Appendix A. Invasive Plant Species Information

Curly Leaf Pondweed

Curly leaf pondweed is specifically designated as an invasive aquatic plant (along with Eurasian water milfoil and purple loosestrife) to be the focus of a statewide program to control invasive species in Wisconsin. Invasive species are defined as a "non-indigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health (23.22(c)."

The Wisconsin Comprehensive Management Plan for Aquatic Invasive Species describes curly leaf pondweed impacts as follows:

> It is widely distributed throughout Wisconsin lakes, but the actual number of waters infested is not known. Curly-leaf pondweed is native to northern Europe and Asia where it is especially well adapted to surviving in low temperature waters. It can actively grow under the ice while most plants are dormant, giving it a competitive advantage over native aquatic plant species. By June, curly-leaf pondweed can form dense surface mats that interfere with aquatic recreation. By mid-summer, when other aquatic plants are just reaching their peak growth for the year, it dies off. Curly-leaf pondweed provides habitat for fish and invertebrates in the winter and spring when most other plants are reduced to rhizomes and buds, but the mid-summer decay creates a sudden loss of habitat. The die-off of curly-leaf pondweed also releases a surge of nutrients into the water column that can trigger algal blooms and create turbid water conditions. In lakes where curly-leaf pondweed is the dominant plant, the summer die-off can lead to habitat disturbance and degraded water quality. In other waters where there is a diversity of aquatic plants, the breakdown of curly-leaf may not cause a problem.[1]

The state of Minnesota DNR web site explains that curly leaf pondweed often causes problems due to excessive growth. At the same time, the plant provides some cover for fish, and some waterfowl species feed on the seeds and winter buds.[2]

[1] *Wisconsin's Comprehensive Management Plan to Prevent Further Introductions and Control Existing Populations of Aquatic Invasive Species.* Prepared by Wisconsin DNR. September 2003.
[2] Information from Minnesota DNR (www.dnr.state.mn.us/aquatic_plants).

The following description is taken from a Great Lakes Indian Fish and Wildlife Commission handout.

Curly Leaf Pondweed (*Potamogeton crispus*)[3]

Identification

Curly leaf pondweed is an invasive aquatic species found in a variety of aquatic habitats, including permanently flooded ditches and pools, rivers, ponds, inland lakes, and even the Great Lakes. Curly leaf pondweed prefers alkaline or high nutrient waters one to three meters deep. Its leaves are strap-shaped with rounded tips and undulating and finely toothed edges. Leaves are not modified for floating, and are generally alternate on the stem. Stems are somewhat flattened and grow to as long as two meters. The stems are dark reddish-green to reddish-brown, with the mid-vein typically tinged with red. Curly leaf pondweed is native to Eurasia, Africa, and Australia and is now spread throughout most of the United States and southern Canada.

Characteristics

New plants typically establish in the fall from freed turions (branch tips). The winter form is short, with narrow, flat, relatively limp, bluish-green leaves. This winter form can grow beneath the ice and is highly shade-tolerant. Rapid growth begins with warming water temperatures in early spring – well ahead of native aquatic plants.

Reproduction and Dispersal

Curly leaf pondweed reproduces primarily vegetatively. Numerous turions are produced in the spring. These turions consist of modified, hardened, thorny leaf bases interspersed with a few to several dormant buds. The turions are typically 1.0 – 1.7 cm long and 0.8 to 1.4 cm in diameter. Turions separate from the plant by midsummer, and may be carried in the water column supported by several leaves. Humans and waterfowl may also disperse turions. Stimulated by cooler water temperatures, turions germinate in the fall, over-wintering as a small plant. The next summer plants mature, producing reproductive tips of their own. Curly leaf pondweed rarely produces flowers.

Ecological Impacts

Rapid early season growth may form large, dense patches at the surface. This canopy overtops most native aquatic plants, shading them and significantly slowing their growth. The canopy lowers water temperature and restricts absorption of atmospheric oxygen into the water. The dense canopy formed often interferes with recreational activities such as swimming and boating.

[3] Information from GLIFWC Plant Information Center (http://www.glifwc.org/epicenter).

In late spring, curly leaf pondweed dies back, releasing nutrients that may lead to algae blooms. Resulting high oxygen demand caused by decaying vegetation can adversely affect fish populations. The foliage of curly leaf pondweed is relatively high in alkaloid compounds possibly making it unpalatable to insects and other herbivores.

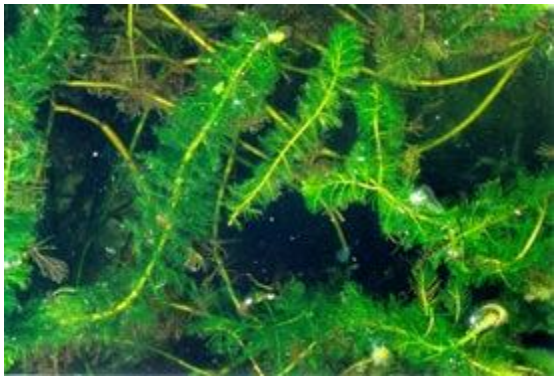
Control

Small populations of curly leaf pondweed in otherwise un-infested water bodies should be attacked aggressively. Hand pulling, suction dredging, or spot treatments with contact herbicides are recommended. Cutting should be avoided because fragmentation of plants may encourage their re-establishment. In all cases, care should be taken to remove all roots and plant fragments, to keep them from re-establishing.

Control of large populations requires a long-term commitment that may not be successful. A prudent strategy includes a multi-year effort aimed at killing the plant before it produces turions, thereby depleting the seed bank over time. It is also important to maintain, and perhaps augment, native populations to retard the spread of curly leaf and other invasive plants. Invasive plants may aggressively infest disturbed areas of the lake, such as those where native plant nuisances have been controlled through chemical applications.

Eurasian Water Milfoil *(Myriophyllum spicatum)*

Introduction



Eurasian water milfoil is a submersed aquatic plant native to Europe, Asia, and northern Africa. It is the only non-native milfoil in Wisconsin. Like the native milfoils, the Eurasian variety has slender stems whorled by submersed feathery leaves and tiny flowers produced above the water surface. The flowers are located in the axils of the floral bracts, and are either four-petaled or without petals. The leaves are threadlike, typically uniform in diameter, and aggregated into a submersed terminal spike. The stem thickens below the inflorescence and doubles its width further down, often curving to lie parallel with the water surface. The fruits are four-jointed nut-like bodies. Without flowers or fruits, Eurasian water milfoil is nearly impossible to distinguish from Northern water milfoil. Eurasian water milfoil has 9-21 pairs of leaflets per leaf, while Northern milfoil typically has 7-11 pairs of leaflets. Coontail is often mistaken for the milfoils, but does not have individual leaflets.

Distribution and Habitat

Eurasian milfoil first arrived in Wisconsin in the 1960's. During the 1980's, it began to move from several counties in southern Wisconsin to lakes and waterways in the northern half of the state. As of 1993, Eurasian milfoil was common in 39 Wisconsin counties (54%)

and at least 75 of its lakes, including shallow bays in Lakes Michigan and Superior and Mississippi River pools.

Eurasian water milfoil grows best in fertile, fine-textured, inorganic sediments. In less productive lakes, it is restricted to areas of nutrient-rich sediments. It has a history of becoming dominant in eutrophic, nutrient-rich lakes, although this pattern is not universal. It is an opportunistic species that prefers highly disturbed lake beds, lakes receiving nitrogen and phosphorous-laden runoff, and heavily used lakes. Optimal growth occurs in alkaline systems with a high concentration of dissolved inorganic carbon. High water temperatures promote multiple periods of flowering and fragmentation.

Life History and Effects of Invasion

Unlike many other plants, Eurasian water milfoil does not rely on seed for reproduction. Its seeds germinate poorly under natural conditions. It reproduces vegetatively by fragmentation, allowing it to disperse over long distances. The plant produces fragments after fruiting once or twice during the summer. These shoots may then be carried downstream by water currents or inadvertently picked up by boaters. Milfoil is readily dispersed by boats, motors, trailers, bilges, live wells, or bait buckets, and can stay alive for weeks if kept moist.

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. Stolons, lower stems, and roots persist over winter and store the carbohydrates that help milfoil claim the water column early in spring, photosynthesize, divide, and 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 monotypic stands. Monotypic stands of Eurasian milfoil provide only a single habitat, and threaten the integrity of aquatic communities in a number of ways; for example, dense stands disrupt predator-prey relationships by fencing out larger fish, and reducing 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. Some stands have been dense enough to obstruct industrial and power generation water intakes. The visual impact that greets the lake user on milfoil-dominated lakes is the flat yellow-green of matted vegetation, often prompting the perception that the lake is "infested" or "dead". Cycling of nutrients from sediments to the water column by Eurasian water milfoil may lead to deteriorating water quality and algae blooms of infested lakes. [4]

[4] Taken in its entirety from WDNR, 2008 (http://www.dnr.state.wi.us/invasives/fact/milfoil.htm)

Reed Canary Grass (*Phalaris arundinacea*)

Description
Reed canary grass is a large, coarse grass that reaches 2 to 9 feet in height. It has an erect, hairless stem with gradually tapering leaf blades 3 1/2 to 10 inches long and 1/4 to 3/4 inch in width. Blades are flat and have a rough texture on both surfaces. The lead ligule is membranous and long. The compact panicles are erect or slightly spreading (depending on the plant's reproductive stage), and range from 3 to 16 inches long with branches 2 to 12 inches in length. Single flowers occur in dense clusters in May to mid-June. They are green to purple at first and change to beige over time. This grass is one of the first to sprout in spring, and forms a thick rhizome system that dominates the subsurface soil. Seeds are shiny brown in color.

Both Eurasian and native ecotypes of reed canary grass are thought to exist in the U.S. The Eurasian variety is considered more aggressive, but no reliable method exists to tell the ecotypes apart. It is believed that the vast majority of our reed canary grass is derived from the Eurasian ecotype. Agricultural cultivars of the grass are widely planted.

Reed canary grass also resembles non-native orchard grass (*Dactylis glomerata*), but can be distinguished by its wider blades, narrower, more pointed inflorescence, and the lack of hairs on glumes and lemmas (the spikelet scales). Additionally, bluejoint grass (*Calamagrostis canadensis*) may be mistaken for reed canary in areas where orchard grass is rare, especially in the spring. The highly transparent ligule on reed canary grass is helpful in distinguishing it from the others. Ensure positive identification before attempting control. The ligule is a transparent membrane found at the intersection of the leaf stem and leaf.

Distribution and Habitat
Reed canary grass is a cool-season, sod-forming, perennial wetland grass native to temperate regions of Europe, Asia, and North America. The Eurasian ecotype has been selected for its vigor and has been planted throughout the U.S. since the 1800's for forage and erosion control. It has become naturalized in much of the northern half of the U.S., and is still being planted on steep slopes and banks of ponds and created wetlands.

Reed canary grass can grow on dry soils in upland habitats and in the partial shade of oak woodlands, but does best on fertile, moist organic soils in full sun. This species can invade most types of wetlands, including marshes, wet prairies, sedge meadows, fens, stream banks, and seasonally wet areas; it also grows in disturbed areas.

Life History and Effects of Invasion
Reed canary grass reproduces by seed or creeping rhizomes. It spreads aggressively. The plant produces leaves and flower stalks for 5 to 7 weeks after germination in early spring, then spreads laterally. Growth peaks in mid-June and declines in mid-July. A second growth spurt occurs in the fall. The shoots collapse in mid to late summer, forming a dense, impenetrable mat of stems and leaves. The seeds ripen in late June and shatter when ripe. Seeds may be dispersed from one wetland to another by waterways, animals, humans, or machines.

This species prefers disturbed areas, but can easily move into native wetlands. Reed canary grass can invade a disturbed wetland in less than twelve years. Invasion is associated with disturbances including ditching of wetlands, stream channelization, deforestation of swamp forests, sedimentation, and intentional planting. The difficulty of selective control makes reed canary grass invasion of particular concern. Over time, it forms large, monotypic stands that harbor few other plant species and are subsequently of little use to wildlife. Once established, reed canary grass dominates an area by building up a tremendous seed bank that can eventually erupt, germinate, and recolonize treated sites.[5]

Purple Loosestrife (*Lythrum salicaria*)[6]

Description
Purple loosestrife is a non-native plant common in Wisconsin. By law, purple loosestrife is a nuisance species in Wisconsin. It is illegal to sell, distribute, or cultivate the plants or seeds, including any of its cultivars.

Purple loosestrife is a perennial herb 3-7 feet tall with a dense bushy growth of 1-50 stems. The stems, which range from green to purple, die back each year. Showy flowers vary from purple to magenta, possess 5-6 petals aggregated into numerous long spikes, and bloom from July to September. Leaves are opposite, nearly linear, and attached to four-sided stems without stalks. It has a large, woody taproot with fibrous rhizomes (underground stems) that form a dense mat.

Characteristics
Purple loosestrife is a wetland herb that was introduced as a garden perennial from Europe during the 1800's. It is still promoted by some horticulturists for its beauty as a landscape plant, and by beekeepers for its nectar-producing capability. Currently, about 24 states

[5] Taken from WDNR, 2008. (http://www.dnr.state.wi.us/invasives/fact/reed canary.htm).
[6] Wisconsin DNR invasive species factsheets.(http:/dnr.wi.gov/invasives).

have laws prohibiting its importation or distribution because of its aggressively invasive characteristics. It has since extended its range to include most temperate parts of the United States and Canada. The plant's reproductive success across North America can be attributed to its wide tolerance of physical and chemical conditions characteristic of disturbed habitats, and its ability to reproduce prolifically by both seed dispersal and vegetative propagation. The absence of natural predators, like European species of herbivorous beetles that feed on the plant's roots and leaves, also contributes to its proliferation in North America.

Purple loosestrife was first detected in Wisconsin in the early 1930's, but remained uncommon until the 1970's. It is now widely dispersed in the state, and has been recorded in 70 of Wisconsin's 72 counties. This plant's optimal habitat includes marshes, stream margins, river flood plains, sedge meadows, and wet prairies. It is tolerant of moist soil and shallow water sites such as pastures and meadows, although established plants can tolerate drier conditions. Purple loosestrife has also been planted in lawns and gardens, which is often how it has been introduced to many of our wetlands, lakes, and rivers.

Reproduction and Dispersal

Purple loosestrife spreads mainly by seed, but it can also spread vegetatively from root or stem segments. A single stalk can produce from 100,000 to 300,000 seeds per year. Seed survival is up to 60-70%, resulting in an extensive seed bank. Most of the seeds fall near the parent plant, but water, animals, boats, and humans can transport the seeds long distances. Vegetative spread through local disturbance is also characteristic of loosestrife; clipped, trampled, or buried stems of established plants may produce shoots and roots. It is often very difficult to locate non-flowering plants, so monitoring for new invasions should be done at the beginning of the flowering period in mid-summer.

Any sunny or partly shaded wetland is susceptible to purple loosestrife invasion. Vegetative disturbances such as water drawdown or exposed soil accelerate the process by providing ideal conditions for seed germination. When the right disturbance occurs, loosestrife can spread rapidly, eventually taking over the entire wetland.

Ecological Impacts

Purple loosestrife displaces native wetland vegetation and degrades wildlife habitat. As native vegetation is displaced, rare plants are often the first species to disappear. Eventually, purple loosestrife can overrun wetlands thousands of acres in size, and almost entirely eliminate the open water habitat. The plant can also be detrimental to recreation by choking waterways.

Mechanical Control

Purple loosestrife (PL) can be controlled by cutting, pulling, digging and drowning. Cutting is best done just before plants begin flowering. Cutting too early encourages more flower stems to grow than before. If done too late, seed may have already fallen. Since lower pods can drop seed while upper flowers are still blooming, check for seed. If none, simply bag all

cuttings (to prevent them from rooting). If there is seed, cut off each top while carefully holding it upright, then bend it over into a bag to catch any dropping seeds. Dispose of plants/seeds in a capped landfill, or dry and burn them. Composting will not kill the seeds. Keep clothing and equipment seed-free to prevent its spread. Rinse all equipment used in infested areas before moving into uninfested areas, including boats, trailers, clothing, and footwear.

Pulling and digging can be effective, but can also create disturbed bare spots, which are good sites for PL seeds to germinate, or leave behind root fragments that grow into new plants. Use these methods primarily with small plants in loose soils, since they do not usually leave behind large gaps nor root tips, while large plants with multiple stems and brittle roots often do. Dispose of plants as described above.

Mowing has not been effective with loosestrife unless the plants can be mowed to a height where the remaining stems will be covered with water for a full twelve months. Burning has also proven largely ineffective. Mowing and flooding are not encouraged because they can contribute to further dispersal of the species by disseminating seeds and stems.

Follow-up treatments are recommended for at least three years after removal.

Chemical Control

This is usually the best way to eliminate PL quickly, especially with mature plants. The chemicals used have a short soil life. Timing is important. Treat in late July or August, but before flowering to prevent seed set. Always back away from sprayed areas as you go, to prevent getting herbicide on your clothes. The best method is to cut stems and paint the stump tops with herbicide. The herbicide can be applied with a small drip bottle or spray bottle, which can be adjusted to release only a small amount. Try to cover the entire cut portion of the stem, but not let the herbicide drip onto other plants since it is non-selective and can kill any plant it touches.

Glyphosate herbicides: Currently, glyphosate is the most commonly used chemical for killing loosestrife. Roundup and Glyfos are typically used, but if there is any open water in the area use Rodeo, a glyphosate formulated and listed for use over water. Glyphosate must be applied in late July or August to be most effective. Since you must treat at least some stems of each plant and they often grow together in a clump, all stems in the clump should be treated to be sure all plants are treated.

Another method is using very carefully targeted foliar applications of herbicide (NOT broadcast spraying). This may reduce costs for sites with very high densities of PL, since the work should be easier and there will be few other plant species to hit accidentally. Use a glyphosate formulated for use over water. A weak solution of around 1% active ingredient can be used and it is generally necessary to wet only 25% of the foliage to kill the plant.

You must obtain a permit from WDNR before applying any herbicide over water. The process has been streamlined for control of purple loosestrife and there is no cost. Contact your regional Aquatic Plant Management Coordinator for permit information.

Biological Control

Conventional control methods like hand pulling, cutting, flooding, herbicides, and plant competition have only been moderately effective in controlling purple loosestrife. Biocontrol is now considered the most viable option for more complete control for heavy infestations. The WDNR, in cooperation with the U.S. Fish and Wildlife Service, is introducing several natural insect enemies of purple loosestrife from Europe. A species of weevil (*Hylobius transversovittatus*) has been identified that lays eggs in the stem and upper root system of the plant; as larvae develop, they feed on root tissue. In addition, two species of leaf eating beetles (*Galerucella calmariensis* and *G. pusilla*) are being raised and released in the state, and another weevil that feeds on flowers (*Nanophyes marmoratu*s) is being used to stress the plant in multiple ways. Research has shown that most of these insects are almost exclusively dependent upon purple loosestrife and do not threaten native plants, although one species showed some cross-over to native loosestrife. These insects will not eradicate loosestrife, but may significantly reduce the population so cohabitation with native species becomes a possibility.

Appendix B. Aquatic Plant Management Strategy WDNR

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 CurlyLeaf 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."

AQUATIC PLANT MANAGEMENT STRATEGY
Northern Region WDNR

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 WNDR review and approval.
   b. 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.

4. 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).

5. Manual removal (see attached definition) is allowed (Admin. Code NR 109.06).

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* *Exceptions to the Jan. 1, 2009 deadline will be considered only on a very limited basis and will be intended to address unique situations that do not fall within the intent of this approach.*

AQUATIC PLANT MANAGEMENT STRATEGY
Northern Region WDNR

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 can not occur because native plants have become a nuisance.

AQUATIC PLANT MANAGEMENT STRATEGY
Northern Region WDNR

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 lifestage 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.

Appendix C. References

Aquatic Ecosystem Restoration Foundation. *Aquatic Plant Management: Best Management Practices in Support of Fish and Wildlife Habitat.* 2005. http://www.aquatics.org/aquatic_bmp.pdf

Borman, Susan, Robert Korth and Jo Tempte. *Through the Looking Glass*. University of Wisconsin-Extension. Stevens Point, Wisconsin. 1997.

Chronology of Fisheries Management Events Mercer Lake – Iron County. Source and data unknown.

Crow, Garrett E. and C. Barre Hellquist. *Aquatic and Wetland Plants of Northeastern North America*. The University of Wisconsin Press. Madison, Wisconsin. Volumes 1 and 2. 2000.

Harmony Environmental. *Balsam Lake Aquatic Plant Management Plan. Polk County, Wisconsin.* October 2010.

Madsen, John D. *Aquatic Plant Management Guidelines for Wisconsin Lakes.* March 22, 2003 Draft.

Nault, Michelle. *Effects of Whole Lake Early Season 2,4-D on Eurasian Watermilfoil (Myriophyllum spicatum).* Presentation at Minnesota-Wisconsin Invasive Species Conference. St. Paul, Minnesota. November 2010.

Newton, B.J., and Jarrell, W.M. *A procedure to estimate the response of aquatic systems to changes in phosphorus and nitrogen inputs:* U.S. Department of Agriculture. National Water and Climate Center. NWCC–TN–99–2. 1999. 37 p.

Nichols, Stanley A. *Distribution and Habitat Descriptions of Wisconsin Lake Plants*. Wisconsin Geological and Natural History Survey. Bulletin 96. Madison, Wisconsin. 1999.

Nichols, Stanley A. *Floristic Quality Assessment of Wisconsin Lake Plant Communities with Example Applications.* Journal of Lake and Reservoir Management 15 (2): 133-141. 1999.

North American Lake Management Society. *Managing Lakes and Reservoirs*. 2001.

Preliminary Lake Watershed Management Plan for Mercer Lake Iron County, Wisconsin. Prepared for: Mercer Lake Association. June 2007. Assistance from Cedar Corporation and Wisconsin Department of Natural Resources.

Robertson, Dale, et. al., *Water Quality, Hydrology, and Simulated Response to Changes in Phosphorus Loading of Mercer Lake, Iron County, Wisconsin, with Special Emphasis on the Effects of Wastewater Discharges*. U.S. Geological Survey. Scientific Investigations Report Draft 2012.

