Rice Lake Management Plan
November, 2020
Iron County, Wisconsin

Rice Lake Association, Inc.

Aquatic Invasive Species Committee

Mercer, WI 54547

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Introduction

This Management Plan is being developed for Rice Lake, Iron County Wisconsin. It presents data about the plant community, fisheries, watershed, and water quality of Rice Lake. Based on this data and public input, this plan provides goals as well as strategies for the sound management of the Lake and containment of Curly Leaf Pondweed. The plan reviews public input, summarizes data, discusses management options and alternatives, and recommends action items. This plan will guide the Rice Lake Association, Iron County, and the Wisconsin Department of Natural Resources in lake management over the next three years (2021-2023). After 2023, this plan will be evaluated and revamped as needed.

The key goal of the plan is to remove 70% of the Curly Leaf Pondweed on the lake while preserving native plants. The plan recommends accomplishing this goal by manual removal and Benthic barriers. The plan also recommends regular monitoring of aquatic invasive species, water quality, and the native plant community

Rice Lake, Iron County Wisconsin (WBIC: 2300600) is a 125 acre drainage lake (from Turtle River). It is located at T43 R3E Section 26 in Iron County Wisconsin. The mean depth is 8.4 ft. (maximum of 21 ft.), a littoral depth of 12.7 ft. and has a water volume of 1044 acre-feet. The lake has two inlet tributaries; Turtle River, which is the larger of the two, and Bear Creek.

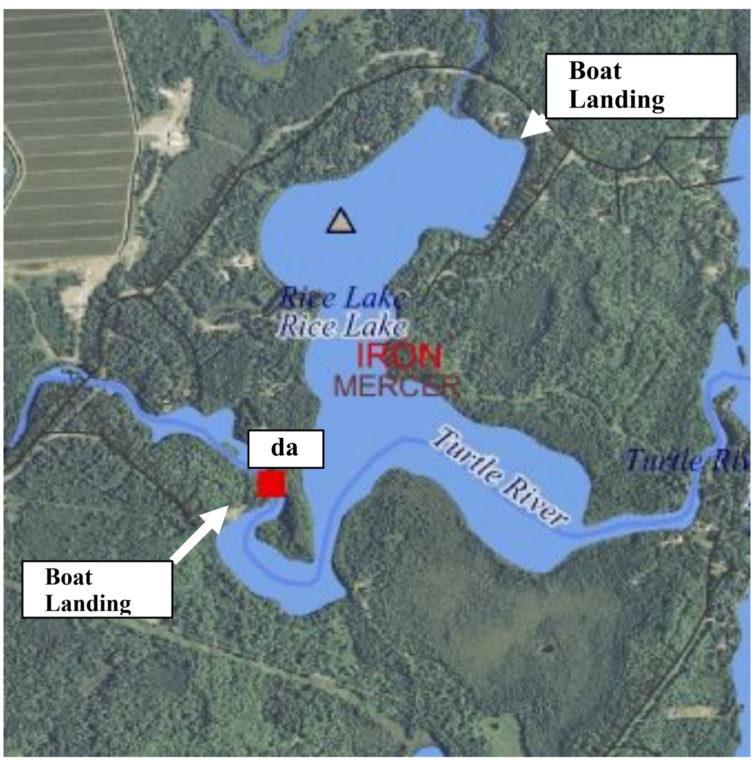


Figure 1: Aerial map of Rice Lake, Iron County indicating showing dam location and boat landing.

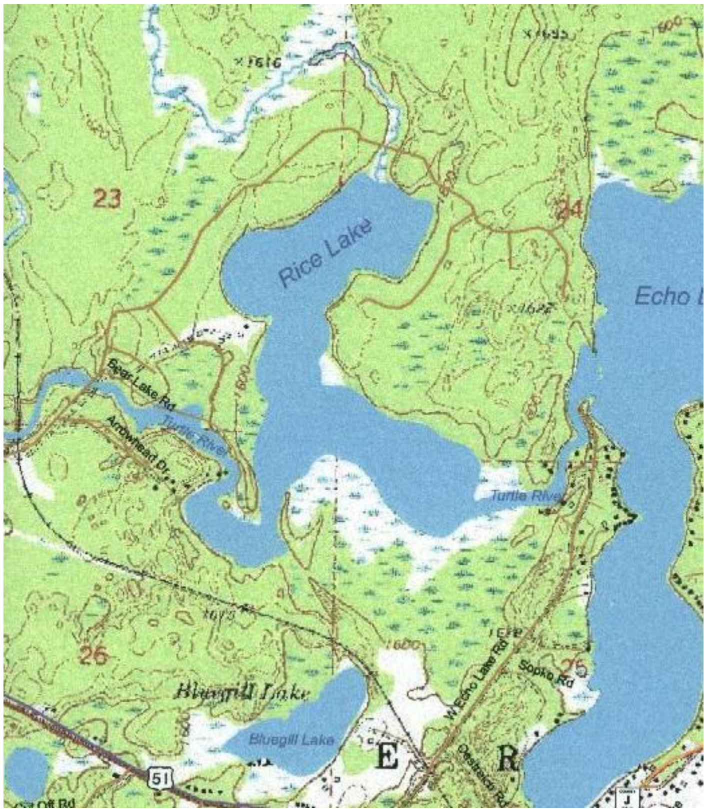


Figure 2: Topographical map showing Rice Lake, Iron County.

Public Involvement

During the fall of 2019, the Aquatic Invasive Species Committee was formed to give input for this management plan. The committee members are as follows:

Bob Kary
Bonnie Banaszak
Laurie Holquist
Jeanne Schoenhard
Patty Sehnoutka

Stakeholders

The current stakeholders in Rice Lake far exceed the lake's 20 Association members and 7 nonmember property owners, which include 3 undeveloped lots. The involvement includes

Rice Lake Association,
Rice Lake Aquatic Invasive Species Committee,
Pike Lake Association,
Lake of the Falls Association,
Turtle-Flambeau Flowage & Trude Lake Property Owners' Association,
Iron County Lakes & Rivers Alliance (ICLRA).

Ongoing Stakeholder Involvement

1998

Since 1998, Rice Lake Association members have attended Wisconsin Lakes Conventions, educated fellow association members on how to be wise riparian property managers, and completed water testing.

2003-2005

In 2003, under the guidance of the University of Wisconsin Cooperative Extension Service (UWEX), representatives from both the Rice Lake Association and the Echo Lake Association initiated a collaborative effort that resulted in the 2005 Rice Lake and Echo Lake Information Review and Management Plan, while under contract to White Water Associates, Inc. The Rice Lake Association realized over 15 years ago that the health and conservation of its lake and Echo Lake formed a natural alliance because of its Turtle River Connection. Both lake associations realized that other lakes fed by the Turtle River should, at some future date, be included in a more comprehensive review and management plan.

2010

In Fall 2010, the Rice Lake Association formed an Aquatic Plant Management Committee. The committee was instrumental in working with Steve Schieffer, Ecological Integrity Service, LLC to formulate its 2012 Aquatic Management Plan. Following the WDNR acceptance of the plan, the committee followed the plan's goals and objectives by implementing strategies that included educating the association members in important concepts of the functions of their lake ecosystem and each property owner's impact on the lake.

