14	5	-
Filamentous algae	0	3	+
Robbins spikerush	1	3	-
Water stargrass	4	3	-
*Dwarf watermilfoil	9	2	-
Leafy pondweed	0	2	+
Sagittaria sp.	11	2	-
*Spiny hornwort	0	1	+
*Pipewort	1	1	no change
Brown-fruited rush	0	1	-
Long-leaf pondweed	0	1	+
White-stem pondweed	1	1	no change
Spiral-fruited pondweed	0	1	+
*Vasey's pondweed	0	1	+
*Narrow-leaved bur-reed	0	1	+
Freshwater sponge	2	1	-
Coontail	3	0	-
Needle spikerush	10	0	-
Creeping spikerush	present	0	no change
Northern watermilfoil	7	0	-
Bushy pondweed	51	0	-
Water smartweed	1	0	+
Pickerelweed	1	0	+
Soft stem bulrush	1	0	-
Common bur-reed	4	0	-

The overall species richness of Osprey Lake varied between surveys. From 2015 to 2019 (2006 raw survey data was not available), species richness increased in shallow to medium depths and stayed the same in deeper sites (Table 1; Figure 8). Overall, the species richness of the lake as a whole did not drastically differ (Figure 8; Table 5). The Mean Coefficient of Conservatism (C) did increase from about 6.5 in 2006 and 2015 to 7.2 in 2019 (Table 1; Table 5).



**Figure 8. Change in species richness from 2015 to 2019 in Osprey Lake**

**Table 5: Floristic Quality Index of Aquatic Macrophytes  
Osprey Lake, Sawyer County**

	<b>2006</b>	<b>2015</b>	<b>2019</b>
<b>Species Richness</b>	35	33	33
<b>Simpson Diversity Index</b>	0.93	0.93	0.91
<b>Mean C</b>	6.5	6.5	7.2
<b>FQI</b>	37.6	36.8	39.44

Across all surveys, 30 **native index plants** were found. They produced a mean Coefficient of Conservatism of 7.2 and a Floristic Quality Index of 39.44 (Table 5). Nichols (1999) reported an average Mean C for the Northern Central Hardwood Forests Region of 5.6, putting Osprey Lake well above average for this part of the state. The FQI was also well above the median FQI of 20.9 for the Northern Central Hardwood Forests Region (Nichols 1999). Exceptionally high value index plants of note included spiny hornwort (C = 10), dwarf watermilfoil *Myriophyllum tenellum* (C=10), water bulrush (C = 9), flat-leaf bladderwort (C = 9), and the State Species of Special Concern Robbins' spikerush (C = 10).

## EWM Management History

EWM was first found in Osprey Lake by the LCO Conservation Department near the boat landing in 2005. At the time, surveys found less than 10 acres of EWM, and it was assumed that EWM had been in the lake less than 5 years. However, its spread did meet the requirements of the WDNR Rapid Response Grant that the OLPOA applied for and obtained. Three years of herbicide treatments were initiated under the Rapid Response Grant (2006-2008). After the first treatment of Navigate (2,4-D) herbicide in 2006, there were only a few plants found near the Round Lake inlet. In the spring of 2007, an additional 6 acres of EWM was treated with 2,4-D, but several more plants were found later in the year. In 2008, 4 acres were treated. In 2010, EWM was found to be spreading, and a larger treatment of 5 acres was applied. Chemical herbicide treatments of 2,4-D continued until 2015, stopped, and resumed with resumed with 3.5-acre treatments using Renovate Max G in both 2019 and 2020. In 2021, a 3.5-acre treatment using 2,4-D Amine 4 was completed (Table 6). Throughout these years, hand pulling of EWM was implemented around docks, swimming areas, and other small areas that did not warrant a chemical treatment. Additionally, diver removal of EWM took place in 2021.