Skogerboe, John. *Sampling of Herbicide Residuals Confirms Extended Exposure to Low Concentrations of 2,4-D and Triclopyr can Control Eurasian Watermilfoil.* Presentation at Minnesota-Wisconsin Invasive Species Conference. St. Paul, Minnesota. November 2010.

Skogerboe, John and Michael Netherland. *Draft Report Following April 2008 Aquatic Herbicide Treatments of Three Bays on Lake Minnetonka.* US Army Engineer Research and Development Center.

Surface Water Resources of Iron County, WI: WI-DNR Mercer Lake, T43N, R3E, Section 36. 1970.

University of Wisconsin-Extension. *Citizen Lake Monitoring Manual*. Revised 2006.

University of Wisconsin-Extension. *Aquatic Plant Management in Wisconsin*. April 2006 Draft.

University of Wisconsin – Madison. Wisconsin State Herbarium. *WISFLORA: Wisconsin Vascular Plant Species.* www.botany.wisc.edu/wisflora/

U.S. Army Corps of Engineers. *Aquatic Plant Information System (APIS).* 2005.

Vilas County Land and Water Conservation Department. *Aquatic Invasive Species: A Guide for Proactive & Reactive Management.* 2006.
http://wisconsinlakes.org/AboutLakes/PDFs/aisguidevc06.pdf

Wisconsin Department of Natural Resources. *Control of Eurasian Water Milfoil & Large-scale Aquatic Herbicide Use.* July 2006.

Wisconsin Department of Natural Resources. *Natural Heritage Inventory County Data by Township: Iron County.* Last revised November 2011.

Wisconsin Department of Natural Resources. Northern Region. *Aquatic Plant Management Strategy.* Summer 2007.

Wisconsin Department of Natural Resources. *Reports and Data: Iron County*. December 2011. http://www.dnr.state.wi.us/lakes/CLMN/reportsanddata/.

Wisconsin Department of Natural Resources. Lakes web site pages.
www.dnr.wi.gov/lakes/LakePages

Wisconsin Department of Natural Resources. Wisconsin Webview GIS mapping.
http:dnrmaps.wi.gov

Wisconsin Department of Natural Resources. *Wisconsin Lakes*. PUB-FH-800. 2009.

Appendix D. Rapid Response Strategy for Eurasian Water Milfoil

If a plant or other potential AIS is observed contact a Mercer Lake Association (MLA) Board Member. The MLA Board is responsible to carry out this protocol.

1. Contact lead (Lead is:_____)
2. Obtain a sample of the plant/organism of question from reported location. If possible, mark the GPS coordinates of the sample location OR mark with a bouy OR as a last resort use landmarks to mark location with 24 hours of reported AIS
3. Bag sample and label with date, location and refrigerate.
4. Contact and forward specimen to Iron County AIS Coordinator within 24 hours.
5. AIS Coordinator will verify specimen (with the WDNR as needed) and go on site to determine (if it is AIS) is a pioneer community or not. If credible AIS possible continue on to 6. .

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6. Lead will contact Wisconsin DNR (Jim Krietlow) within 24 hours of verification.
7. Lead will contact all Mercer Lake Board members.
8. Residents nearest location will be contacted with 48 hours.
9. Sign will be posted at landings with in 72 hours.
10. A whole specimen will be bagged and sent to UW Stevens Point Herbarium.
11. Evaluation of a need for control measures will be evaluated with AIS Coordinator, DNR and/or consultant within 72 hours.
12. Implement control measures.
13. Apply for rapid response grant.

Contacts:

Lead 715-

Iron County AIS Coordinator, Heather Palmquist; 715-561-2234; lakes@ironcountywi.org

Wisconsin DNR Jim Krietlow 715-365-8947 **james.kreitlow@wi**.gov

Consultant/Diver Steve Schieffer 715-554-1168 ecointegrity@hotmail.com

Herbicide Applicator Cliff Schmidt 715-445-3962 (office) 715-570-0954 (cell)

Appendix E. Management Options for Aquatic Plant Management

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
No Management	N	Do not actively manage plants	Minimizing disturbance can protect native species that provide habitat for aquatic fauna; protecting natives may limit spread of invasive species; aquatic plants reduce shoreline erosion and may improve water clarity	May allow small population of invasive plants to become larger, more difficult to control later
			No immediate financial cost	Excessive plant growth can hamper navigation and recreational lake use
			No system disturbance	May require modification of lake users' behavior and perception
			No unintended effects of chemicals	
			Permit not required	
Mechanical Control	May be required under NR 109	Plants reduced by mechanical means	Flexible control	Must be repeated, often more than once per season
		Wide range of techniques, from manual to highly mechanized	Can balance habitat and recreational needs	Can suspend sediments and increase turbidity and nutrient release
a. Handpulling/Manual raking	Y/N	SCUBA divers or snorkelers remove plants by hand or plants are removed with a rake	Little to no damage done to lake or to native plant species	Very labor intensive
		Works best in soft sediments	Can be highly selective	Needs to be carefully monitored
			Can be done by shoreline property owners without permits within an area <30 ft wide OR where selectively removing exotics	Roots, runners, and even fragments of some species, particularly Eurasian watermilfoil (EWM) will start new plants, so all of plant must be removed
			Can be very effective at removing problem plants, particularly following early detection of an invasive exotic species	Small-scale control only

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
b. Harvesting	Y	Plants are "mowed" at depths of 2-5 ft, collected with a conveyor and off-loaded onto shore	Immediate results	Not selective in species removed
		Harvest invasives only if invasive is already present throughout the lake	EWM removed before it has the opportunity to autofragment, which may create more fragments than created by harvesting	Fragments of vegetation can re-root
			Minimal impact to lake ecology	Can remove some small fish and reptiles from lake
			Harvested lanes through dense weed beds can increase growth and survival of some fish	Initial cost of harvester expensive
			Can remove some nutrients from lake	
Biological Control	Y	Living organisms (e.g. insects or fungi) eat or infect plants	Self-sustaining; organism will over-winter, resume eating its host the next year	Effectiveness will vary as control agent's population fluctates
			Lowers density of problem plant to allow growth of natives	Provides moderate control - complete control unlikely
				Control response may be slow
				Must have enough control agent to be effective
a. Weevils on EWM	Y	Native weevil prefers EWM to other native water-milfoil	Native to Wisconsin: weevil cannot "escape" and become a problem	Need to stock large numbers, even if some already present
			Selective control of target species	Need good habitat for overwintering on shore (leaf litter) associated with undeveloped shorelines
			Longer-term control with limited management	Bluegill populations decrease densities through predation

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
b. Pathogens	Y	Fungal/bacterial/viral pathogen introduced to target species to induce mortalitiy	May be species specific	Largely experimental; effectiveness and longevity unknown
			May provide long-term control	Possible side effects not understood
			Few dangers to humans or animals	
c. Allelopathy	Y	Aquatic plants release chemical compounds that inhibit other plants from growing	May provide long-term, maintenance-free control	Initial transplanting slow and labor-intensive
			Spikerushes (*Eleocharis* spp.) appear to inhibit Eurasian watermilfoil growth	Spikerushes native to WI, and have not effectively limited EWM growth
				Wave action along shore makes it difficult to establish plants; plants will not grow in deep or turbid water
d. Planting native plants	Y	Diverse native plant community established to repel invasive species	Native plants provide food and habitat for aquatic fauna	Initial transplanting slow and labor-intensive
			Diverse native community may be "resistant" to invasive species	Nuisance invasive plants may outcompete plantings
			Supplements removal techniques	Largely experimental; few well-documented cases
				If transplants from external sources (another lake or nursury), may include additional invasive species or "hitchhikers"

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
Physical Control	Required under Ch. 30 / NR 107	Plants are reduced by altering variables that affect growth, such as water depth or light levels		
a. Fabrics/ Bottom Barriers	Y	Prevents light from getting to lake bottom	Reduces turbidity in soft-substrate areas	Eliminates all plants, including native plants important for a healthy lake ecosystem
			Useful for small areas	May inhibit spawning by some fish
				Need maintenance or will become covered in sediment and ineffective
				Gas accumulation under blankets can cause them to dislodge from the bottom
				Affects benthic invertebrates
				Anaerobic environment forms that can release excessive nutrients from sediment
b. Drawdown	Y, May require Environmental Assessment	Lake water lowered with siphon or water level control device; plants killed when sediment dries, compacts or freezes	Winter drawdown can be effective at restoration, provided drying and freezing occur. Sediment compaction is possible over winter	Plants with large seed bank or propagules that survive drawdown may become more abundant upon refilling
		Season or duration of drawdown can change effects	Summer drawdown can restore large portions of shoreline and shallow areas as well as provide sediment compaction	May impact attached wetlands and shallow wells near shore
			Emergent plant species often rebound near shore providing fish and wildlife habitat, sediment stabilization, and increased water quality	Species growing in deep water (e.g. EWM) that survive may increase, particularly if desirable native species are reduced
			Success demonstrated for reducing EWM, variable success for curly-leaf pondweed (CLP)	Can affect fish, particularly in shallow lakes if oxygen levels drop or if water levels are not restored before spring spawning
			Restores natural water fluctuation important for all aquatic ecosystems	Winter drawdawn must start in early fall or will kill hibernating reptiles and amphibians
				Navigation and use of lake is limited during drawdown

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
c.	Dredging	Y	Plants are removed along with sediment	Increases water depth	Severe impact on lake ecosystem
			Most effective when soft sediments overlay harder substrate	Removes nutrient rich sediments	Increases turbidity and releases nutrients
			For extremely impacted systems	Removes soft bottom sediments that may have high oxygen demand	Exposed sediments may be recolonized by invasive species
			Extensive planning required		Sediment testing may be necessary
					Removes benthic organisms
					Dredged materials must be disposed of
d.	Dyes	Y	Colors water, reducing light and reducing plant and algal growth	Impairs plant growth without increasing turbidity	Appropriate for very small water bodies
				Usually non-toxic, degrades naturally over a few weeks	Should not be used in pond or lake with outflow
					Impairs aesthetics
					Effects to microscopic organisms unknown
e.	Non-point source nutrient control	N	Runoff of nutrients from the watershed are reduced (e.g. by controlling construction erosion or reducing fertilizer use) thereby providing fewer nutrients available for plant growth	Attempts to correct source of problem, not treat symptoms	Results can take years to be evident due to internal recycling of already-present lake nutrients
				Could improve water clarity and reduce occurrences of algal blooms	Requires landowner cooperation and regulation
				Native plants may be able to better compete with invasive species in low-nutrient conditions	Improved water clarity may increase plant growth

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
	Chemical Control	Y, Required under NR 107	Granules or liquid chemicals kill plants or cease plant growth; some chemicals used primarily for algae	Some flexibility for different situations	Possible toxicity to aquatic animals or humans, especially applicators
			Results usually within 10 days of treatment, but repeat treatments usually needed	Some can be selective if applied correctly	May kill desirable plant species, e.g. native water-milfoil or native pondweeds; maintaining healthy native plants important for lake ecology and minimizing spread of invasives
			Chemicals must be used in accordance with label guidelines and restrictions	Can be used for restoration activities	Treatment set-back requirements from potable water sources and/or drinking water use restrictions after application, usually based on concentration
					May cause severe drop in dissolved oxygen causing fish kill, depends on plant biomass killed, temperatures and lake size and shape
					Often controversial
a.	2,4-D	Y	Systemic[1] herbicide selective to broadleaf[2] plants that inhibits cell division in new tissue	Moderately to highly effective, especially on EWM	May cause oxygen depletion after plants die and decompose
			Applied as liquid or granules during early growth phase	Monocots, such as pondweeds (e.g. CLP) and many other native species not affected	May kill native dicots such as pond lilies and other submerged species (e.g. coontail)
				Can be selective depending on concentration and seasonal timing	Cannot be used in combination with copper herbicides (used for algae)
				Can be used in synergy with endothall for early season CLP and EWM treatments	Toxic to fish
				Widely used aquatic herbicide	

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
b.	Endothall	Y	Broad-spectrum[3], contact[4] herbicide that inhibits protein synthesis	Especially effective on CLP and also effective on EWM	Kills many native pondweeds
			Applied as liquid or granules	May be effective in reducing reestablishment of CLP if reapplied several years in a row in early spring	Not as effective in dense plant beds; heavy vegetation requires multiple treatments
				Can be selective depending on concentration and seasonal timing	Not to be used in water supplies; post-treatment restriction on irrigation
				Can be combined with 2,4-D for early season CLP and EWM treatments, or with copper compounds	Toxic to aquatic fauna (to varying degrees)
				Limited off-site drift	
c.	Diquat	Y	Broad-spectrum, contact herbicide that disrupts cellular functioning	Mostly used for water-milfoil and duckweed	May impact non-target plants, especially native pondweeds, coontail, elodea, naiads
			Applied as liquid, can be combined with copper treatment	Rapid action	Toxic to aquatic invertebrates
				Limited direct toxicity on fish and other animals	Must be reapplied several years in a row
					Ineffective in muddy or cold water (<50°F)
d.	Fluridone	Y; special permit and Environmental Assessment may be required	Broad-spectrum, systemic herbicide that inhibits photosynthesis	Effective on EWM for 1 to 4 years with aggressive follow-up treatments	Affects non-target plants, particularly native milfoils, coontails, elodea, and naiads, even at low concentrations
			Must be applied during early growth stage	Some reduction in non-target effects can be achieved by lowering dosage	Requires long contact time at low doses: 60-90 days
			Available with a special permit only; chemical applications beyond 150 ft from shore not allowed under NR 107	Slow decomposition of plants may limit decreases in dissolved oxygen	Demonstrated herbicide resistance in hydrilla subjected to repeat treatments
			Applied at very low concentration at whole lake scale	Low toxicity to aquatic animals	In shallow eutrophic systems, may result in decreased water clarity
					Unknown effect of repeat whole-lake treatments on lake ecology

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
e.	Glyphosate	Y	Broad-spectrum, systemic herbicide that disrupts enzyme formation and function	Effective on floating and emergent plants such as purple loosestrife	RoundUp is often incorrectly substituted for Rodeo - Associated surfactants of RoundUp believed to be toxic to reptiles and amphibians
			Usually used for purple loosestrife stems or cattails	Selective if carefully applied to individual plants	Cannot be used near potable water intakes
			Applied as liquid spray or painted on loosetrife stems	Non-toxic to most aquatic animals at recommended dosages	Ineffective in muddy water
				Effective control for 1-5 years	No control of submerged plants
f.	Triclopyr	Y	Systemic herbicide selective to broadleaf plants that disrupts enzyme function	Effective on many emergent and floating plants	Impacts may occur to some native plants at higher doses (e.g. coontail)
			Applied as liquid spray or liquid	More effective on dicots, such as purple loosestrife; may be more effective than glyphosate	May be toxic to sensitive invertebrates at higher concentrations
				Control of target plants occurs in 3-5 weeks	Retreatment opportunities may be limited due to maximum seasonal rate (2.5 ppm)
				Low toxicity to aquatic animals	Sensitive to UV light; sunlight can break herbicide down prematurely
				No recreational use restrictions following treatment	Relatively new management option for aquatic plants (since 2003)
g.	Copper compounds	Y	Broad-spectrum, systemic herbicide that prevents photosynthesis	Reduces algal growth and increases water clarity	Elemental copper accumulates and persists in sediments
			Used to control planktonic and filamentous algae	No recreational or agricultural restrictions on water use following treatment	Short-term results
			Wisconsin allows small-scale control only	Herbicidal action on hydrilla, an invasive plant not yet present in Wisconsin	Long-term effects of repeat treatments to benthic organisms unknown
					Toxic to invertebrates, trout and other fish, depending on the hardness of the water
					Clear water may increase plant growth

[1]Systemic herbicide - Must be absorbed by the plant and moved to the site of action. Often slower-acting than contact herbicides.
[2]Broadleaf herbicide - Affects only dicots, one of two groups of plants. Aquatic dicots include waterlilies, bladderworts, watermilfoils, and coontails.
[3]Broad-spectrum herbicide - Affects both monocots and dicots.
[4]Contact herbicide - Unable to move within the plant; kills only plant tissue it contacts directly.
Specific effects of herbicide treatments dependent on timing, dosage, duration of treatment, and location.
References to registered products are for your convenience and not intended as an endorsement or criticism of that product versus other similar products.
This document is intended to be a guide to available aquatic plant control techniques, and is not necessarily an exhaustive list.
Please contact your local Aquatic Plant Management Specialist when considering a permit.

Appendix F. Shoreline Assessment Results/Template for further study

Shoreline Inventory Key

Canopy, Ground Cover, shoreline substrate, yard slope

0 -= none

1 = up to 10%

2 = 11 to 25%

3 = 26 to 50%

4 = > 50%

Human Influence if noted is a 1

Buffer Width

0 = none

1 = 1-5’

2 = 5-15’

3= 15-35’,

4 =>35’

Unprotected = unprotected shoreline percentage

GPS	Photo1	Photo2	Photo3	Photo4	Canopy	Cyard	Cbuffer	Understory	Woody	Grasses	Ground	Gwoody	Ggrasses	Gbare	Gerosion	Substrate	Gravel	Sand	Muck	Organic	Slope Yard	Slope Buffer	Influence	Building	Docks	Walls/Riprap	Lawn to Shoreline	Beach Area	Mitigation	Restoration	Buffer Width	Unprotected	Comments	Rating
001	1	263			D	4	4	D	4	4		4	4	1	1		0	0	2	2	2	1		1	1	0	0	0		0	4	15%		15.0
002	2				M	1	1	M	2	2		2	2	0	0		0	0	2	2	1	0		1	0	0	1	0		0	2	10%		7.0
003	3	4	5		M	4	4	M	4	4		4	4	0	0		0	0	2	2	1	1		0	1	0	0	0		0	4	0%		21.0
004	6	-			M	3	2	M	4	4		4	4	0	0		0	0	2	2	1	0		0	1	0	0	0		0	3	10%		18.5
005	7	8			M	4	4	M	4	4		4	4	0	0		0	0	2	2	1	1		0	1	0	0	0		0	4	0%		21.0
006	9	10			M	1	4	M	4	4		4	4	0	0		0	0	2	2	1	0		0	1	0	1	0		0	4	50%		14.5
007	11				M	3	0	D	0	1		0	2	0	0		0	0	2	2	1	0		0	1	0	0	0		0	1	30%		0.5
008	12				M	4	0	D	0	0		0	2	0	0		0	0	2	2	2	0		0	1	0	0	0		0	1	50%		-3.0
009	13				M	4	4	D	0	0		0	2	0	0		0	0	2	2	3	2		0	1	0	0	0		0	1	50%		-4.0
010	14				M	3	3	D	0	0		0	2	0	0		0	0	2	2	3	2		0	1	1	0	0		0	1	90%		-10.0

011	15				C	1	1	D	1	0		0	0	0	0		0	0	2	2	2	1		0	1	1	1	0		0	0	100%		-14.0
012	16				M	3	3	D	0	0		0	0	0	0		0	0	2	2	2	1		0	1	1	1	0		0	0	100%		-13.0
013	17	18	19		M	3	3	D	1	0		0	0	0	0		0	0	2	2	2	1		0	1	1	1	0		0	0	90%		-11.0
014	20	-			D	3	4	D	1	0		0	0	0	0		0	0	2	2	2	1		0	1	1	1	0		0	0	90%		-10.5
015	21	-			M	2	2	M	0	0		0	0	0	0		0	0	2	2	2	1		1	1	0	1	0		0	0	100%		-14.0
016	22	-			M	4	4	M	1	0		0	0	0	0		0	0	2	2	3	1		0	1	0	1	0		0	0	100%		-11.0
017	23				M	2	2	M	1	0		0	0	0	0		0	0	2	2	2	1		0	1	1	1	0		0	0	100%		-13.0
018	24				M	2	2	D	1	0		0	0	0	0		0	0	2	2	2	1		0	1	1	1	0		0	0	100%		-13.0
019	25	-	-	-	M	4	2	D	1	0		0	0	0	0		0	0	2	2	2	1		0	1	0	1	0		0	0	100%		-11.0
020	26	-			M	2	2	D	1	0		0	0	0	0		0	0	2	2	2	1		0	1	0	1	0		0	0	100%		-12.0
021	27	28	-		M	2	2	D	0	0		0	0	0	0		0	0	2	2	2	1		0	1	0	1	0		0	0	100%		-13.0
022	29	-	-		M	2	1	D	0	0		0	0	0	0		0	0	2	2	2	1		0	1	0	1	0		0	0	100%		-13.5

023	30	31			Construction													0	0	2	2																				0.0
024	32	-			M	1	2	M	1	0		0	3	0	0		0	0	2	2	1	1		0	1	0	0	0			1	10%		2.5
025	33	34	35		M	2	2	M	1	0		0	3	0	0		0	0	2	2	1	1		0	1	0	0	0			1	20%		2.0
026	36	37	38		M	2	3	M	1	1		1	3	0	0		0	0	2	2	1	2		0	1	0	0	0			2	40%		2.5
027	39	40	-	-	M	2	3	M	2	2		2	2	0	0		0	0	2	2	1	1		0	1	0	0	0		0	4	40%		7.5
028	41	-			M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	1		0	1	0	0	0		0	4	10%		19.0
029	42				M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	1		0	1	0	0	0		0	4	10%		19.0
030	43	44	-		M	4	4	M	4	4		4	4	1	1		0	0	2	2	2	2		0	1	0	0	0		0	4	20%		14.5
031	45	46	-		M	4	4	M	4	4		4	4	1	1		0	0	2	2	2	2		0	1	0	0	0		0	4	0%		16.5
032	47	48			M	4	4	M	4	4		4	4	1	1		0	0	2	2	2	2		0	1	0	0	0		0	4	0%		16.5
033	49	50	51	52	M	4	4	M	4	4		4	4	1	1		0	0	2	2	2	2		0	1	0	0	0		0	4	0%		16.5