2012

With the aid of the WDNR's 2012 aquatic plant management funding, the members of the Aquatic Plant Committee offered a Clean Boats/Clean Waters Workshop and an on-the-water workshop for association members in identifying Curly-Leaf Pondweed and other Aquatic Invasive Species (AIS), along with other educational opportunities.

2013

In early July 2013, the AIS Curly-leaf pondweed was first identified in Rice Lake. On July 9, 2013, Iron County Conservationist Heather Palmquist reported the identification, along with her point-intercept survey of the discovery area to Kevin Gauthier, WDNR Water Management Specialist. At that point, the Aquatic Plant Committee became active in following the WDNR guidelines in dealing with the AIS infestation, aided by staff.

2014-Present

From 2014 to the present, numerous emails, teleconferences, and meetings have occurred among members of the Lake Association and Kevin Gauthier, WDNR Water Management Specialist, and Carol Warden, WDNR AIS Specialist, in addition to Heather Palmquist, Iron County Land and Water Department Head and Zach Wilson, Iron County Conservation Specialist. Zach also guided and worked alongside members of the association in addressing the AIS problem. The main purpose of these communications was to collaboratively strategize how to best approach the Curly-leaf Pondweed Invasion and get the necessary funding to do so.

2019

In June 2019, the Rice Lake Association hired the services of Aquatic Management, LLC to have professional crews spend 4 days both hand pulling the Curly-leaf Pondweed and using a DASH boat.

In August 2019, The Association officers and members of the Aquatic Invasive Species Committee summarized those results with Carol Warden and Kevin Gauthier.

Also in August, Zach Wilson notified the Rice Lake Association that the Curly-leaf Pondweed had traveled downstream and was found both in the Turtle River and in neighboring Pike Lake. It was apparent the group of stakeholders now had to include Turtle River and Pike Lake property owners. A Pike Lake Association had not yet been founded. Zach and Rice Lake Association President Bob Kary met with the Pike Lake property owners to inform them of the seriousness of a Curly-leaf Pondweed invasion and urged them to form a lake association, so they would be eligible to apply for WDNR grants to address the AIS in their lake before it became as pervasive as in Rice Lake. In addition, their efforts could stem the AIS from traveling further down the Turtle River to the Lake of the Falls and the Turtle Flambeau Flowage.

The Rice Lake Association officers had kept the Iron County Lakes and Rivers Alliance (ICLRA) notified of the cost, time, effort, and member involvement throughout their endeavors. Using this information, Dick Thiede of the Alliance consulted with George Meyer, WI Wildlife Federation Executive Director, regarding a watershed-based management plant to be presented to the WDNR. This umbrella management plan could significantly cut costs to individual lakes and allow for a greater team-based effort to address similar lake problems.

2020

In January, the ICLRA sponsored a Watershed-based Lake and River Management. ICLRA member and non-member lake associations, Iron County Officials, WDNR district staff, and other local stakeholders were invited. During the conference, WDNR staff Carrol Schall, Eric Olson, and Alison Mikulyuk explained the lake and river management assistance available from the WDNR. The last agenda item and discussion focused on a Turtle River Watershed Management Plan and, more pointedly, how to resolve the Rice Lake CLP problem.

In early June, the ICLRA assisted members of Rice Lake in a two-day "Plant Pull" of Curly-Leaf Pondweed on Rice Lake. During those same 2 days, the Iron County Land and Water took control of the Turtle River and Pike Lake hand pull. More than 35 volunteers joined in the project on Rice Lake. At the conclusion of the weekend's activities, Rice Lake representatives and the ICLRA evaluated the results of the pull and developed a plan for the next phase of the offensive against the AIS.

In March, Bob Kary, Rice Lake Association President worked with fellow-stakeholder Pike Lake to form a lake association. He also assisted them in writing a WDNR Rapid Response Grant Application.

RICE LAKE PROPERTY OWNERS SURVEY

In July 2020, a survey was sent to Rice Lake riparian property owners. The results will be included in the Updated Rice Lake Management Plan. Of the 20 surveys distributed, 18 were returned. 7 of the respondents are full-time residents and 11 are seasonal residents. 4 are non-association residents, and there are an additional 3 undeveloped lots on the lake. The 18 returned surveys resulted in a 90% response rate. Since a benchmark of a 60% response rate is required to make conclusions from a survey with statistical validity, Rice Lake is secure the results accurately portray the population's beliefs and attitudes.
The following is a summarized compilation of the questions and answers:

General Satisfaction

➢ In terms of what people valued most about their property, the following responses were received:

78% - Recreational use of the lake
71% - Scenic beauty of the lake and shoreline
35% - Undeveloped Northwood's character/solitude
29% - Natural beauty of the watershed and Property value as an investment
19% - Fishing
6% - Winter recreation and Entertaining

➢ Of those surveyed, 50% were "Not satisfied" with Rice Lake at this time; 17% were "Not at all satisfied." 22% were "Very satisfied" and 11% were "Neutral."

➢ In regard to how important recreational use of Rice Lake is to each respondent: 67% percent reported "Very important;" for 29% it is "Somewhat Important," and "Not Important" to 4%

➢ As far as recreational use, the following breakdown of responses was received:

83% - Canoeing, kayaking, rowing, or paddle boating
61% - Fishing from a boat
50% - Swimming
33% - Shore fishing
28% - Motor boating, Pontoon boating and Sailing or Paddle boarding
4% - Ice fishing and Viewing the lake from the shore

➢ Of those surveyed, 44% of the respondents believe Recreational Use of Rice Lake has become "Less Frequent;" 44% believe it is "About the same;" 12% believe it is a "Little more or Much more frequent."

Water Quality

➢ 100% of the respondents felt the current quality of water in Rice Lake was "Very Important to them," and 89% believed the current quality of the water either "Greatly Diminishes" or "Diminishes" their use and enjoyment of the lake.

Invasive Species

➢ 88% felt the issue of exotic species in Rice Lake was "Very Important to them" while 12% felt it was" Somewhat Important."

➢ In terms of noticing curly-leaf pondweed in the lake over the last several years, 67% stated "Yes, very much" while 23% stated "Yes, to a limited degree." 0% replied "Not at all." Areas of infestation noted were predominantly around the small island, in the east entrance and the south exit of the Turtle River's flow through the lake, around the island, and the rock pile where the loons annually nest. Other sightings noted were along the shorelines, around private docks, and the area around the resort.

➢ Of those surveyed, 88% would support further efforts to improve the education and awareness of the negative impact of the Invasive Species on the Rice Lake and in the Watershed. 12% were "Unsure."

➢ In terms of attempting further efforts to eradicate Curly-leaf Pondweed on Rice Lake, 94% stated "Yes" and 6% were "Unsure."

Vision for the Future

➢ In citing the respondents top 3 concerns for Rice Lake, 94% noted the "Introduction of Curly-leaf Pondweed and other Invasive Species," 88% believed "Excessive Overall aquatic plant growth," 56% felt "Water quality degradation" and 44% of respondents noted "Algae Blooms."