**Table 6. EWM treatment history in Osprey Lake (D. Dressel, Contracted herbicide applicator)**

Year	Acres Treated	Herbicide	Rate (lbs/acre)	Rate (gal/acre)
2006	8	2,4-D	125	-
2007	6	2,4-D	100-125	-
2008	5	2,4-D	150	-
<u>2009</u>	<u>1</u>	<u>2,4-D</u>	<u>150</u>	
2010	5	2,4-D	150	-
2011	2.5	2,4-D	200	-
	3.5	Renovate Max G	300	
<u>2012</u>	<u>12</u>	<u>2,4-D</u>	<u>??</u>	
2013	9	2,4-D	262	-
2015	6	Renovate Max G	300	-
2019	<u>3.54.24</u>	Renovate Max G	300	
2020	<u>3.53.24</u>	Renovate Max G	330	-
2021	3.5	2,4-D Amine 4	-	12.0



EWM. Photo Credit: Megan Mader, LEAPS, LLC

## Aquatic Plant Management Alternatives

Protecting native plants and limiting EWM is a primary focus of plant management in Osprey Lake due to its diverse plant community and the benefits it offers, including providing fish and wildlife habitat, keeping other aquatic invasive plant species at bay, maintaining water quality, protecting the shoreline from erosion, improving lake aesthetics, and increasing land owner privacy. Generally, control methods for nuisance aquatic plants can be grouped into four broad categories:

- Chemical control: use of herbicides
- Mechanical/physical control: pulling, cutting, raking and harvesting
- Biological control: the use of species that compete successfully with the nuisance species for resources
- Aquatic plant habitat manipulation: dredging, flooding, and drawdowns

In many cases, an integrated approach to aquatic plant management is the best way to protect and enhance the native plant community while maintaining functional use of the lake.

### **Physical/Manual Removal: Recommended**

Physical removal will be completed by educated landowners who monitor their own shorelines or by a trained EWM Management Team sponsored by the OLPOA. There is no limit as to how far out into the lake this management activity can occur, provided the area cleared is no more than 30-ft wide. It limits disturbance to the lake bottom, is inexpensive, and can be practiced by many lake residents. Landowners should also continually monitor near their docks and swimming areas in the open water season and remove rooted plants as well as floating fragments that wash into their shoreline.

Pulling EWM while snorkeling or SCUBA diving in deeper water is also allowable without a permit and can be effective at slowing the spread of a new aquatic invasive species infestation within a waterbody when done properly. Diver removal will be completed by OLPOA volunteers and/or resource professionals retained by the OLPOA. These efforts will focus on smaller beds not treated with chemical herbicides in areas not directly adjacent to any landowner's property. Diver Assisted Suction Harvesting (DASH), a hand removal method that requires a diver to handfeed EWM into a suction tube, is not recommended at this time on Osprey Lake because the additional equipment, permitting, and overall cost is much greater compared to diver removal.

### **Chemical Herbicide Treatments: Recommended**

Herbicides will be used to manage existing EWM and any existing or new areas with moderate to severe growth density and deemed too large for effective physical removal. Determining which herbicide to use (as approved by the state of Wisconsin) and at what concentration will be determined on a yearly basis during the treatment planning phase. Spring application of herbicides is preferred to reduce negative effects on native plants. Mid-season application of herbicides will be implemented if new beds of EWM that meet the previous discussed criteria are discovered post-treatment.

There are several chemical herbicide options currently available in the State of Wisconsin (as approved by the Environmental Protection Agency). There are two classes of aquatic chemical herbicides currently in use:

- 1) Systemic: moves through the entire plant. It is absorbed through the leaves or stem and moves through the entire plant and usually results in the death of the plant within two or more weeks

- 2) **Contact:** kills the plant at the point of contact. The entire plant may not be damaged, and the roots may still be viable for regrowth. Mostly used when an immediate removal of a plant is required.

Available aquatic herbicides for EWM include:

### **ProcellaCOR**

ProcellaCOR® is a relatively new systemic, selective herbicide that can be used to target EWM with limited impact to most native species. It is also very fast acting, making it an effective control measure on smaller beds like those located in Osprey Lake, especially ones in high boat traffic areas and/or deeper water. In addition, applications rates are measured in ounces, not gallons as is common with almost all other liquid herbicides. And while it is more expensive to use than 2,4-D equivalents, it has been shown to provide 2 or more years of control without re-application. ProcellaCOR is recommended for future EWM management implementation.

### **Triclopyr**

Triclopyr is a selective, systemic herbicide used to control broadleaf plants like EWM by mimicking plant hormones. Liquid triclopyr (Renovate®) or granular triclopyr combined with granular 2,4-D (Renovate Max G®) may be an option in Osprey Lake. Renovate Max G® was successfully used on Osprey Lake in several previous years, and it may be a useful management tool again in the future, however neither triclopyr nor 2,4-D based herbicides are recommended for small-scale (<3ac) EWM treatments.