034	53	-	-		M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	2		0	1	0	0	0		0	4	0%		19.0
035	54	-	-		M	3	2		3	3		3	4	0	0		0	2	0	2	2	1		0	1	0	0	0		0	4	20%		13.5
036	55	56			M	2	1		1	1		1	1	0	0		0	2	0	2	2	1		0	1	0	1	1		0	1	70%		-6.5
037	57	58	59		M	4	3		3	3		1	1	0	0		0	2	0	2	2	1		0	1	0	1	0		0	4	25%		8.0
038	60	-			M	4	3	M	3	3		2	1	0	0		0	2	0	2	2	1		1	1	0	1	0		0	4	50%		5.5
039	61	62			M	4	4	M	4	4		4	4	0	0		0	2	0	2	2	2		0	1	0	0	0		0	4	0%		19.0
040	63	64			M	4	4	M	4	4		4	4	0	0		0	1	2	1	2	2		0	1	0	0	0		0	4	0%		19.0
041	65				M	4	4	M	4	4		4	4	0	0		0	1	2	1	2	2		0	1	0	0	0		0	4	0%		19.0
042	66	-	-		M	3	4	M	4	4		4	4	2	1		0	1	2	1	2	1		0	1	0	0	0		0	4	10%		15.0
043	67	68			M	3	3	M	1	1		1	1	1	1		0	0	2	2	3	1		0	1	1	0	0		0	2	30%		-2.5
044	69	70	-		M	4	4	M	4	4		4	4	0	0		0	0	2	2	3	1		0	1	0	0	0		1	4	5%	George Simatovich	18.5

045	71	72	-		M	0	0	M	0	0		0	0	0	0		0	0	2	2	2	1		0	1	1	1	0		0	0	100%		-16.0
046	73	74	-		M	2	2	M	2	2		2	2	0	0		0	0	2	2	2	1		0	1	1	0	0		1	2	30%	DougKnudtson	4.0
047	75	76	77		M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	2		0	1	0	0	0		0	4	0%		19.0
048	78	79	80	81	M	1	4	M	3	3		2	2	4	4		0	0	2	2	3	3		0	1	0	0	0		0	2	20%		-4.5
049	82	83			M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	2		0	1	0	0	0		0	4	0%		19.0
050	84	85			M	4	4	M	4	4		4	4	2	2		0	0	2	2	2	2		0	1	0	0	0		0	4	10%		13.0
051	86	-			M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	2		0	0	0	0	0		0	4	0%		20.0
052	87	88			M	4	4	M	4	4		4	4	1	1		0	0	2	2	2	2		0	1	0	0	0		0	4	10%		15.5
053	89	90	91		M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	2		0	0	0	0	0		0	4	0%		20.0
054	92	93	94		M	4	4	M	4	4		4	4	0	0		0	0	2	2	3	2		0	1	0	0	0		0	4	5%		17.5
055	95	96			M	4	4	M	4	4		4	4	0	0		0	0	2	2	3	2		0	0	0	0	0		0	4	0%		19.0

056	97	98	99		M	4	4	M	4	4		4	4	0	0		0	0	2	2	3	2		0	1	0	0	0		0	4	5%		17.5
057	100	101			M	4	4	M	4	4		2	2	0	0		0	0	2	2	3	2		0	1	0	0	0		0	4	5%		13.5
058	102	103			M	4	4	M	4	4		3	3	0	0		0	0	2	2	3	2		0	0	0	0	0		0	4	0%		17.0
059	104	105			M	4	4	M	4	4		3	3	0	0		0	0	2	2	3	2		0	0	0	0	0		0	4	0%		17.0
060	106	107			M	4	4	M	4	4		4	4	2	1		0	0	2	2	2	2		0	1	0	0	0		0	4	10%		14.5
061	108				M	4	4	M	4	4		3	3	0	0		0	0	2	2	3	2		0	0	0	0	0		0	4	5%		16.5
062	109	110			M	4	4	M	4	4		4	4	1	1		0	2	1	1	3	2		0	1	0	0	0		0	4	30%		12.5
063	111	112	113	114	M	4	4	M	4	4		4	4	1	1		0	2	1	1	2	2		0	1	0	0	0		0	4	10%		15.5
064	115	116	117		M	4	4	M	4	4		4	4	0	0		0	1	1	2	3	2		0	0	0	0	0		0	4	0%		19.0
065	118	119			M	4	4	M	4	4		4	4	0	0		0	2	1	1	3	2		0	0	0	0	0		0	4	0%		19.0
066	120	121			M	4	4	M	4	4		4	4	0	0		0	0	3	1	3	2		0	0	0	0	0		0	4	0%		19.0
067	122				M	4	4	M	4	4		4	4	0	0		0	1	3	0	3	2		0	0	0	0	0		0	4	0%		19.0

068	123	124	125		M	4	4	M	2	2		2	2	2	2		1	2	1	0	3	2		0	1	0	0	0		0	3	20%		2.0
069	126	127	128		M	4	4	M	2	2		2	2	2	2		1	2	1	0	3	2		0	1	0	0	0		0	3	40%		0.0
070	129	130			M	4	4	M	4	4		4	4	0	0		0	0	1	3	3	2		0	1	0	0	0		0	4	0%		18.0
071	131	132			M	4	4	M	4	4		4	4	1	1		0	0	1	3	2	1		0	1	0	0	0		0	4	25%		15.0
072	133	134	135		M	4	4	M	4	4		4	4	2	2		0	0	1	3	2	2		0	1	0	0	0		0	4	35%		10.5
073	136	137	138		M	4	4	M	2	1		1	2	3	3		0	0	1	2	2	2		0	1	0	0	0		0	2	20%		-2.5
074	139	140			M	4	4	M	3	1		1	2	2	2		0	0	1	3	2	2		0	1	0	0	0		0	1	30%		-1.0
075	141	142			M	4	4	M	1	1		1	2	3	3		0	0	1	3	2	1		0	1	0	0	0		0	2	20%		-2.5
076	143	144			M	3	4		2	2		2	2	0	0		0	0	1	3	1	1		0	1	0	0	0		0	3	30%		8.5
077	145	146			M	1	1		1	1		2	1	0	0		0	0	1	3	1	1		0	1	1	0	0		0	1	100%		-7.0
078	147				M	4	4		3	3		3	3	1	1		0	0	1	3	3	1		0	1	0	0	0		0	1	50%		4.5
079	148	149	150	151	M	4	4		4	4		4	4	1	1		0	0	1	3	3	2		0	1	0	0	0		0	4	10%		14.5

080	152	153	154		M	4	4		4	4		4	4	1	1		0	0	1	3	3	2		0	0	0	0	0		0	4	0%		16.5
081	155	156			M	4	4		4	4		4	4	1	1		0	0	1	3	1	1		0	0	0	0	0		0	4	0%		19.5
082	157	158	159		M	4	4		3	4		3	4	1	1		0	0	1	3	3	1		0	1	0	0	0		0	4	10%		13.5
083	160	161	162		M	2	3		4	4		4	4	0	0		0	0	1	3	3	3		0	1	0	0	0		0	4	10%		14.5
084	163	164	165		M	4	3		4	4		4	4	0	0		0	0	1	3	3	3		0	0	0	0	0		0	4	0%		17.5
085	166	167	168		M	4	4		3	3		3	4	1	1		0	0	1	3	2	1		1	1	0	0	0		0	4	40%		9.5
086	169	170	171		M	4	4	M	1	1		1	2	2	2		0	1	2	1	1	1		0	1	0	0	0			2	30%		0.0
087	172	173	174	175	M	4	4	M	1	4		2	4	1	1		0	1	2	1	2	1		0	1	0	0	0			4	30%		9.5
088	176	177	178		M	4	4	M	3	3		3	3	0	0		0	1	2	1	2	1		0	1	0	0	0			4	30%		13.0
089	179	180	181		M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	1	0	1	0			4	25%		19.5
090	182	183			M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0
091	184	185	186		M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0

092	187	188	189		M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0
093	190	191	192		M	4	4	M	4	4		4	4	2	2		0	1	2	1	3	1		0	1	1	0	0			4	20%		11.0
094	193	194	195		M	4	4	M	4	4		4	4	2	1		0	1	2	1	3	1		0	0	0	0	0			4	10%		15.5
095	196	197	198		M	4	4	M	1	1		1	3	0	0		0	1	2	1	2	1		0	1	1	0	0			1	20%		4.0
096	199	200			M	4	4	M	4	4		4	4	0	0		0	1	2	1	1	1		0	1	0	0	0			4	5%		20.5
097	201	202			M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0
098	203	204	205	206	M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0
099	207	208	209	210	M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0
100																	0	1	2	1														0.0
101	211	212			M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0
102	213				M	4	4	M	4	4		4	4	0	0		0	1	2	1	0	0		0	0	0	0	0			4	0%		24.0
103	214	215	216		M	4	4	M	4	4		4	4	0	0		1	0	2	1	0	0		0	0	0	0	0			4	0%		24.0

104	217				M	4	4	M	4	4		4	4	0	0		1	0	2	1	1	1		0	0	0	0	0			4	5%		21.5
105	218	219	220		M	4	4	M	4	4		4	4	0	0		0	0	2	2	0	0		0	0	0	0	0			4	0%		24.0
106	221	222			M	4	4	M	4	4		4	4	0	0		0	0	2	2	0	0		0	0	0	0	0			4	0%		24.0
107	223				M	4	4	M	4	4		4	4	0	0		0	0	2	2	0	0		0	0	0	0	0			4	0%		24.0
108	224	225	226	227	M	4	4	M	4	4		4	4	0	0		0	0	2	2	0	0		0	0	0	0	0			4	0%		24.0
109	228	229	230	231	M	4	4	M	4	4		4	4	0	0		0	0	2	2	0	0		0	0	0	0	0			4	0%		24.0
110	232	233	234	235	M	4	4	M	4	4		4	4	0	0		0	0	2	2	0	0		0	0	0	0	0			4	0%		24.0
111	236	237	238		M	1	1	M	0	0		0	1	0	0		0	0	2	2	0	1		0	1	1	0	0			1	80%		-8.0
112	239	240			M	4	4	M	4	4		4	4	0	0		0	0	2	2	0	0		0	0	0	0	0			4	0%		24.0
113	241				M	2	3	M	4	4		4	4	0	0		0	0	2	2	1	0		0	1	0	0	0			4	5%		20.0
114	242	243			M	2	3	M	4	4		4	4	0	0		0	0	2	2	2	1		0	1	0	0	0			4	5%		18.0
115	244	245	246		M	3	2	M	4	4		4	4	0	0		0	0	2	2	3	1		0	1	0	0	0			4	20%		15.5

116	247	248	249		M	3	4	M	4	2		2	4	0	0		0	0	2	2	3	1		1	1	0	0	0			3	20%		10.5
117	250	251			M	4	4	M	4	4		4	4	0	0		0	0	2	2	3	1		0	0	0	0	0			4	0%		20.0
118	252				M	0	0	M	0	1		0	1	0	0		0	0	2	2	1	1		0	1	0	0	0			0	100%	BoatLanding	-11.0
119	253	254	255	256	M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	1		0	0	0	0	0			4	10%		20.0
120	257	259			M	0	0	M	0	0		0	0	0	0		0	0	2	2	1	0		0	1	0	1	0			0	100%		-13.0
121	258				M	3	1	M	0	0		0	0	0	0		0	0	2	2	1	0		0	1	0	1	0			1	50%		-5.0
122	260	261	262		M	4	4	M	4	4		4	4	0	0		0	0	2	2	2	1		0	1	0	0	0			4	20%		18.0

Shoreland Survey

Lake Name:

Waypoint number (or range):

Within 35 feet of Ordinary High Water

Vegetation	0-15	15-35	70-100%	30-70%	0-30%
Canopy (>15 ft high)	1	1	2	1	0
Understory (1-15 ft high)	1	1	2	1	0
Woody shrubs and saplings	1	1	2	1	0
Native herbs, grasses, forbs	1	1	2	1	0
Wetlands	1	1			
Organic (leaf pack, detritus)	1	1			
Woody structure at water interface	2		Total pts		

Human Influence			
Artificial beach	-1	-1	
Seawall	-2	-2	
Rip-rap	-1	-1	
Dock / pier at water	-1		
Boat landing	-1	-1	
Mowed lawn	-1	-1	
Barren, bare dirt	-2	-2	Total pts

Type Erosion			
None	1	1	
Undercut banks/slumping	-3	-3	
Furrow/gullies	-5	-5	

Erosion Length			
<21 Feet	-1	-1	
21-60 Feet	-2	-2	
>60 Feet	-3	-3	

Slope			
Flat (<10%)	3	3	
Moderate (10-25%)	2	2	
Steep (>25%)	1	1	Total pts

Within 75 feet of Ordinary High Water

Buildings	0-35	35-75	
Principal Structure	-3	-2	
Detached Deck/Patio/Gazebo/Boathouse	-2	-1	
Other Accessory Building/Impervious	-1	0	Total pts

Land use		
Residential	Yes	No
Cropland	Yes	No
Fallow	Yes	No
Forest	Yes	No

Mark on Map — Approx location of waypoint

Erosion (if any)

Grand Total

Appendix G. Funding options

Potential Funding Sources for Aquatic Invasive Species Monitoring, Planning, etc.

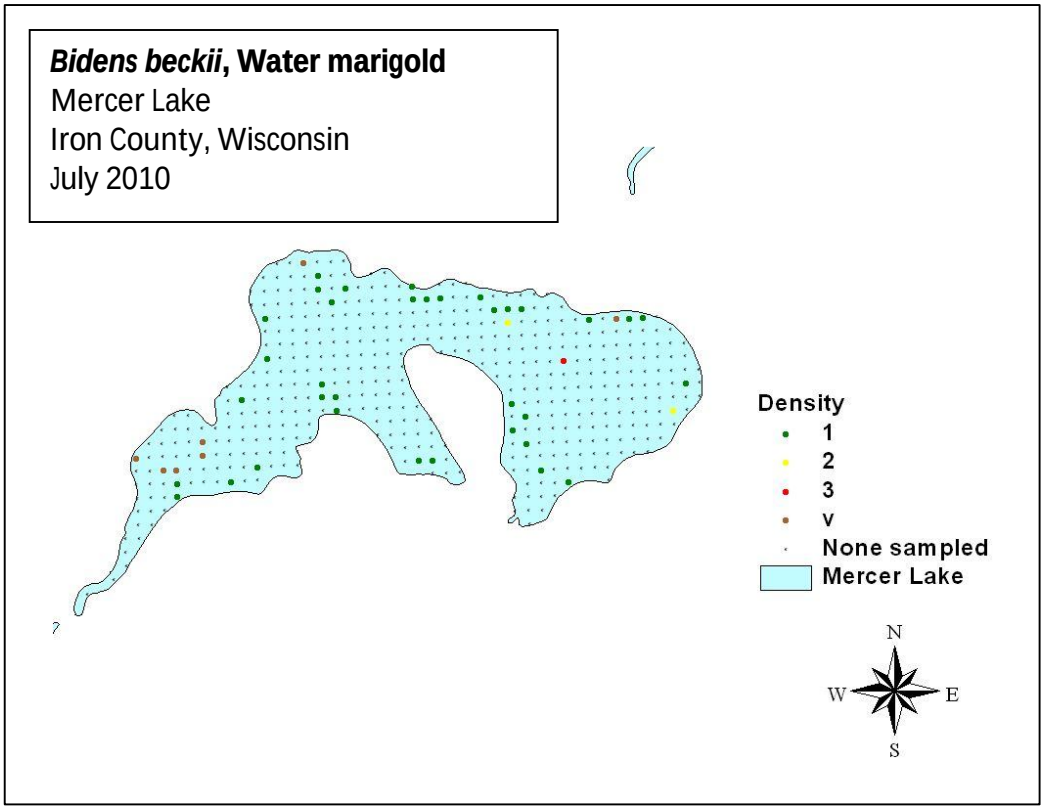
Grant Program: AIS Grant
Wisconsin Department of Natural Resources
Program Goals/Objectives: control aquatic invasive species
Eligible Applicants: Qualified lake and river management organizations and qualified school districts
Eligible Project Elements: education, prevention, and planning; early detection and response; controlling established infestations
Funding limits and rate: 75% of project costs up to $75,000 for education, prevention, planning and controlling established infestations; 75% of project costs up to $10,000 for early detection and rapid response
Application Deadline: February 1st of each year

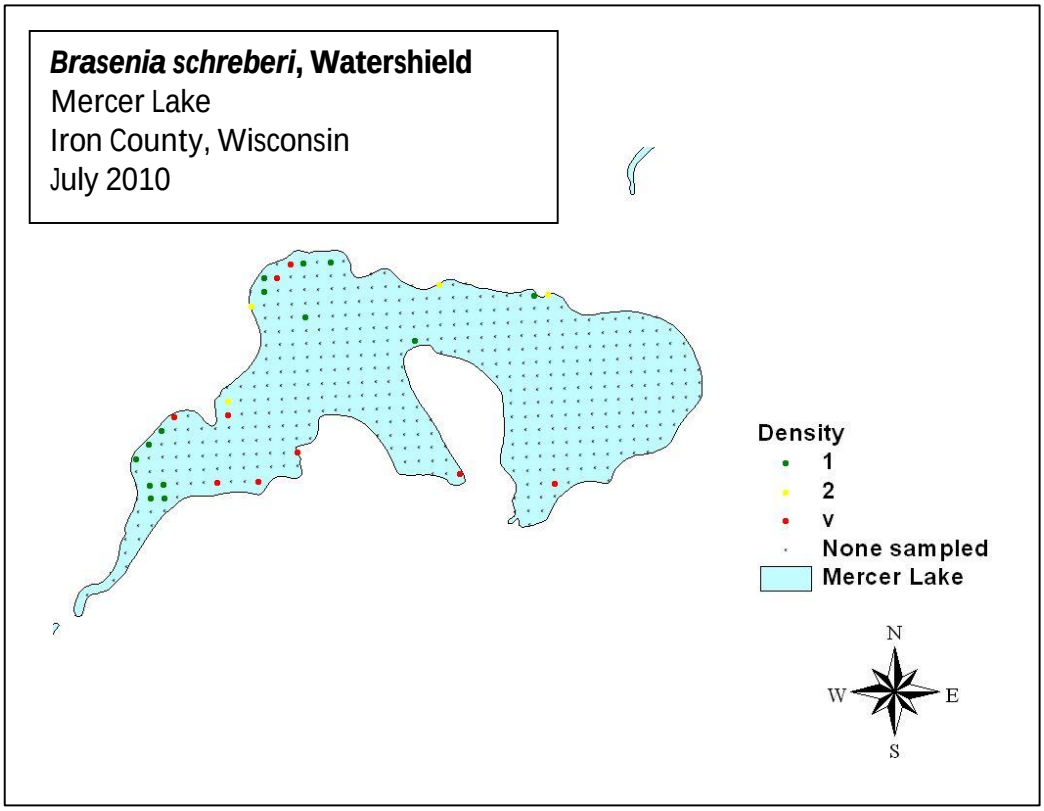
Grant Program: Lake Planning
Wisconsin Department of Natural Resources
Program Goals/Objectives: collect information in order to manage lakes
Eligible Applicants: Qualified lake and local government organizations; qualified school districts
Eligible Project Elements: Monitoring and education; organization development; studies or assessments.
Funding limits and rate: Small scale-75% share costs with a cap of $3000; large scale-75% share costs with a cap of $10,000.
Application Deadline: Feb 1st and August 1st of each year.