As far as which Management and Education activities respondents would support, the following were received:

94% - Chemically treating Curly-leaf Pondweed, where and as needed
83% - Information posted at the resort regarding Exotic Species
78% - Hand-pulling or suctioning of Curly-leaf Pondweed, where and as needed
56% - Education regarding steps that individual property owners can take to reduce water pollution

Yourself

➢ Based upon the survey, the following was learned about the property owners who use and care for Rice Lake regarding the length of their ownership of their lake property

50% - for over 20 years
33% - 11-20 years
17% - from 1 – 10 years

Additional Comments

The additional comments received focused on the Curly-leaf Pondweed and the overabundance of all aquatic plants in Rice Lake.

"This lake is turning into a swamp eliminating virtually all recreation…"

"The weed problem is so bad that, I feel, the only way to eradicate (it) is through chemical application."

"If we cannot get the help needed from the state on this issue (Curly-leaf Pondweed), including strong consideration of using herbicides to control massive amounts of (the) invasive, it is apparent that…. The down river lakes will be next with the eventual catastrophe of reaching the Flambeau Flowage."

SUMMARY

Based upon the results of the survey, the length of ownership of the 24 riparian property owners on Rice Lake spans from 1 to over 20 years. They range from 50% for ownerships over 20 years, 33% for those from 11-20 years and 17% from 10 years or under. The majority of the respondents are seasonal owners (65%) and (35%) are full-time residents.

Most of the property owners highly value the recreational use of the lake (78%) and the scenic beauty of the lake and shoreline (71%).

67% of the respondents are not satisfied or not at all satisfied with Rice Lake currently. Those concerns range from the 89% who believe the current water quality diminishes their use and enjoyment of the lake to the 89% who believe the issue of Curly-leaf Pondweed in the lake is very important. 94% of the property owners strongly support further efforts to improve the education and awareness of the negative impact of the Invasive Species on Rice Lake and the Watershed. And that same majority (94%) emphasizes the need to attempt further efforts to eradicate Curly-leaf Pondweed on the lake. The breakdown of the proposed efforts to address the Invasive species ranges from 94% who support chemical treatment, where and as needed, to 76% to espouse hand pulling and suctioning, where and as needed. 83% of the respondents believe educational information about the Invasive Species needs to be posted at the only resort on the Turtle River section of Rice Lake.

The Rice Lake riparian property managers clearly enjoy the lake for its natural beauty and the recreational opportunities it offers. They are distressed by the diminishment of the water quality and the appearance and proliferation of the Invasive Curly-leaf Pondweed on the lake. The respondents are looking at several ways to address these problems. Since one-half of the residents have owned their property over 20 years, they have already been involved in the past Rice Lake management plans to improve and enhance the ecosystem, including participating in numerous workshops and training sessions. They can add insight and experience to a collaborative implementation of strategies with the new riparian property owners for a vision and action plan for the future health and conservation of Rice Lake and the Watershed.

Importance of Aquatic Plants

The lake ecosystem relies extensively on the littoral zone, which is the area of the lake where the water is shallow enough to hold plants. As a result, the aquatic plant community plays a very important role in maintaining a healthy lake ecosystem.

Emergent plants (the ones sticking above the water surface) can help filter runoff that enters the lake from the watershed area. Their extensive root networks can stabilize sediments on the lake bottom. Wave energy can be reduced by emergent plants, thus reducing shoreline erosion. Many of these beds provide important fish habitat and spawning areas, as well as key wildlife habitat. Many birds, waterfowl, and some mammals rely on these plants for nesting materials as well as food.

Floating-leaf plants such as water lily provide shade and cover for invertebrates and fish. Although they appear thick on the surface, the underwater area beneath them is more open. This allows fish and other animals to move about hidden by the leaves above.

Submerged plants provide many benefits to the lake ecosystem. These plants are nature's aerators, producing the essential oxygen byproduct from photosynthesis. Submersed plants absorb nutrients through their roots and in some cases through their leaves, decreasing the nutrients that would otherwise be available for nuisance algae growth. Roots stabilize bottom sediments thus reducing re-suspended sediments. As a result, these plants help maintain water clarity. Since Rice Lake has had consistent phosphorus readings at or above the eutrophic threshold, aquatic plants can be an integral part of maintaining water quality in Rice Lake.

Aquatic plants take on many shapes and sizes and provide excellent habitat. Many of the plants, such as the milfoils or water marigold, have fine leaves that provide key invertebrate habitat. These invertebrates comprise a very important level in the food chain and result in excellent forage opportunities for fish. Other plants are adapted to grow in low nutrient substrates such as sand and gravel. These plants maintain important fish and wildlife cover for areas that would otherwise be devoid of plants.

Many fish rely on aquatic plants for reproduction. *Esox sp.* often spawn amongst submergent plants. The Northern Pike even has eggs that are adapted for attachment to the plants themselves. Once fish emerge from their eggs, the plants provide important cover and foraging areas. Muskellunge are present in Rice Lake and are stated to have natural reproduction occurring. This species relies on vegetation cover for successful reproduction.

Lake Information

This section of the Management Plan will give an overview of the various characteristics and information about Rice Lake. These include: Fisheries, water quality data, watershed information, critical habitat and endangered/threatened species present.

Fisheries

The amount of fish data about Rice Lake is quite limited. The most recent electrofishing survey was conducted on June 10, 2013. The Mercer DNR Fisheries Management Team conducted the survey. The entire shoreline (3.5 miles) of the lake was surveyed for the purpose of obtaining representative samples of bass and panfish populations. Temperatures during the survey were in the upper 60s and weather conditions were calm.

The Wisconsin Department of Natural Resources team provided the following data from the survey.

Species	Number Captured	Size Range (in)
Largemouth Bass	11	6-15
Walleye	2	14.5-20.5
Muskellunge	3	16-24.9
Northern Pike	9	16.5-23.9
Black Crappie	7	3-9.2
Rock Bass	2	3.8-4.1
Bluegill	>200	<3-7
Pumpkinseed	53	<3-6
Yellow Perch	82	<3-7

The following comments were presented based upon this survey:

- Largemouth bass were captured at a low rate of 3 per mile. The size structure of the population was considered good, although it is indicative of a population experiencing low levels of recruitment. No smallmouth bass were captured or seen during the survey.

- Bluegill >3 inches were captured at a high rate of 171 per mile. The size structure of the population was very poor, with no fish being of preferred size to anglers. The capture rate and size structure were indicative of an overabundant population. The size structure of the population was also very poor for pumpkinseed and yellow perch.

- ➢ The survey also captured shorthead redhorse, white sucker, golden and common shiners and central mudminnow.

The survey concluded that the Rice Lake fish community exhibited characteristics of a fishery in which apex predator populations (e.g. largemouth bass) are at insufficient levels to effectively control the overabundant prey population (e.g. bluegill). As a result, bluegill and other pan fish species' growth and size are negatively affected as they compete with each other for limited space and food resources. In order to help rectify this problem, anglers are encouraged to release all predatory game fish species to promote predation on young pan fishes. Lowered abundances of pan fish may promote increased pan fish growth as a result of decreased competition for available resources.

Watershed

It does not appear as though the watershed of Rice Lake has been delineated professionally. There are rather "coarse" maps of land use around the lake, but lack any area coverage or export data in relationship to nutrient contributions. However, nearly all of the land that appears to be in the watershed of Rice Lake is forested or wetland. In addition the topography is a gentle slope with only one area with a greater than 20% slope. There is very little impervious surface around Rice Lake with limited roads and development. The north end of Rice Lake contains the most amount of human development, which can increase the nutrient loading from the woodland that surrounds the lake.