### **2,4-D (liquid)**

2,4-D is a commonly used systemic herbicide that targets dicot plants (or broad-leaved plants) like EWM. Monocots (like pondweed species and water celery) are generally not affected by 2,4-D. Shredder Amine 4®, also referred to as 2,4-D Amine 4® is a liquid formulation of 2,4-D. It was successfully used on Osprey Lake in 2021 to control EWM, and is a viable option again in the future. The use of liquid 2,4-D products are supported by the WDNR.

### **2,4-D (granular)**

Granular 2,4-D, under the trade name Navigate® or Sculpin G® has been effectively used in Osprey Lake to treat EWM in the past, and its use may be warranted again in the future, although under present WDNR guidelines for aquatic plant management, the use of granular 2,4-D products is not supported for management.

### **Fluridone (liquid)**

Fluridone is also a non-selective, systemic herbicide often used for whole-lake treatment. It is slow-acting and can be selective to EWM at low concentrations; however, the contact time must be very long in order for this to be effective, which may not be practical in Osprey Lake depending on wind and weather during and after applications. At the present time, whole-lake management of EWM is not a recommendation in this plan. As such, Fluridone is not appropriate for use in Osprey Lake.

### **Endothall (liquid)**

Endothall is a non-selective contact herbicide. This herbicide is generally recommended when EWM growth needs to be suppressed to allow native plants to recover and potentially reclaim the area. It is not recommended for cases when eradication is the goal. In Osprey Lake, Endothall is not likely to be a viable option in the future in order to protect the native plant community and prevent EWM from re-growing in treated areas.

### **Diquat (liquid)**

Diquat is another non-selective herbicide that is commonly used to control emergent and submersed aquatic vegetation. It is fast-acting and has no restrictions for swimming, fish, or wildlife, but there may be irrigation and drinking water restrictions for up to 5 days. Again, a non-selective contact herbicide is generally not going to be an option in Osprey Lake where the native plant community is so valuable and the risk of stressing the native plants and allowing EWM to re-grow would be detrimental to the lake.

### **Mechanical Harvesting: Not Recommended**

Harvesters can remove thousands of pounds of vegetation in a relatively short time period. They are not, however, species specific. Everything in the path of the harvester will be removed, including the target species, other plants, macro-invertebrates, semi-aquatic vertebrates, forage fishes, young-of-the-year fishes, and even adult game fish found in the littoral zone (Booms, 1999). Plants are cut at a designated depth, but the root of the plants are often not disturbed. Cut plants will usually grow back after time, and re-cutting several times a season is often required to provide adequate annual control (Madsen, 2000). Harvesting activities in shallow water can re-suspend bottom sediments into the water column releasing nutrients and other accumulated compounds (Madsen, 2000). Even the best aquatic plant harvesters leave some cutting debris in the water to wash up on the shoreline or create loose mats of floating vegetation on the surface of the lake. This “missed” cut vegetation can potentially increase the amount of EWM in a lake by creating more fragments that can go on to establish new sites elsewhere. A major benefit, however, of aquatic plant harvesting is the removal of large amounts of plant biomass from a water body. Mechanical harvesting is not recommended in Osprey Lake due to the risk of releasing EWM fragments and further spreading it throughout the lake.

### **Biological Control: Not Recommended**

Biological control uses one or more living organisms to control, or suppress, another living organism. Milfoil weevils *Euhychiopsis lecontei* are one method used to manage EWM. Weevils are an alternative to chemical treatments and potentially damaging mechanical harvesting. However, they are expensive to rear, easily predated on by sunfish, and only suppress – not eliminate – EWM. Biological control is not recommended in Osprey Lake due to the density of EWM in some beds and the healthy sunfish population.

### **Habitat Manipulation: Not Recommended**

Habitat manipulation can take the form of flooding, dredging and drawdowns. None of these options are recommended or viable in Osprey Lake. Flooding and drawdowns are not possible because there are no water level control structures on or near Osprey Lake that could be used to manipulate the water levels. Dredging is not recommended because the high-water quality and valuable habitat of Osprey Lake would be jeopardized by removing large quantities of substrate and bottom materials.