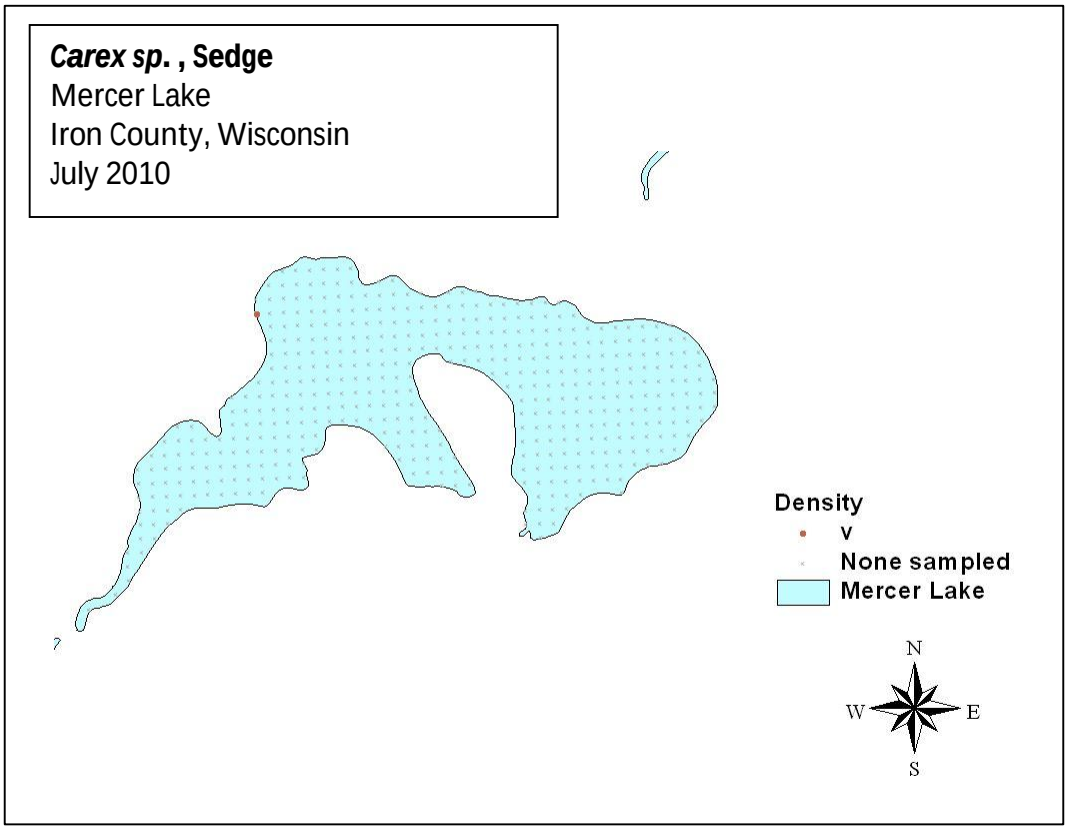
Potential Funding Sources for Watershed Practices

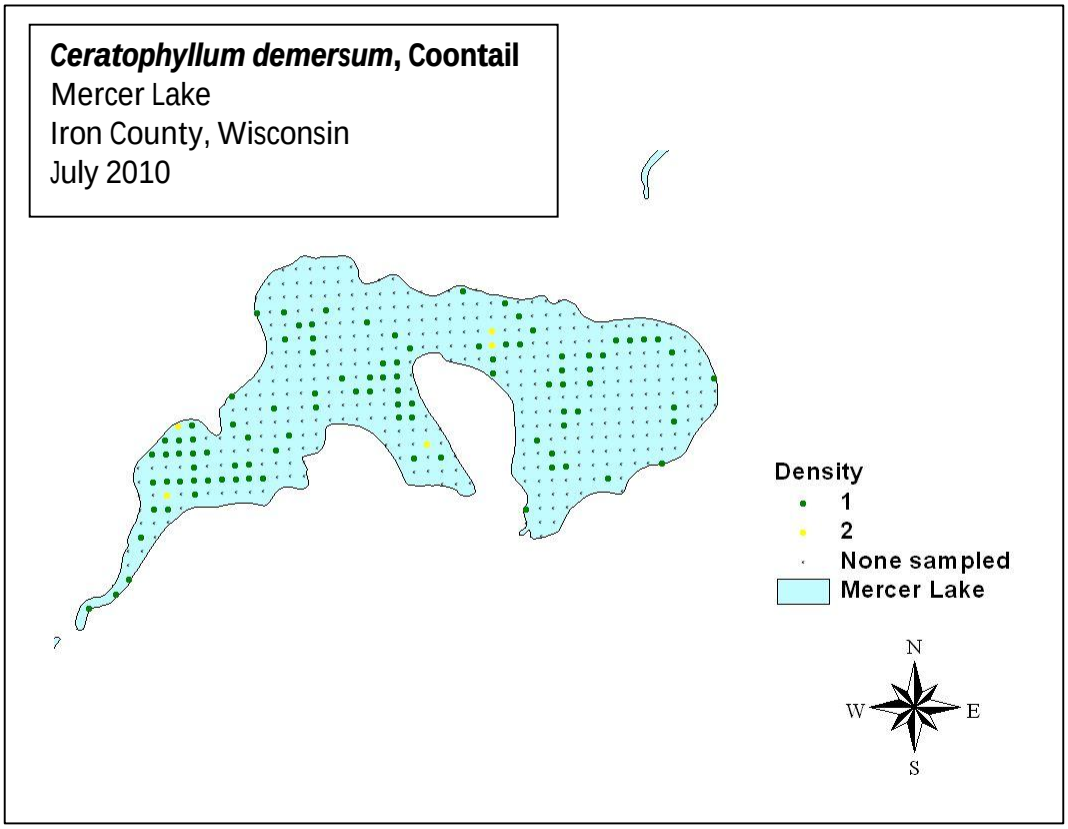
SHORELINE BUFFERS AND INFILTRATION PRACTICES

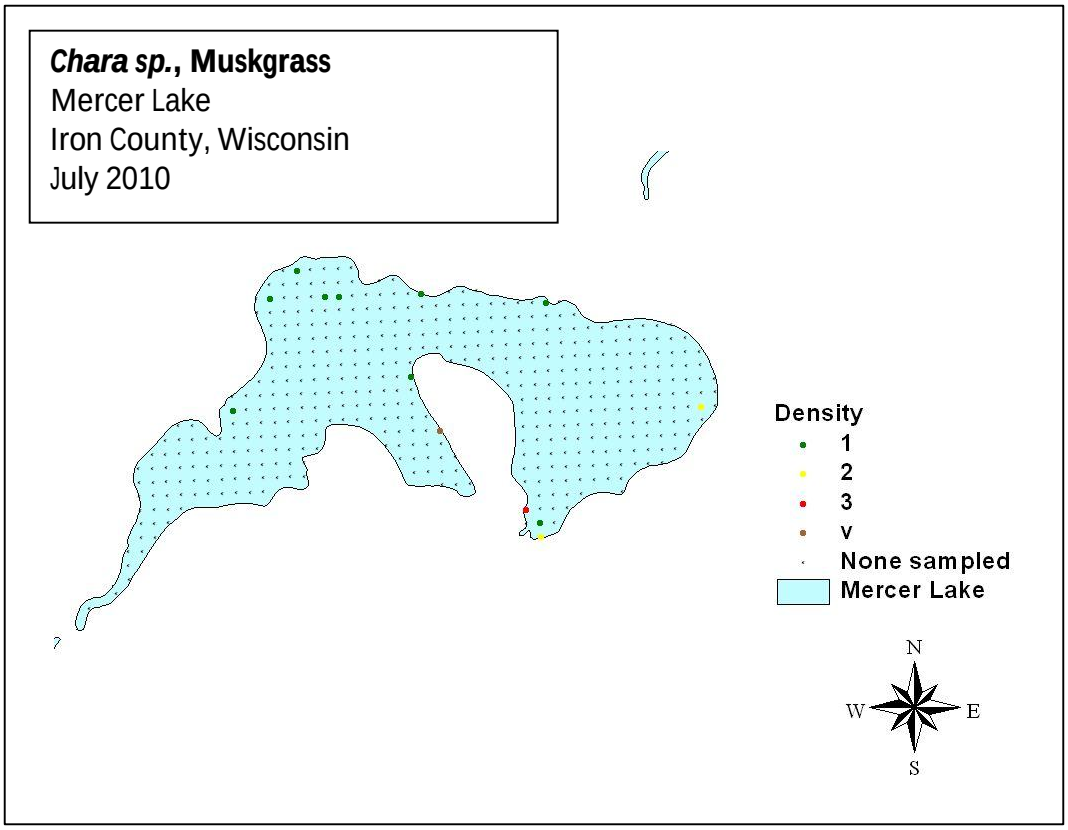
Grant Program: Lake Protection
Wisconsin Department of Natural Resources
Program Goals/Objectives: lake protection and restoration
Eligible Applicants: Qualified lake and conservation organizations
Eligible Project Elements: plans and specifications, earth moving and structure removal, native plants and seeds, monitoring costs
Funding Limits and Rates: 75 % of project costs up to $100,000
Application Deadline: May 1st each year

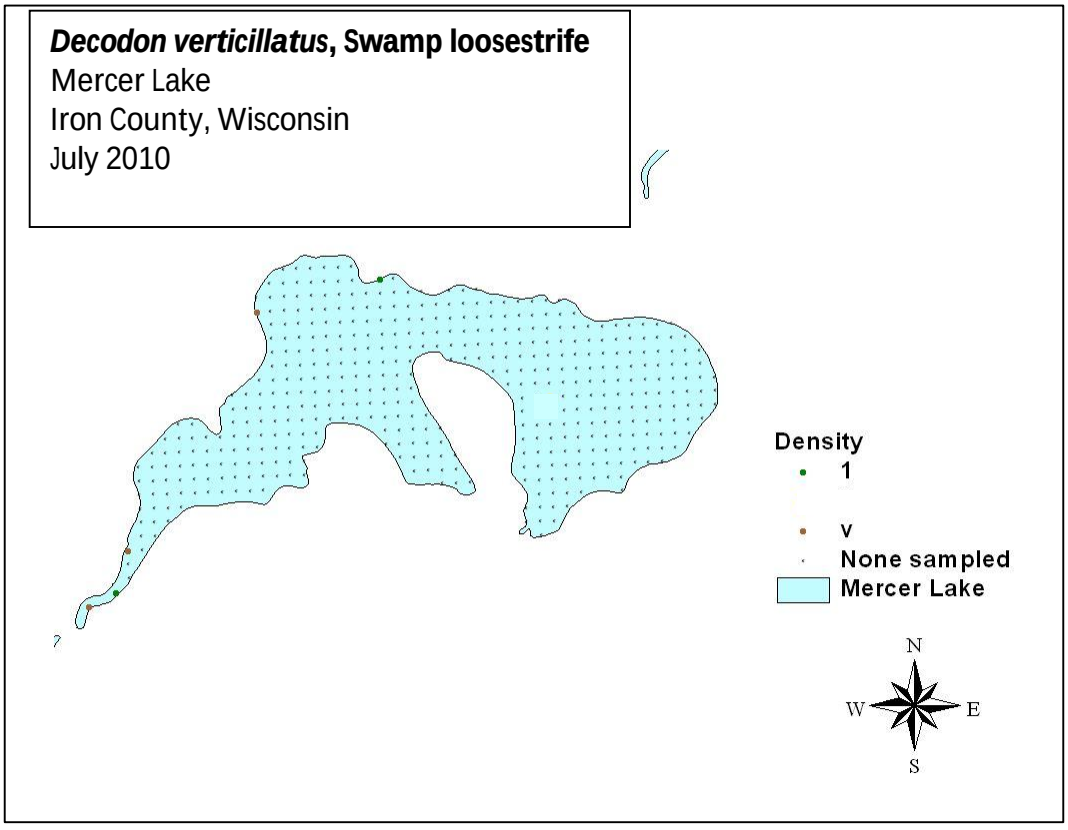

***Bidens beckii*, Water marigold**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
3
v
None sampled
Mercer Lake
N
W
E
S

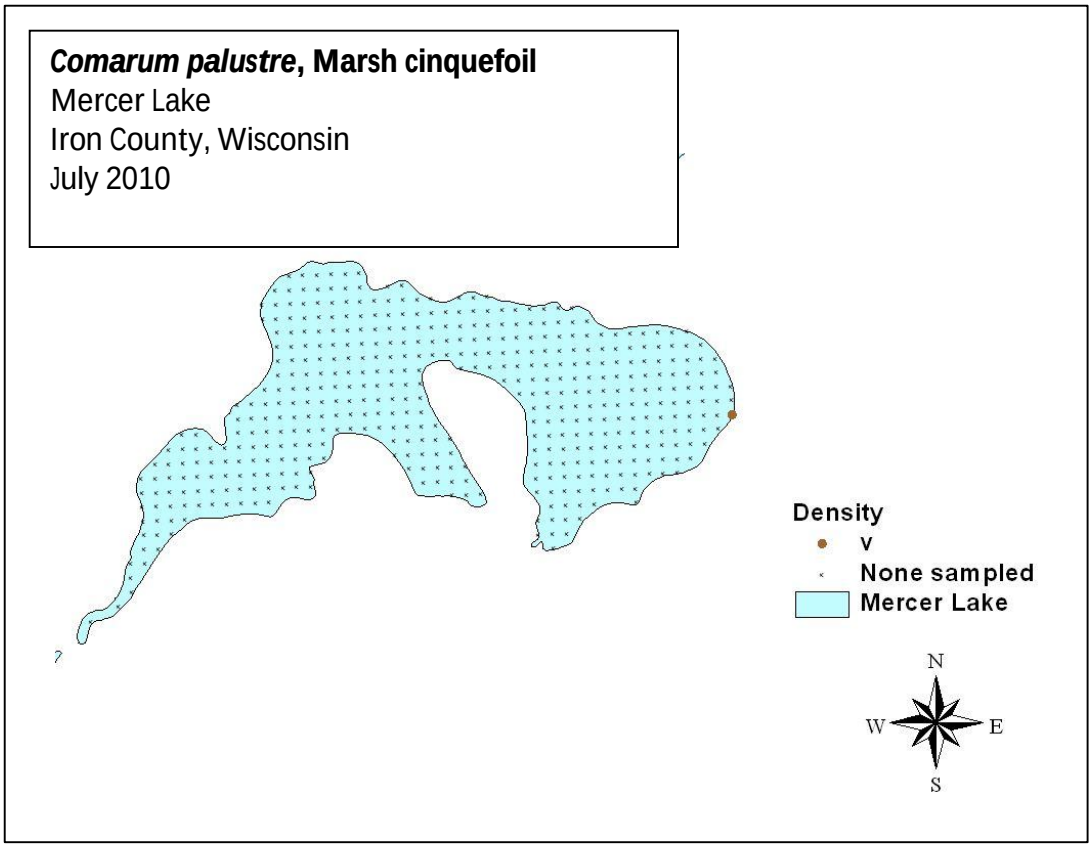

***Brasenia schreberi*, Watershield**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
v
None sampled
Mercer Lake
N
W
E
S

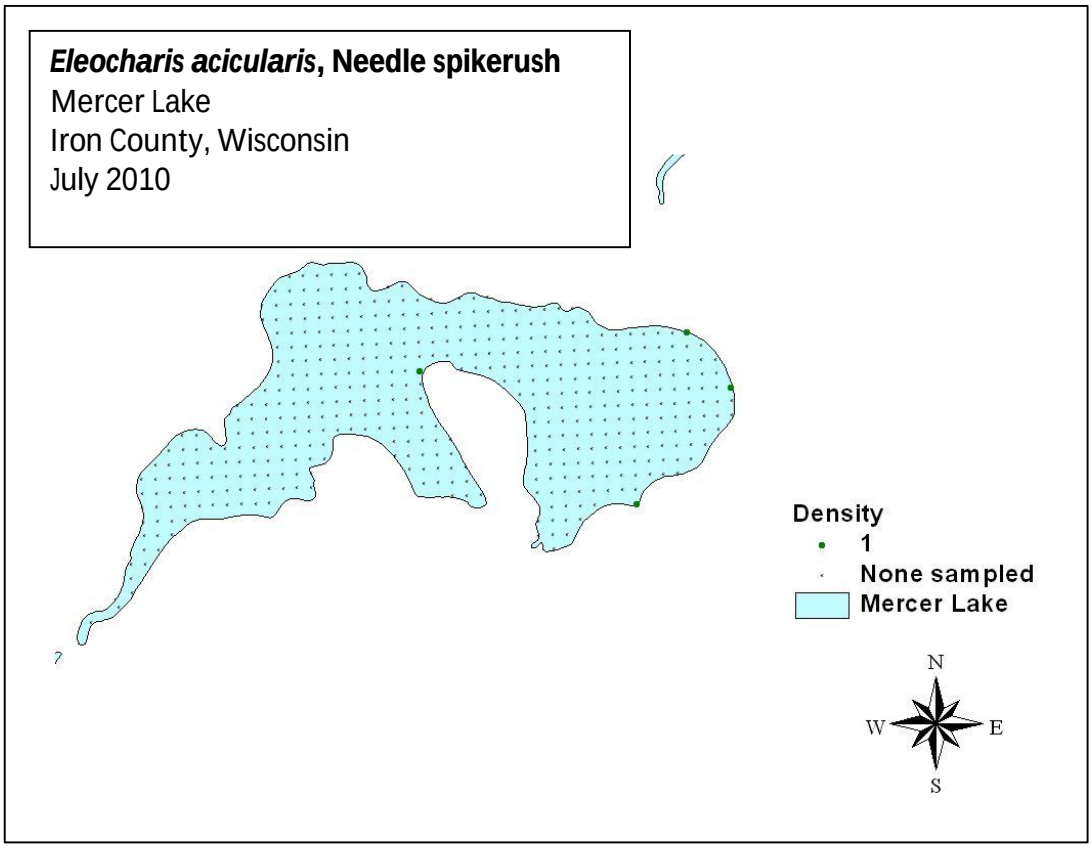

Carex sp. **, Sedge**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
v
None sampled
Mercer Lake
N
W
E
S

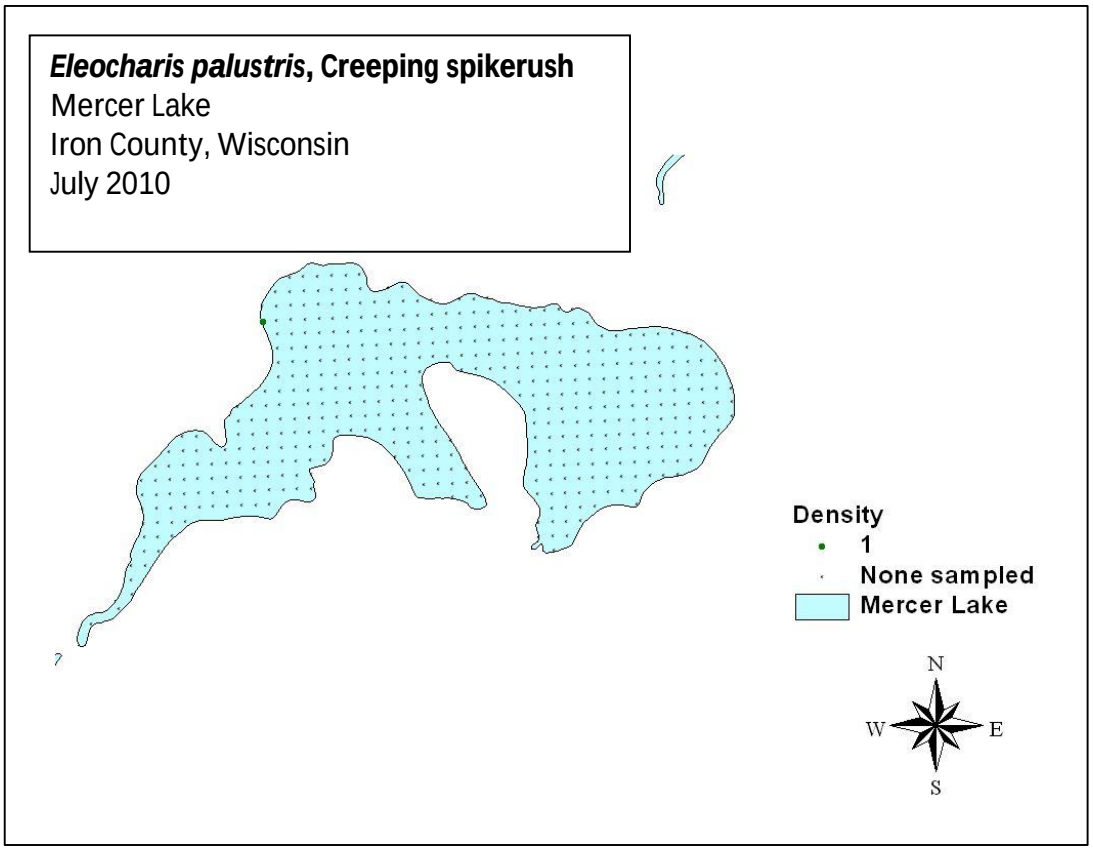

Ceratophyllum demersum**, Coontail**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
None sampled
Mercer Lake
N
W
E
S

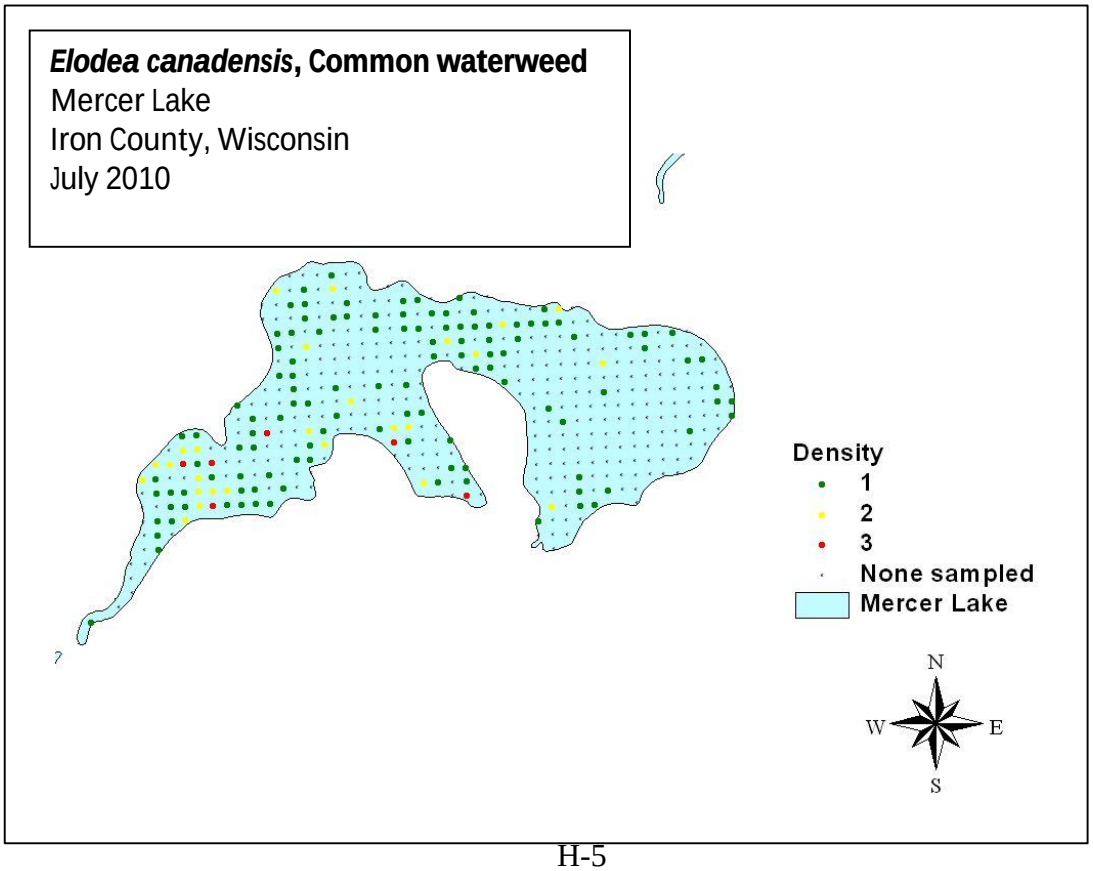

Chara sp., Muskgrass
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
3
v
None sampled
Mercer Lake
N
W
E
S