Since Turtle Creek is an inlet, the greater watershed of Rice Lake is very large. The land use practices around Turtle Creek could ultimately affect Rice Lake. Bear Creek further increases the watershed area. Within the Bear Creek watershed is a cranberry production operation. Cranberry production uses phosphorus and nitrogen in growing of cranberries. This water is then released during harvest and could cause nutrient loading into Bear Creek and then into Rice Lake.

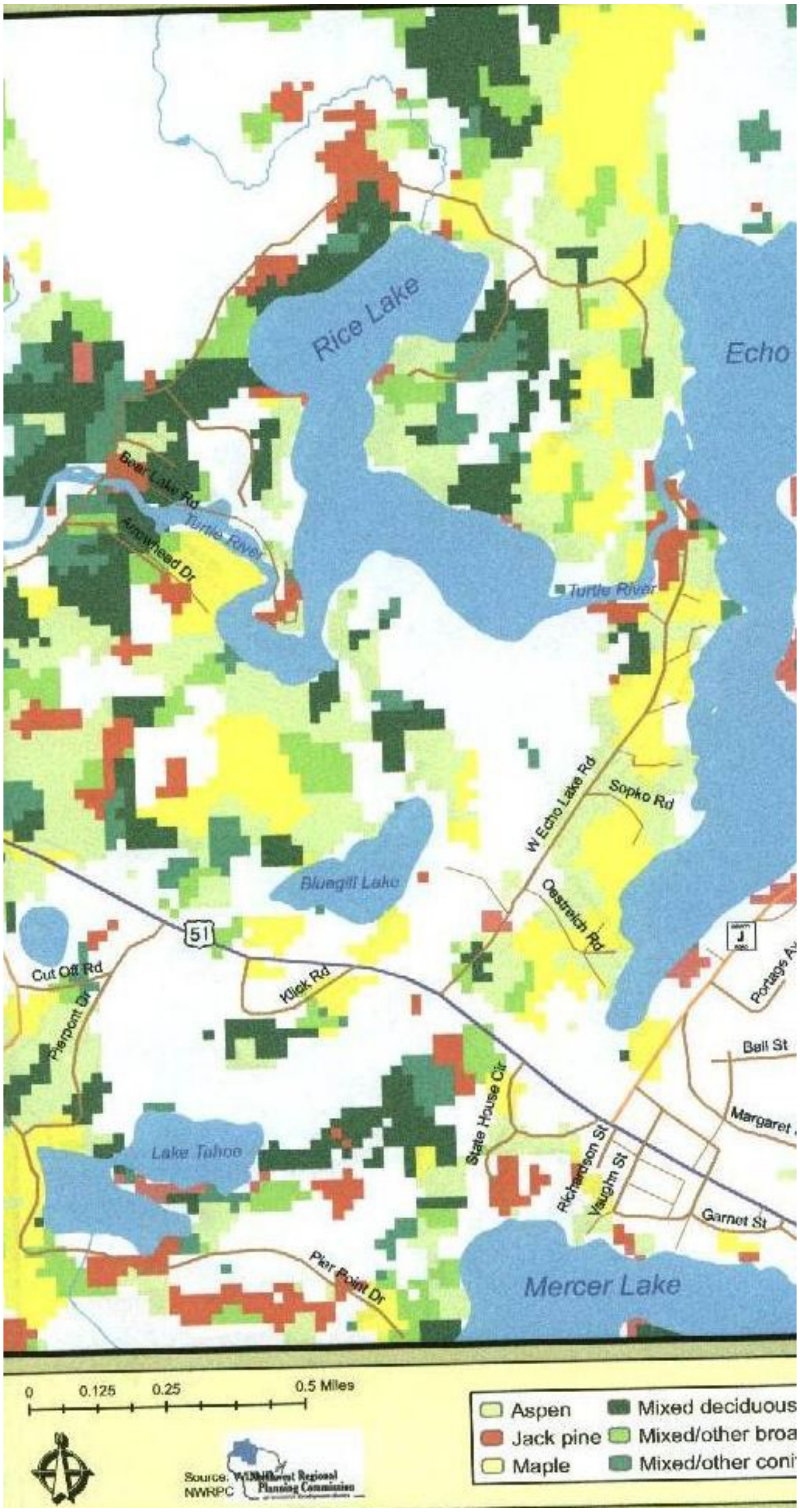


Figure 3: Forest cover type around Rice Lake

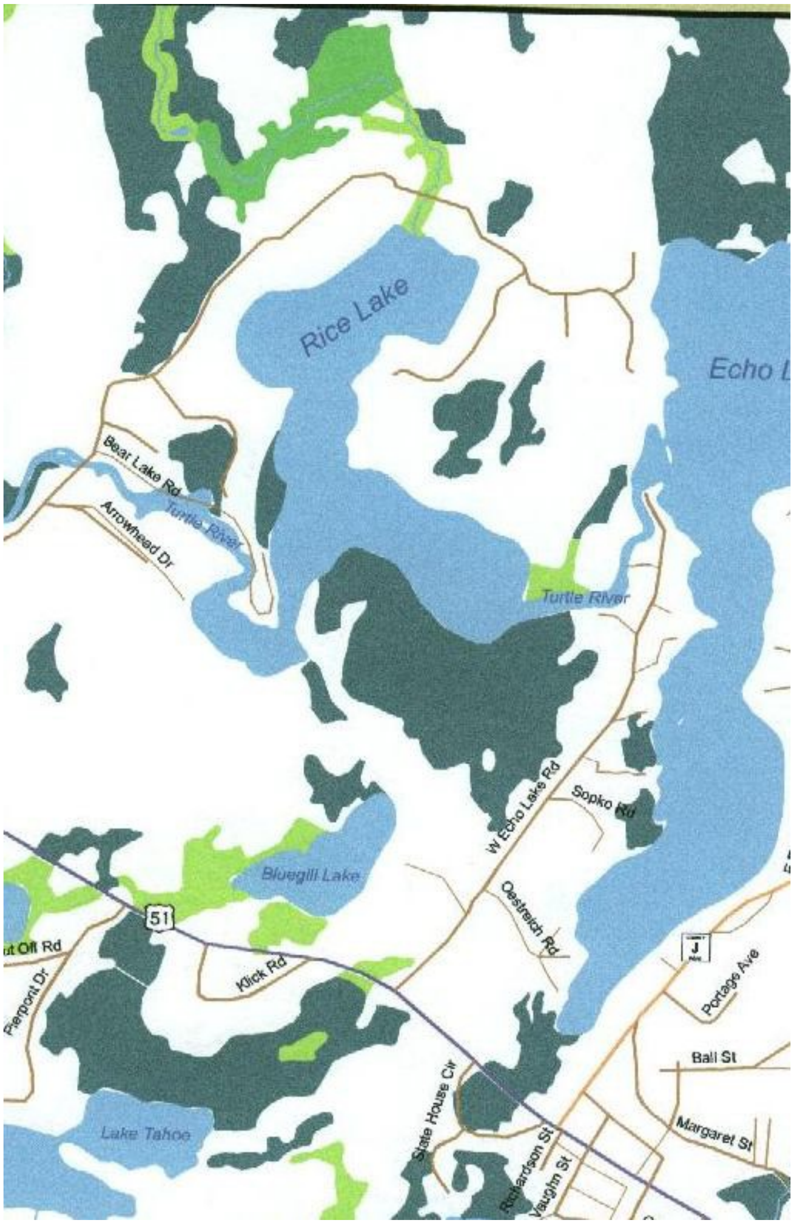


Figure 4: Wetland areas around Rice Lake

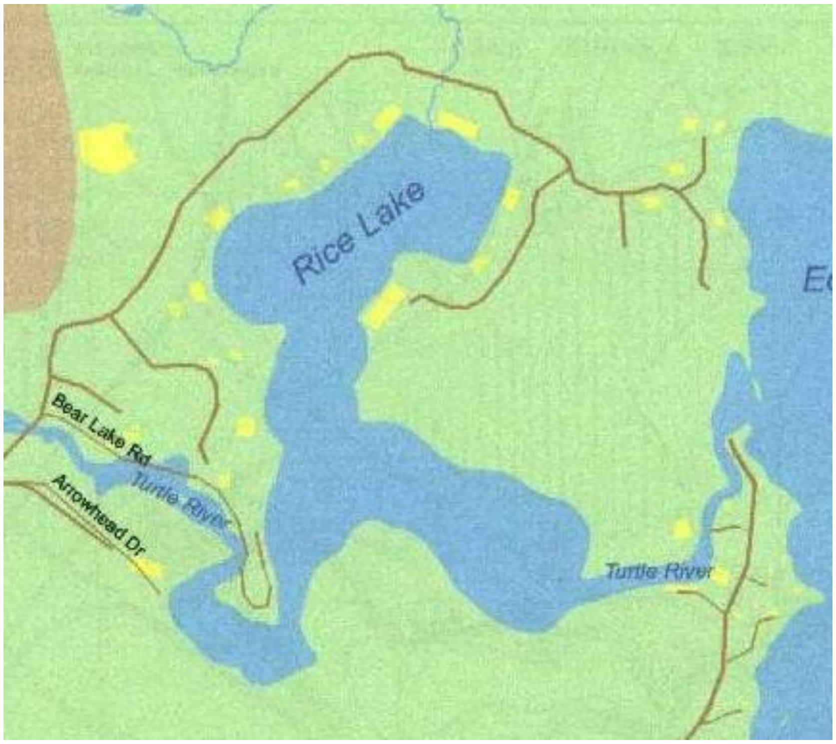


Figure 5: The yellow areas are residential/developed areas around Rice Lake.

Water Quality

Regular data on water quality for Rice Lake (43 03e 23) Deep Hole has been recorded since 2009. The figure below shows data from 2009 through 2020. The data originated from Lake Water Quality Annual Reports provided by the Wisconsin Department of Natural Resources. The readings were taken the third week in July for all years except 2015 and 2017 when data was not available so the third week in August was used.

Figure 6: Rice Lake Water Quality Data 2009-2020.

TSI values	2009	2010	2011	2012	2013	2014	2015*	2016	2017*	2018	2019	2020
Secchi	49.6	53	54	54	56	56	55	61	52	53	53	56
Total Phosph	na	54	52	52	55	52	54	55	53	50	51	52
Chlorophyll-A	na	57	50	50	53	53	56	59	56	52	52	54
Other Measures												
Phosphorus ug/l	na	27	23	23	33.8	25.6	29.5	30.6	24.3	16.5	20.1	22.5
Chlorophyll ug/l	na	18.3	7.9	7.7	10.9	17.6	16.9	23.5	16.9	9.6	9.51	13.3
Secchi(ft)	5.5	5.5	5	5	4.25	4.25	4.6	3	5.6	5.3	5.3	4.3

The figure shows fairly consistent readings over the period, although high phosphorus levels were recorded from 2013 to 2016. Chlorophyll was also high in 2016 and the Secchi disk reading for that year was very low at 3 feet. All readings normalized after 2016.

The 2020 Lake Narrative Report for Rice Lake (43 03e 23) Deep Hole provided by the Wisconsin Department of Natural Resources summarized current water quality conditions of the lake. According to the report:

- The average summer (July-Aug) Secchi disk reading for Rice Lake was 4.8 feet. The average for the Northwest Georegion was 9.7 feet. Typically, the summer (July–Aug) water was reported as clear and brown. This suggests that the Secchi depth may have been mostly impacted by tannins, stain from decaying matter. Tannins are natural and not a result of pollution. Tannins can be distinguished from suspending sediment because the water, even though it is brown, looks clear, like tea. Though tannins are not harmful per se, they are often not perceived as aesthetically pleasing as clear water. Tannins can also be important for decreasing light perpetration in the water and decreasing algal growth.

- The average summer chlorophyll was 13.3ug/l, compared to a Northwest Georegion summer average of 12.5ug/l.

- ➢ The summer total <u>phosphorus</u> average was 22.5ug/l. Lakes that have more than 20ug/l and impoundments that have more that 30ug/l of total phosphorus may experience noticeable algae blooms.
