Appendix A-Wisconsin DNR management option summary

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

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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

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	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

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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

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	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

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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

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	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 B-Rapid Response Protocol

If a plant or other potential AIS is observed contact a Rice Lake Board Member. The Rice Lake Board is responsible to carry out this protocol.

1. Contact lead (Bonnie B.)
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) with 24 hours of verification.
7. Lead will contact all Rice 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 Bonnie Bonazek 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 (ofc) 715-570-0954 (cell)

Appendix C-Aquatic Plant Management Strategy, Northern Region-2007

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

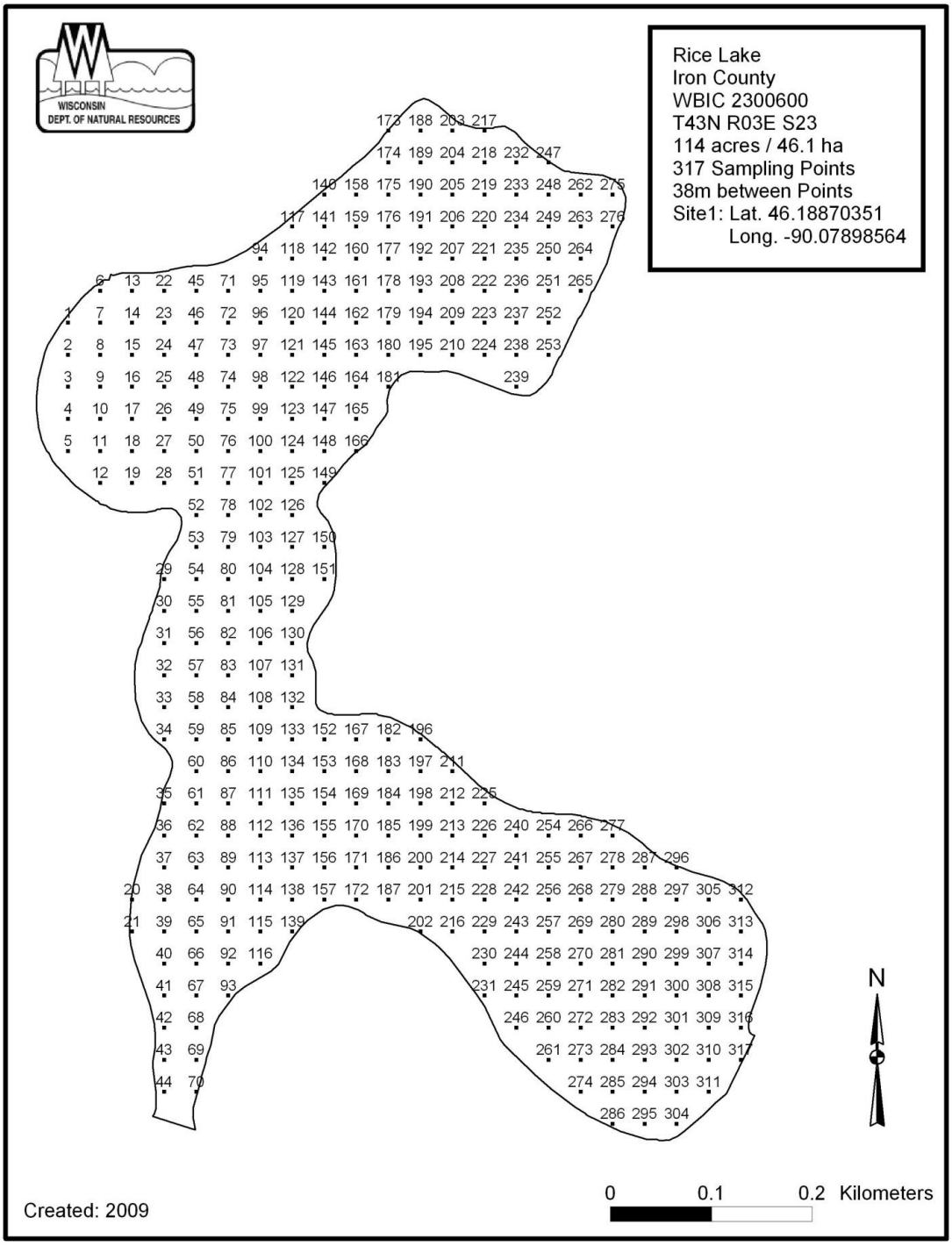
plants that are removed or controlled under an aquatic plant management permit.

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."

Appendix D- PI Sample points and location coordinates



sampling point	Latitiude	Latitude
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3	46.188019510	-90.078984660
4	46.187677510	-90.078984170
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6	46.189045850	-90.078493700
7	46.188703850	-90.078493210
8	46.188361850	-90.078492720
9	46.188019850	-90.078492240
10	46.187677850	-90.078491750
11	46.187335850	-90.078491260
12	46.186993840	-90.078490780
13	46.189046190	-90.078001270
14	46.188704190	-90.078000780
15	46.188362190	-90.078000300
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18	46.187336180	-90.077998850
19	46.186994180	-90.077998360
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21	46.182206160	-90.077991590
22	46.189046520	-90.077508840
23	46.188704520	-90.077508360
24	46.188362520	-90.077507870
25	46.188020520	-90.077507390
26	46.187678520	-90.077506910
27	46.187336520	-90.077506430
28	46.186994520	-90.077505950
29	46.185968510	-90.077504510
30	46.185626510	-90.077504030
31	46.185284510	-90.077503550
32	46.184942510	-90.077503070
33	46.184600500	-90.077502590
34	46.184258500	-90.077502110
35	46.183574500	-90.077501150
36	46.183232500	-90.077500660
37	46.182890500	-90.077500180
38	46.182548490	-90.077499700
39	46.182206490	-90.077499220
40	46.181864490	-90.077498740
41	46.181522490	-90.077498260
42	46.181180490	-90.077497780
43	46.180838480	-90.077497300
44	46.180496480	-90.077496820
45	46.189046860	-90.077016410
46	46.188704860	-90.077015930
47	46.188362850	-90.077015450
48	46.188020850	-90.077014970
49	46.187678850	-90.077014490
50	46.187336850	-90.077014020
51	46.186994850	-90.077013540
52	46.186652850	-90.077013060
53	46.186310850	-90.077012580
54	46.185968840	-90.077012110
55	46.185626840	-90.077011630
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57	46.184942840	-90.077010670
58	46.184600840	-90.077010200
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61	46.183574830	-90.077008760
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67	46.181522820	-90.077005900
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70	46.180496820	-90.077004470
71	46.189047190	-90.076523970
72	46.188705190	-90.076523500
73	46.188363190	-90.076523030
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75	46.187679180	-90.076522080
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80	46.185969170	-90.076519700
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83	46.184943170	-90.076518280
84	46.184601170	-90.076517810
85	46.184259170	-90.076517330
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87	46.183575160	-90.076516380
88	46.183233160	-90.076515910
89	46.182891160	-90.076515430
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91	46.182207160	-90.076514480
92	46.181865150	-90.076514010
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94	46.189389520	-90.076032020
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104	46.185969500	-90.076027300
105	46.185627500	-90.076026830
106	46.185285500	-90.076026360
107	46.184943500	-90.076025890
108	46.184601500	-90.076025410
109	46.184259490	-90.076024940
110	46.183917490	-90.076024470
111	46.183575490	-90.076024000
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113	46.182891490	-90.076023060
114	46.182549490	-90.076022590
115	46.182207480	-90.076022120
116	46.181865480	-90.076021640
117	46.189731850	-90.075540050
118	46.189389840	-90.075539580
119	46.189047840	-90.075539110
120	46.188705840	-90.075538650
121	46.188363840	-90.075538180
122	46.188021840	-90.075537710
123	46.187679840	-90.075537240
124	46.187337840	-90.075536770
125	46.186995830	-90.075536300
126	46.186653830	-90.075535830
127	46.186311830	-90.075535370
128	46.185969830	-90.075534900
129	46.185627830	-90.075534430

130	46.185285830	-90.075533960
131	46.184943820	-90.075533490
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135	46.183575820	-90.075531620
136	46.183233820	-90.075531150
137	46.182891810	-90.075530680
138	46.182549810	-90.075530210
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157	46.182550140	-90.075037840
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160	46.189390490	-90.074554720
161	46.189048490	-90.074554250
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256	46.182552350	-90.071591230
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259	46.181526340	-90.071589900

260	46.181184340	-90.071589460
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262	46.190076690	-90.071108560
263	46.189734690	-90.071108120
264	46.189392690	-90.071107680
265	46.189050690	-90.071107240
266	46.183236660	-90.071099740
267	46.182894660	-90.071099300
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313	46.182212160	-90.068636570
314	46.181870160	-90.068636150
315	46.181528150	-90.068635720
316	46.181186150	-90.068635300
317	46.180844150	-90.068634870

Appendix E. Invasive Plant Species Information

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

Curly Leaf Pondweed (*Potamogeton crispus*)

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.

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.

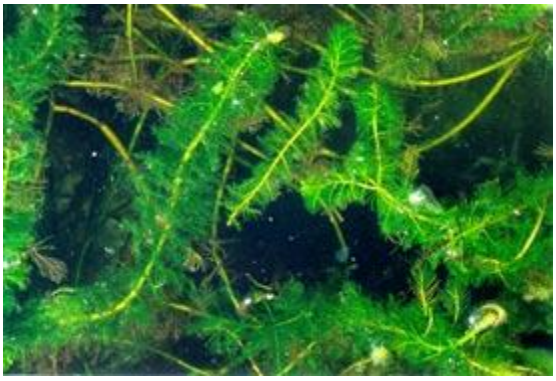
Control

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.

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.

Purple Loosestrife (*Lythrum salicaria*)

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 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 marmoratus*) 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 F-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

Appendix G-Glossary of terms

Glossary

Ecosystem-Any complex of living organisms together with all biotic and abiotic (non-living) factors which affect them.

Emergent plant-Aquatic plants that are rooted or anchored in sediment and have stems and leaves extending well above the water surface.

Floating-leafed plant-Plants with leaves floating on the water surface and are rooted or attached to sediments by long, flexible stems.

Habitat-The physical place where an organism lives.

Herbarium-A collection of plants sampled.

Littoral zone-The region of a body of water extending from the shoreline outward to the greatest depth occupied by rooted aquatic plants.

Macrophyte-Large, rooted or floating aquatic plants that may bear flowers and seeds. Some plants are free floating and are not attached to the bottom.

Nutrient-Any chemical element, ion or compound required by an organism for the continuation of growth, reproduction, and other life processes.

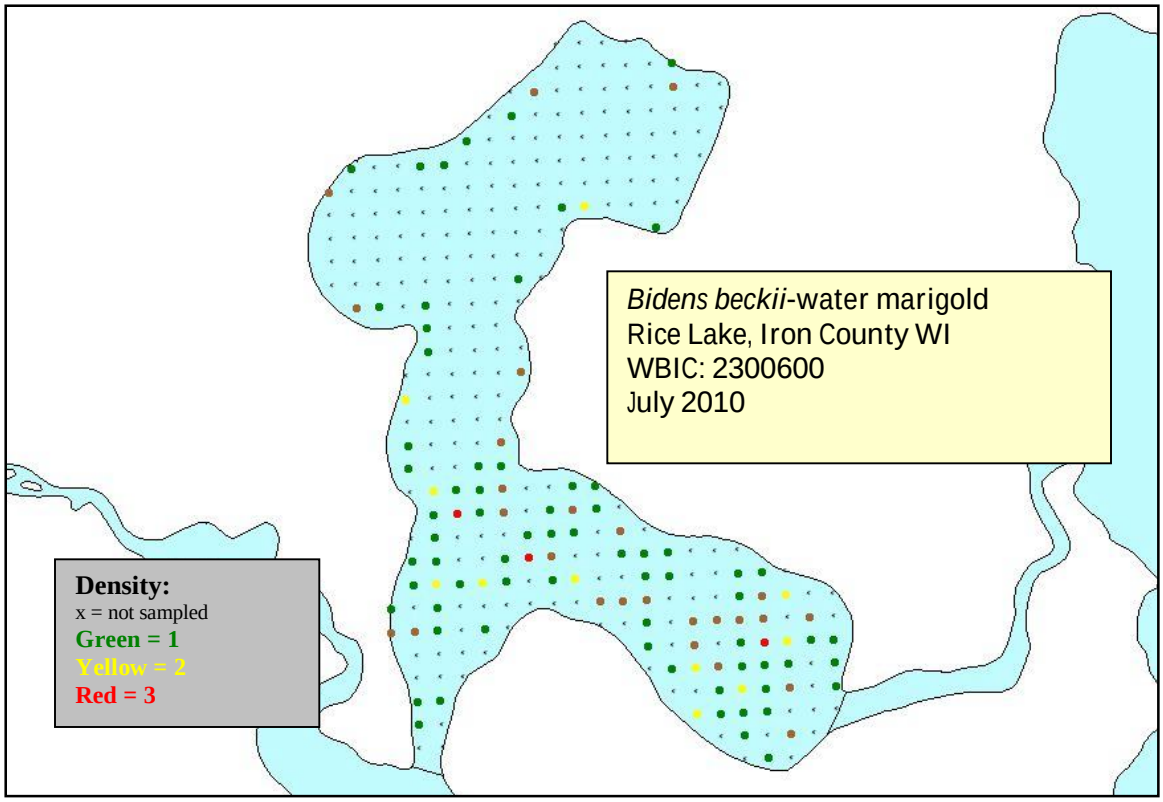
Photosynthesis-Production of organic matter (carbohydrate) from inorganic carbon and water in the presence of light.

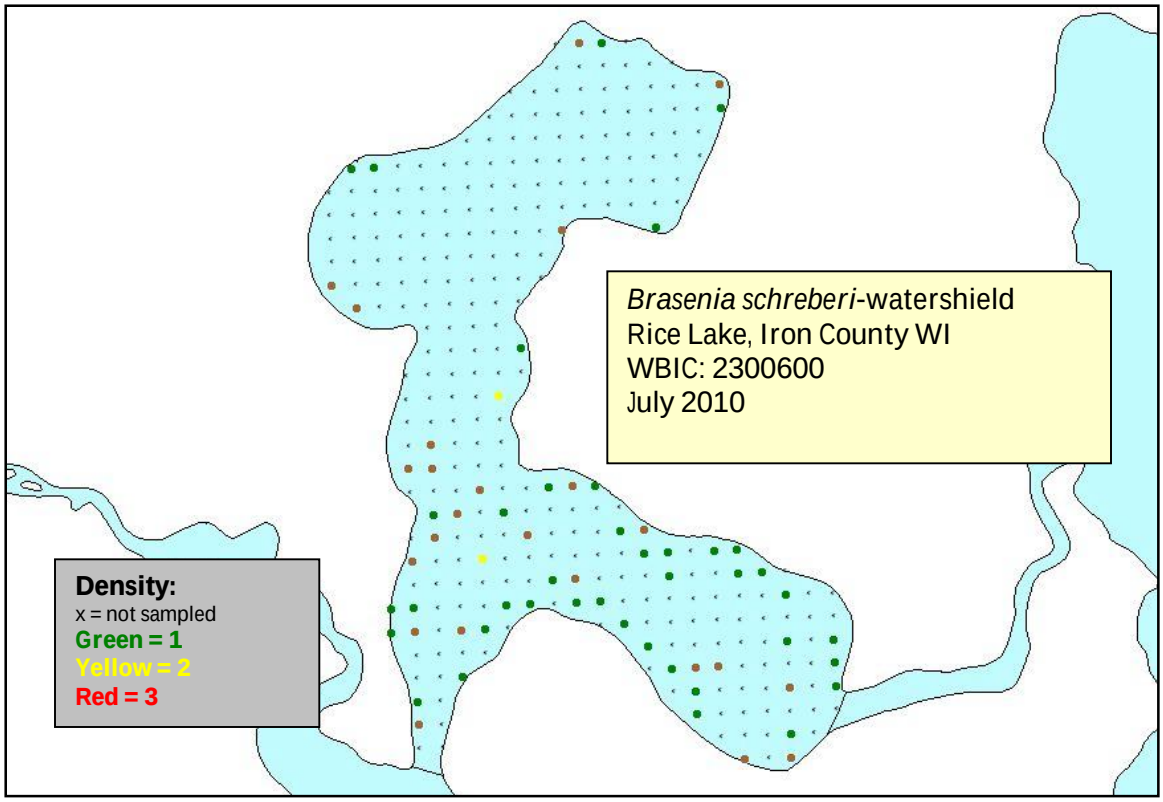
Sediment-Solid material deposited in the bottom of a basin.

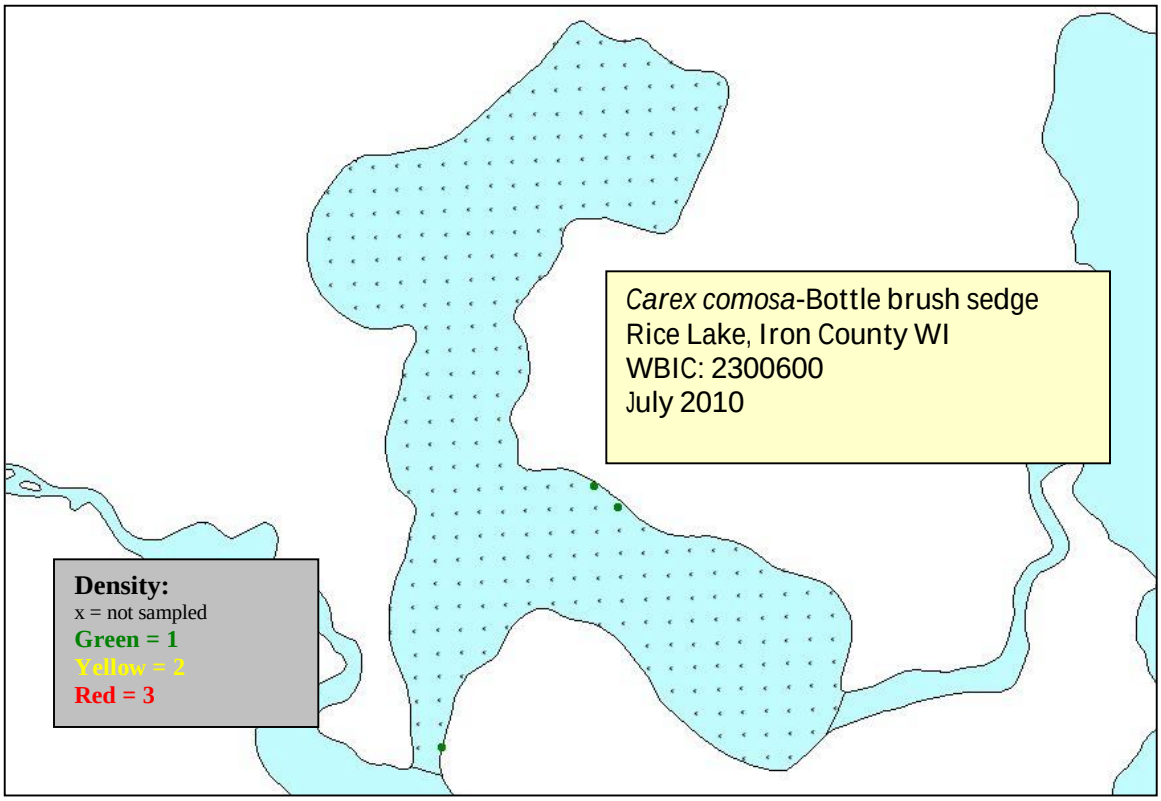
Submergent plant-Aquatic plant that grows with all or most of its stems and leaves below the water surface.