### **No Management: Not Recommended**

Regardless of the target plant species, native or non-native, sometimes no management is the best management option. Plant management activities can be disruptive to areas identified as critical habitat for fish and wildlife and should not be done unless it can occur without ecological impacts. This management alternative is not recommended for Osprey Lake due to the excessive growth of EWM in some areas and restrictions to public and lake property owner access to the lake. Additionally, limiting the spread of EWM within the lake through management protects the ecological integrity of the lake long-term.

## Aquatic Plant Management Discussion

Osprey Lake supports a valuable aquatic plant community with a number of uncommon species and a quality fishery valued by the lake community and the general public. The lake currently has only one known fully aquatic invasive species – Eurasian watermilfoil. Nuisance conditions and navigation impairment occur throughout the open water season as a direct result of the EWM infestation. The main goal of the Aquatic Plant Management Plan is to control EWM in a sound, ecological manner to minimize the effect on native plants while keeping EWM at acceptable levels. Since discovered in Osprey Lake, management has never encompassed more than 9.0 acres in a single year. On average between 2005 and 2021 5.5 acres have been treated in any given year when management is done. This is slightly higher than the 4.8 acres of EWM per year reported in the 2011 APM Plan. In the history of EWM management on Osprey Lake, EWM has generally never been found at levels more than 4% of the lake (using 171 acres as total size and a littoral zone of 82 acres).

A combination of chemical and manual/physical removal control methods are recommended for Osprey Lake. Mechanical harvesting, biological control (for EWM), and habitat manipulation are not recommended at this time. Neither is no management at all.

For the following activities, the main basin of the lake, 171 acres, is only considered (see Figure 1). Based on 2019 aquatic plant survey work, 82 of the 171 acres is considered littoral zone. Given the goal of the Osprey Lake Property Owners Association to control EWM in a sound, ecological manner, the following control activities have been outlined:

- 1) Total EWM levels in the lake based on annual fall bedmapping that are  $\leq 2$  acres (2.4% of the littoral zone of the lake) will trigger minor control activities including hand pulling and snorkel/scuba diver removal.
- 2) Total EWM levels in the lake based on annual fall bedmapping that are between 2 and 4 acres (2.5% and 4.9% of the littoral zone) will trigger moderate control activities including applying herbicides (ProcellaCOR on areas  $< 2$  acres in size and possibly liquid 2,4-D products on areas  $\geq 2$  acres up to 4 acres). ProcellaCOR has proven to be very effective on small, even deep water treatment areas, often eliminating the need for re-application of herbicides for 2 or more years. IT has been used effectively on very small treatment areas even  $< 0.25$  acres. On larger treatment areas, liquid 2,4-D has been shown effective and will provide more than one year of control if minor control activities are completed in subsequent years. Scuba diver removal would be continued where feasible.
- 3) Total EWM levels in the lake based on annual fall bedmapping that are  $\geq 4$  acres (5% of the littoral zone) will trigger more aggressive or intensive control activities including larger-scale applications of herbicide (ProcellaCOR, 2,4-D, and/or triclopyr) and all activities from above. It is expected that this level of management will not be necessary every year, only when EWM seems to be increasing in distribution and density faster than minor and moderate levels of management can keep up.

Concerns exist when herbicide treatments using the same herbicide are done over multiple and subsequent years. Target plant species may build up a tolerance to a given herbicide making it less effective, susceptible plant species may be damaged and/or disappear from the lake (ex. water lilies), concerns over fish and other wildlife might occur, and concern over recreational use in chemically treated water may be voiced. By using several different aquatic herbicides interspersed with physical removal efforts between treatments, many of these concerns are minimized. Given the treatment history of Osprey Lake, the small spot treatments that are occurring are not likely to be causing great environmental harm, even to the

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sparse amounts of wild rice that may be present downstream of the outlet of Osprey Lake. If there are any negative impacts to native plants in treated areas, plants would be available from other areas of the lake to re-colonize that location. It is also likely that an extensive seed bank of native plants throughout the lake would aid in the recovery of any area impacted by management actions.

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## Aquatic Plant Management Plan

This Aquatic Plant Management Plan establishes the following goals for aquatic plant management in Osprey Lake:

1. **EWM Management.** Limit the spread of EWM through environmentally responsible methods to benefit the native plant community while maintaining EWM at manageable levels.
2. **Education and Awareness.** Continue to educate property owners and lake users on aquatic invasive species through public outreach and education programs to help contain EWM within the lake and prevent its spread further in the lake, as well as to other water bodies.
3. **Research and Monitoring.** Develop a better understanding of the lake and the factors affecting lake water quality through continued and expanded monitoring efforts.
4. **Adaptive Management.** Follow an adaptive management approach that measures and analyzes the effectiveness of control activities and modify the management plan as necessary to meet goals and objectives.