- ➢ The overall <u>Trophic State Index</u> (based on chlorophyll) for Rice Lake was 54. The TSI suggests that Rice Lake is **<u>eutrophic</u>**. This TSI usually suggests decreased clarity, fewer algal species, oxygen-depleted bottom waters during the summer, plant overgrowth evident and warm-water fisheries (pike, perch, bass, etc.) only.

Endangered, Threatened Species of Concern

According to the Wisconsin Natural History Inventory (NHI)[1], Township 43 North Range 3E (location of Rice Lake), have had the following species identified as observed in this range (not necessarily located in and immediately around Rice Lake):

Aeshna clepsydra Mottled darner (dragonfly)-species of special concern
Canis lupus Gray Wolf-species of special concern
Cygnus buccinator Trumpeter Swan-species of special concern
Falcipennis canadensis Spruce Grouse-threatened
Haliaeetus leucocephalus Bald Eagle-species of special concern
Martes Americana American marten-endangered

Although some very sensitive plants were sampled in the point intercept survey, no endangered, threatened, or species of special concern were sampled or observed. In an earlier lake management plan, the entity completing the study mentioned that *Potamogeton vaseyii* (Vasey's pondweed), which is a species of special concern, was observed. No details were provided other than stating no formal survey was conducted and that the plant was just "seen." This species was not sampled or viewed in the point intercept survey. Although it is possible this plant is in Rice Lake, it has never been vouchered (collected and preserved for verification).

A sensitive habitat survey has not been conducted on Rice Lake at this writing. This could be considered for future practices in Rice Lake.

Human use of aquatic resource

As of 2020, there were 22 residences, seven of which were full-time residences. Rice Lake is classified as a Class 2 lake, based upon its size. There is a possibility of old and possibly faulty (failing) septic systems which could affect water quality and lake health (as may be the case with any lake). There is a commercial cranberry production operation along Bear Creek and effluent from that operation could enter Rice Lake by way of Bear Creek. Cranberry production operations may use large amounts of phosphorus for production, which could increase the nutrient loading into Rice Lake, thus adding to productivity in the form of more macrophyte growth.
We have considered for years that the presence of the cranberry operation could have contributed to the overabundance of plants in rice lake.
We have been discouraged from doing a phosphorus study at the inlet of bear creek because common knowledge is that the state protects cranberry operations and our findings would not lead to any positive outcome.
In spite of that, we feel compelled to revisit the issue in an attempt to determine if there is any evidence of excessive phosphorus and if so, offer our report to Wisconsin DNR officials. This action is included in our implementation plan on page 55

Plant Community

In June of 2020 a point intercept survey was conducted on Rice Lake. The survey involved sampling plants at each of 279 pre-determined sample points. Each species on the rake was given a density rating from 1-3.