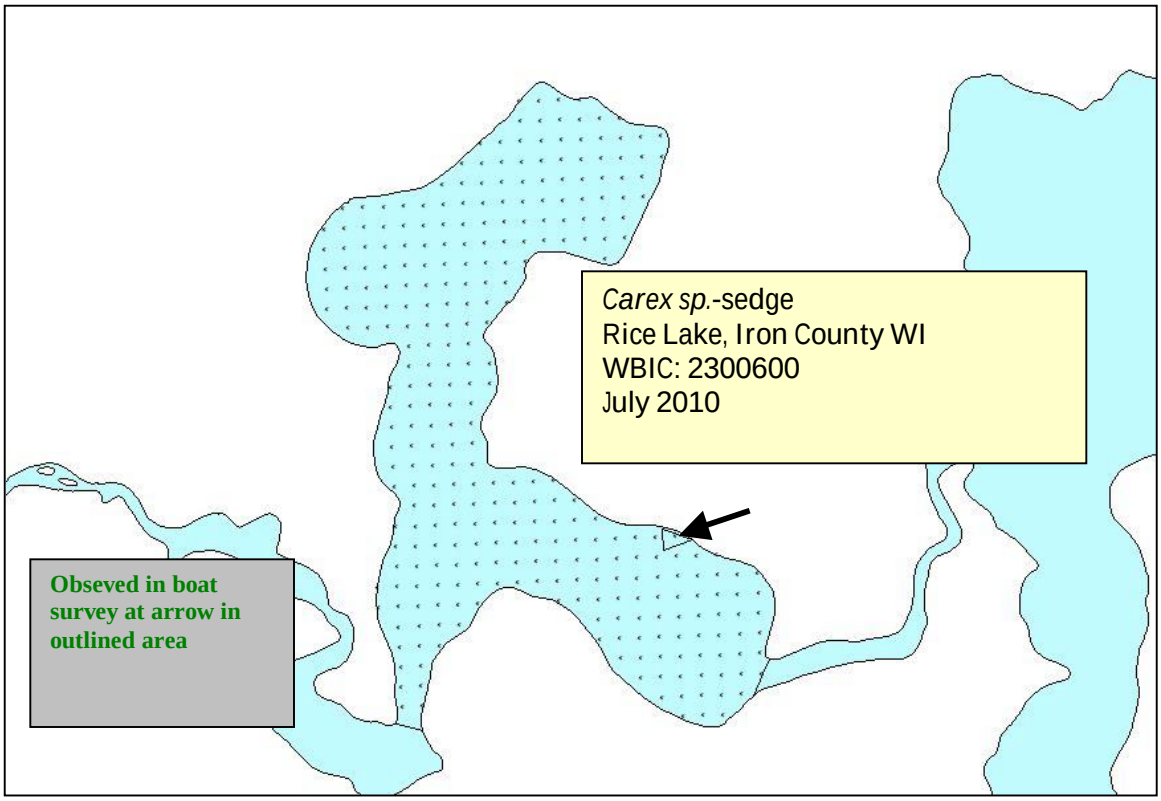
Voucher-A collection of specimens sampled in a particular location.

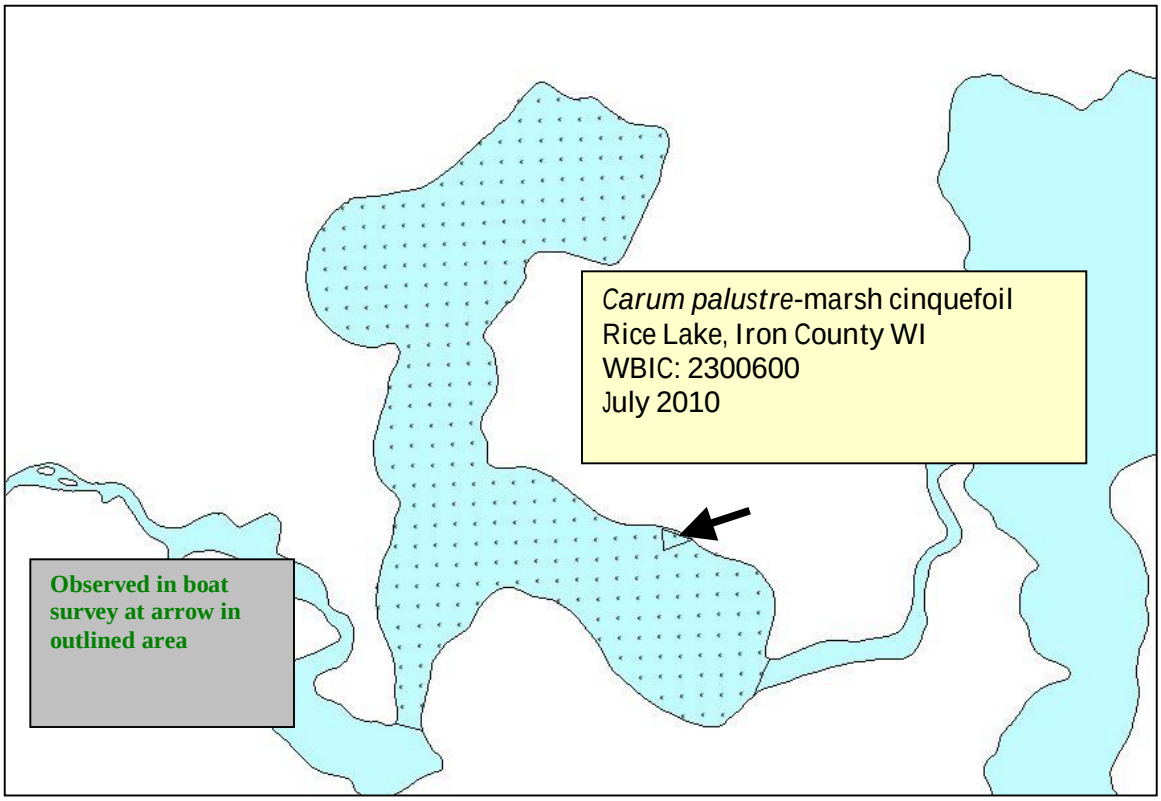
Watershed-The entire surface landscape that contributes water to a lake or river.

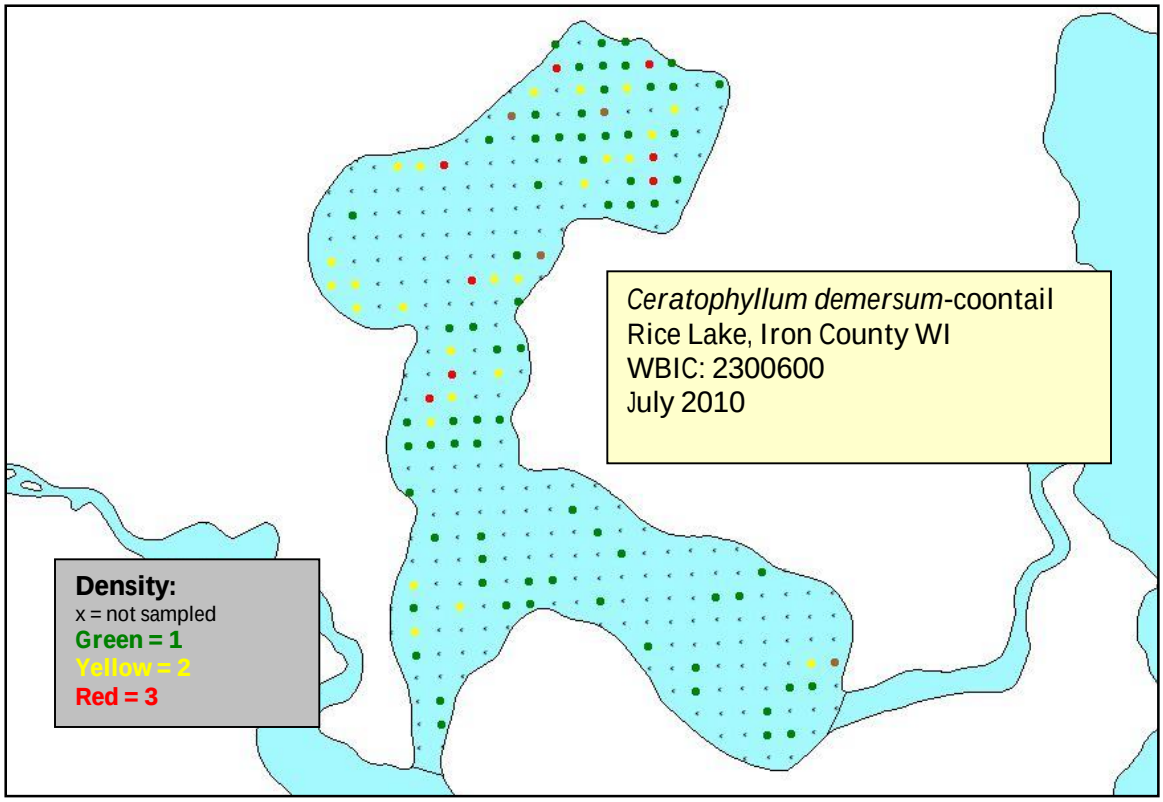

Bidens beckii-water marigold
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

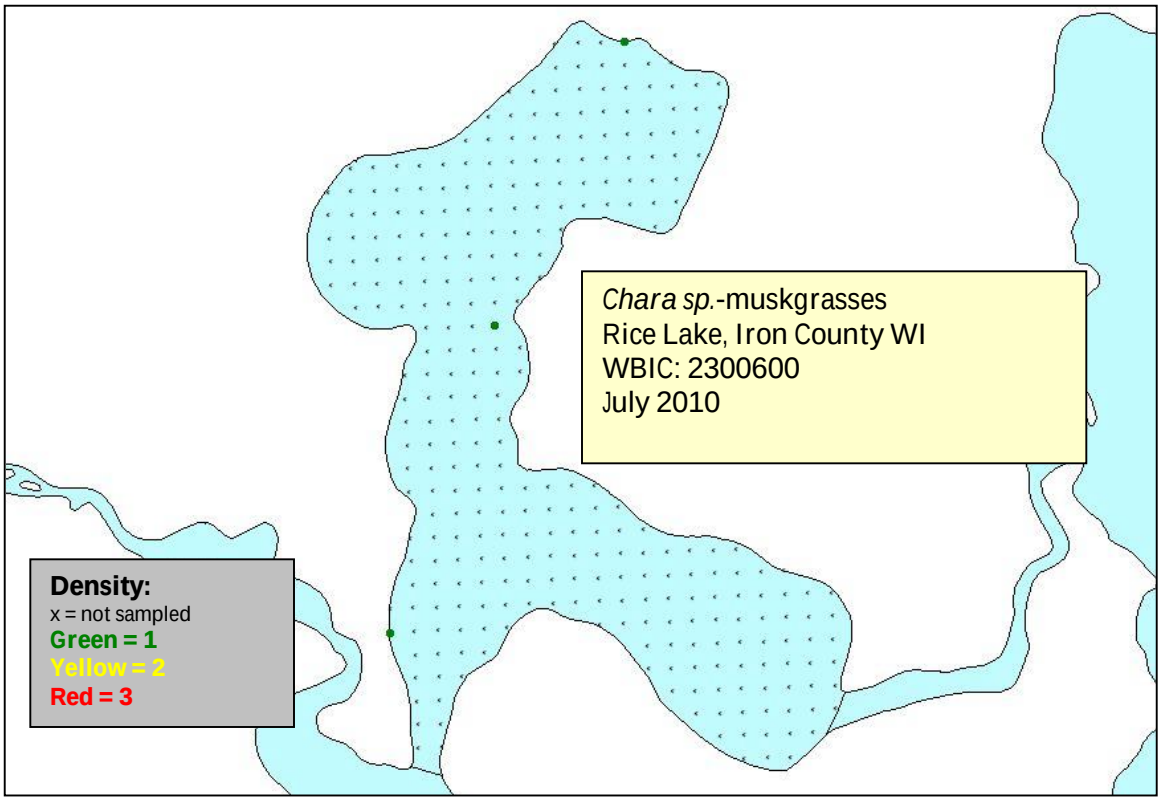

Brasenia schreberi-watershield
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

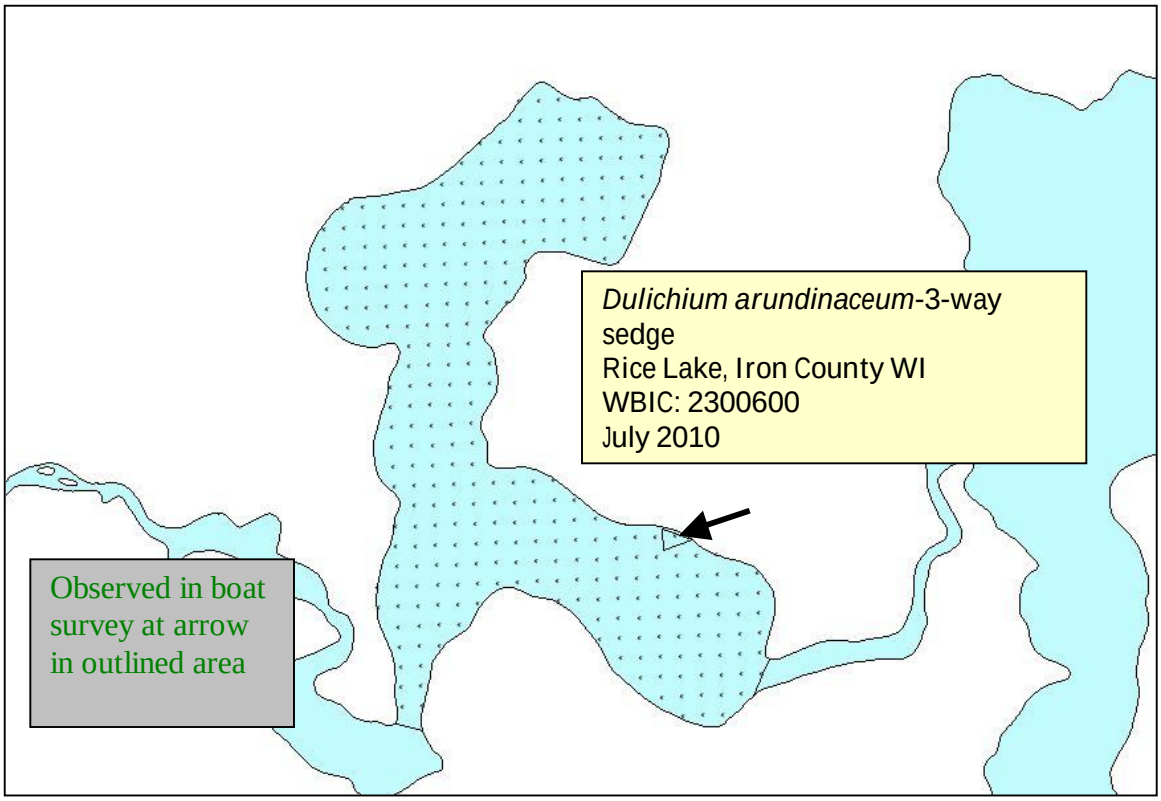

Carex comosa-Bottle brush sedge
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

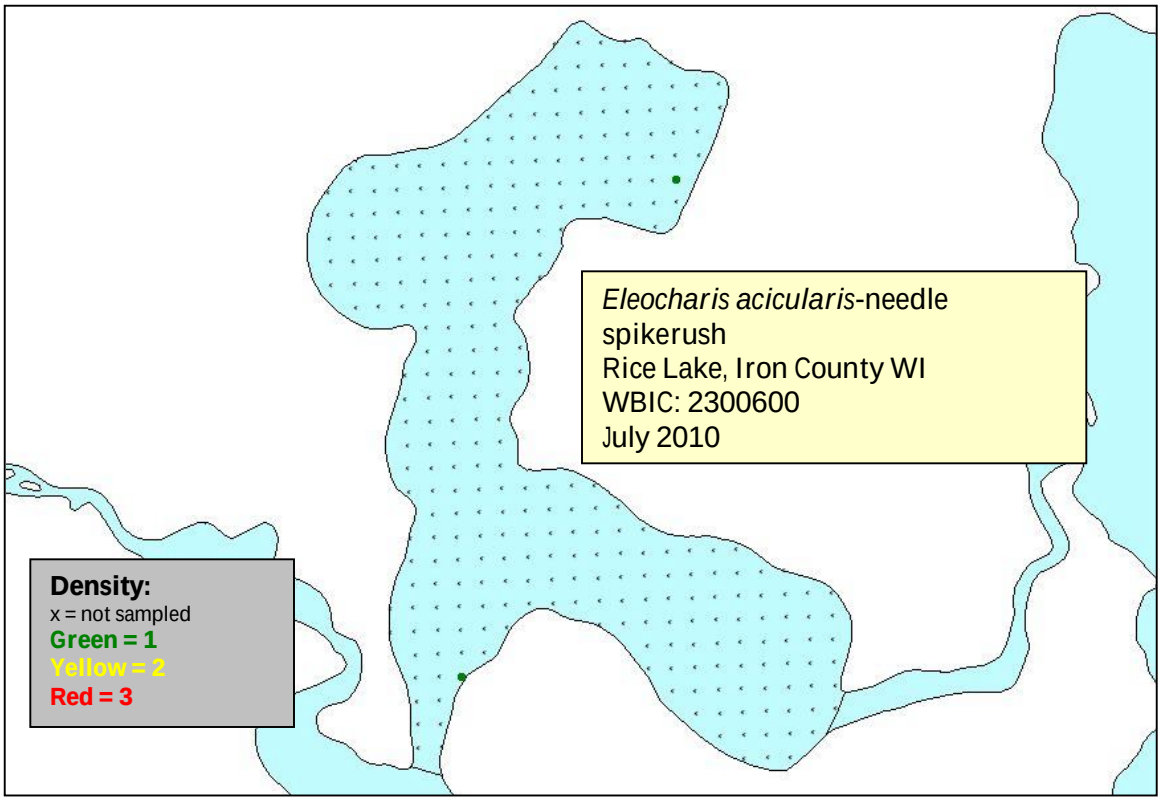

Carex sp.-sedge
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Obseved in boat survey at arrow in outlined area