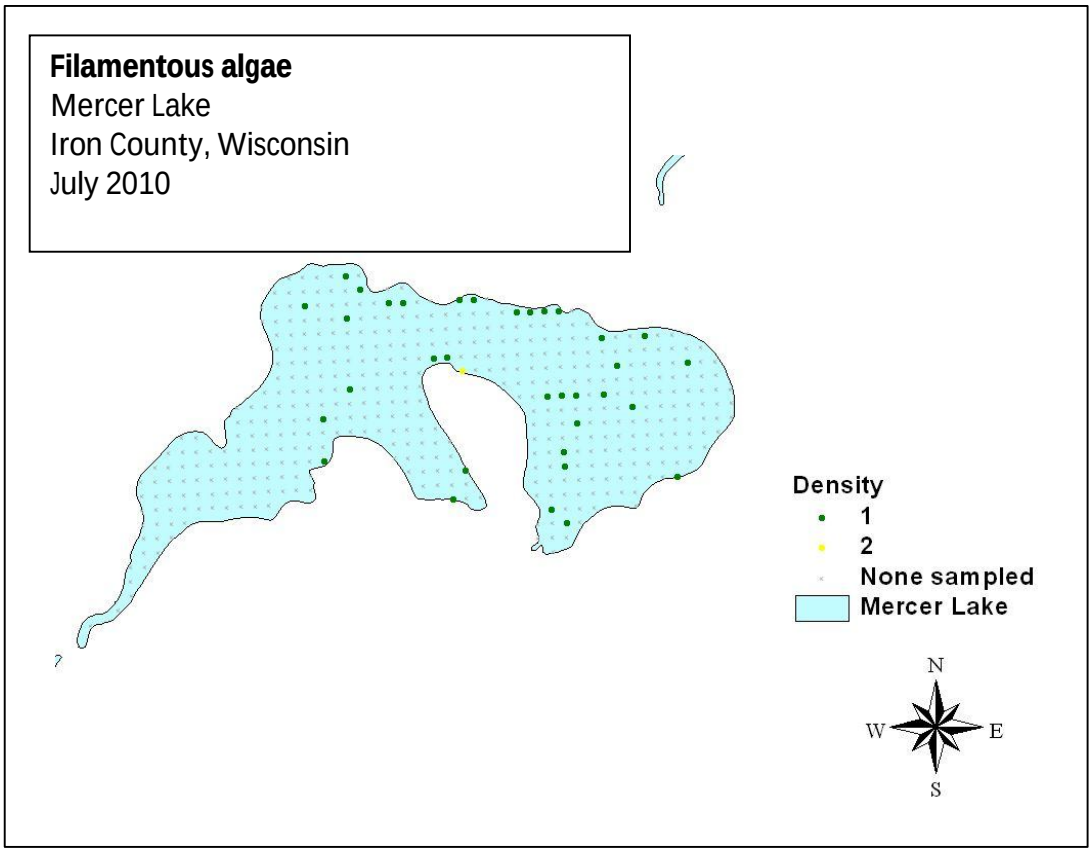

Decodon verticillatus, Swamp loosestrife
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
v
None sampled
Mercer Lake
N
W
E
S

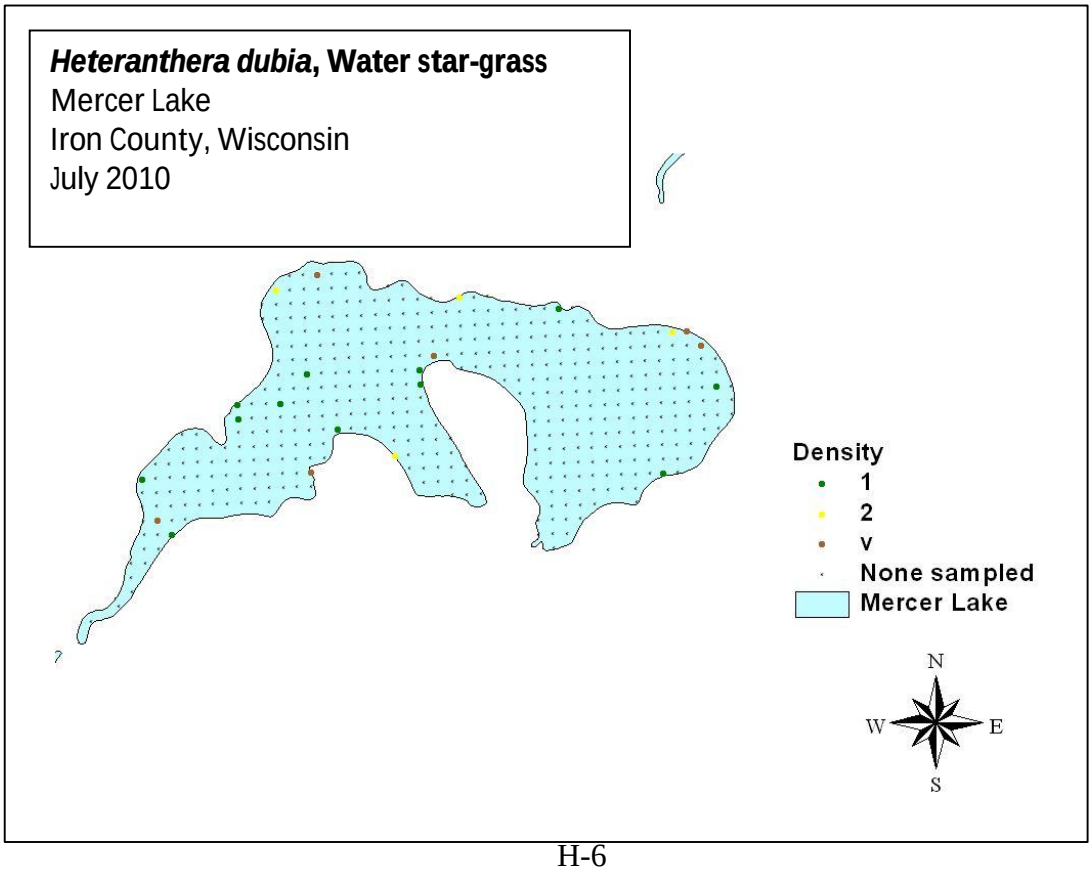

Comarum palustre, Marsh cinquefoil
Mercer Lake
Iron County, Wisconsin
July 2010
Density
v
None sampled
Mercer Lake
N
W
E
S

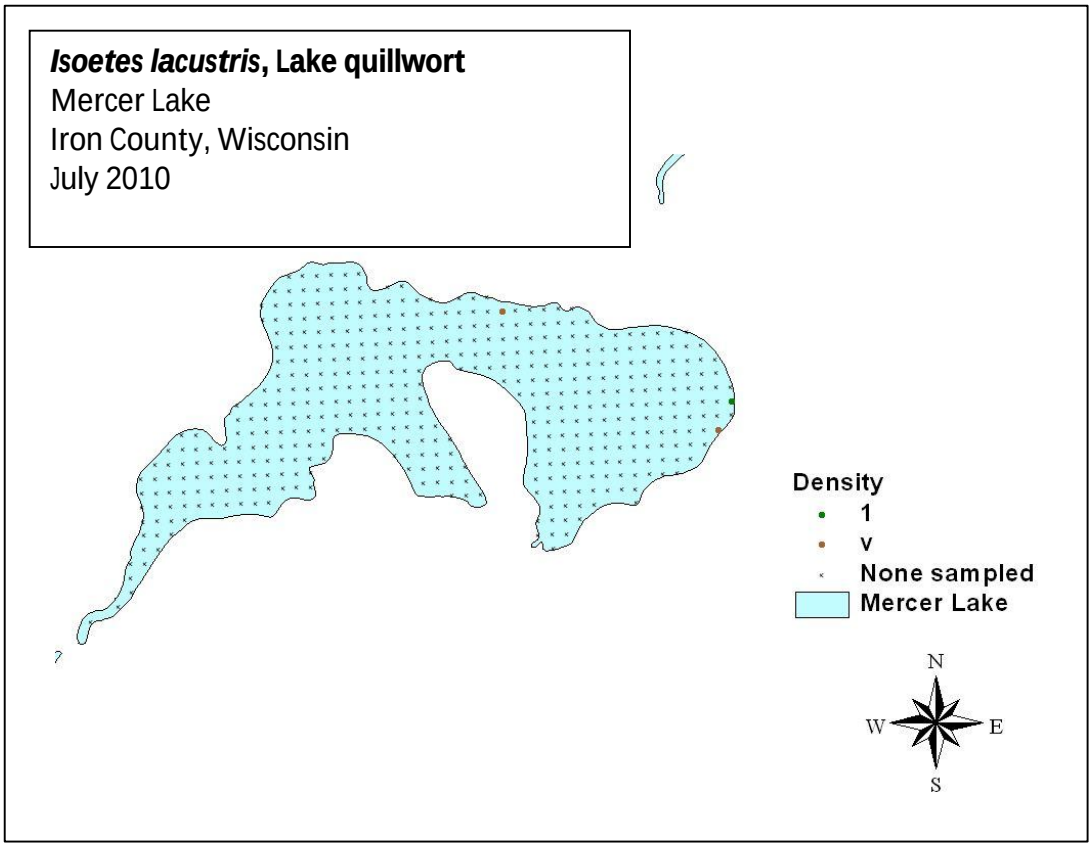

Eleocharis acicularis, Needle spikerush
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
None sampled
Mercer Lake
N
W
E
S

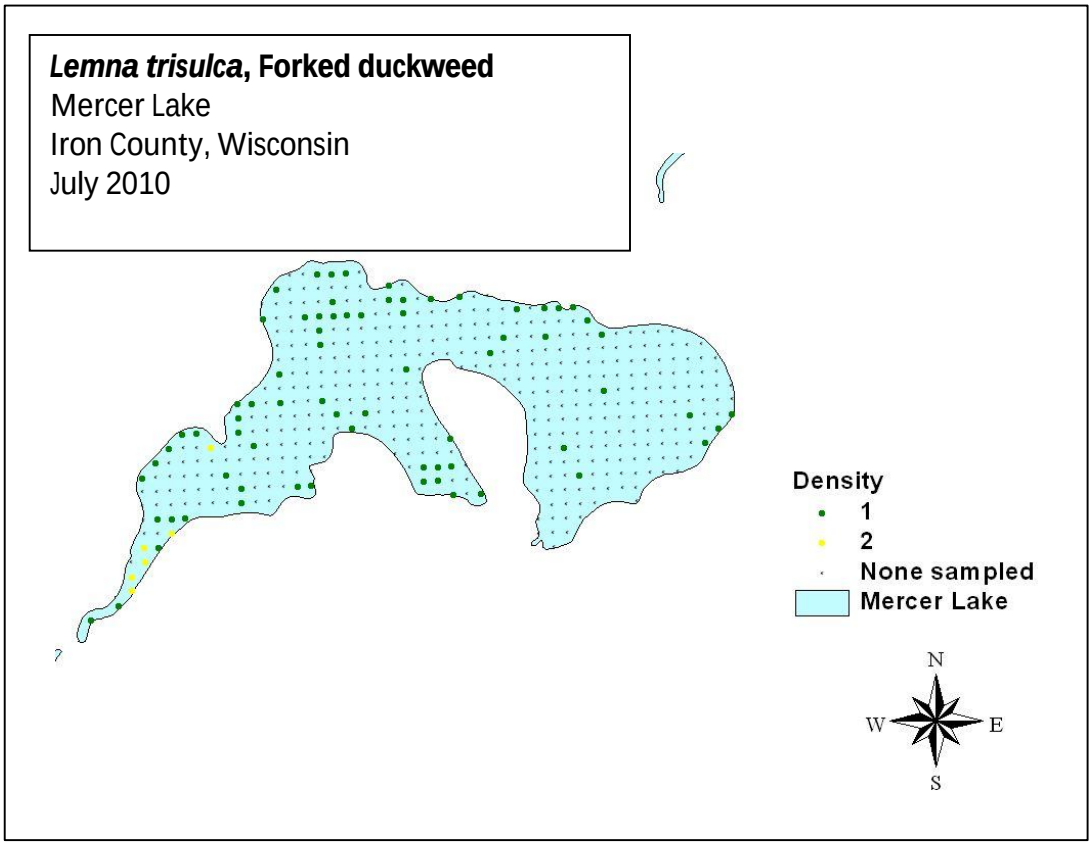

Eleocharis palustris, Creeping spikerush
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
None sampled
Mercer Lake
N
W
E
S


Elodea canadensis, Common waterweed
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
3
None sampled
Mercer Lake
N
W
E
S

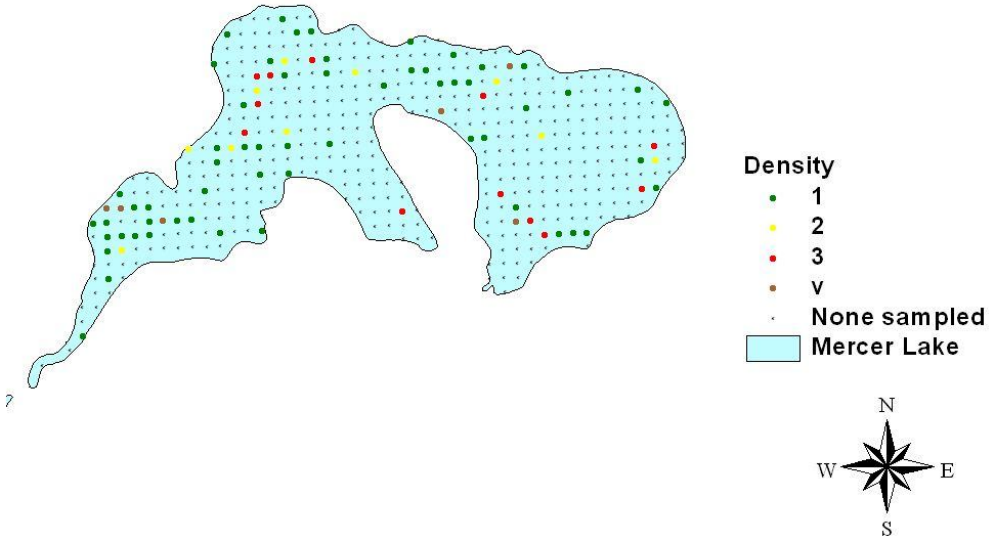

Filamentous algae
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
None sampled
Mercer Lake
N
W
E
S


***Heteranthera dubia*, Water star-grass**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
v
None sampled
Mercer Lake
N
W
E
S

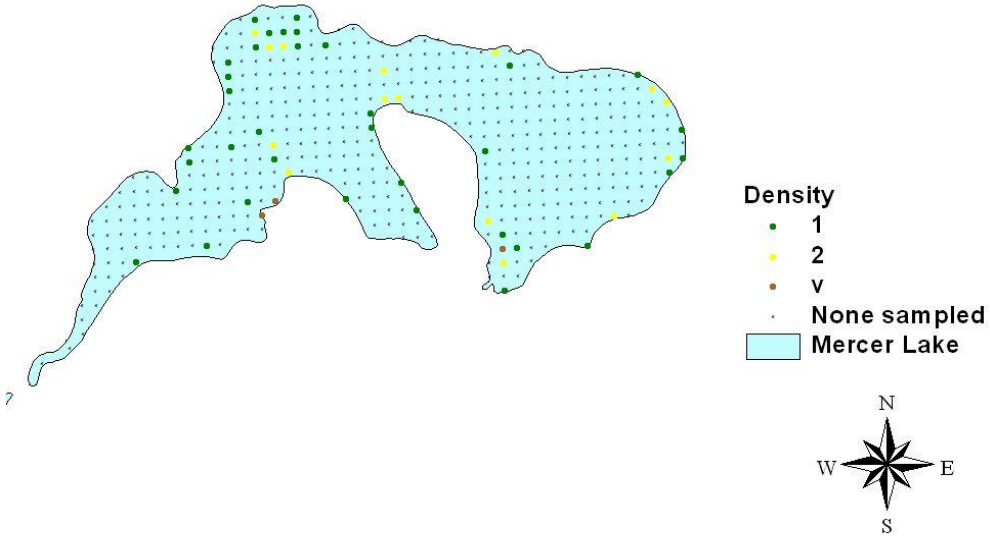

Isoetes lacustris, Lake quillwort
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
v
None sampled
Mercer Lake
N
W
E
S

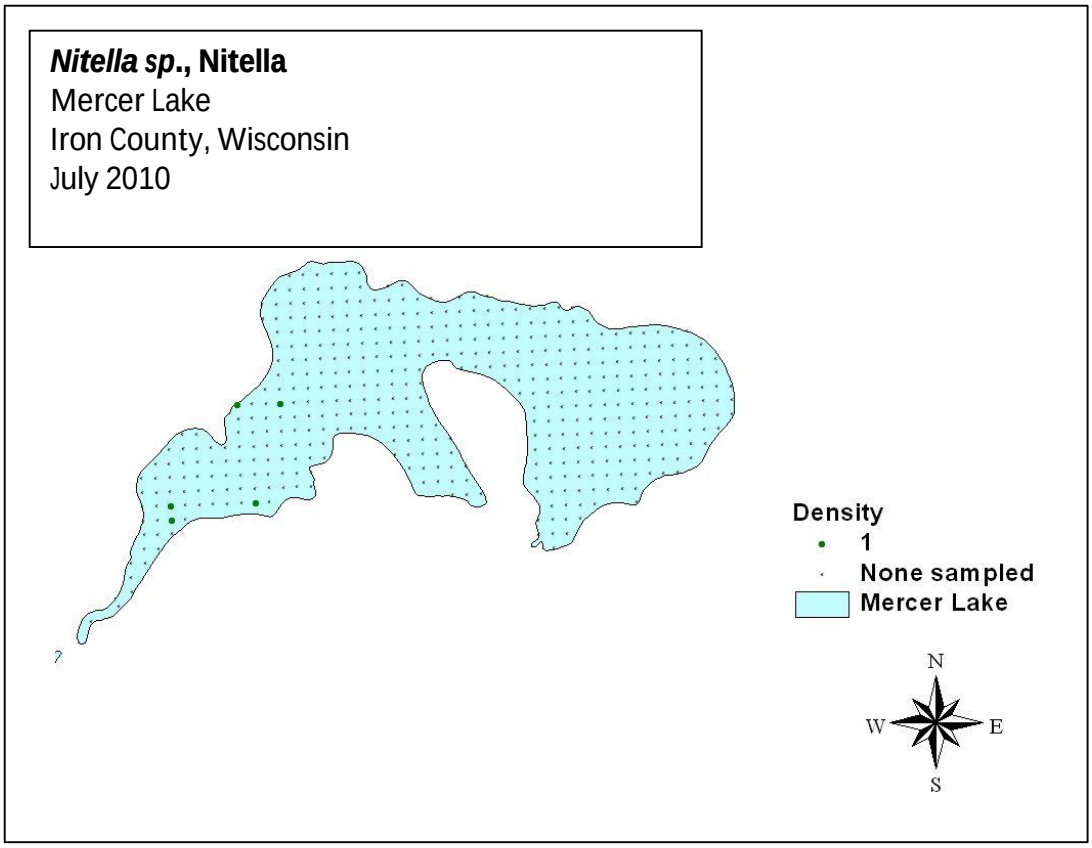

Lemna trisulca, Forked duckweed
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
None sampled
Mercer Lake
N
W
E
S

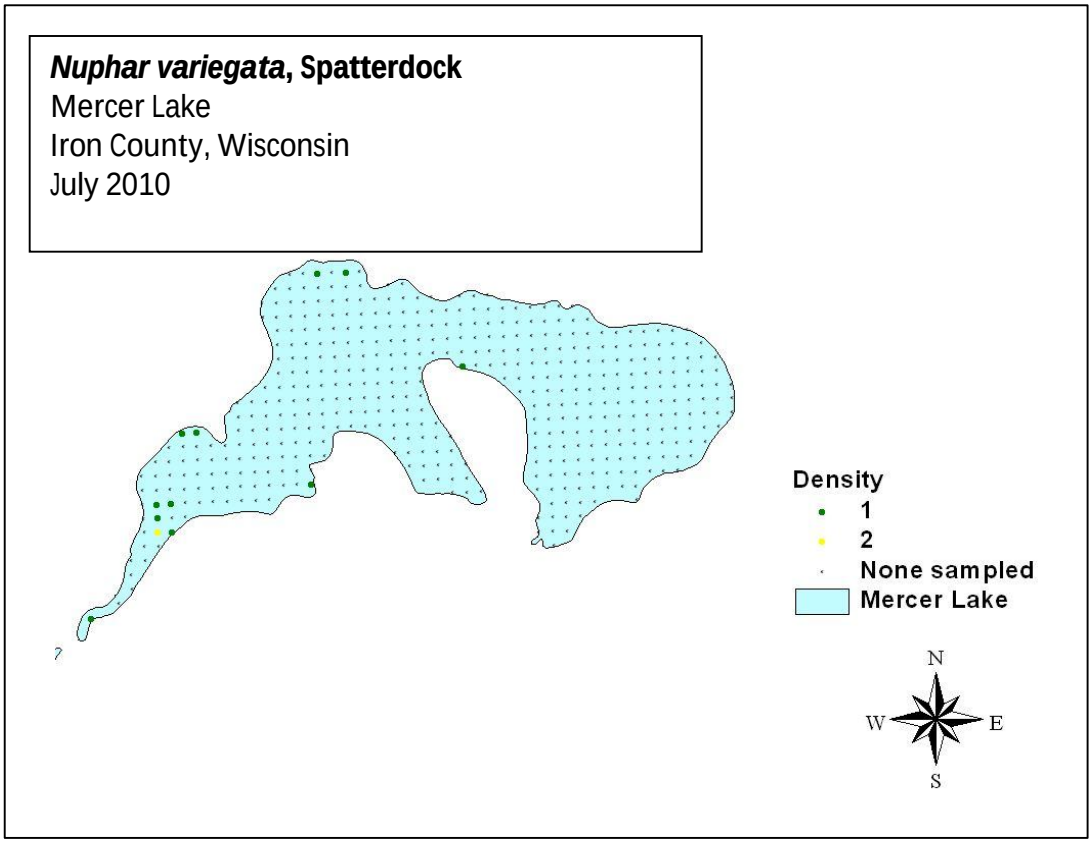
***Myriophyllum sibiricum*, Northern water-milfoil**
Mercer Lake
Iron County, Wisconsin
July 2010