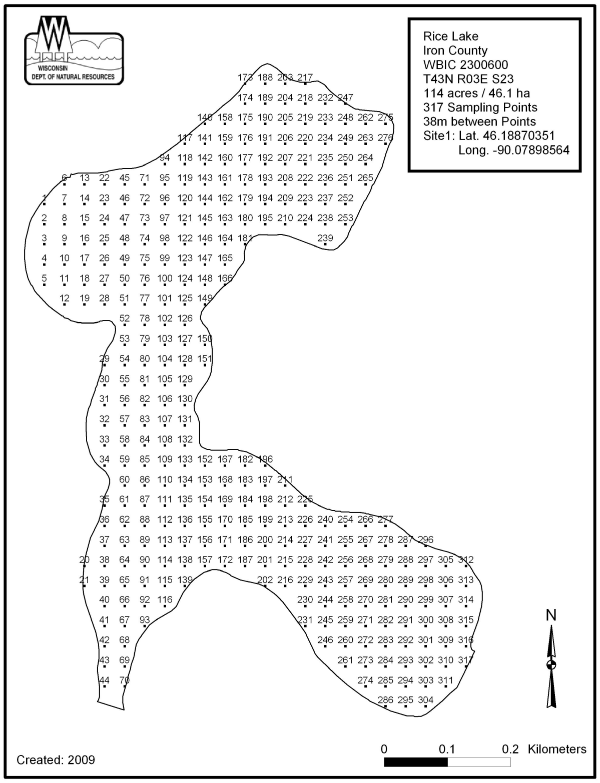


Figure 7: Map of point intercept sampling grid.

There were 279 sample points for aquatic macrophytes in Rice Lake. There were 187 sites with vegetation sampled or 84%. The greatest depth plants were sampled was 12.7 feet. This is relatively shallow for the deepest growth of plants, but is probably due to the dark brown color of the water (from tannins). There were 266 sample sites with vegetation that were shallower than 12.7 feet, which calculates to 91% of the littoral zone (depth where plants can grow) with plant growth.

Table #1 below details all of the data gathered in the Point Intercept survey done by Carol Warden of the Trout Lake Station in Boulder Junction.
Note the statistics of Potamogeton Crispus(Curly Leaf Pondweed) showing high frequency rates.
All of the data presented from here to page 34 is a result of the Survey conducted by DNR representative Carol Warden from the Trout Lake Station.
Although the aquatic plants are diverse, the data confirmed the abundance of Curly Leaf Pondweed in Rice lake and further supports the needs for aggressive action over the next three years to control its spread!

Table 1: Point intercept survey statistics summary

STATS		Frequency of occurrence within vegetated areas (%)	Frequency of occurrence at sites shallower than maximum depth of plants	**Relative Frequency (%)**	Relative Frequency (squared)	**Number of sites where species found**	**Average Rake Fullness**	**#visual sightings**	**present (visual or collected)**
Lake	Rice								
County	Iron								
WBIC	2300600								
Survey date	June 1-3 2020								
INDIVIDUAL SPECIES STATS:									
Total vegetation					0.08		1.57		
Potamogeton crispus,Curly-leaf pondweed		25.13	17.67	8.7	0.01	47	1.28	7	present
Bidens beckii (formerly Megalodonta), Water marigold		9.63	6.77	3.3	0.00	18	1.00	2	present
Brasenia schreberi, Watershield		3.21	2.26	1.1	0.00	6	1.00	25	present
Ceratophyllum demersum, Coontail		32.09	22.56	11.1	0.01	60	1.18	2	present
Chara sp., Muskgrasses		2.67	1.88	0.9	0.00	5	1.00		present
Dulichium arundinaceum, Three-way sedge		0.53	0.38	0.2	0.00	1	1.00	1	present
Eleocharis acicularis, Needle spikerush		1.60	1.13	0.6	0.00	3	1.00	1	present
Eleocharis palustris, Creeping spikerush								5	present
Elodea canadensis, Common waterweed		24.06	16.92	8.3	0.01	45	1.13		present

Equisetum fluviatile, Water horsetail		2.67	1.88	0.9	0.00	5	1.00	6	present
Heteranthera dubia, Water star-grass		18.18	12.78	6.3	0.00	34	1.00	2	present
Lemna minor, Small duckweed		0.53	0.38	0.2	0.00	1	1.00		present
Myriophyllum heterophyllum, Various-leaved water-milfoil		17.65	12.41	6.1	0.00	33	1.03	3	present
Myriophyllum sibiricum, Northern water-milfoil		10.16	7.14	3.5	0.00	19	1.05	3	present
Nuphar variegata, Spatterdock		1.60	1.13	0.6	0.00	3	1.67	22	present
Nymphaea odorata, White water lily		17.11	12.03	5.9	0.00	32	1.19	92	present
Pontederia cordata, Pickerelweed		2.67	1.88	0.9	0.00	5	1.00	29	present
Potamogeton amplifolius, Large-leaf pondweed		4.81	3.38	1.7	0.00	9	1.00	13	present
Potamogeton epihydrus, Ribbon-leaf pondweed		1.07	0.75	0.4	0.00	2	1.00		present
Potamogeton gramineus, Variable pondweed								2	present
Potamogeton praelongus, White-stem pondweed		1.60	1.13	0.6	0.00	3	1.33	23	present
Potamogeton pusillus, Small pondweed		0.53	0.38	0.2	0.00	1	1.00		present
Potamogeton richardsonii, Clasping-leaf pondweed		1.07	0.75	0.4	0.00	2	1.00	8	present
Potamogeton robbinsii, Fern pondweed		35.83	25.19	12.4	0.02	67	1.48		present
Potamogeton spirillus, Spiral-fruited pondweed		2.14	1.50	0.7	0.00	4	1.25		present
Potamogeton zosteriformis, Flat-stem pondweed		7.49	5.26	2.6	0.00	14	1.00	5	present
Ranunculus aquatilis, White water crowfoot		1.07	0.75	0.4	0.00	2	1.00		present
Schoenoplectus acutus, Hardstem bulrush								8	present
Sparganium sp., Bur-reed		34.22	24.06	11.9	0.01	64	1.00	12	present

Utricularia intermedia, Flat-leaf bladderwort		0.53	0.38	0.2	0.00	1	1.00		present
Utricularia vulgaris, Common bladderwort		27.81	19.55	9.6	0.01	52	1.19	4	present
Aquatic moss		2.67	1.88			5	1.00	1	present
Freshwater sponge		11.76	8.27			22	1.00		present
Filamentous algae		2.67	1.88			5	1.00		present
Leersia sp.								4	present
Hypericum		0.53	0.38	0.2	0.00	1	1.00	1	present
Carex sp.								3	present