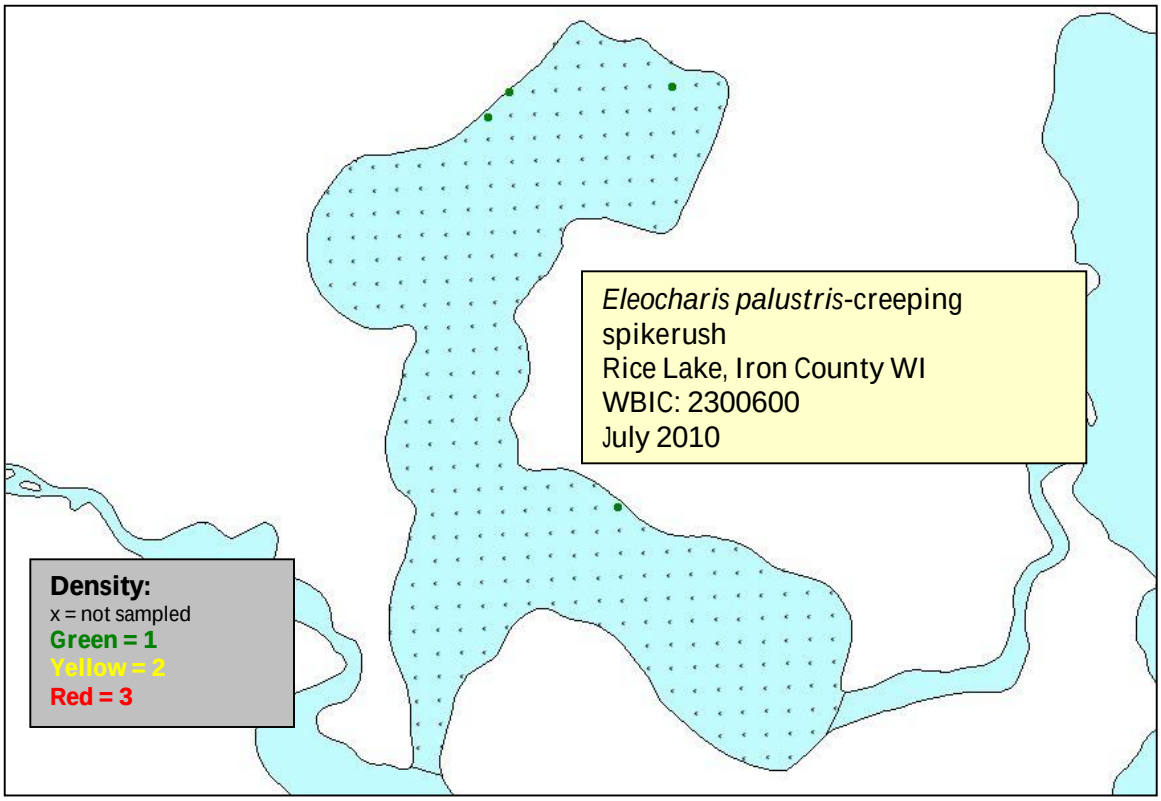

Carum palustre-marsh cinquefoil
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Observed in boat survey at arrow in outlined area


Ceratophyllum demersum-coontail
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Chara sp.-muskgrasses
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Dulichium arundinaceum-3-way sedge
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Observed in boat survey at arrow in outlined area


Eleocharis acicularis-needle spikerush
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Eleocharis palustris-creeping spikerush
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
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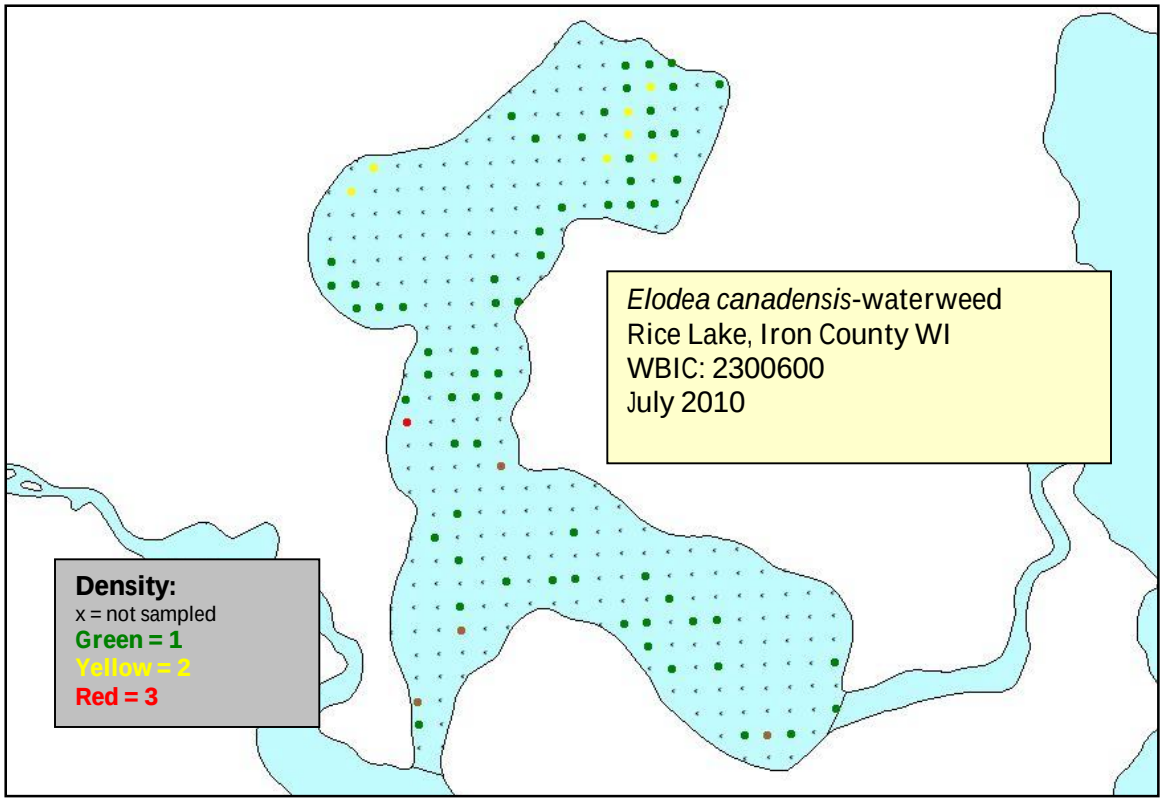
Yellow = 2
Red = 3


Elodea canadensis-waterweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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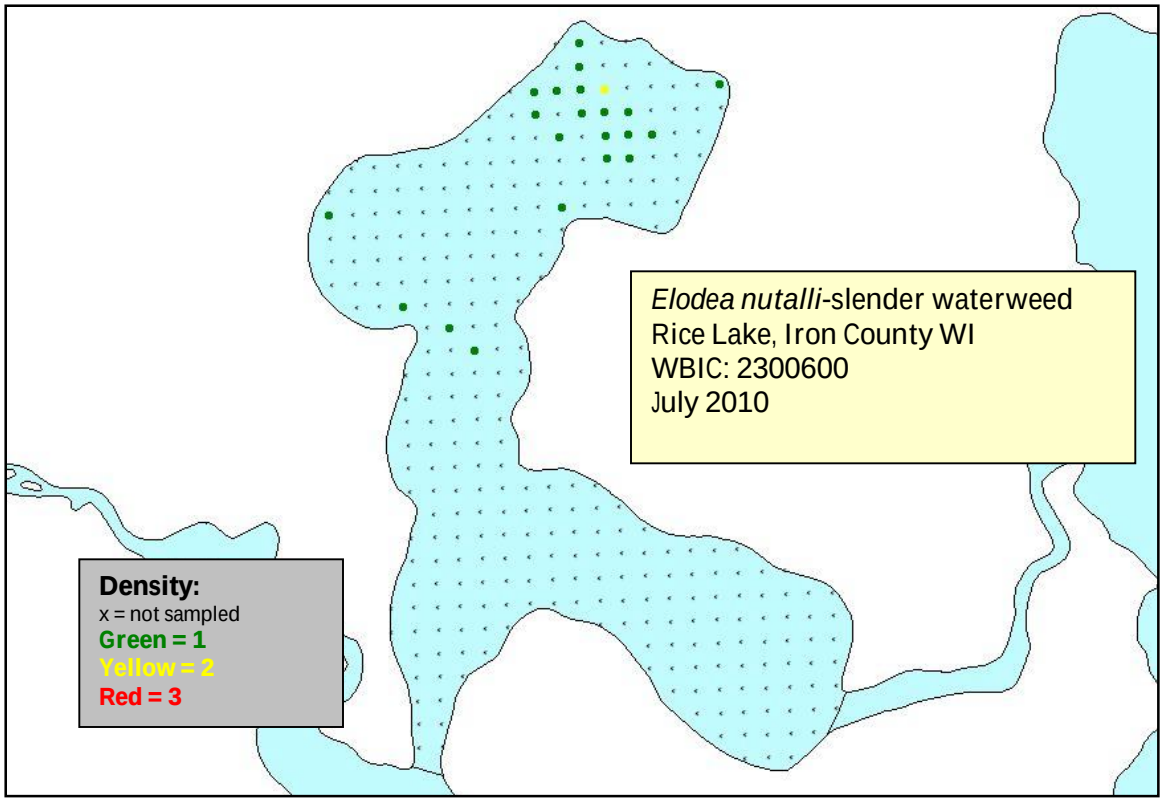
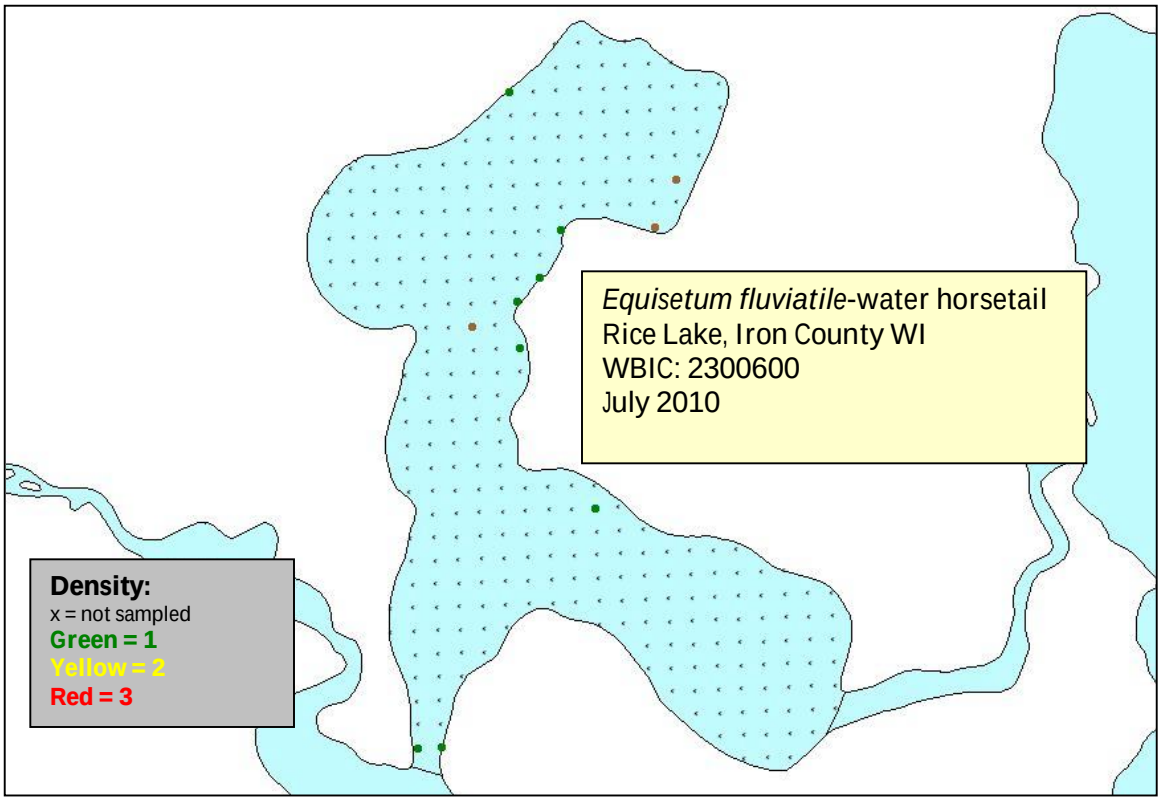
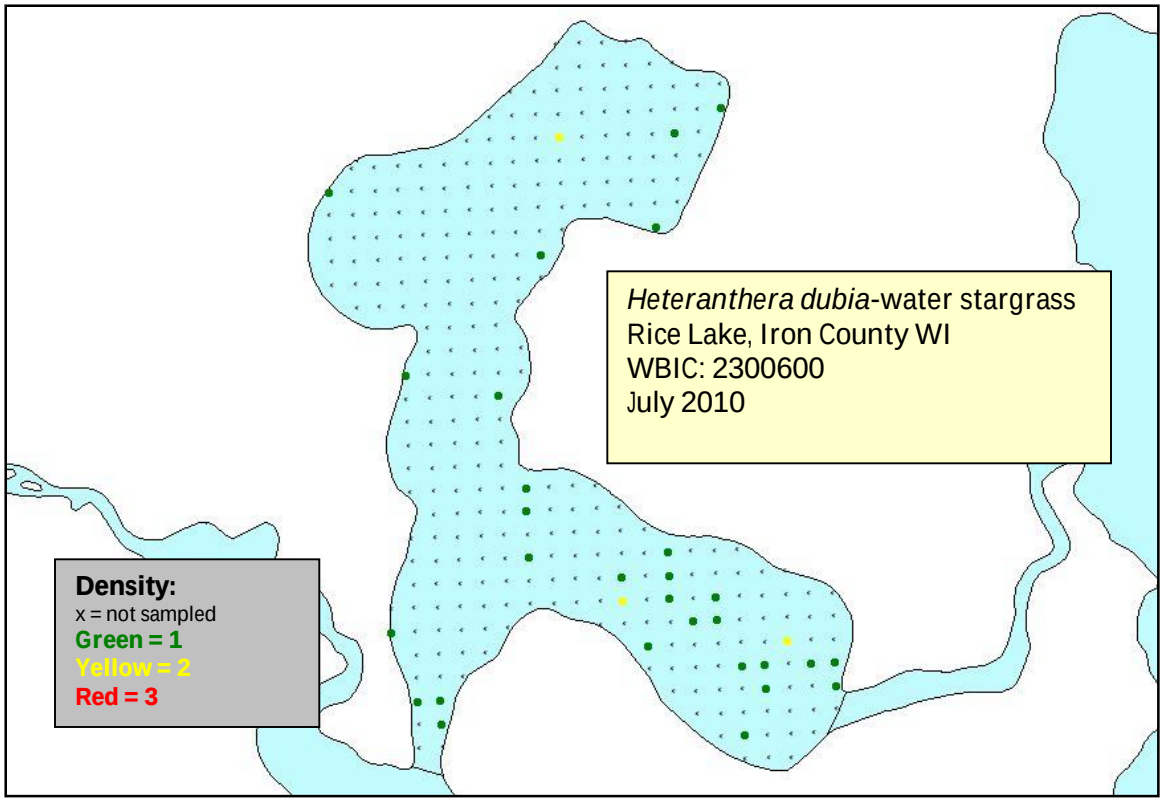
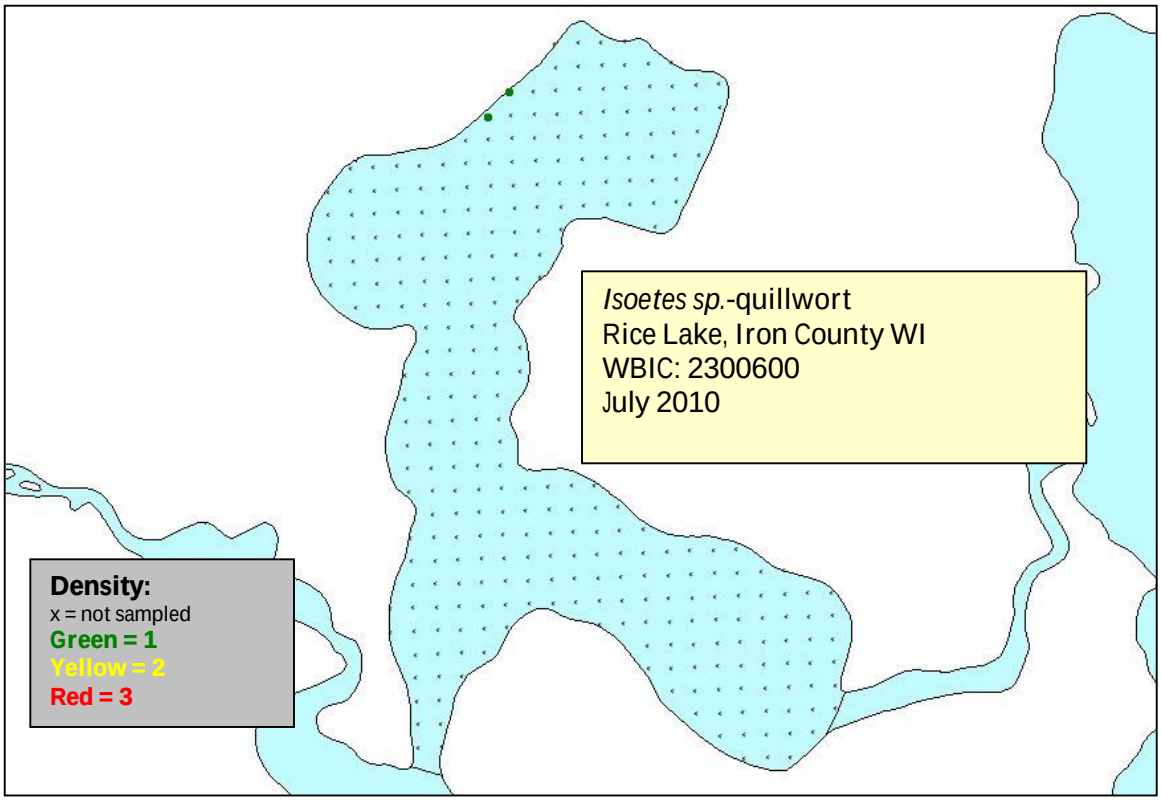
Red = 3