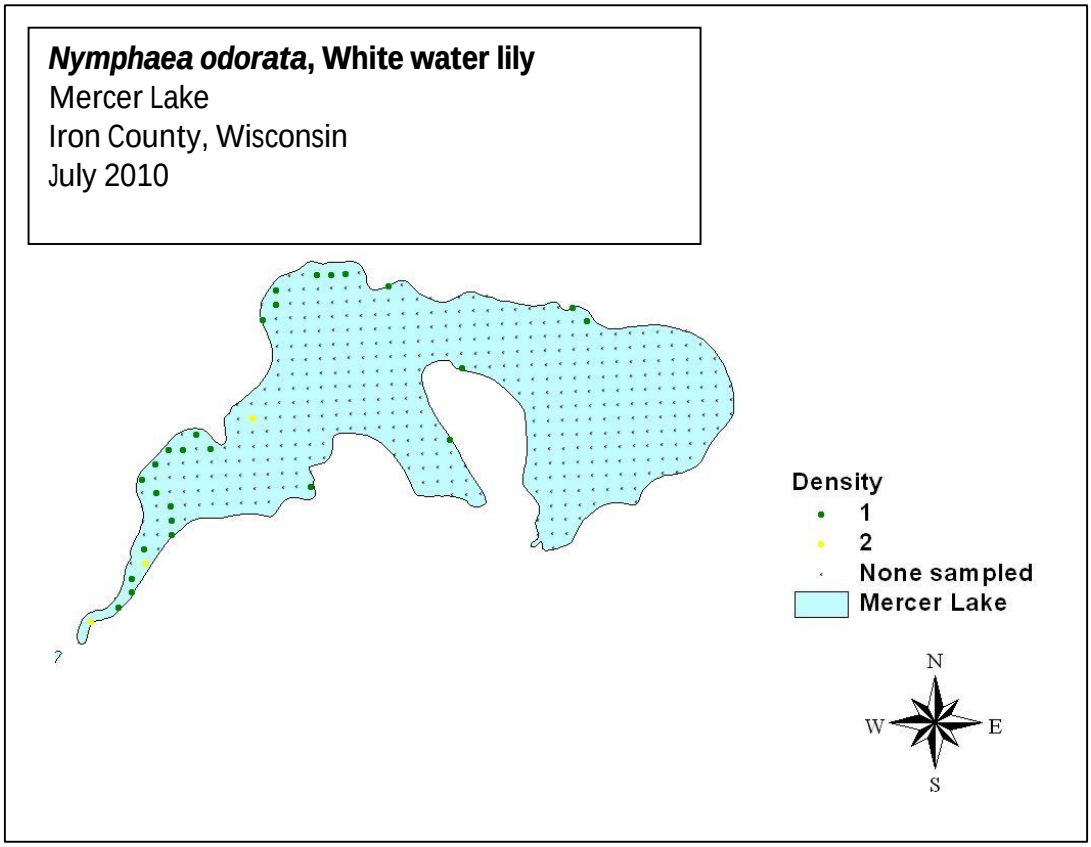


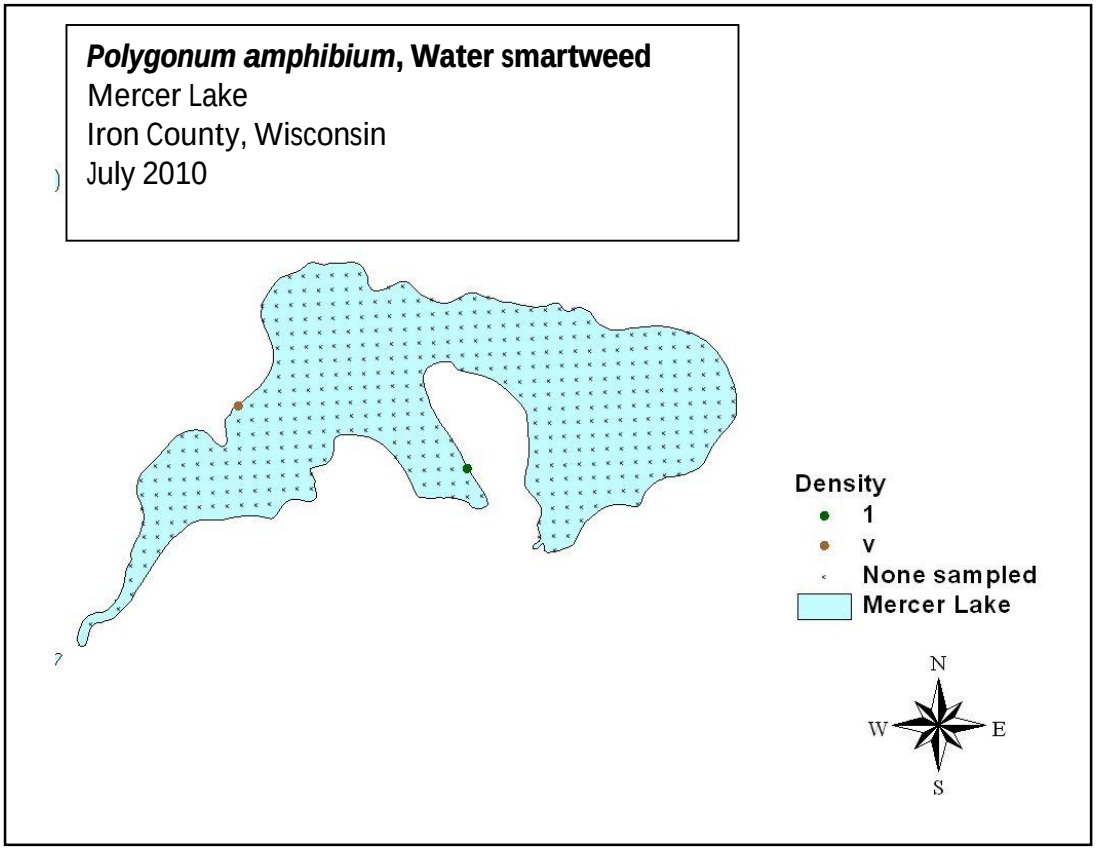
***Najas flexilis*, Slender naiad**
Mercer Lake
Iron County, Wisconsin
July 2010




***Nitella sp.*, Nitella**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
None sampled
Mercer Lake
N
W
E
S


***Nuphar variegata*, Spatterdock**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
None sampled
Mercer Lake
N
W
E
S


***Nymphaea odorata*, White water lily**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
None sampled
Mercer Lake
N
W
E
S


***Polygonum amphibium*, Water smartweed**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
v
None sampled
Mercer Lake
N
W
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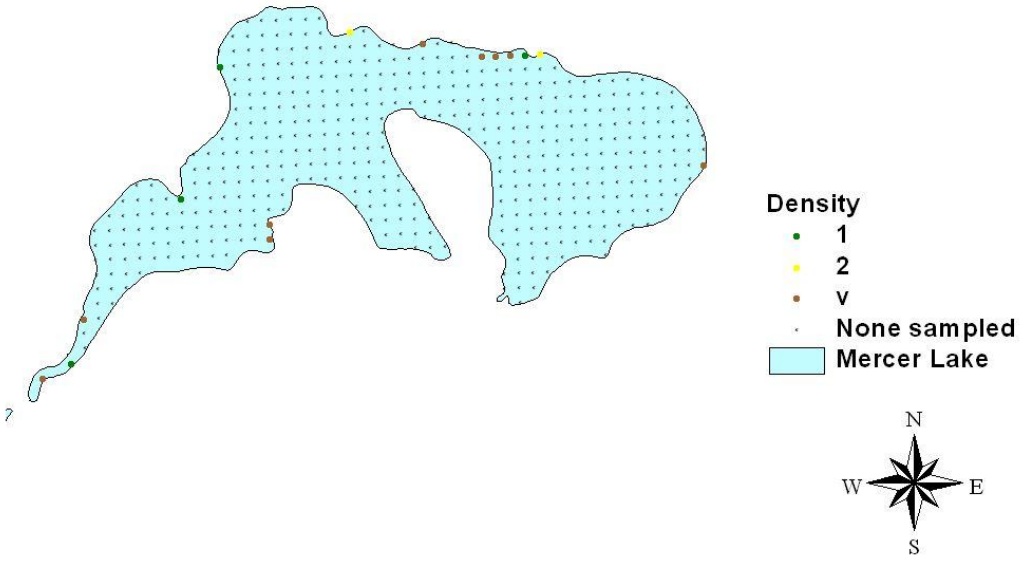
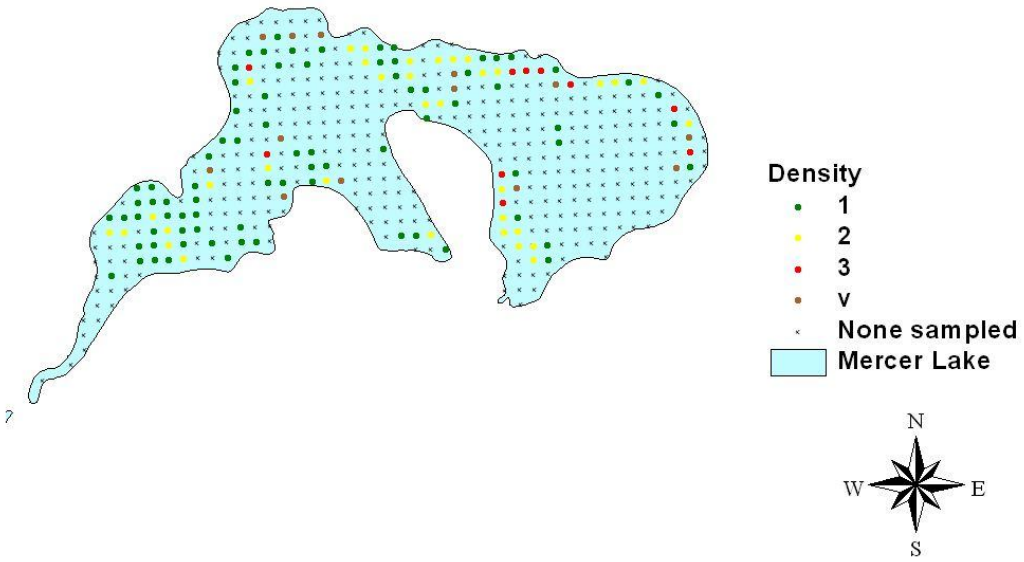
S

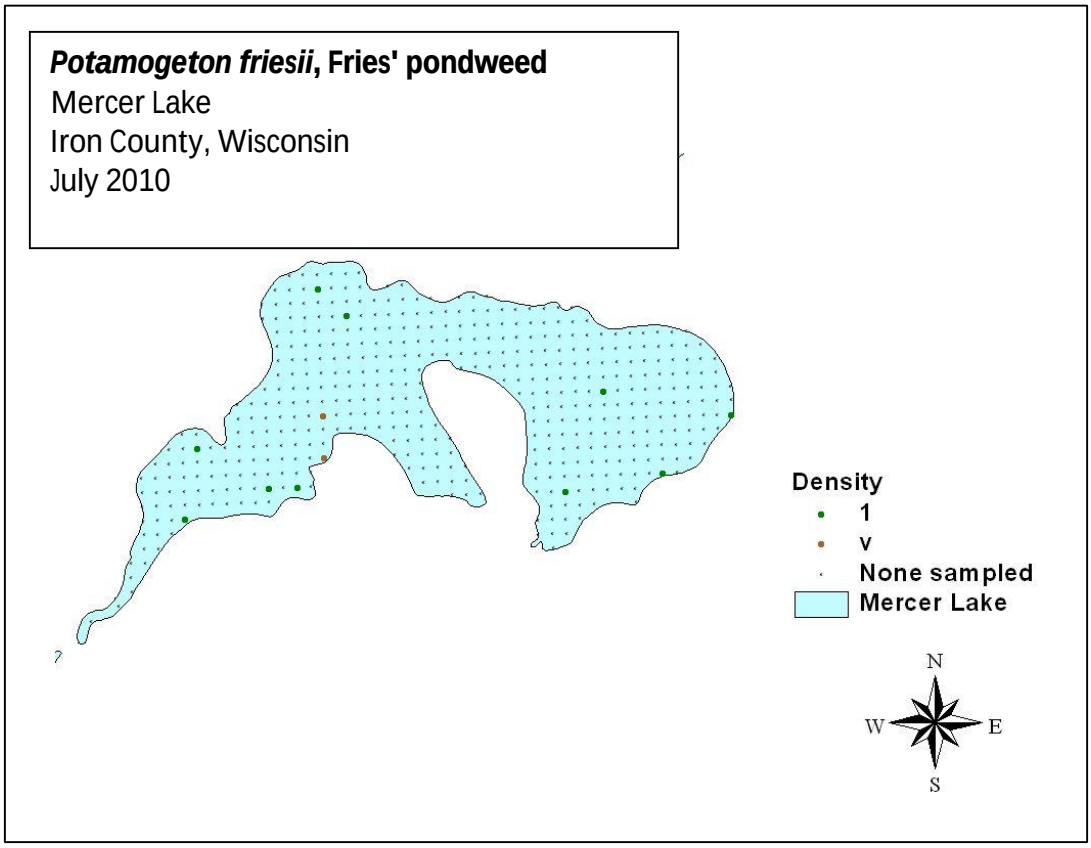
***Pontederia cordata*, Pickerelweed**
Mercer Lake
Iron County, Wisconsin
July 2010

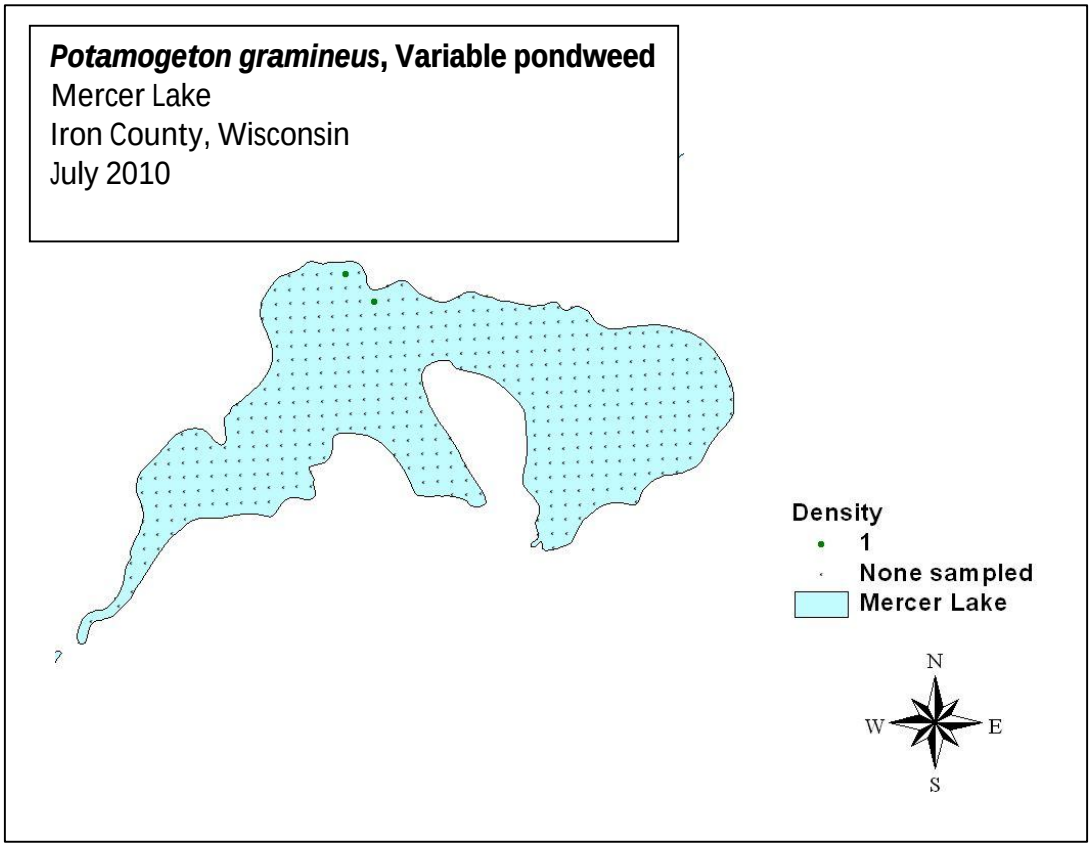


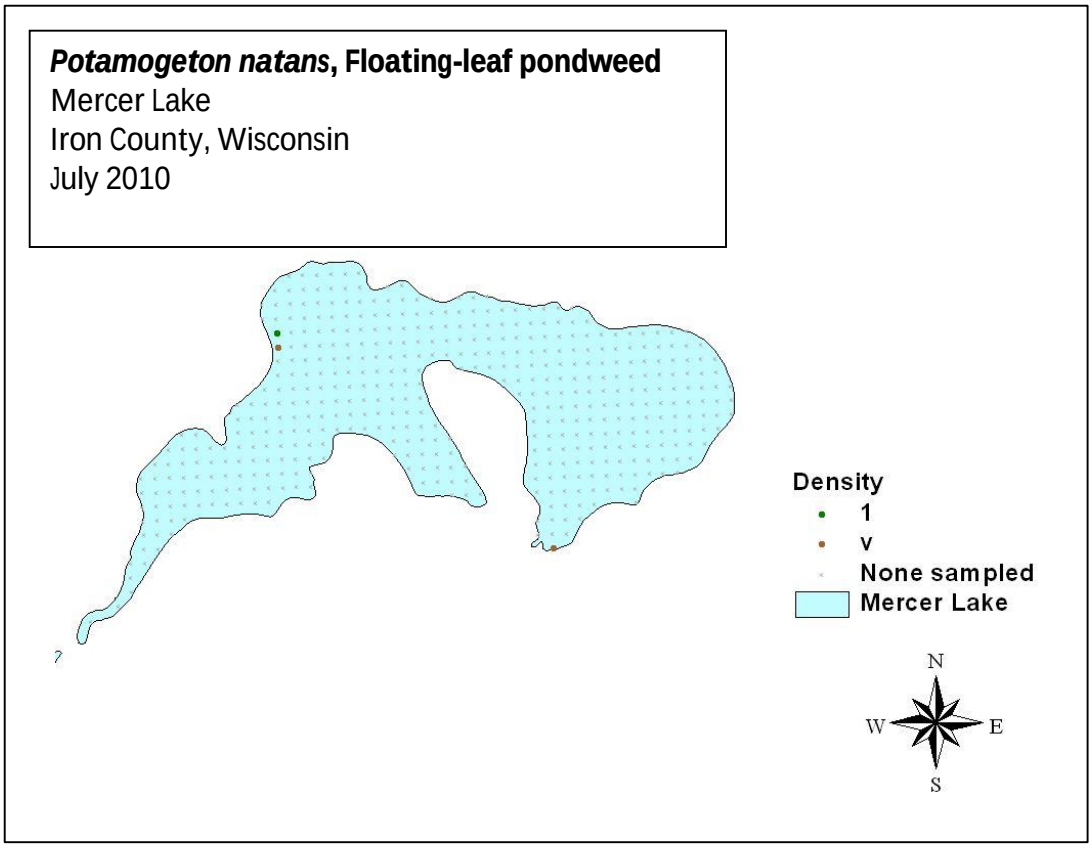
***Potamogeton amplifolius*, Large-leaf pondweed**
Mercer Lake
Iron County, Wisconsin
July 2010

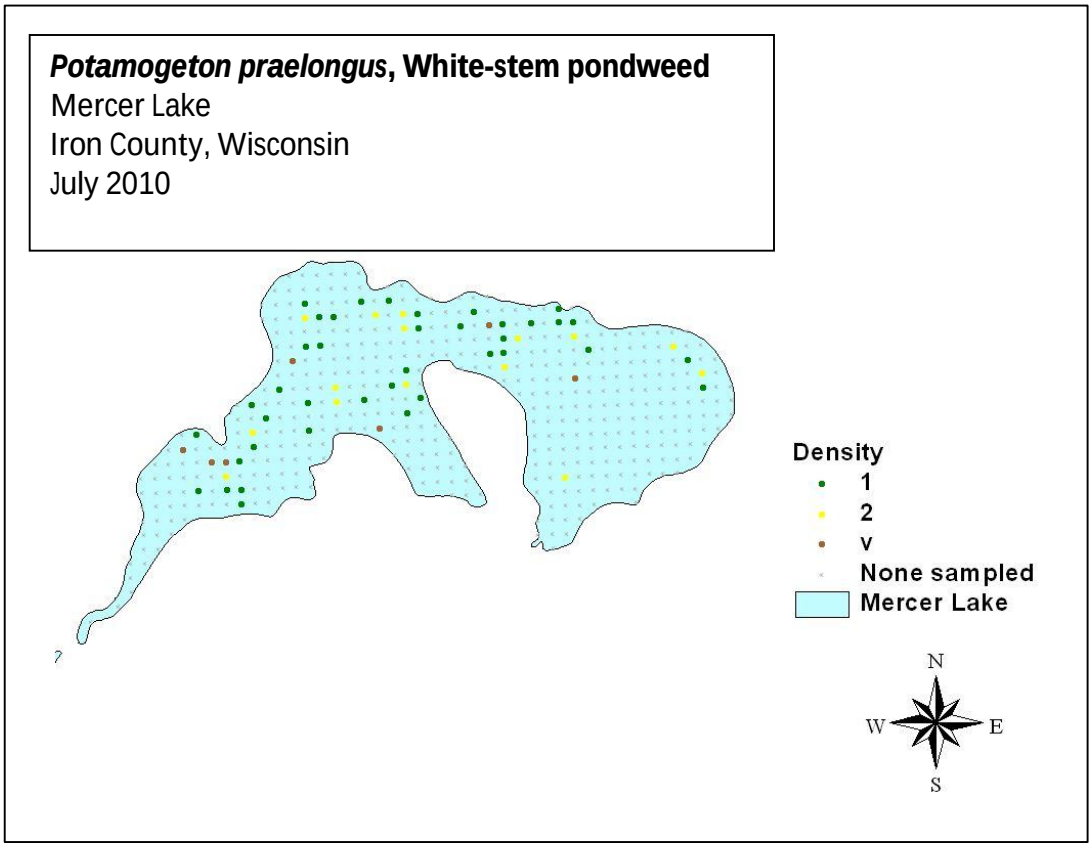


Vallisneria americ
Mercer Lake
Iron County, Wisco
July 2010

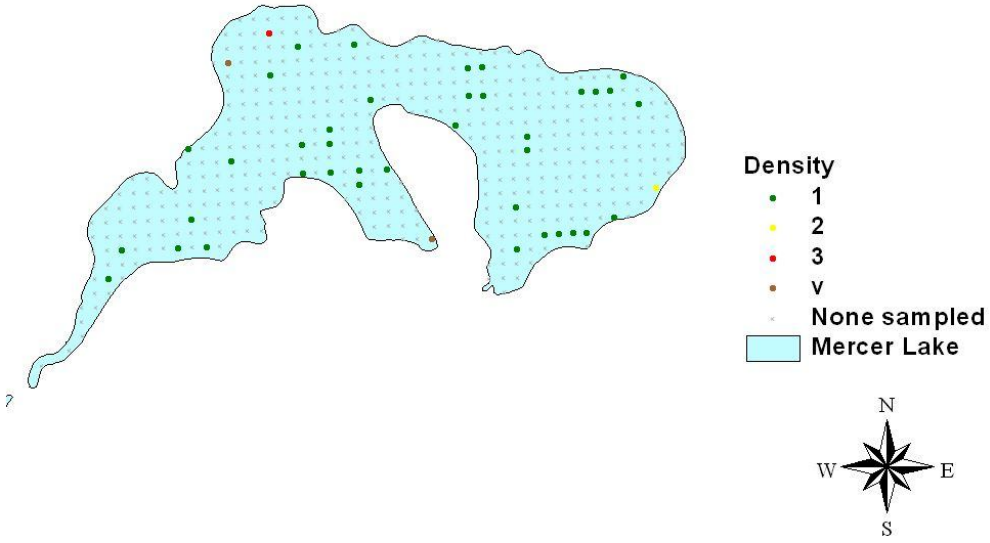

***Potamogeton friesii*, Fries' pondweed**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
v
None sampled
Mercer Lake
N
W
E
S