### **Goal 1. EWM Management**

Despite years of treatment, EWM continues to be a nuisance in Osprey Lake. A combination of management alternatives will be used to help minimize the negative impacts of EWM on native plants and water quality, and to provide relief for navigation impairment caused by EWM. EWM management options to be utilized include small-scale physical removal, diver removal, and targeted use of aquatic herbicides (see previous section). Other AIS will continue to be monitored for, but no specific management is recommended at this time.

#### **Pre and Post Treatment Survey and Fall Bed Mapping**

Management of EWM will be updated regularly based on annual fall bed mapping surveys, pre-treatment surveys, and post-treatment surveys performed by either trained OLPOA volunteers or resource professionals retained by the OLPOA. Pre and post treatment surveys are not required by the WDNR unless the chemically treated area covers more than 10 acres or 10% of the littoral zone. However, completing these tasks is highly recommended in any treatment program as they provide a means to measure success.

### **Goal 2. Education and Awareness**

Aquatic invasive species (AIS) can be transported via a number of vectors, but most invasions are associated with human activity. It is recommended that the OLPOA continue to maintain and update signage at the boat launch as necessary.

Early detection and rapid response efforts increase the likelihood that a new aquatic invasive species will be addressed successfully while the population is still localized and levels are not beyond that which can be contained and eradicated. Once an aquatic invasive species becomes widely established in a lake, complete eradication becomes extremely difficult, so attempting to partially mitigate negative impacts becomes the goal. The costs of early detection and rapid response efforts are typically far less than those of long-term invasive species management programs needed when an AIS becomes established.

It is recommended that the OLPOA continue to implement a proactive and consistent AIS monitoring program. At least three times during the open water season, trained volunteers should patrol the shoreline and littoral zone looking for Eurasian watermilfoil (and other species like curly-leaf pondweed, purple loosestrife, Japanese knotweed, giant reed grass, zebra mussels). Free support for this kind of monitoring program is provided as part of the UW-Extension Lakes/WDNR Citizen Lake Monitoring Network (CLMN) AIS Monitoring Program. Any monitoring data collected should be recorded annually and submitted to the WDNR SWIMS database.

Providing education, outreach opportunities, and materials to the lake community will improve general knowledge and likely increase participation in lake protection and restoration activities. It is further recommended that the OLPOA continue to cultivate an awareness of the problems associated with AIS and enough community knowledge about certain species to aid in detection, planning, and implementation of management alternatives within their lake community. It is also recommended that the OLPOA continue to strive to foster greater understanding and appreciation of the entire aquatic ecosystem including the important role plants, animals, and people play in that system.

Understanding how their activities impact the aquatic plants and water quality of the lakes is crucial in fostering a responsible community of lakeshore property owners. To accomplish this, the OLPOA should distribute, or re-distribute, informational materials and provide educational opportunities on aquatic invasive species and other factors that affect Osprey Lake. At least one annual activity (picnic at the lake, public workshop, guest speakers, etc.) should be sponsored and promoted by the OLPOA that is focused on AIS. Maintaining signs, continuing aquatic invasive species monitoring, and active inspections of watercraft at the public launch should be done to educate lake users about what they can do to prevent the spread of AIS. Results of water quality monitoring should be shared with the lake community at the annual meeting, or another event, to promote a greater understanding of the lake ecosystem and potentially increase participation in planning and management.

### **Goal 3. Research and Monitoring**

Long-term data can be used to identify the factors leading to changes to water quality, such as aquatic plant management activities, changes in the watershed land use, and the response of the lakes to environmental changes. From 2008 to at least 2015, LCO Tribal sampling of the lake for water clarity using a Secchi disk, total phosphorus (TP) chlorophyll-*a* (Chl-*a*), and dissolved oxygen and temperature profiles was regular but inconsistent.