Elodea nutalli-slender waterweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Equisetum fluviatile-water horsetail
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Heteranthera dubia-water stargrass
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Isoetes sp.-quillwort
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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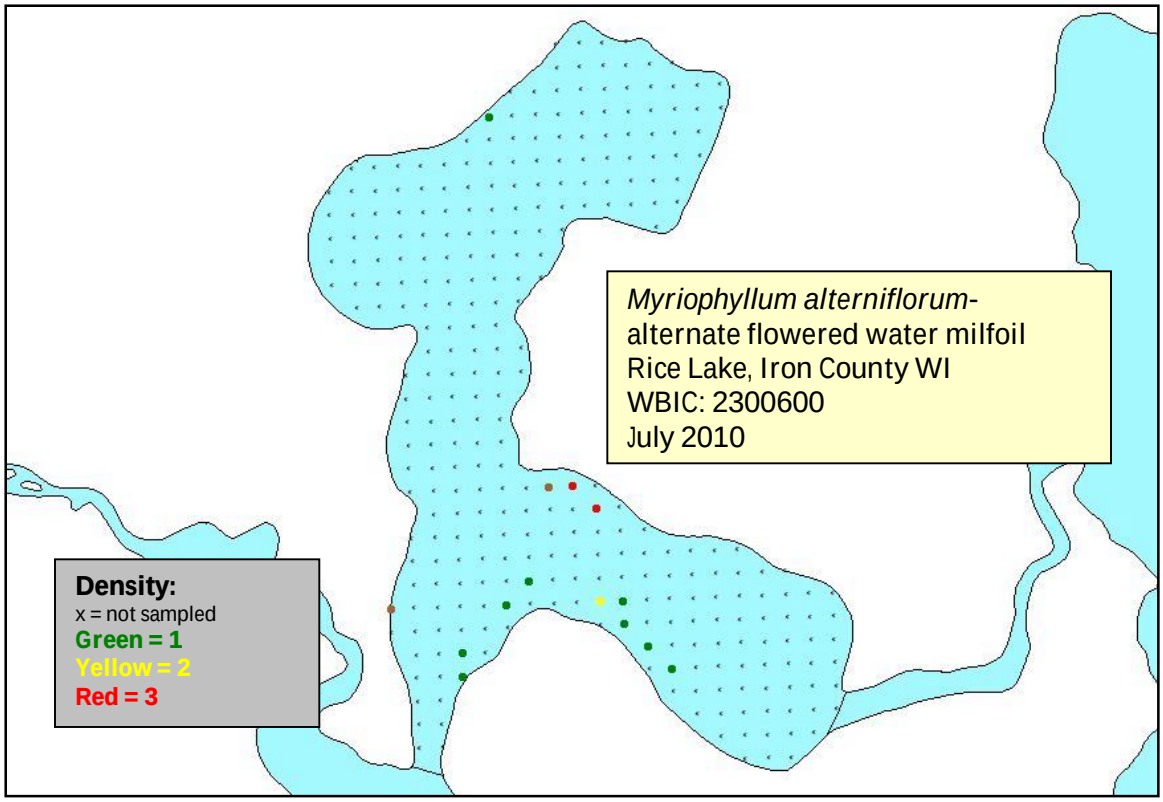
Yellow = 2
Red = 3


Myriophyllum alterniflorum-
alternate flowered water milfoil
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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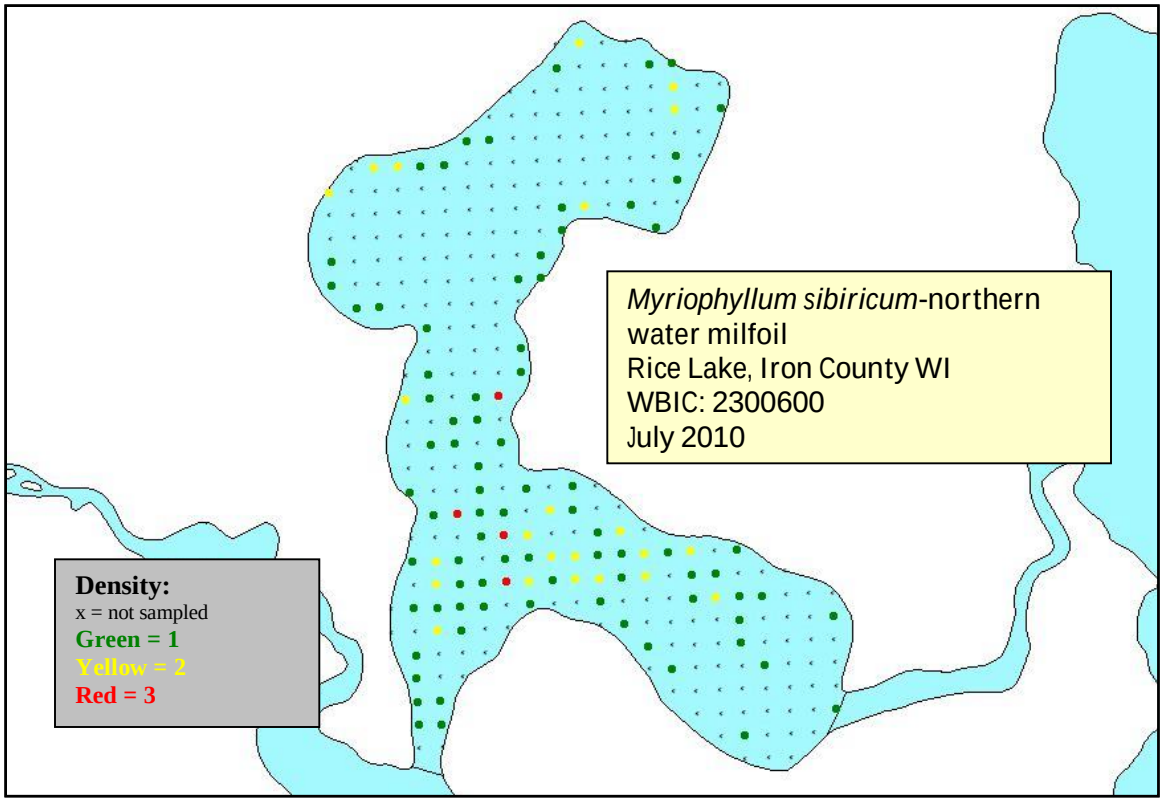
Myriophyllum sibiricum-northern water milfoil
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
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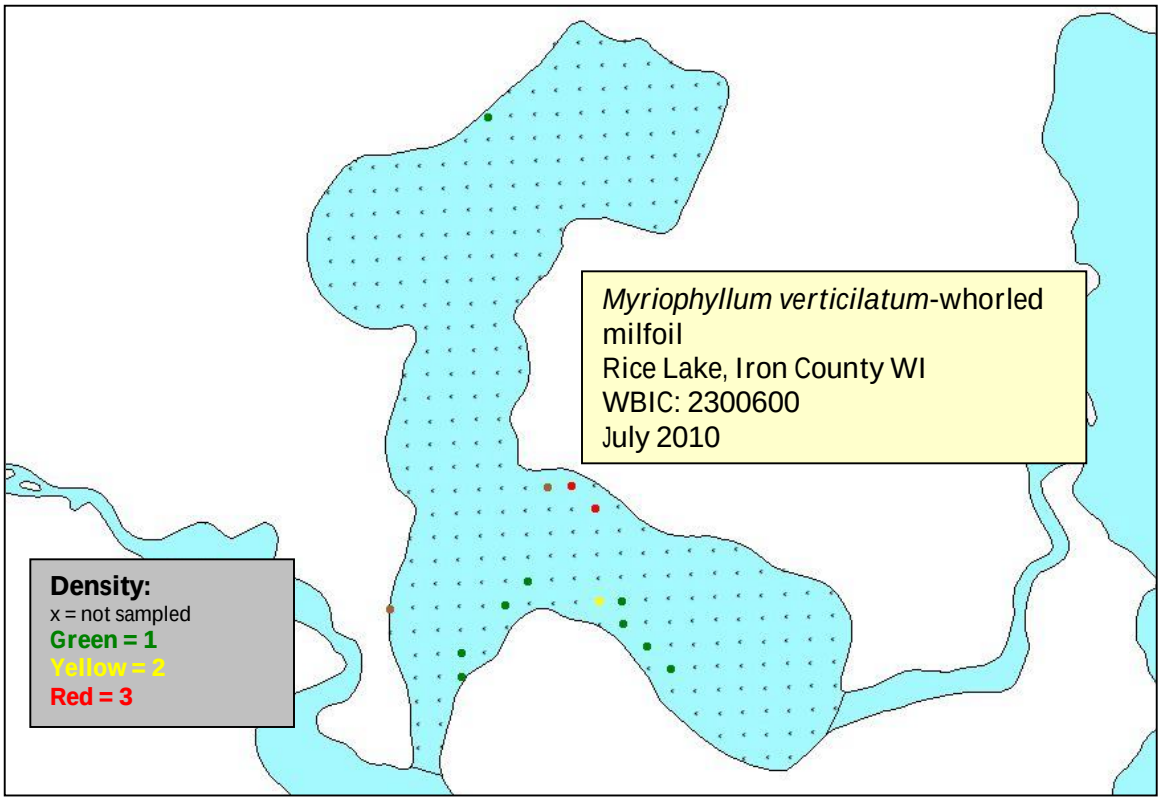
Myriophyllum verticilatum-whorled milfoil
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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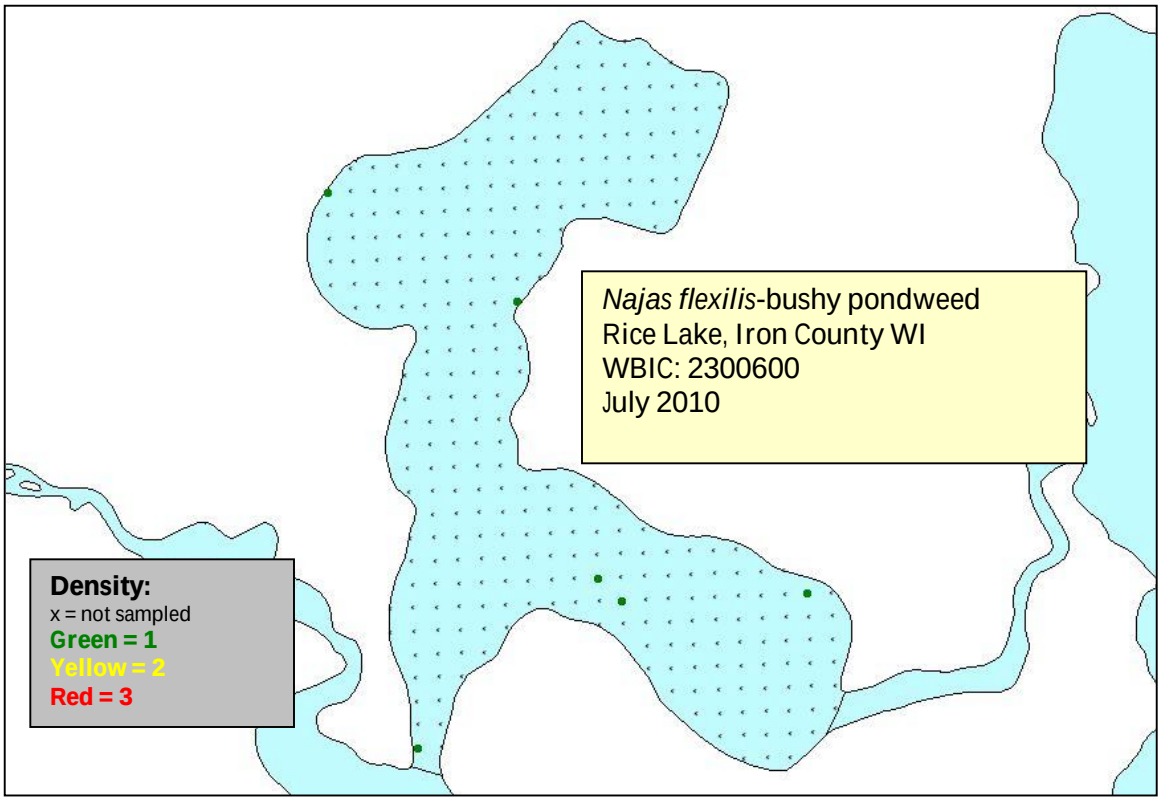
Red = 3


Najas flexilis-bushy pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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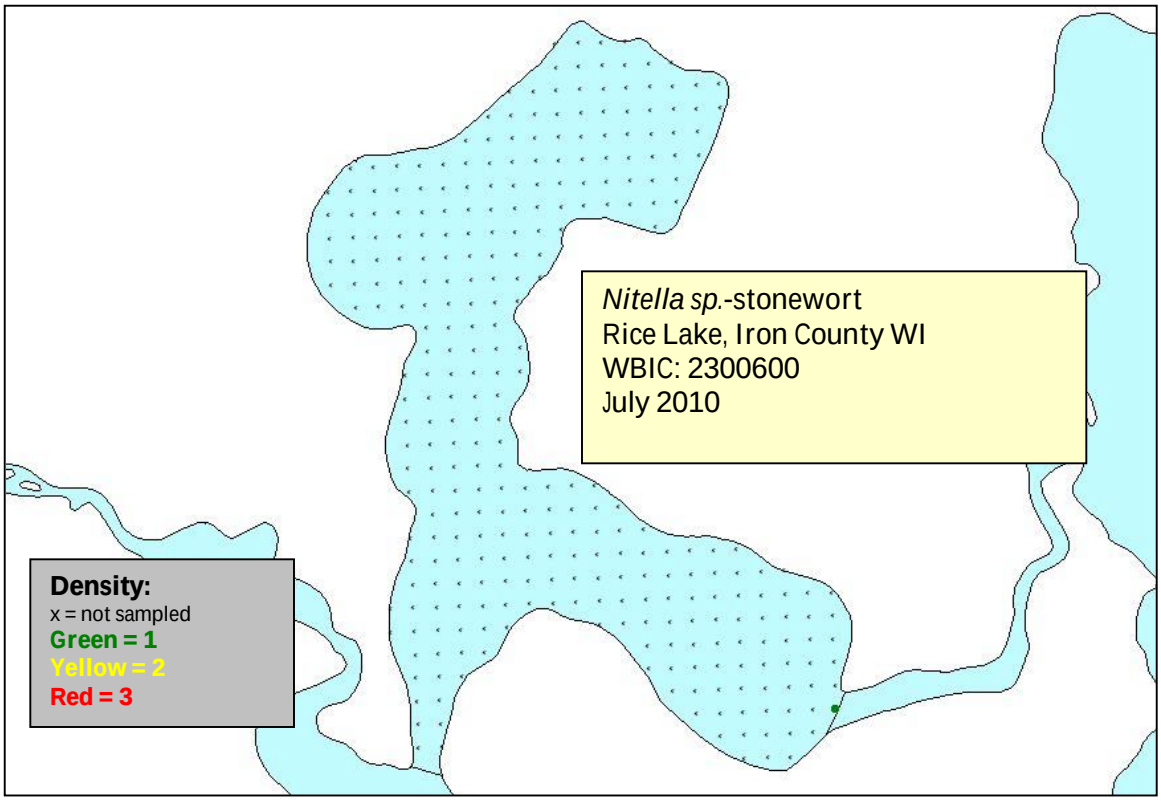
Yellow = 2
Red = 3


Nitella sp.-stonewort
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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Yellow = 2
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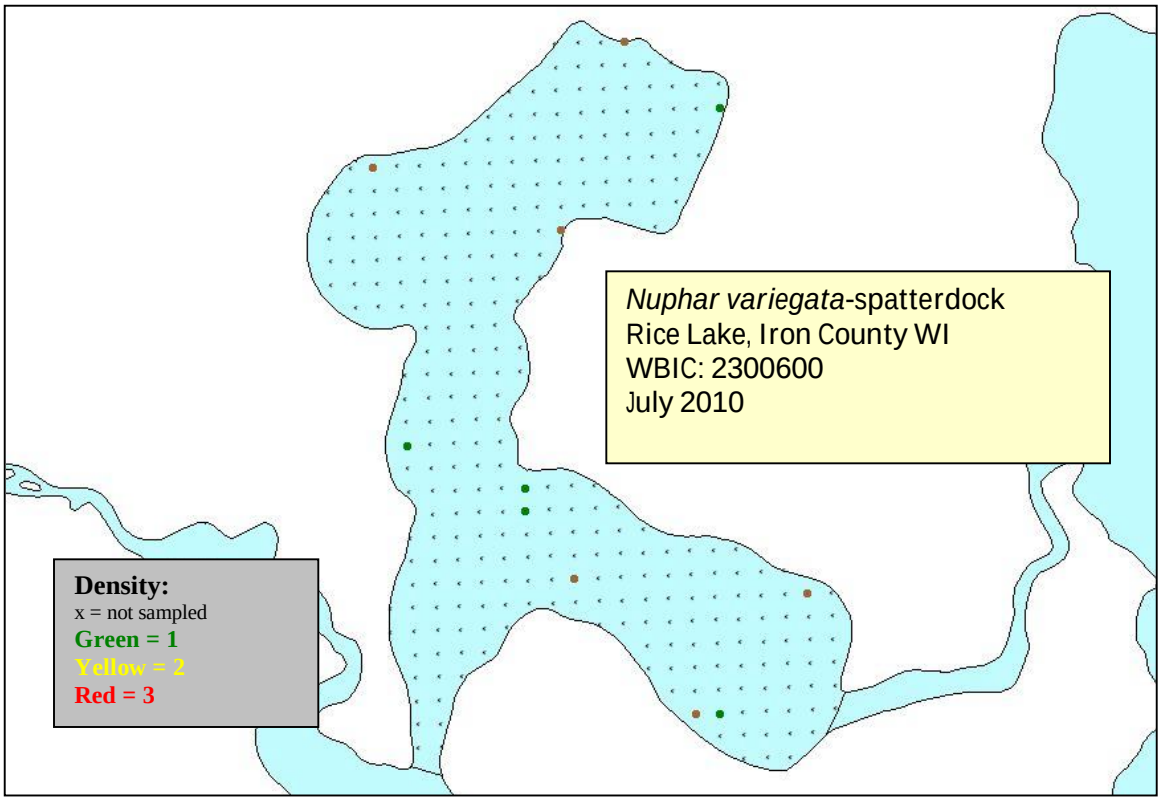
Nuphar variegata-spatterdock
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
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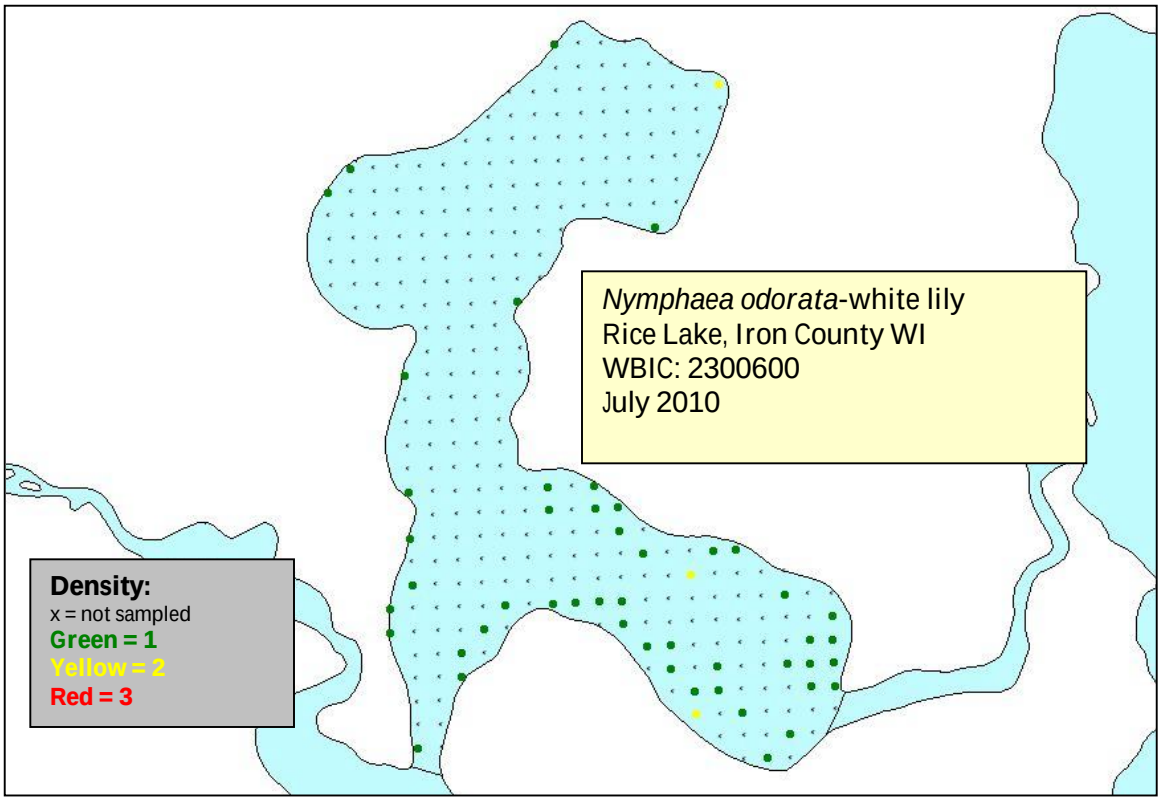
Yellow = 2
Red = 3