***Potamogeton gramineus*, Variable pondweed**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
None sampled
Mercer Lake
N
W
E
S

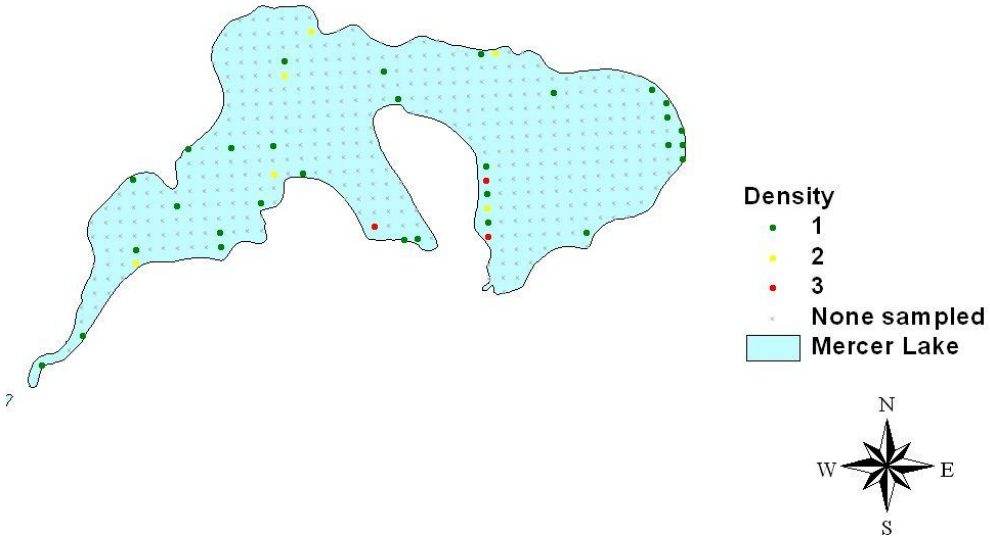

Potamogeton natans, Floating-leaf pondweed
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
v
None sampled
Mercer Lake
N
W
E
S


Potamogeton praelongus, White-stem pondweed
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
v
None sampled
Mercer Lake
N
W
E
S

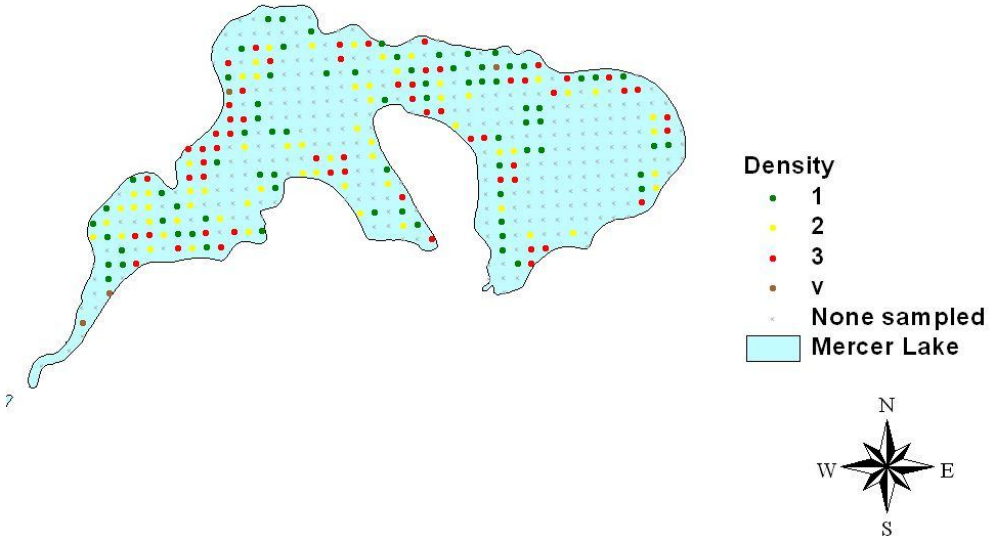
***Potamogeton pusillus*, Small pondweed**
Mercer Lake
Iron County, Wisconsin
July 2010



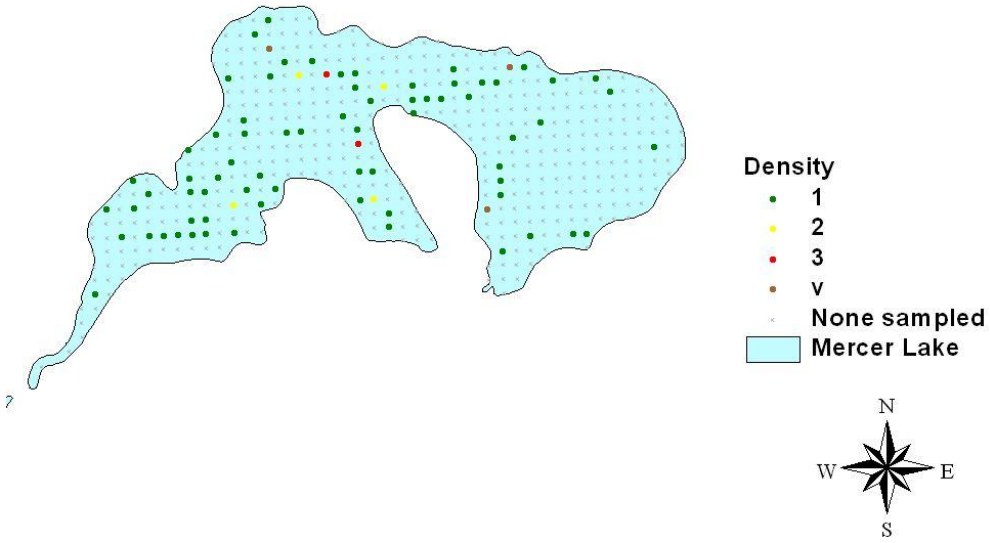
***Potamogeton richardsonii*, Clasping-leaf pondweed**
Mercer Lake
Iron County, Wisconsin
July 2010



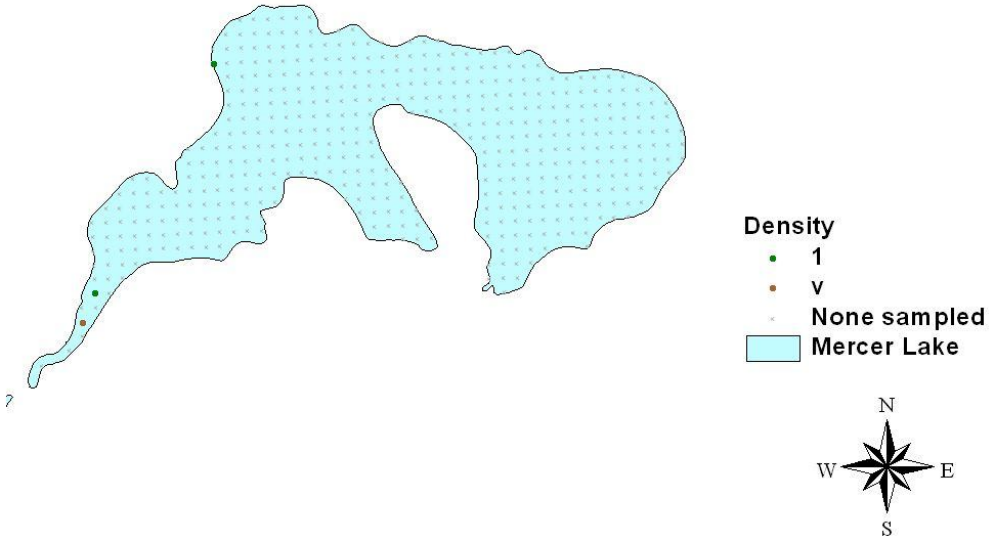
***Potamogeton robbinsii*, Fern pondweed**
Mercer Lake
Iron County, Wisconsin
July 2010



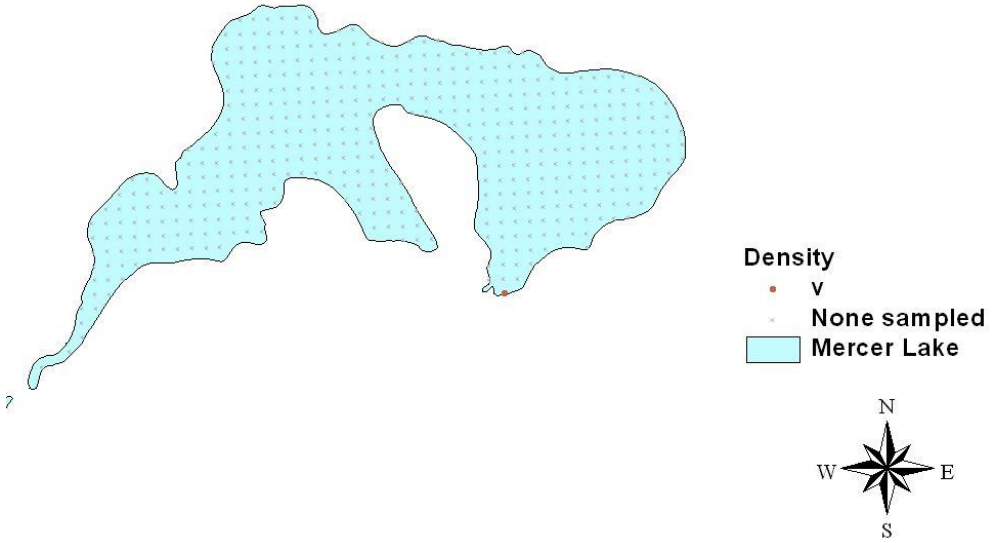
***Potamogeton zosteriformis*, Flat-stem pondweed**
Mercer Lake
Iron County, Wisconsin
July 2010

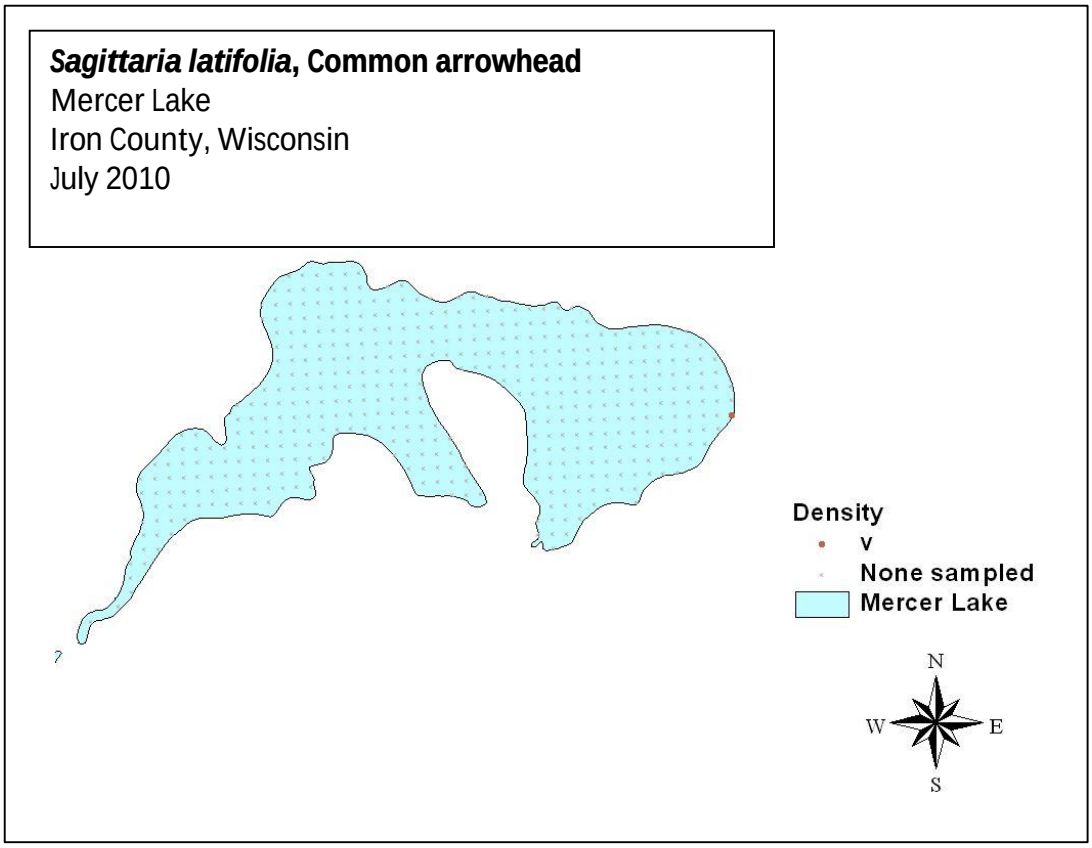


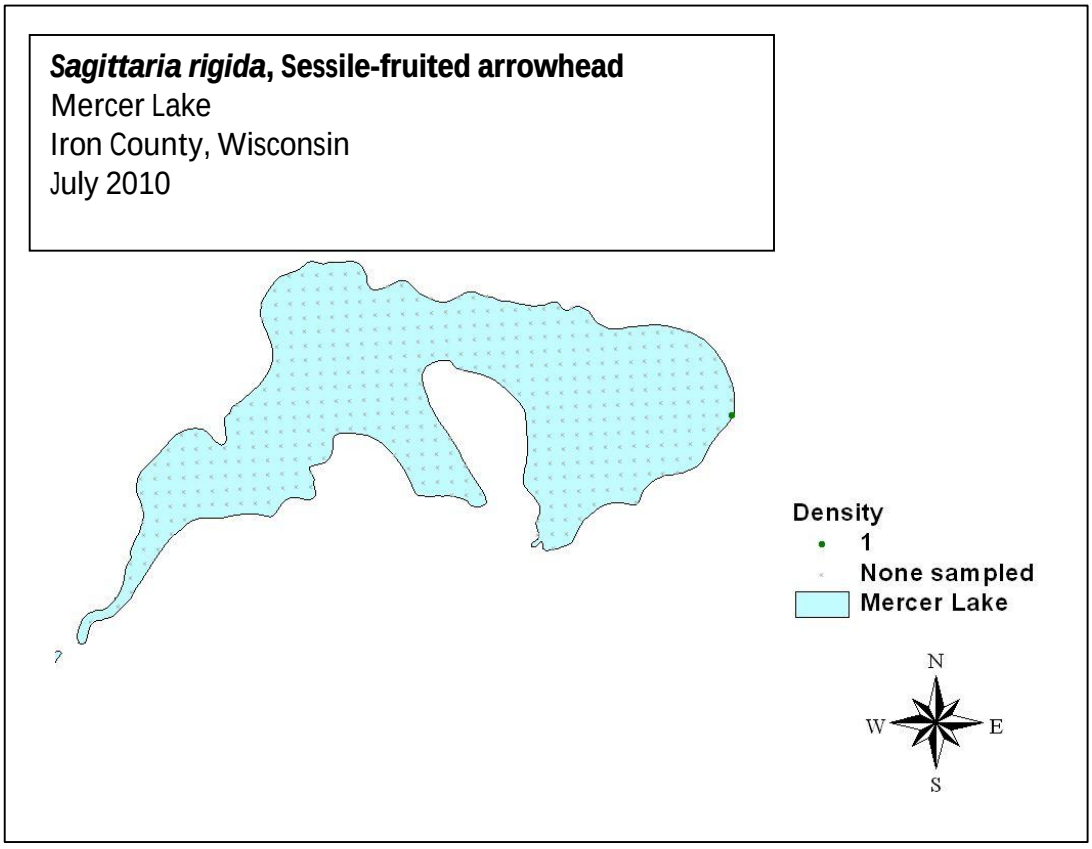
***Ranunculus aquatilis*, White water crowfoot**
Mercer Lake
Iron County, Wisconsin
July 2010



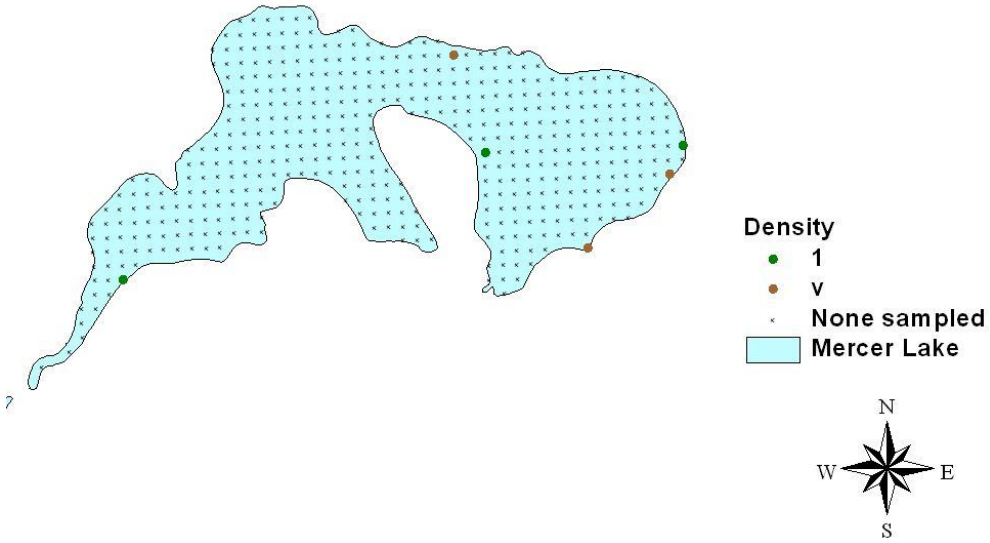
***Sagittaria graminea*, Grass-leaved arrowhead**
Mercer Lake
Iron County, Wisconsin
July 2010



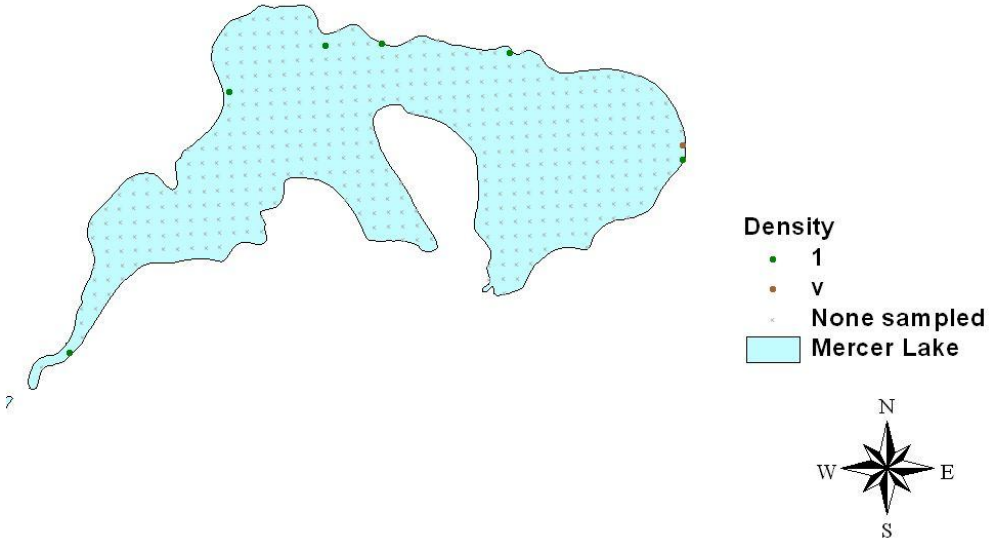

***Sagittaria latifolia*, Common arrowhead**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
v
None sampled
Mercer Lake
N
W
E
S