The CLMN Water Quality Monitoring Program supports volunteer water quality monitors across the state following a clearly defined schedule. In the first level of the program, Secchi disk readings are encouraged 2-3 times a month from ice out to ice on. In the CLMN expanded monitoring program, water samples are collected for analysis of TP two weeks after ice out, and once each in June, July and August. Water samples are collected and processed for chlorophyll-*a* once each in June, July, and August. Temperature profiles are encouraged anytime a Secchi reading is taken, but recommended to be done at the same time water samples for TP and chlorophyll-*a*. If the necessary equipment is available to collect dissolved oxygen profiles these are encouraged at least monthly as well.

Available data suggests that the OLPOA has never had lake volunteers collect basic water quality data through the CLMN Water Quality Monitoring Program. Thus, it is recommended that the OLPOA identify at least one volunteer and sign up for level one (collecting Secchi disk readings of water clarity) of the CLMN program. CLMN expanded monitoring parameters (temperature, dissolved oxygen, total phosphorus, and

chlorophyll-*a*) should be added as soon as the lake can be enrolled by the WI-DNR. The intensity/success of water quality monitoring efforts should be evaluated at least every three years. The background information and trends provided by these data are invaluable for current and future lake and aquatic plant management planning.

An alternative to this approach is to work closely with LCO Tribal Resources to establish a regular, consistent, long-term trend water quality monitoring program.

To monitor any changes in the plant community, it is recommended that whole-lake point intercept aquatic plant surveys be completed at three to five-year intervals. This will allow managers to adjust the APM Plan as needed in response to how the plant community changes as a result of management and natural factors like water level.

To monitor changes in the amount of EWM in the system, late season bed mapping surveys should be completed annually.

#### **Goal 4. Adaptive Management**

This APM Plan is a working document guiding management actions on Osprey Lake for the next five years. This plan will follow an adaptive management approach by adjusting actions as the results of management and data obtained deem fit. This plan is therefore a living document, progressively evolving and improving to meet environmental, social, and economic goals, to increase scientific knowledge, and to foster good relations among stakeholders. Annual and end of project assessment reports are necessary to monitor progress and justify changes to the management strategy, with or without state grant funding. Project reporting will meet the requirements of all stakeholders, gain proper approval, allow for timely reimbursement of expenses, and provide the appropriate data for continued management success. Success will be measured by the efficiency and ease in which these actions are completed.

The OLPOA and their retainers will compile, analyze, and summarize management operations, public education efforts, and other pertinent data into an annual report each year. The information will be presented to members of the OLPOA, Sawyer County, LCO Tribal Resources, and the WDNR and made available in hardcopy and digital format on the internet. These reports will serve as a vehicle to propose future management recommendations and will therefore be completed prior to implementing following year management actions (approximately March 31st annually). At the end of this five-year project, all management efforts (including successes and failures) and related activities will be summarized in a report to be used for revising the Aquatic Plant Management Plan.

#### **Timeline of Activities**

The activities in this APM Plan are designed to be implemented over a 5-year period beginning in 2022. The plan is intended to be flexible to accommodate future changes in the needs of the lake and its watershed, as well as those of the OLPOA. Some activities in the timeline are eligible for grant support to complete.

#### **Potential Funding**

There are several WDNR grant programs that may be able to assist the OLPOA in implementing its new APM Plan. AIS grants are specific to actions that involve education, prevention, planning, and in some cases, implementation of AIS management actions. Lake Management Planning grants can be used to support a broad range of management planning and education actions. Lake Protection grants can be used to help implement approved management actions that would help to improve water quality.

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## APPENDIX A

### AQUATIC PLANT MANAGEMENT STRATEGY Northern Region WDNR

#### ISSUES

- Protect desirable native aquatic plants.
- Reduce the risk that invasive species replace desirable native aquatic plants.
- Promote “whole lake” management plans
- Limit the number of permits to control native aquatic plants.

#### BACKGROUND

As a general rule, the Northern Region has historically taken a protective approach to allow removal of native aquatic plants by harvesting or by chemical herbicide treatment. This approach has prevented lakes in the Northern Wisconsin from large-scale loss of native aquatic plants that represent naturally occurring high quality vegetation. Naturally occurring native plants provide a *diversity of habitat* that *helps maintain water quality*, helps *sustain the fishing* quality known for Northern Wisconsin, supports common lakeshore wildlife from loons to frogs, and helps to provide the *aesthetics* that collectively create the “up-north” appeal of the Northwoods lake resources.