Nymphaea odorata-white lily
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
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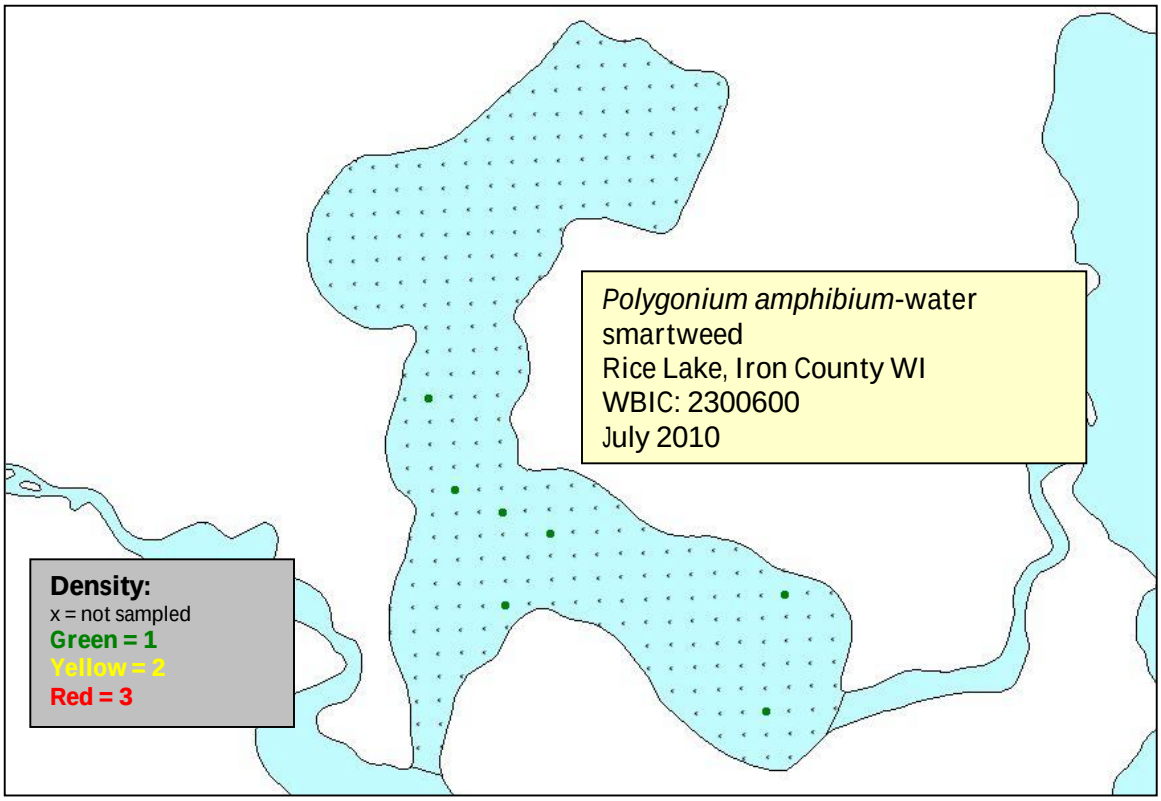
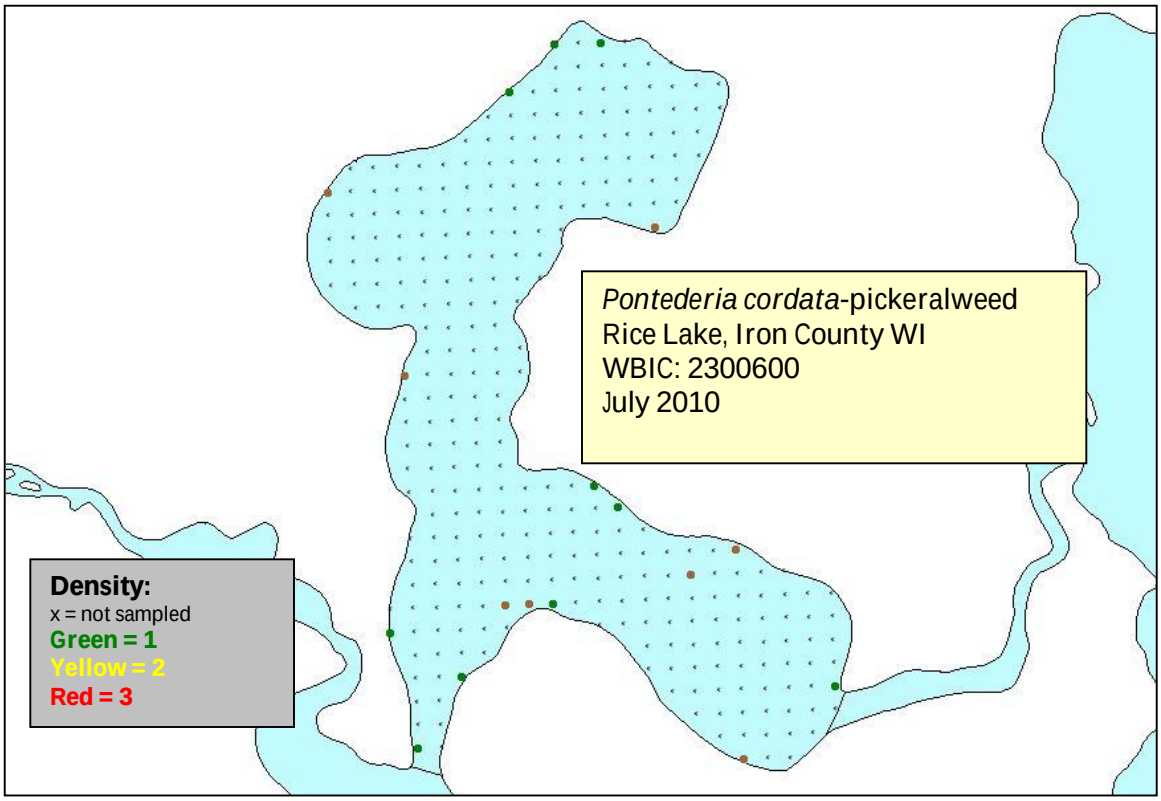
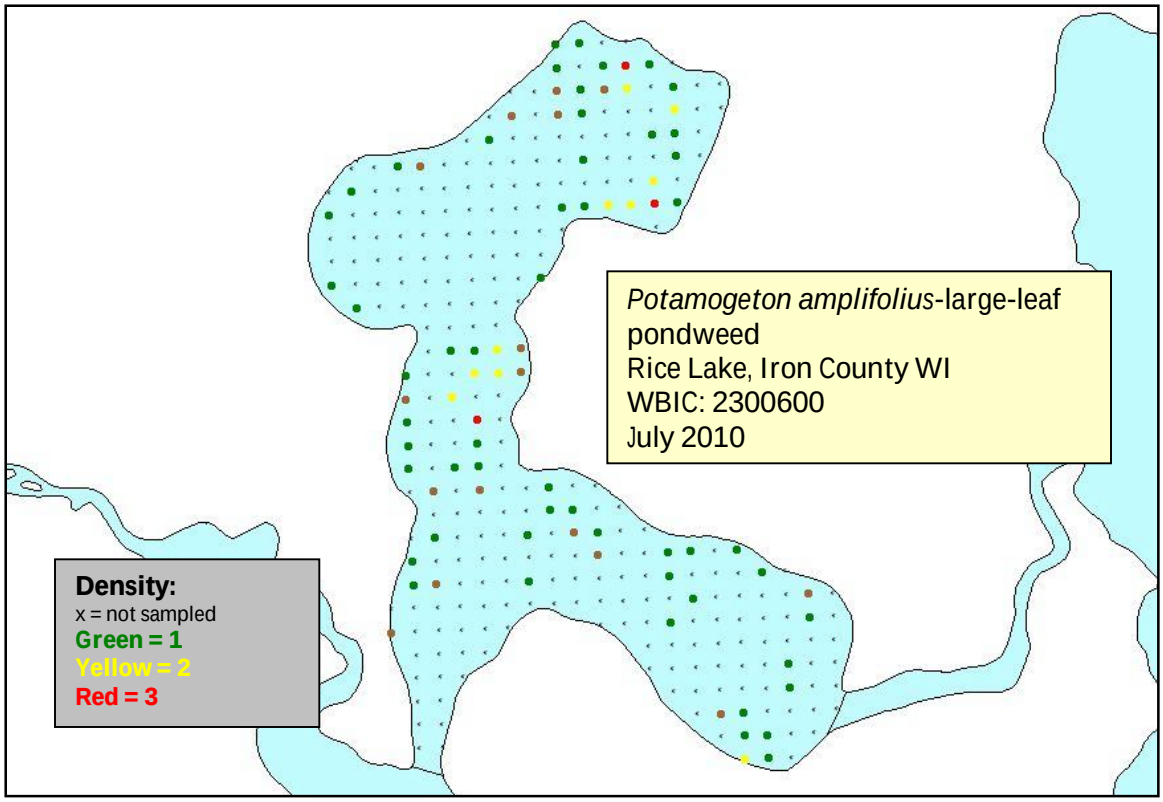
Yellow = 2
Red = 3


Polygonium amphibium-water smartweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Pontederia cordata-pickeralweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Potamogeton amplifolius-large-leaf pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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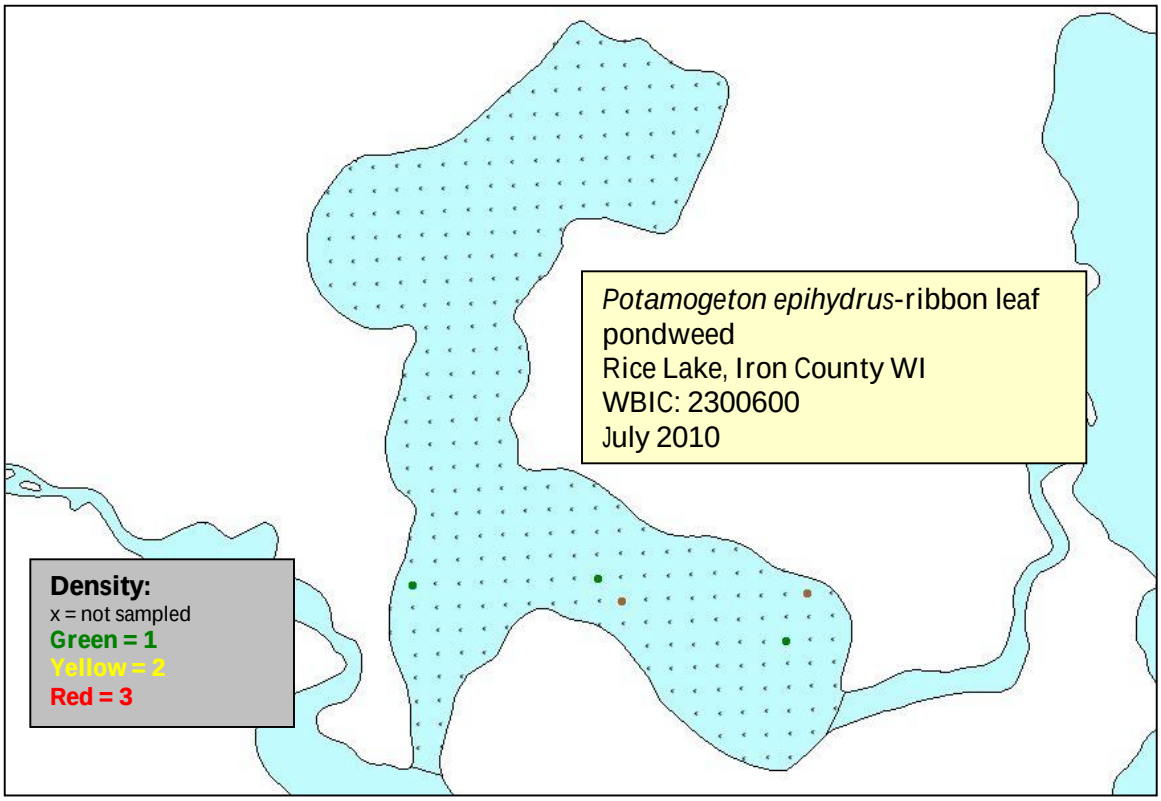
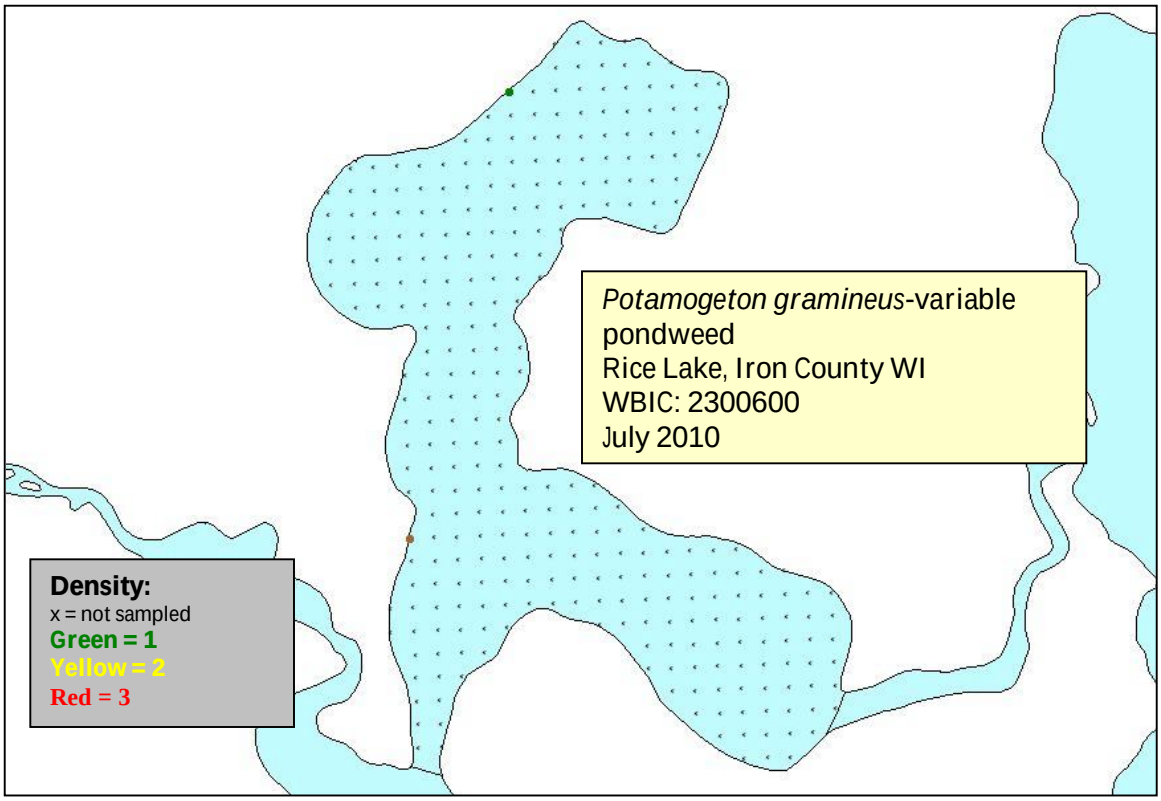
Yellow = 2
Red = 3