SUMMARY STATS:	
Total number of sites visited	279
Total number of sites with vegetation	187
Total number of sites shallower than maximum depth of plants	266
Frequency of occurrence at sites shallower than maximum depth of plants	70.30
Simpson Diversity Index	0.92
Maximum depth of plants (ft)**	10.00
Number of sites sampled using rake on Rope (R)	4
Number of sites sampled using rake on Pole (P)	275
Average number of all species per site (shallower than max depth)	2.02
Average number of all species per site (veg. sites only)	2.88
Average number of native species per site (shallower than max depth)	1.85
Average number of native species per site (veg. sites only)	2.70
Species Richness	29
Species Richness (including visuals)	34

Table 2: Criteria for rake fullness

	Criteria for rake fullness rating
1	Plant present, occupies less than ½ of tine space
2	Plant present, occupies more than ½ tine space
3	Plant present, occupies all or more than tine space
v	Plant not sampled but observed within 6 feet of boat

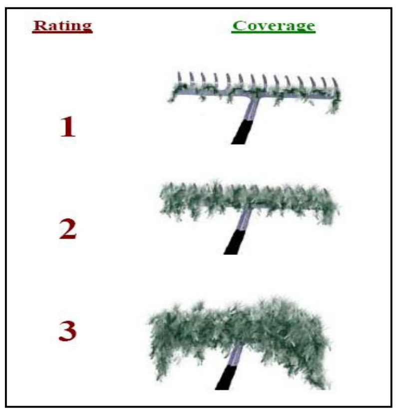


Table 3: FQI Stats

Species	Freq	Freq littoral	Relative freq	sampled	mean density	visuals
Potamogeton robbinsii, Fern pondweed	45.49	41.43	10.63	116	1.53	2
Vallisneria americana, Wild celery	42.75	38.93	9.99	109	1.28	5
Ceratophyllum demersum, Coontail	40.78	37.14	9.50	104	1.40	4
Bidens beckii (formerly Megalodonta), Water marigold	32.55	29.64	7.61	83	1.20	26
Myriophyllum sibiricum, Northern water-milfoil	31.37	28.57	7.33	80	1.16	13
Elodea canadensis, Common waterweed	28.24	25.71	6.60	72	1.13	4
Potamogeton zosteriformis, Flat-stem pondweed	28.24	25.71	6.60	72	1.13	5
Potamogeton amplifolius, Large-leaf pondweed	27.06	24.64	6.30	69	1.23	17
Nymphaea odorata, White water lily	20.00	18.21	4.67	51	1.06	23
Potamogeton richardsonii, Clasping-leaf pondweed	16.86	15.36	3.94	43	1.07	18
Brasenia schreberi, Watershield	16.47	15.00	3.85	42	1.05	24
Heteranthera dubia, Water star-grass	12.55	11.43	2.93	32	1.09	9
Utricularia vulgaris, Common bladderwort	11.37	10.36	2.66	29	1.14	4
Potamogeton pusillus, Small pondweed	10.20	9.29	2.38	26	1.12	2
Elodea nuttallii, Slender waterweed	8.63	7.86	2.02	22	1.05	
Sparganium fluctuans, Floating-leaf bur-reed	8.63	7.86	2.02	22	1.27	7
Potamogeton praelongus, White-stem pondweed	5.88	5.36	1.40	15	1.07	5
Schoenoplectus acutus, Hardstem bulrush	5.10	4.64	1.19	13	1.00	3
Myriophyllum alterniflorum, Alternate-flowered water-milfoil	4.71	4.29	1.10	12	1.42	2
Pontederia cordata, Pickerelweed	3.92	3.57	0.92	10	1.00	8
Equisetum fluviatile, Water horsetail	3.14	2.86	0.73	8	1.00	3
Polygonum amphibium, Water smartweed	2.75	2.50	0.64	7	1.00	
Najas flexilis, Slender naiad	2.35	2.14	0.55	6	1.00	
Nuphar variegata, Spatterdock	1.96	1.79	0.46	5	1.00	6

Ranunculus aquatilis, White water crowfoot	1.96	1.79	0.46	5	1.00	
Eleocharis palustris, Creeping spikerush	1.57	1.43	0.37	4	1.00	
Sagittaria graminea, Grass-leaved arrowhead	1.57	1.43	0.37	4	1.00	
Sparganium eurycarpum, Common bur-reed	1.57	1.43	0.37	4	1.00	1
Carex comosa, Bottle brush sedge	1.18	1.07	0.27	3	1.00	
Chara sp., Muskgrasses	1.18	1.07	0.27	3	1.00	
Potamogeton epihydrus, Ribbon-leaf pondweed	1.18	1.07	0.27	3	1.00	2
Utricularia intermedia, Flat-leaf bladderwort	1.18	1.07	0.27	3	1.00	1
Eleocharis acicularis, Needle spikerush	0.78	0.71	0.18	2	1.00	
Isoetes sp., Quillwort	0.78	0.71	0.18	2	1.00	
Myriophyllum verticilatum, Whorled water milfoil	0.78	0.71	0.18	2	1.00	2
Schoenoplectus tabernaemontani, Softstem bulrush	0.78	0.71	0.20	2	1.00	1
Nitella sp., Nitella	0.39	0.36	0.09	1	1.00	
Potamogeton gramineus, Variable pondweed	0.39	0.36	0.09	1	1.00	1
Potamogeton spirillus, Spiral-fruited pondweed	0.39	0.36	0.09	1	1.00	
Sagittaria cuneata., (rosette) –Sessile fruited arrowhead.	0.39	0.36	0.09	1	1.00	1
Sparganium sp., Bur-reed	0.39	0.36	0.09	1	1.00	
Typha latifolia, Broad-leaved cattail	0.39	0.36	0.09	1	1.00	
Carex Sp-Sedge	na	na	na	na	na	4

Species viewed in boat survey
Potederia Cordata, pickerel weed
Nuphar Variegata, spatter dock
Eqistetem Fluviatile, horse tail
Shoenoplectus Acutus, hardstem bulrush

Table 4: Point intercept survey species list from boat survey.

The most abundant aquatic plants sampled were *Potamogeton robbinsii* (fern pondweed), *Spaganium sp.(burned)* and *Ceratophyllum demersum* (coontail) respectively. All three of these plants are common native aquatic plants in Wisconsin. These plants serve important roles in the lake ecosystem and are desirable to have present in the lake ecosystem.

The coverage of aquatic plants in Rice Lake is extensive. Of the sample points that were at depths conducive for plant growth (less than 12.7 ft), 91% had plants. The density of plants is also quite extensive where plants were growing. There were several sample points where the total rake fullness was a “2” or higher, with an average rake fullness (where plants were sampled) of 2.28. In the more shallow areas, the plants are dense enough to potentially reduce navigation.