In Northern Wisconsin lakes, an inventory of aquatic plants may often find 30 different species or more, whereas a similar survey of a Southern Wisconsin lake may often discover less than half that many species. Historically, similar species diversity was present in Southern Wisconsin, but has been lost gradually over time from stresses brought on by cultural land use changes (such as increased development, and intensive agriculture). Another point to note is that while there may be a greater variety of aquatic vegetation in Northern Wisconsin lakes, the vegetation itself is often *less dense*. This is because northern lakes have not suffered as greatly from nutrients and runoff as have many waters in Southern Wisconsin.

The newest threat to native plants in Northern Wisconsin is from invasive species of aquatic plants. The most common include Eurasian Water Milfoil (EWM) and Curly Leaf Pondweed (CLP). These species are described as *opportunistic invaders*. This means that these “invaders” benefit where an opening occurs from removal of plants, and without competition from other plants may successfully become established in a lake. Removal of native vegetation not only diminishes the natural qualities of a lake; it *may increase the risk that an invasive species can successfully invade onto the site where native plants have been removed*. There it may more easily establish itself without the native plants to compete against. This concept is easily observed on land where bared soil is quickly taken over by replacement species (often weeds) that crowd in and establish themselves as new occupants of the site. While not a providing a certain guarantee against invasive plants, protecting and allowing the native plants to remain may reduce the success of an invasive species becoming established on a lake. Once established, the invasive species cause far more inconvenience for all lake users, riparian and others included; can change many of the natural features of a lake; and often lead to *expensive annual control plans*.

Native vegetation may cause localized concerns to some users, but as a natural feature of lakes, they generally do not cause harm.

To the extent we can maintain the normal growth of native vegetation, Northern Wisconsin lakes can continue to offer the water resource appeal and benefits they've historically provided. A regional position on removal of aquatic plants that carefully recognizes how native aquatic plants benefit lakes in Northern Region can help prevent a gradual decline in the overall quality and recreational benefits that make these lakes attractive to people and still provide abundant fish, wildlife, and Northwoods appeal.

### **GOALS OF STRATEGY:**

1. Preserve native species diversity which, in turn, fosters natural habitat for fish and other aquatic species, from frogs to birds.
2. Prevent openings for invasive species to become established in the absence of the native species.
3. Concentrate on a "whole-lake approach" for control of aquatic plants, thereby fostering systematic documentation of conditions and specific targeting of invasive species as they exist.
4. Prohibit removal of wild rice. WDNR – Northern Region will not issue permits to remove wild rice unless a request is subjected to the full consultation process via the Voigt Tribal Task Force. We intend to discourage applications for removal of this ecologically and culturally important native plant.
5. To be consistent with our WDNR Water Division Goals (work reduction/disinvestment), established in 2005, to "not issue permits for chemical or large-scale mechanical control of native aquatic plants – develop general permits as appropriate or inform applicants of exempted activities." This process is similar to work done in other WDNR Regions, although not formalized as such.

### **BASIS OF STRATEGY IN STATE STATUTE AND ADMINISTRATIVE CODE**

**State Statute 23.24 (2)(c)** states:

"The requirements promulgated under par. (a) 4. may specify any of the following:

1. The **quantity** of aquatic plants that may be managed under an aquatic plant management permit.
2. The **species** of aquatic plants that may be managed under an aquatic plant management permit.
3. The **areas** in which aquatic plants may be managed under an aquatic plant management permit.
4. The **methods** that may be used to manage aquatic plants under an aquatic plant management permit.
5. The **times** during which aquatic plants may be managed under an aquatic plant management permit.
6. The **allowable methods** for disposing or using aquatic plants that are removed or controlled under an aquatic plant management permit.
7. The requirements for plans that the department may require under sub. (3) (b).

**State Statute 23.24(3)(b)** states:

"The department may require that an application for an aquatic plant management permit contain a plan for the department's approval as to how the aquatic plants will be introduced, removed, or controlled."

**Wisconsin Administrative Code NR 109.04(3)(a)** states:

"The department may require that an application for an aquatic plant management permit contain an aquatic plant management plan that describes how the aquatic plants will be introduced, controlled,

removed or disposed. Requirements for an aquatic plant management plan shall be made in writing stating the reason for the plan requirement. In deciding whether to require a plan, the department shall consider the potential for effects on protection and development of diverse and stable communities of native aquatic plants, for conflict with goals of other written ecological or lake management plans, for cumulative impacts and effect on the ecological values in the body of water, and the long-term sustainability of beneficial water use activities.”