Potamogeton epihydrus-ribbon leaf pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Potamogeton gramineus-variable pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
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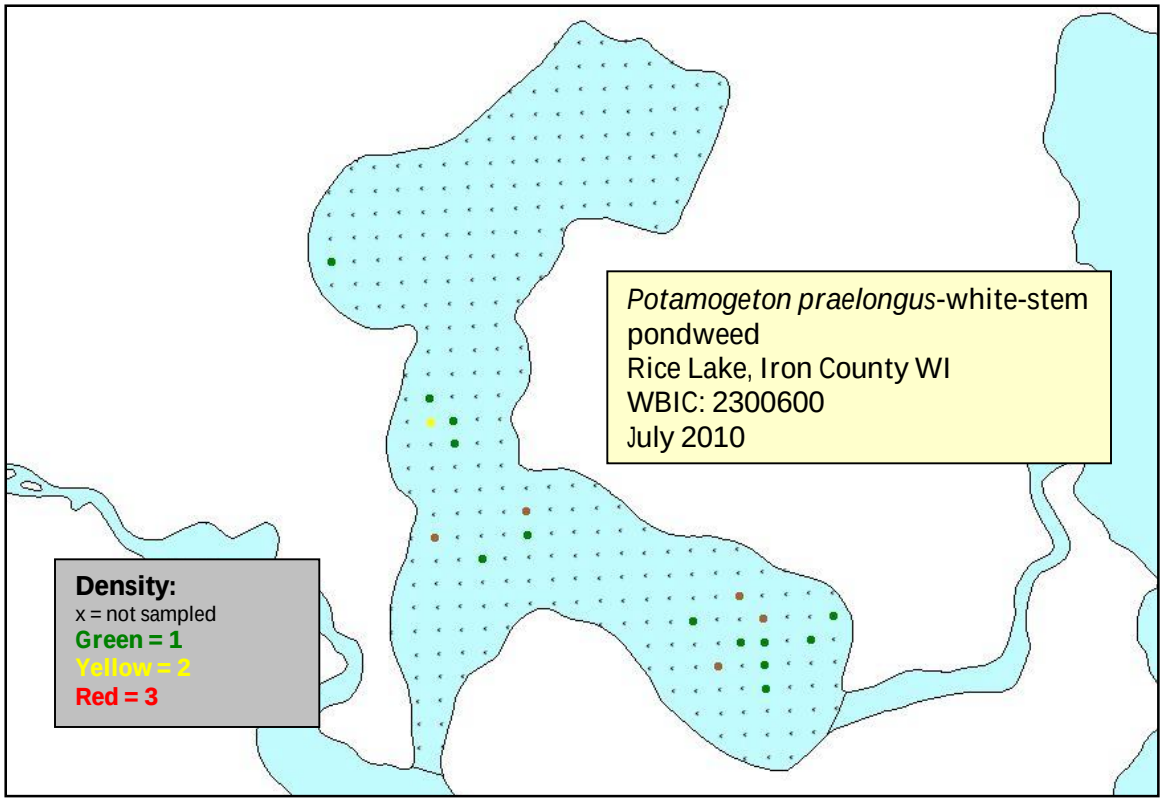
Green = 1
Yellow = 2
Red = 3


Potamogeton praelongus-white-stem pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
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Yellow = 2
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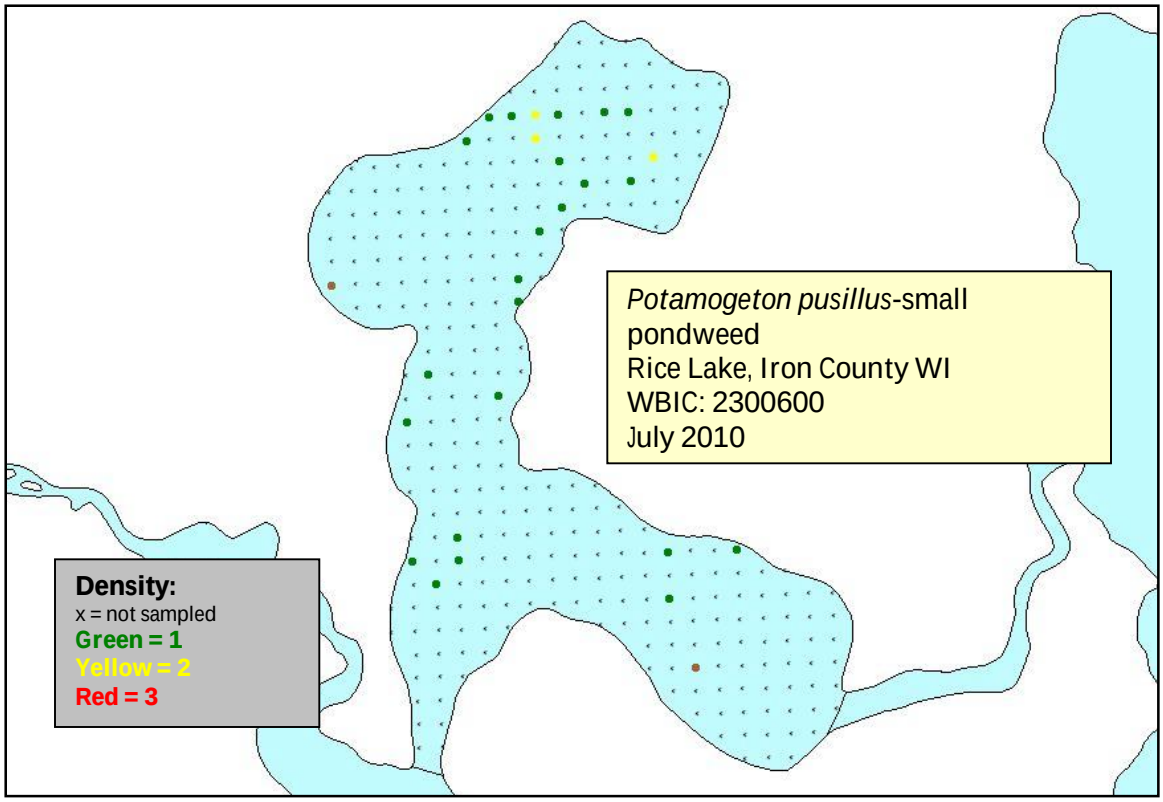
Potamogeton pusillus-small pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
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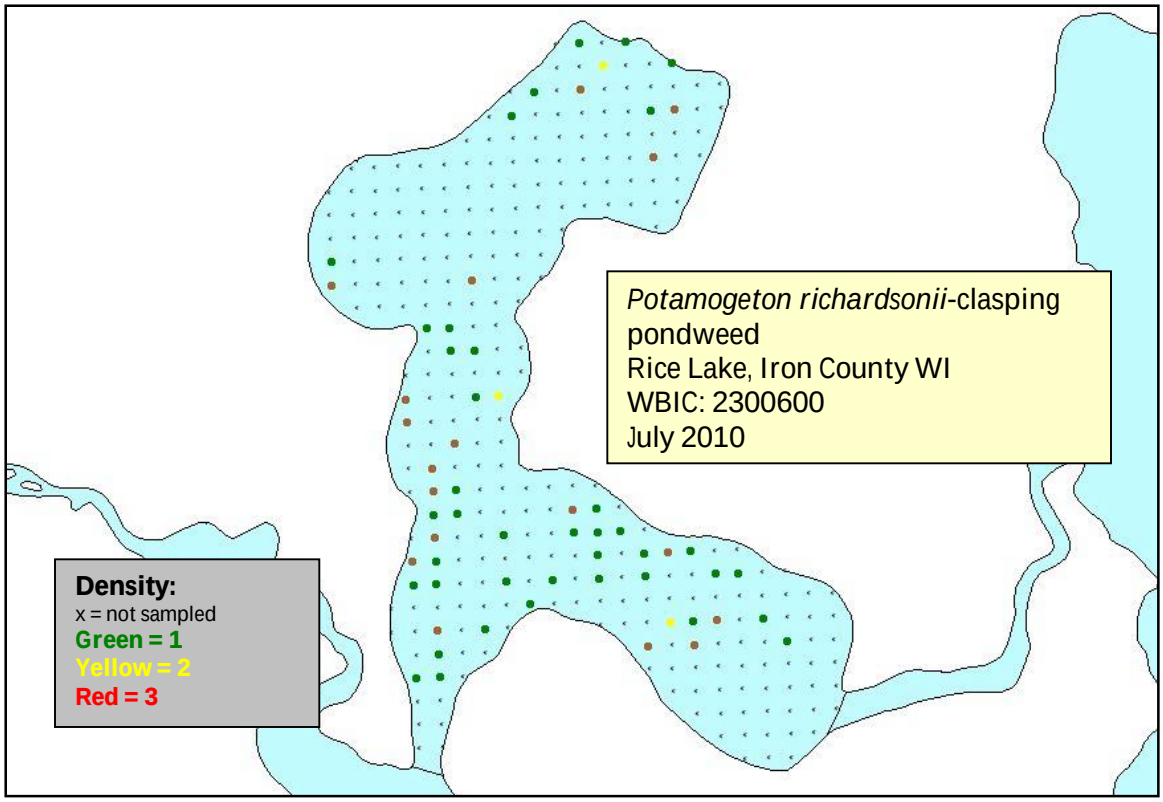
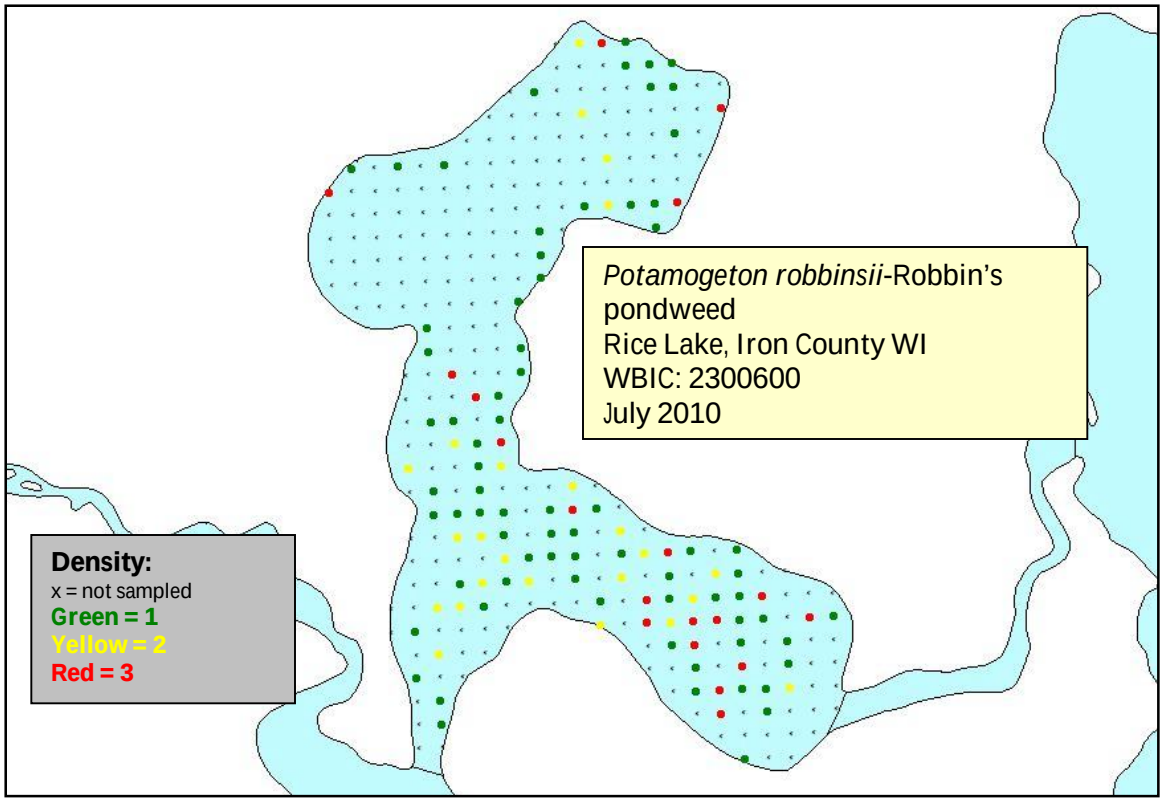
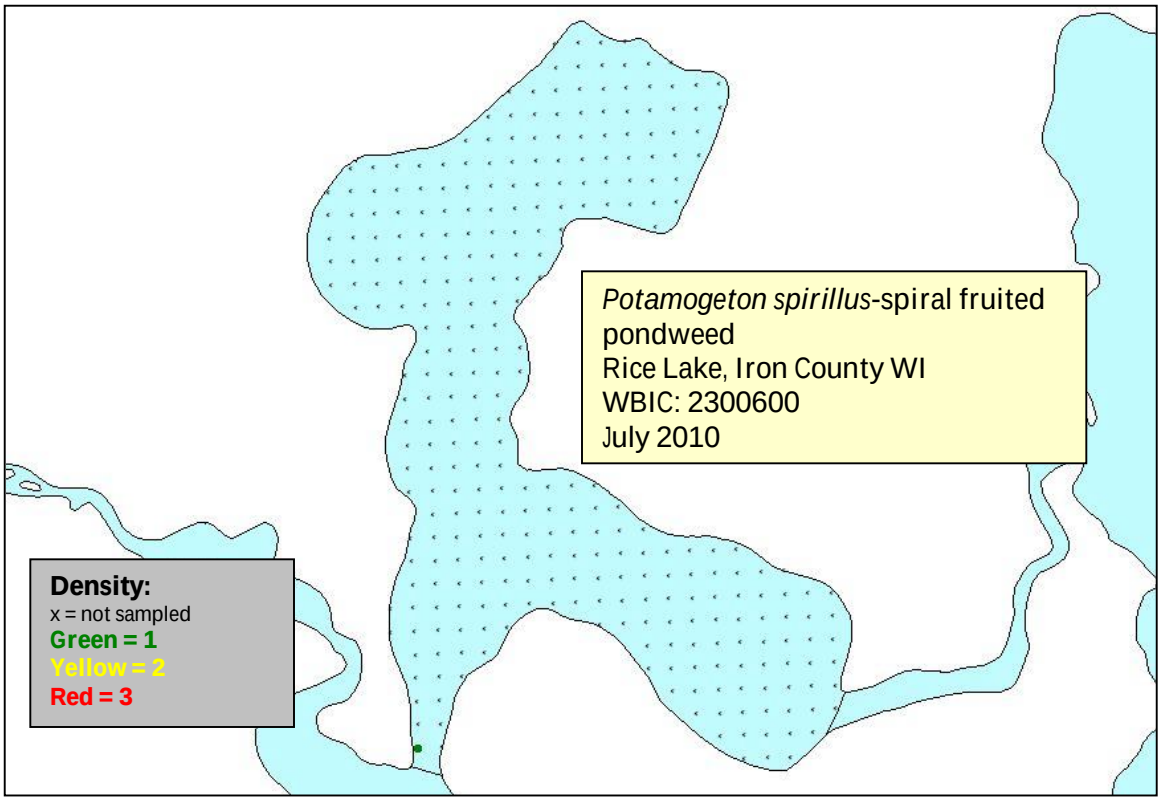
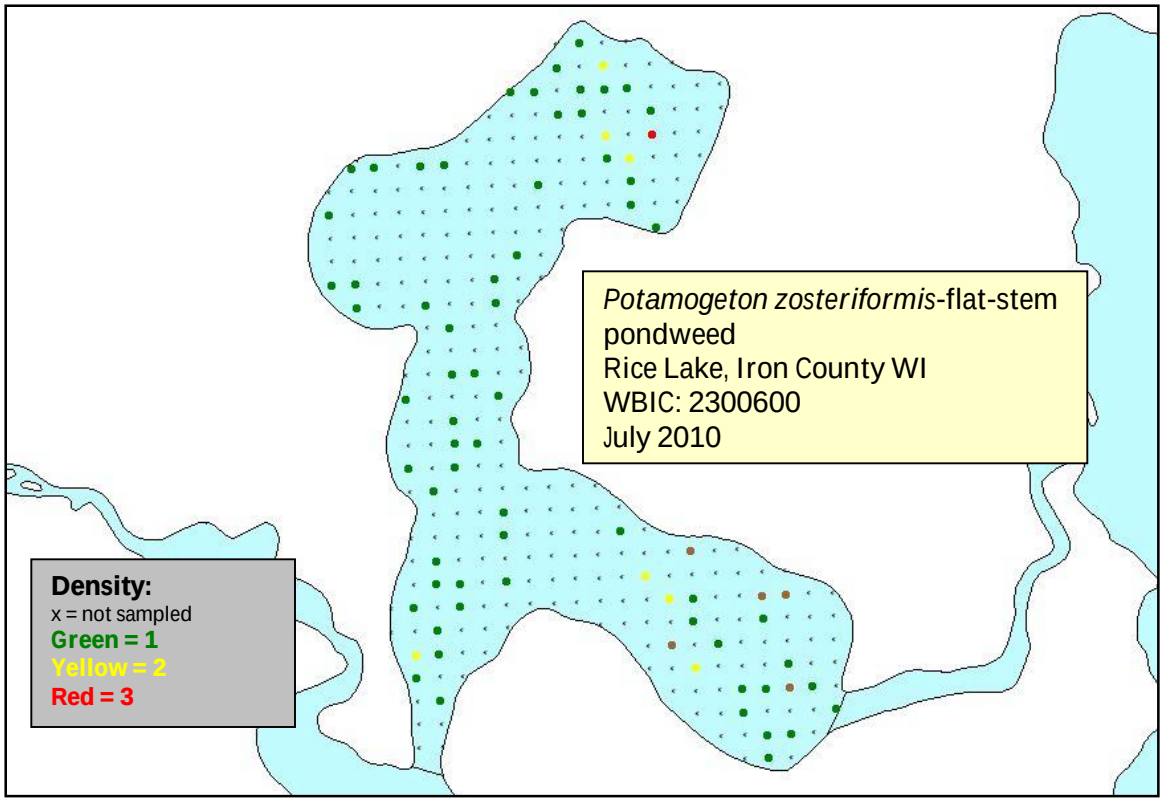
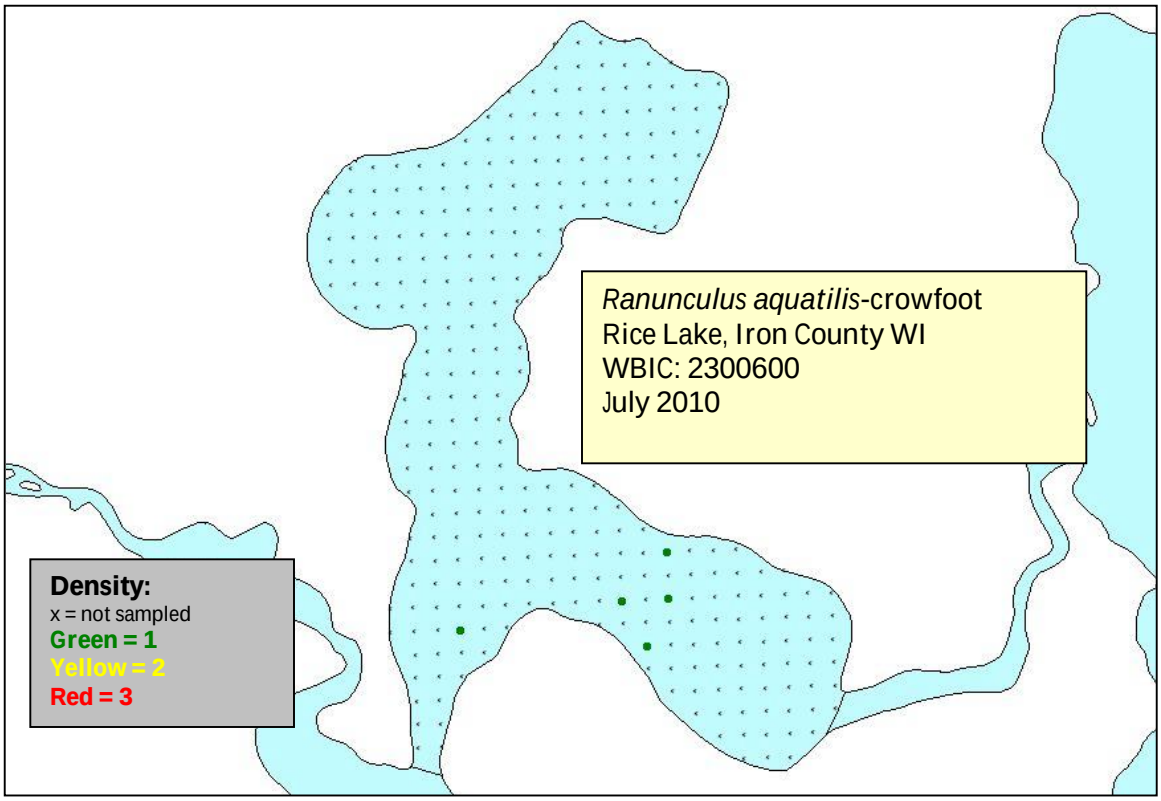
Red = 3