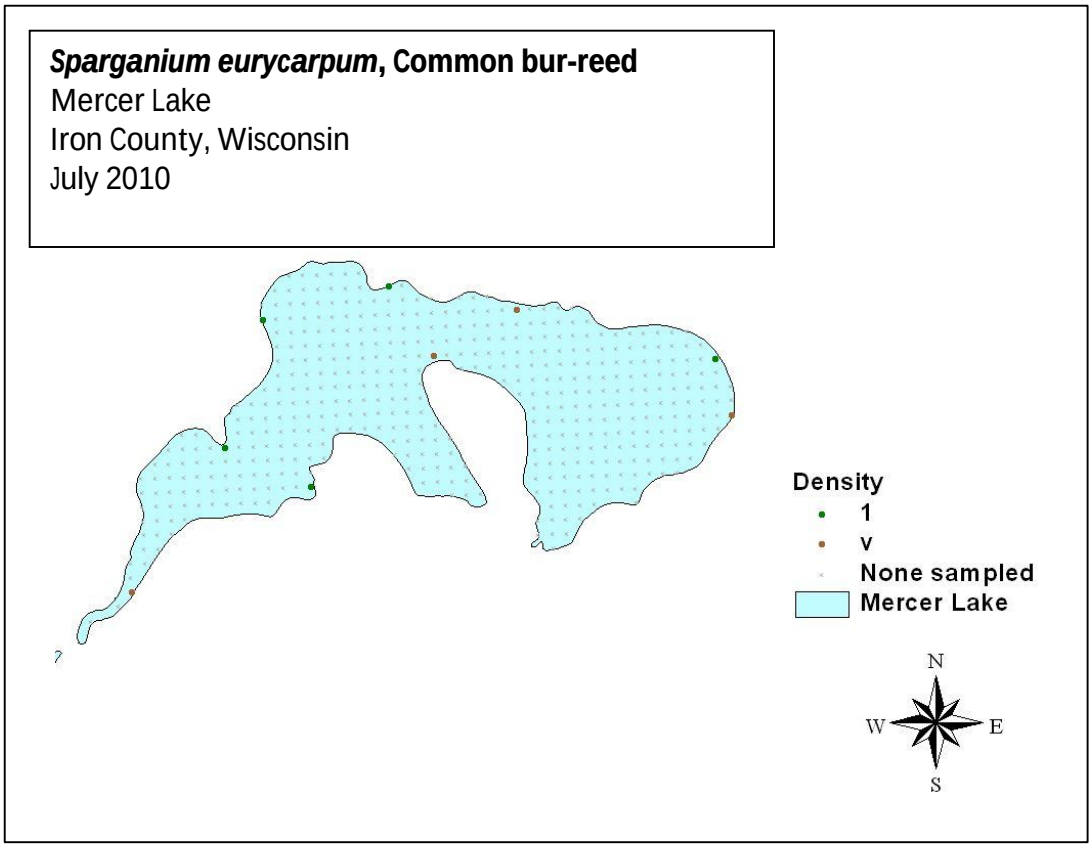

***Sagittaria rigida*, Sessile-fruited arrowhead**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
None sampled
Mercer Lake
N
W
E
S

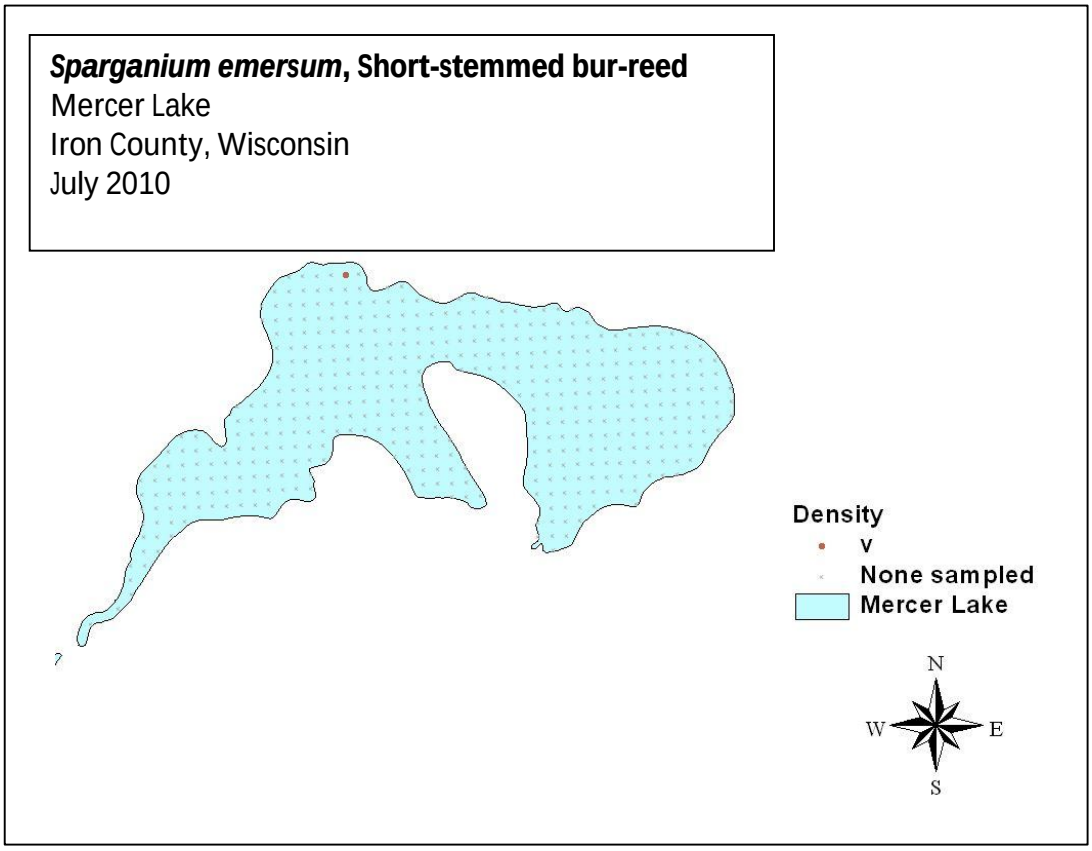
***Sagittaria sp.*, Arrowhead rosette**
Mercer Lake
Iron County, Wisconsin
July 2010

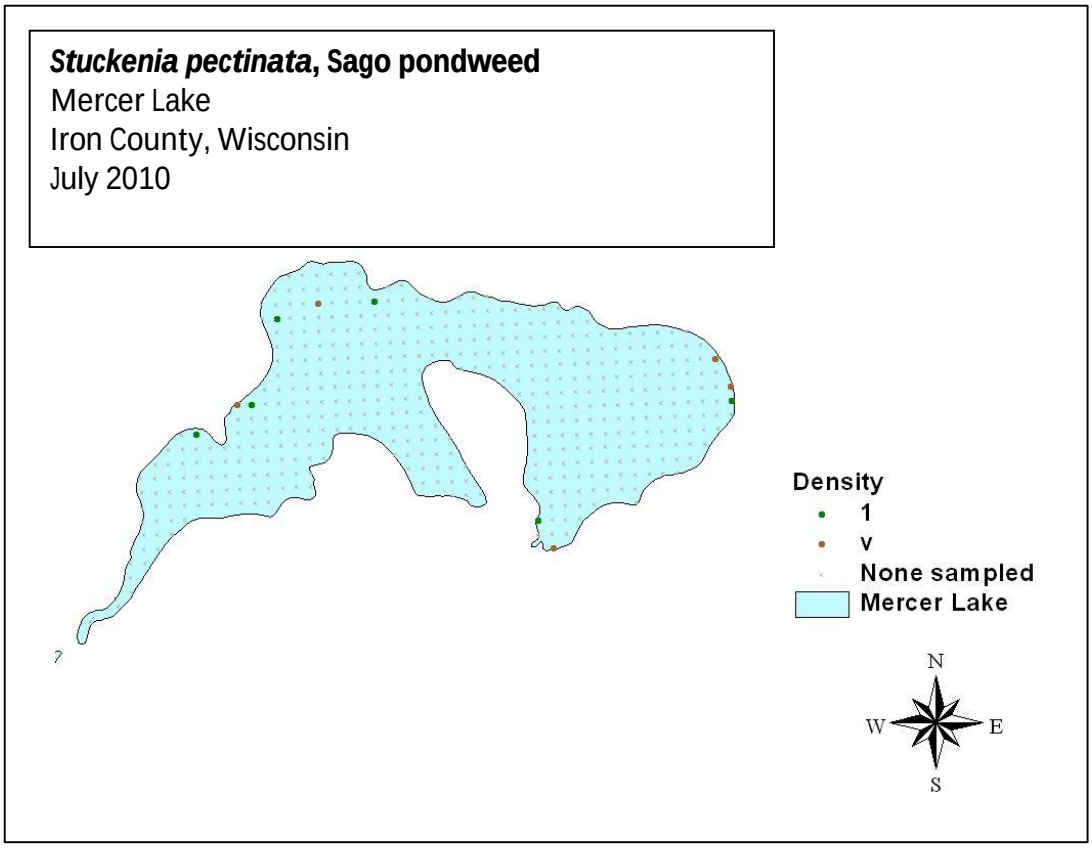


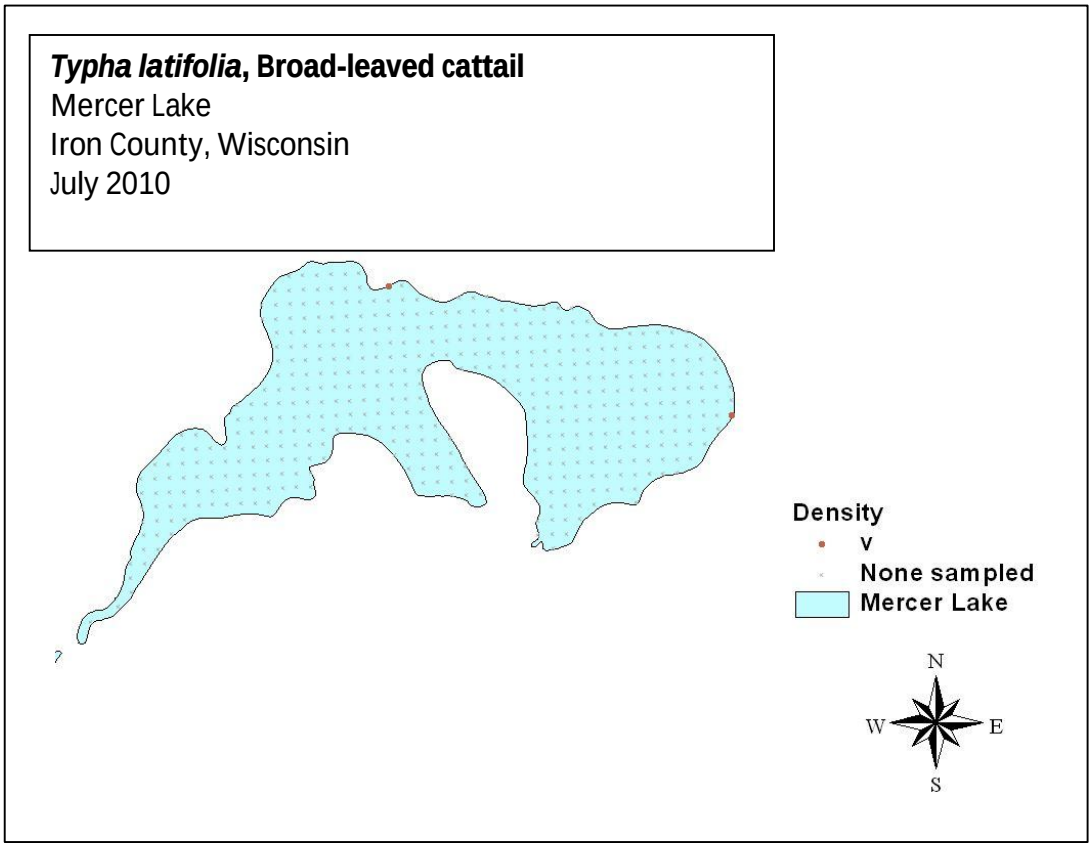
***Schoenoplectus acutus*, Hardstem bulrush**
Mercer Lake
Iron County, Wisconsin
July 2010



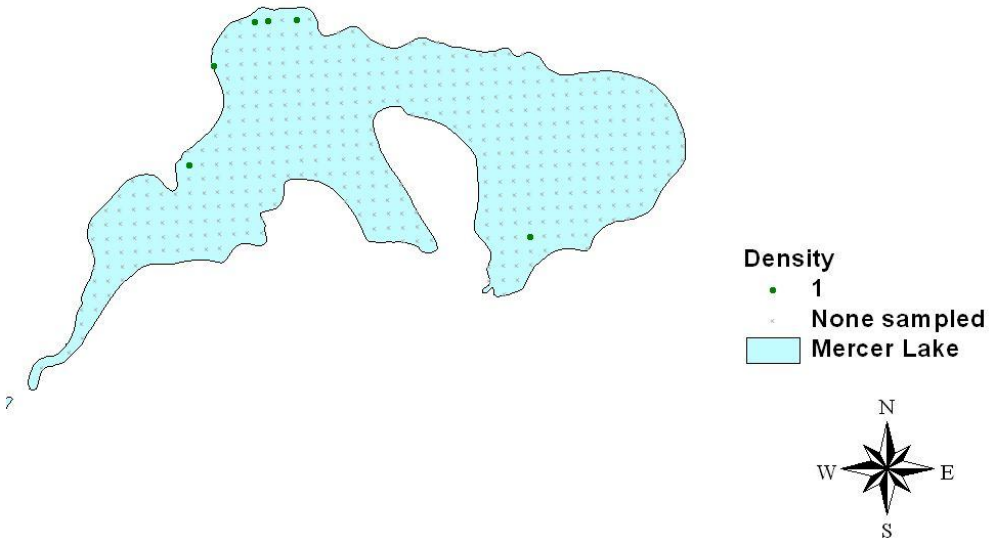

Sparganium eurycarpum, Common bur-reed
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
v
None sampled
Mercer Lake
N
W
E
S


Sparganium emersum, Short-stemmed bur-reed
Mercer Lake
Iron County, Wisconsin
July 2010
Density
v
None sampled
Mercer Lake
N
W
E
S

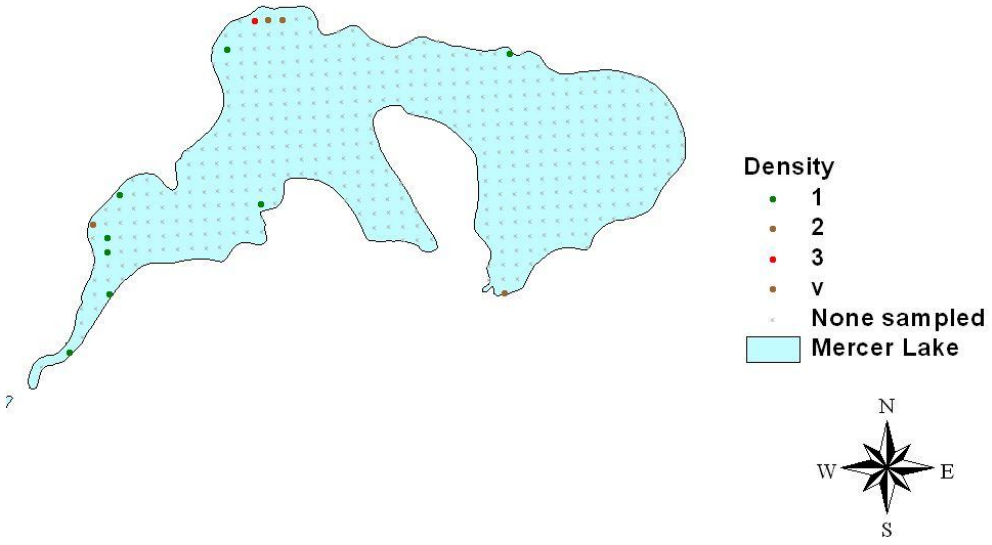

Stuckenia pectinata, Sago pondweed
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
v
None sampled
Mercer Lake
N
W
E
S

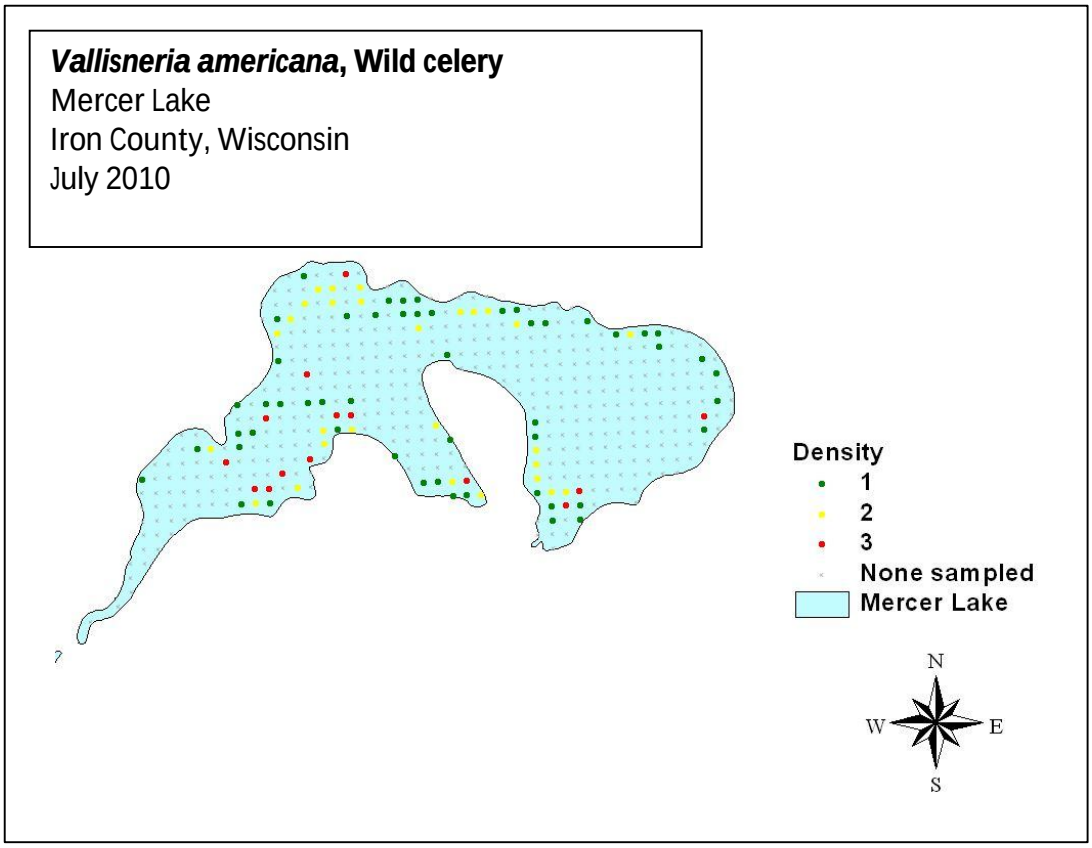

Typha latifolia, Broad-leaved cattail
Mercer Lake
Iron County, Wisconsin
July 2010
Density
v
None sampled
Mercer Lake
N
W
E
S

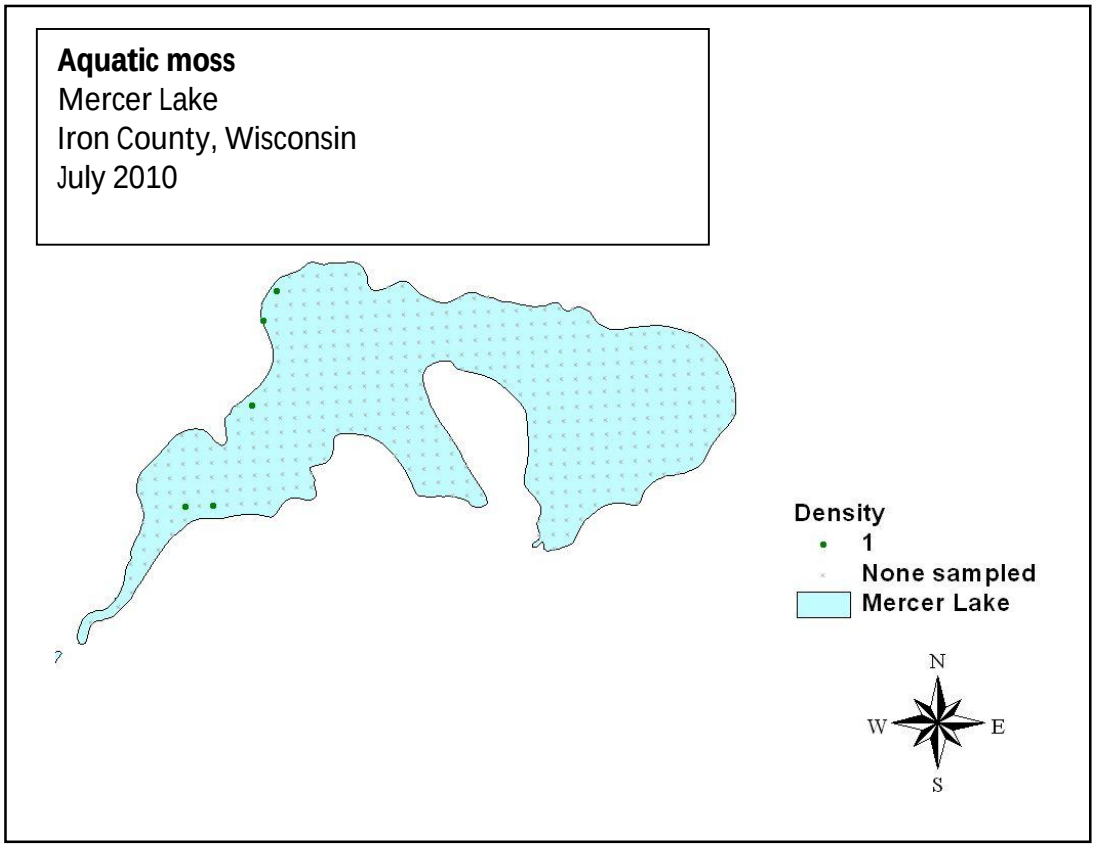
***Utricularia intermedia*, Flat-leaf bladderwort**
Mercer Lake
Iron County, Wisconsin
July 2010



***Utricularia vulgaris*, Common bladderwort**
Mercer Lake
Iron County, Wisconsin
July 2010




***Vallisneria americana*, Wild celery**
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
2
3
None sampled
Mercer Lake
N
W
E
S


Aquatic moss
Mercer Lake
Iron County, Wisconsin
July 2010
Density
1
None sampled
Mercer Lake
N
W
E
S