### **APPROACH**

1. After January 1, 2009\* no individual permits for control of native aquatic plants will be issued. Treatment of native species may be allowed under the auspices of an approved lake management plan, and only if the plan clearly documents “impairment of navigation” and/or “nuisance conditions”. Until January 1, 2009, individual permits will be issued to previous permit holders, only with adequate documentation of “impairment of navigation” and/or “nuisance conditions”. No new individual permits will be issued during the interim.
2. Control of aquatic plants (if allowed) in documented sensitive areas will follow the conditions specified in the report.
3. Invasive species must be controlled under an approved lake management plan, with two exceptions (these exceptions are designed to allow sufficient time for lake associations to form and subsequently submit an approved lake management plan):
  - a. Newly-discovered infestations. If found on a lake with an approved lake management plan, the invasive species can be controlled via an amendment to the approved plan. If found on a lake without an approved management plan, the invasive species can be controlled under the WDNR’s Rapid Response protocol (see definition), and the lake owners will be encouraged to form a lake association and subsequently submit a lake management plan for WNDNR review and approval.
4. Individuals holding past permits for control of *invasive* aquatic plants and/or “mixed stands” of native and invasive species will be allowed to treat via individual permit until January 1, 2009 if “impairment of navigation” and/or “nuisance conditions” is adequately documented, unless there is an approved lake management plan for the lake in question
5. Control of invasive species or “mixed stands” of invasive and native plants will follow current best management practices approved by the Department and contain an explanation of the strategy to be used. Established stands of invasive plants will generally use a control strategy based on Spring treatment (typically, a water temperature of less than 60 degrees Fahrenheit, or approximately May 31st, annually).
6. Manual removal (see attached definition) is allowed (Admin. Code NR 109.06).

## **DOCUMENTATION OF IMPAIRED NAVIGATION AND/OR NUISANCE CONDITIONS**

Navigation channels can be of two types:

- Common use navigation channel. This is a common navigation route for the general lake user. It often is off shore and connects areas that boaters commonly would navigate to or across, and should be of public benefit.
- Individual riparian access lane. This is an access lane to shore that normally is used by an individual riparian shore owner.

Severe impairment or nuisance will generally mean vegetation grows thickly and forms mats on the water surface. Before issuance of a permit to use a regulated control method, a riparian will be asked to document the problem and show what efforts or adaptations have been made to use the site. (This is currently required in NR 107 and on the application form, but the following helps provide a specific description of what impairments exist from native plants).

**Documentation of *impairment of navigation*** by native plants must include:

- a. Specific locations of navigation routes (preferably with GPS coordinates)
- b. Specific dimensions in length, width, and depth
- c. Specific times when plants cause the problem and how long the problem persists
- d. Adaptations or alternatives that have been considered by the lake shore user to avoid or lessen the problem
- e. The species of plant or plants creating the nuisance (documented with samples or a from a Site inspection)

**Documentation of the *nuisance*** must include:

- a. Specific periods of time when plants cause the problem, e.g. when does the problem start and when does it go away?
- b. Photos of the nuisance are encouraged to help show what uses are limited and to show the severity of the problem.
- c. Examples of specific activities that would normally be done where native plants occur naturally on a site but cannot occur because native plants have become a nuisance.

## **DEFINITIONS**

Manual removal: Removal by hand or hand-held devices without the use or aid of external or auxiliary power. Manual removal cannot exceed 30 ft. in width and can only be done where the shore is being used for a dock or swim raft. The 30 ft. wide removal zone cannot be moved, relocated, or expanded with the intent to gradually increase the area of plants removed. Wild rice may not be removed under this waiver.

Native aquatic plants: Aquatic plants that are indigenous to the waters of this state.

Invasive aquatic plants: non-indigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Sensitive area: Defined under s. NR 107.05(3)(i) (sensitive areas are areas of aquatic vegetation identified by the department as offering critical or unique fish and wildlife habitat, including seasonal or life stage requirements, or offering water quality or erosion control benefits to the body of water).

Rapid Response protocol: This is an internal WDNR document designed to provide guidance for grants awarded under NR 198.30 (Early Detection and Rapid Response Projects). These projects are intended to control pioneer infestations of aquatic invasive species before they become established.