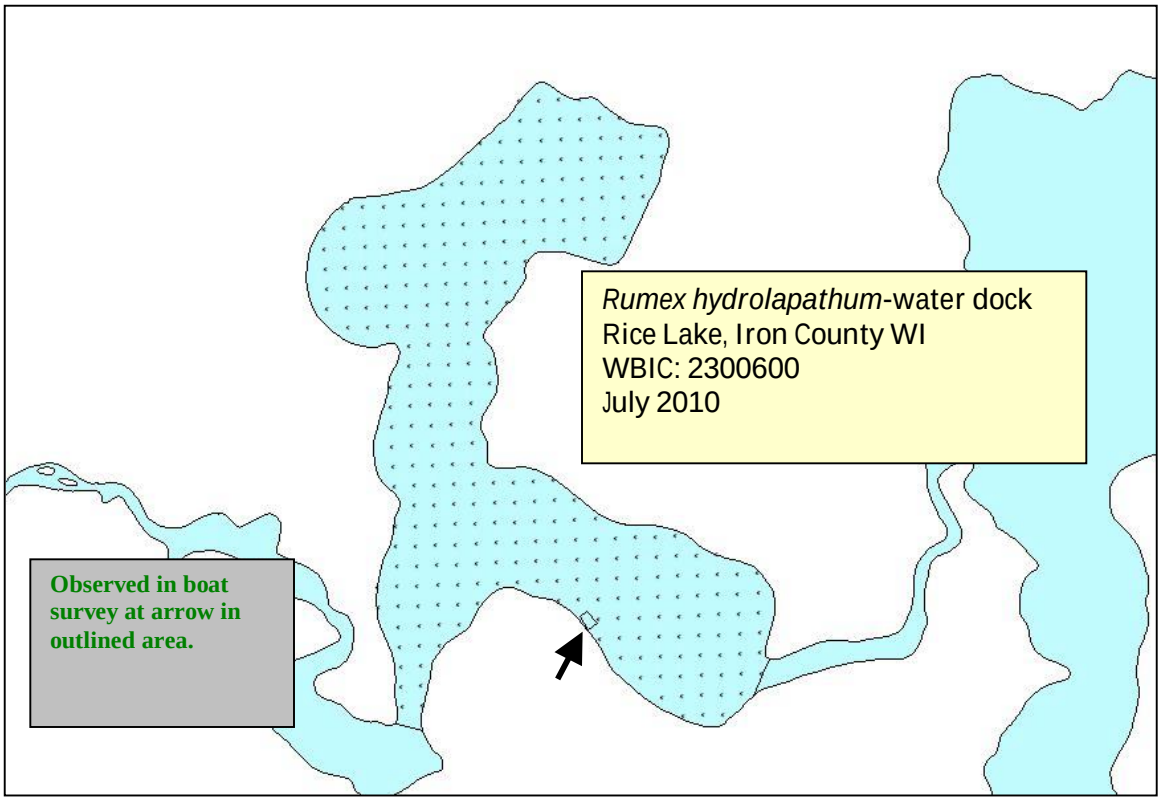

Potamogeton richardsonii-clasping pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

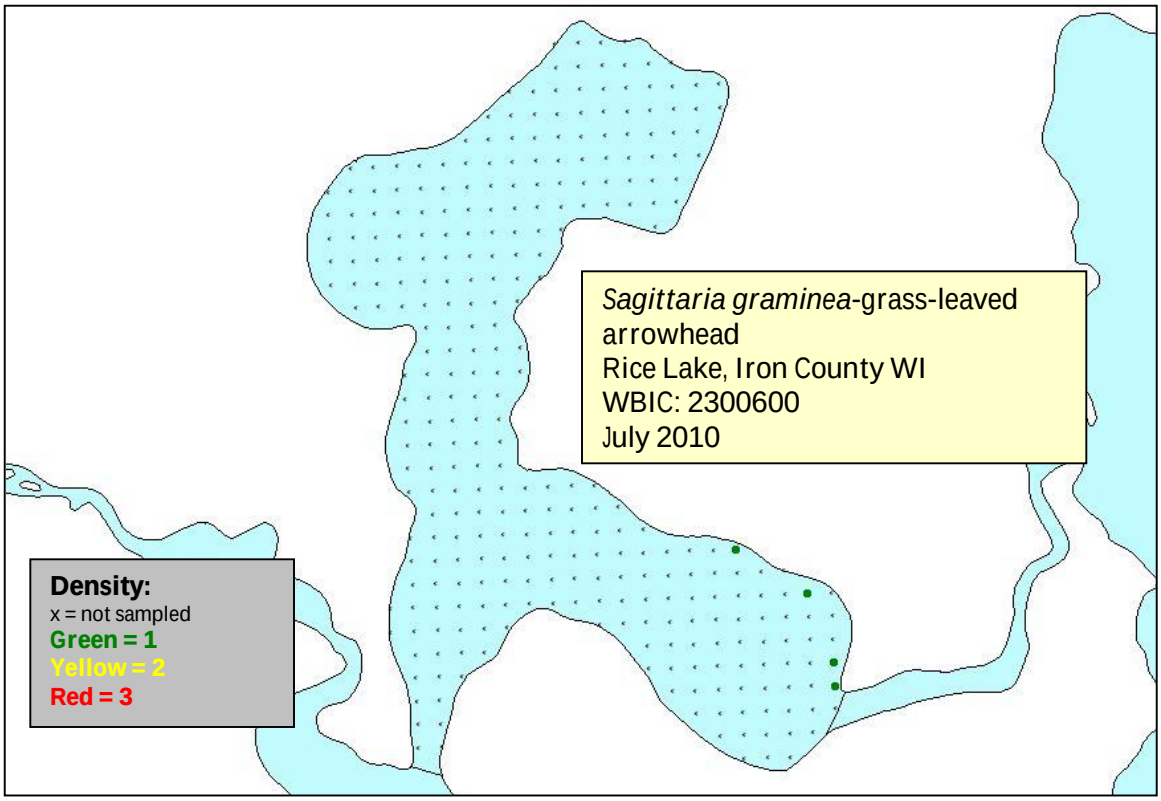

Potamogeton robbinsii-Robbin's pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

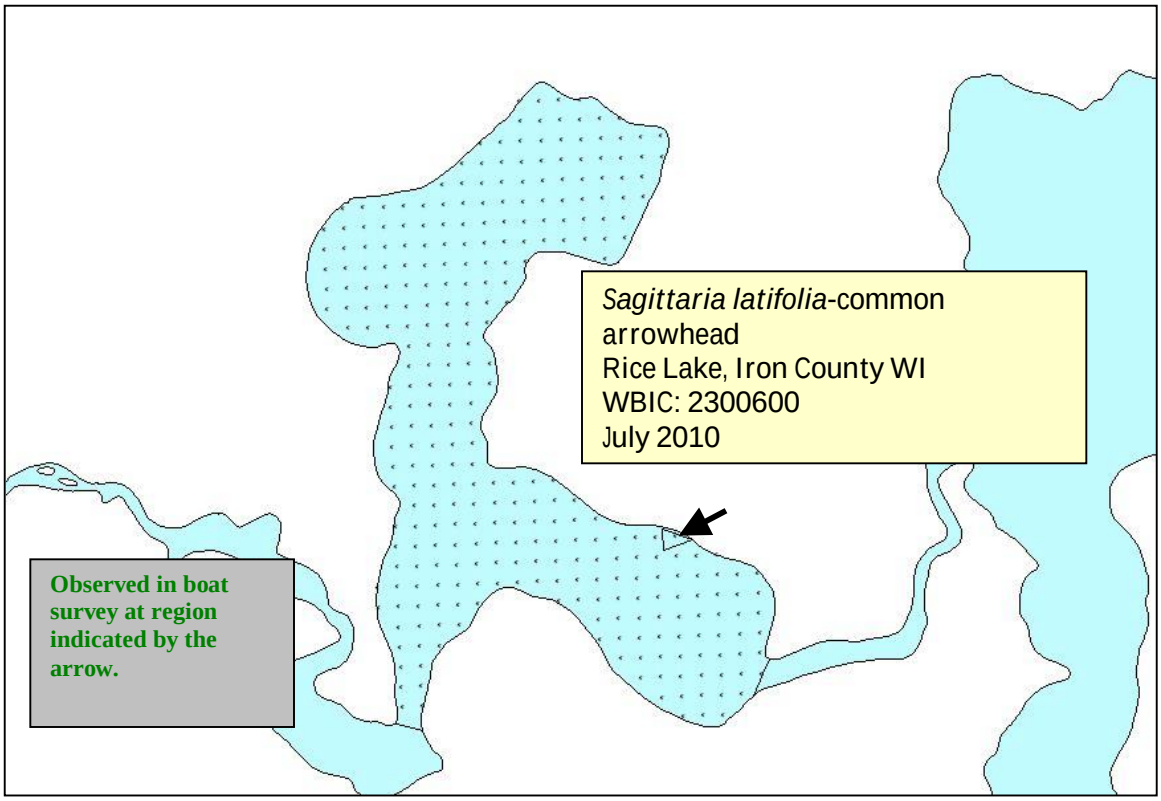

Potamogeton spirillus-spiral fruited pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

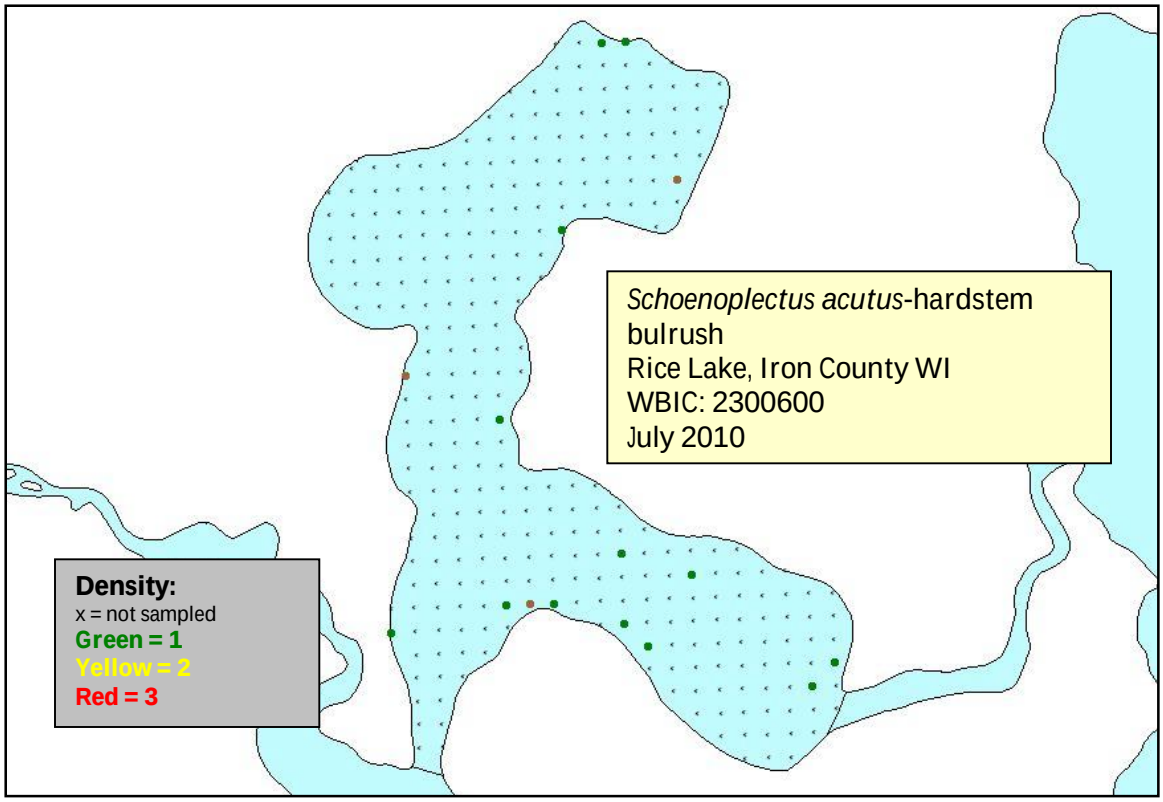

Potamogeton zosteriformis-flat-stem pondweed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

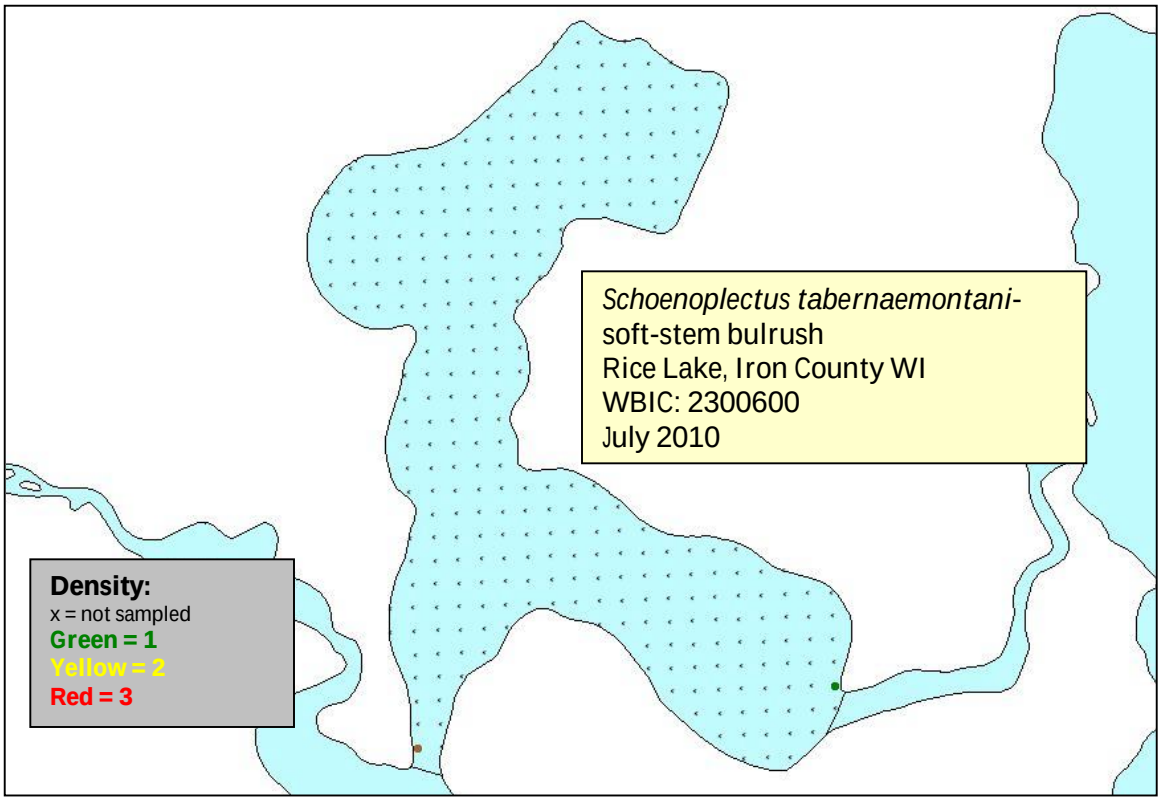

Ranunculus aquatilis-crowfoot
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

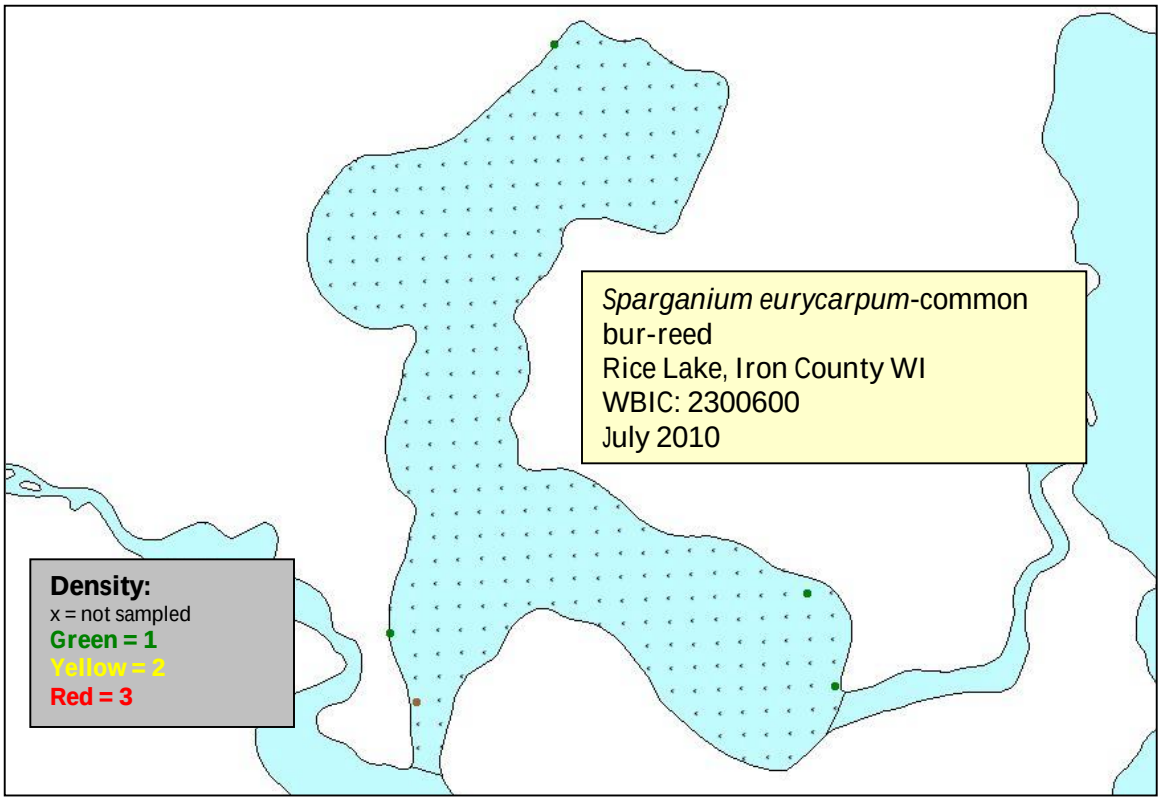

Rumex hydrolapathum-water dock
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Observed in boat survey at arrow in outlined area.

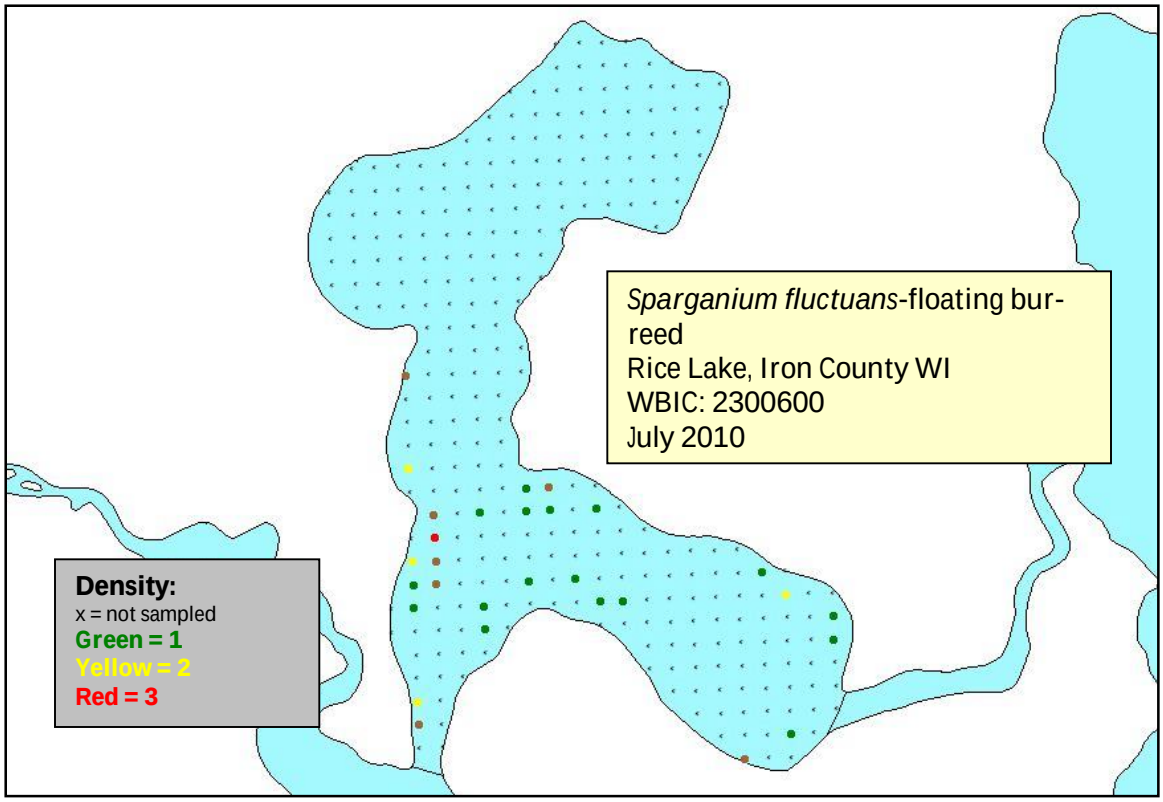

Sagittaria graminea-grass-leaved arrowhead
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

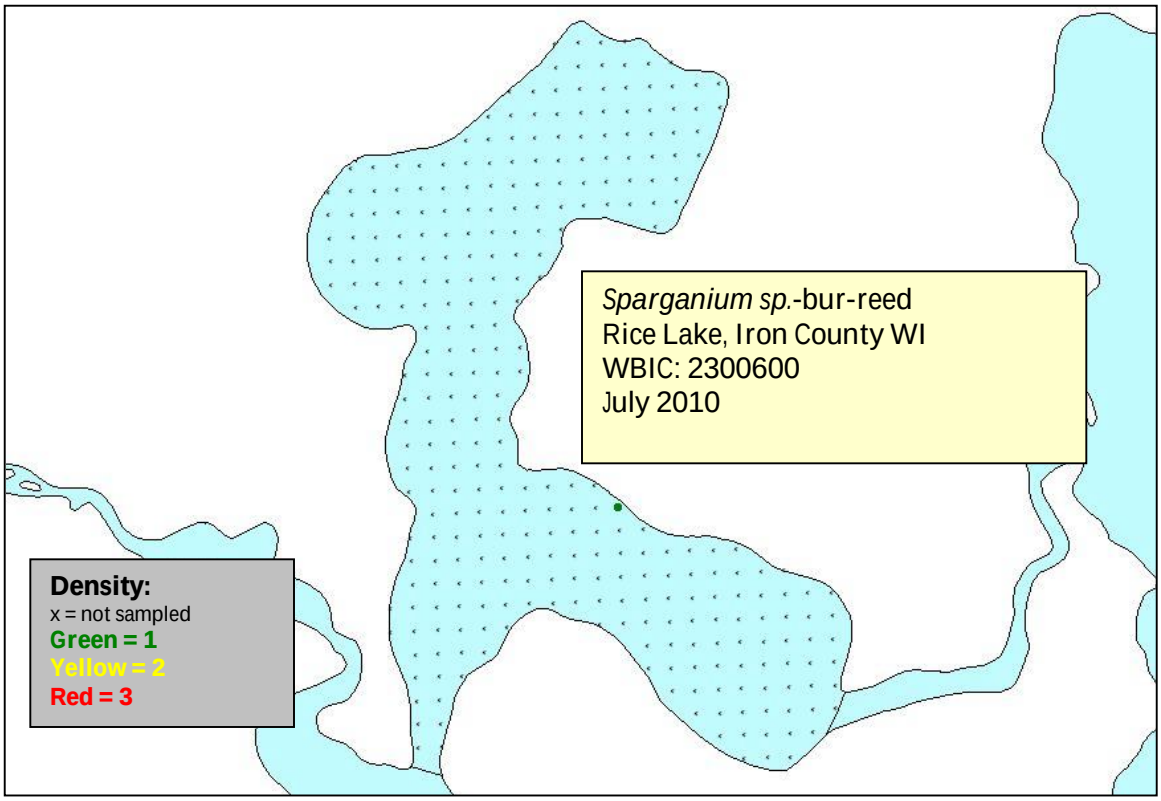

Sagittaria latifolia-common arrowhead
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Observed in boat survey at region indicated by the arrow.

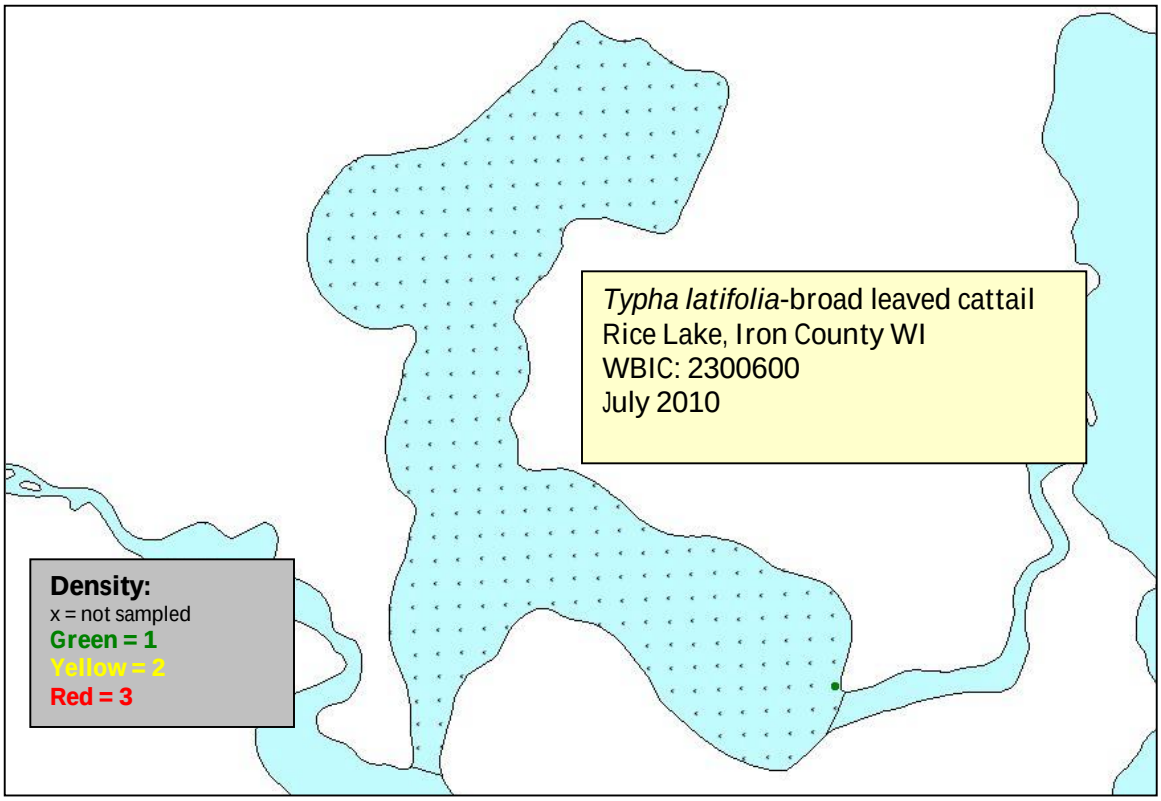

Schoenoplectus acutus-hardstem bulrush
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

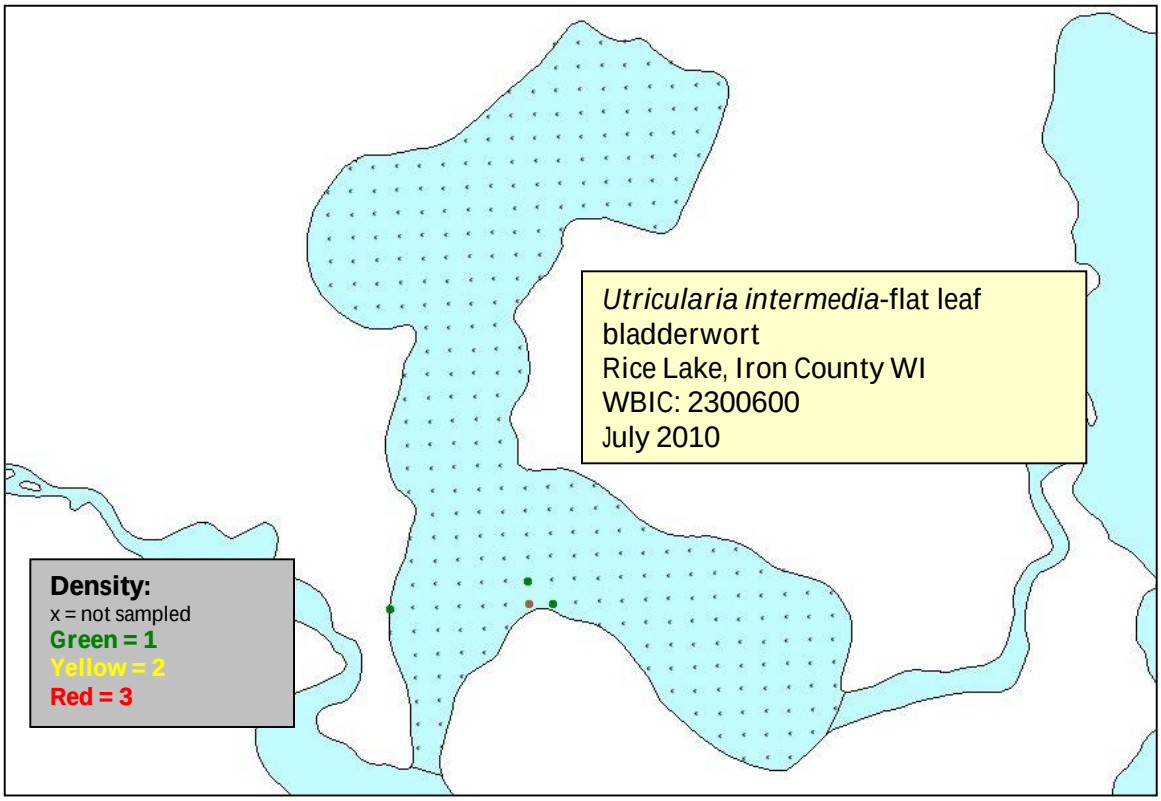

Schoenoplectus tabernaemontani-
soft-stem bulrush
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

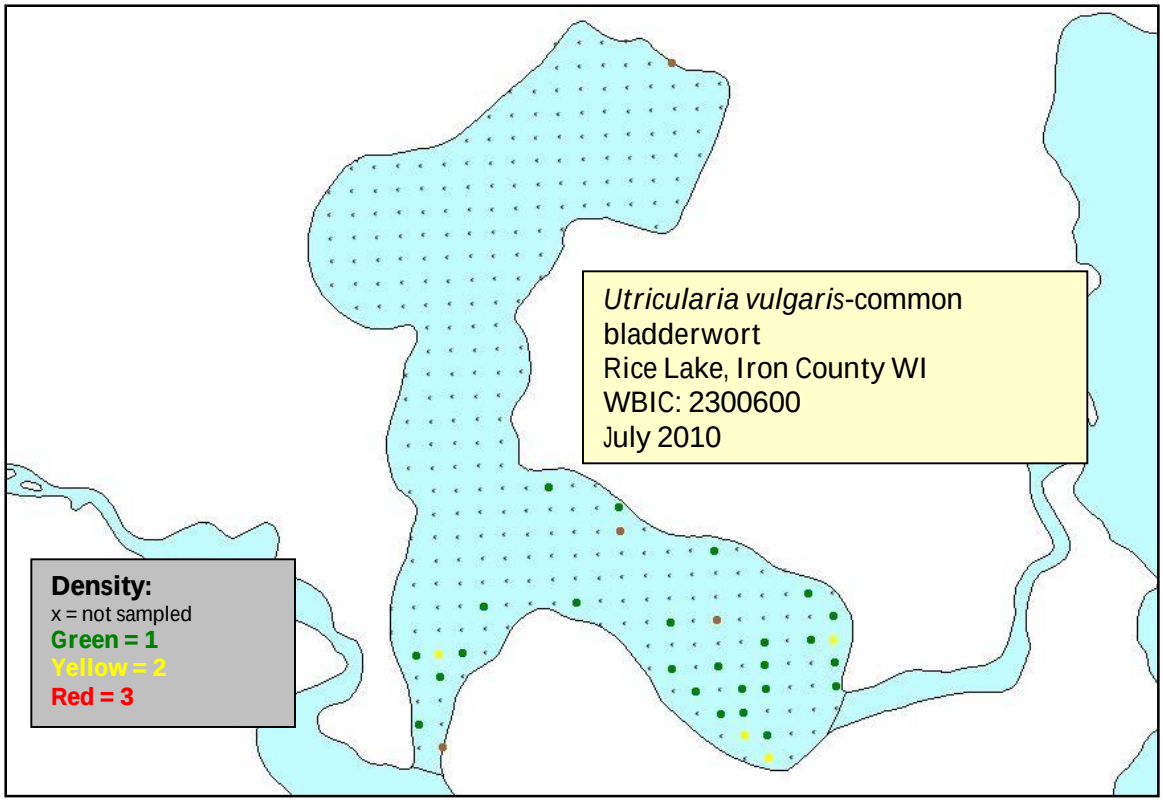

Sparganium eurycarpum-common bur-reed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3

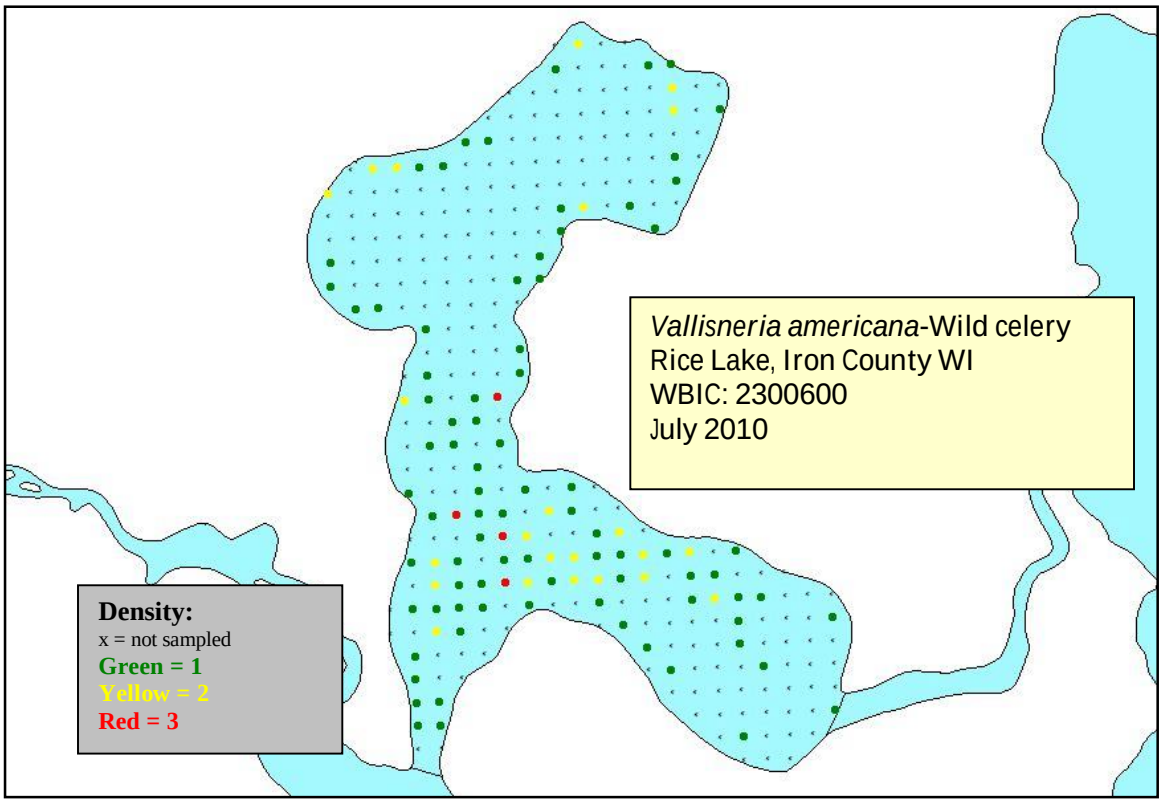

Sparganium fluctuans-floating bur-reed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Sparganium sp.-bur-reed
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Typha latifolia-broad leaved cattail
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Utricularia intermedia-flat leaf bladderwort
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Utricularia vulgaris-common bladderwort
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3


Vallisneria americana-Wild celery
Rice Lake, Iron County WI
WBIC: 2300600
July 2010
Density:
x = not sampled
Green = 1
Yellow = 2
Red = 3