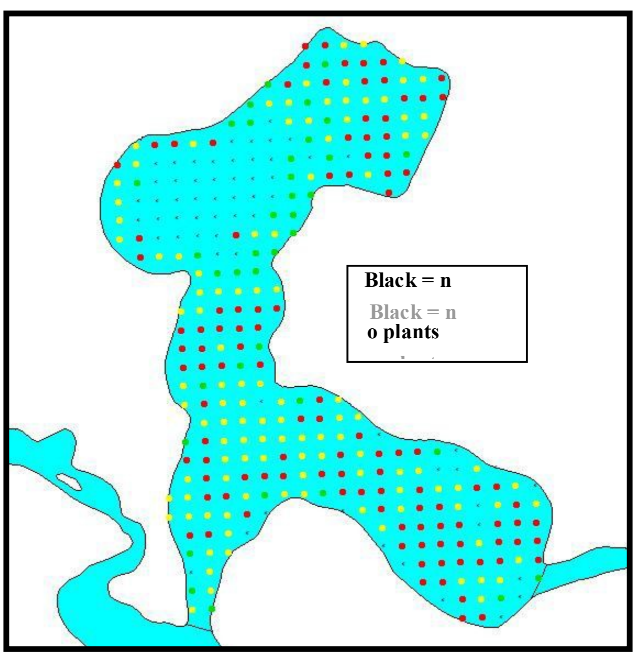


Figure 8: Rake density map for Rice Lake, 2020

Floristic Quality

The plant community can indicate changes in habitat and water quality from human development by using a tool known as the Floristic Quality Index (FQI). This index uses the number of species sampled on the rake and a value given to certain plants known as conservatism. The greater the conservatism value (ranges from 1-10), the less tolerant the plant is to changes in habitat disturbances. The habitat changes are compared to pre-development characteristics in the lake. Table 5 summarizes the FQI information.

Table 5: FQI statistical summary

N	41
Mean Conservatism value	7
FQI	**34**

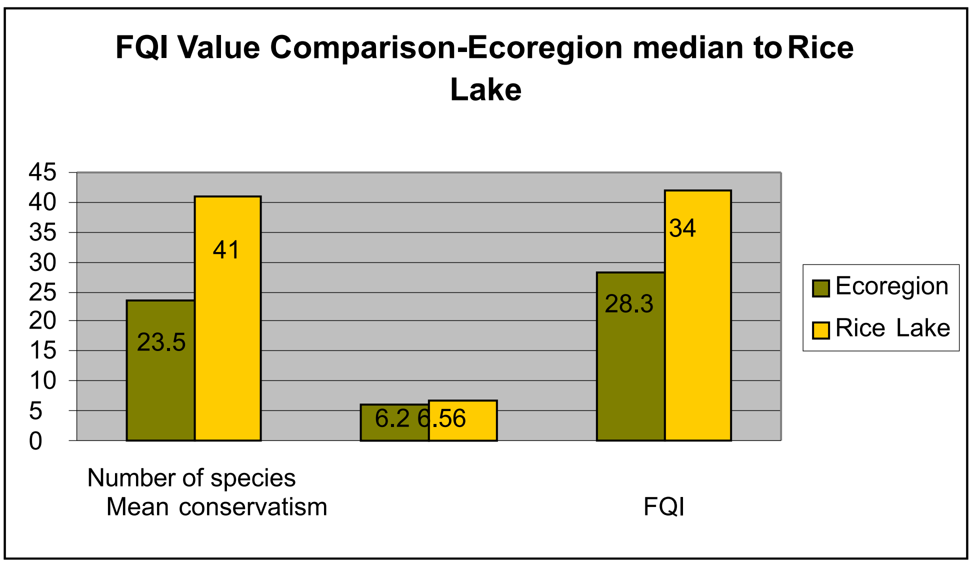


Figure 9: Comparison of FQI median value for the ecoregion (Northern Lakes and Forests-Flowages) to the Rice Lake FQI values.

Table 6: FQI species list and C values

Species	Common Name	C
Acorus americanus	Sweet-flag	7
Alisma triviale	Northern water-plantain	4
Bidens beckii	Water marigold	8
Bolboschoenus fluviatilis	River bulrush	6
Brasenia schreberi	Watershield	6
Calla palustris	Wild calla	9
Callitriche hermaphroditica	Autumnal water-starwort	9
Callitriche heterophylla	Large water-starwort	9
Callitriche palustris	Common water-starwort	8
Carex comosa	Bottle brush sedge	5
Catabrosa aquatica	Brook grass	10
Ceratophyllum demersum	Coontail	3
Ceratophyllum echinatum	Spiny hornwort	10
Chara	Muskgrasses	7
Dulichium arundinaceum	Three-way sedge	9
Elatine minima	Waterwort	9
Elatine triandra	Greater waterwort	9
Eleocharis acicularis	Needle spikerush	5
Eleocharis erythropoda	Bald spikerush	3
Eleocharis palustris	Creeping spikerush	6
Elodea canadensis	Common waterweed	3
Elodea nuttallii	Slender waterweed	7
Equisetum fluviatile	Water horsetail	7
Eriocaulon aquaticum	Pipewort	9
Glyceria borealis	Northern manna grass	8
Gratiola aurea	Golden hedge-hyssop	10
Heteranthera dubia	Water star-grass	6

Isoetes echinospora	Spiny-spored quillwort	8
Isoetes lacustris	Lake quillwort	8
Isoetes sp.	Quillwort	8
Juncus pelocarpus f. submersus	Brown-fruited rush	8
Juncus torreyi	Torrey's rush	4
Lemna minor	Small duckweed	4
Lemna perpusilla	Least duckweed	10
Lemna trisulca	Forked duckweed	6
Littorella uniflora	Littorella	10
Lobelia dortmanna	Water lobelia	10
Ludwigia palustris	Marsh purslane	4
Myriophyllum alterniflorum	Alternate-flowered water-milfoil	10
Myriophyllum farwellii	Farwell's water-milfoil	8

The FQI for Rice Lake is very high. This shows that the plant community has several intolerant plant species. These are plants that do not respond well to habitat changes and/or water quality degradation in the lake. The mean conservatism for the Rice Lake FQI is 7 which is higher than normal.

Two of the most sensitive plants sampled (with high conservatism value) was *Myriophyllum alterniflorum* (alternate flowered water milfoil) and *Sparganium fluctuans* (floating leaf bur-reed). Both of these plants have the highest conservatism value of "10". Two other plants, *Sagittaria graminea* (grass leaved arrowhead) and *Utricularia intermedia* (flat-leaf bladderwort), with conservatism values of "9' were sampled.

Aquatic Invasive Species

In the point intercept survey and boat survey, large populations of aquatic invasive species (AIS) were sampled or surveyed, primarily consisting of Potamogeton crispus Curly Leaf Pondweed. This AIS was discovered in 2013 and has been proliferating since that time. Efforts have been made annually to deal with this AIS with little success. The main focus has been hand pulling and some DASH boat work in 2019. In June of 2020 a large volunteer group gathered at the lake for a two day hand pulling event. Two large trailers were filled with the weed and at the end of the event it was determined approximately 10% of the AIS had been removed. On a positive note, volunteers were able to remove pioneer plants on the shoreline which will help prevent new colonies from forming. That being said, the bulk of the CLP resides in the east bay of the lake where Echo Lake enters Rice Lake and also around a rock pile in mid lake which is the site for the annual Loon platform. Efforts to pull around the Loon nesting site are hampered in the spring for obvious reasons. The CLP in the east bay measures approximately 25-30 acres and therefore is a huge concern not only for Rice Lake, but for the watershed downstream which includes the Turtle-Flambeau Flowage.

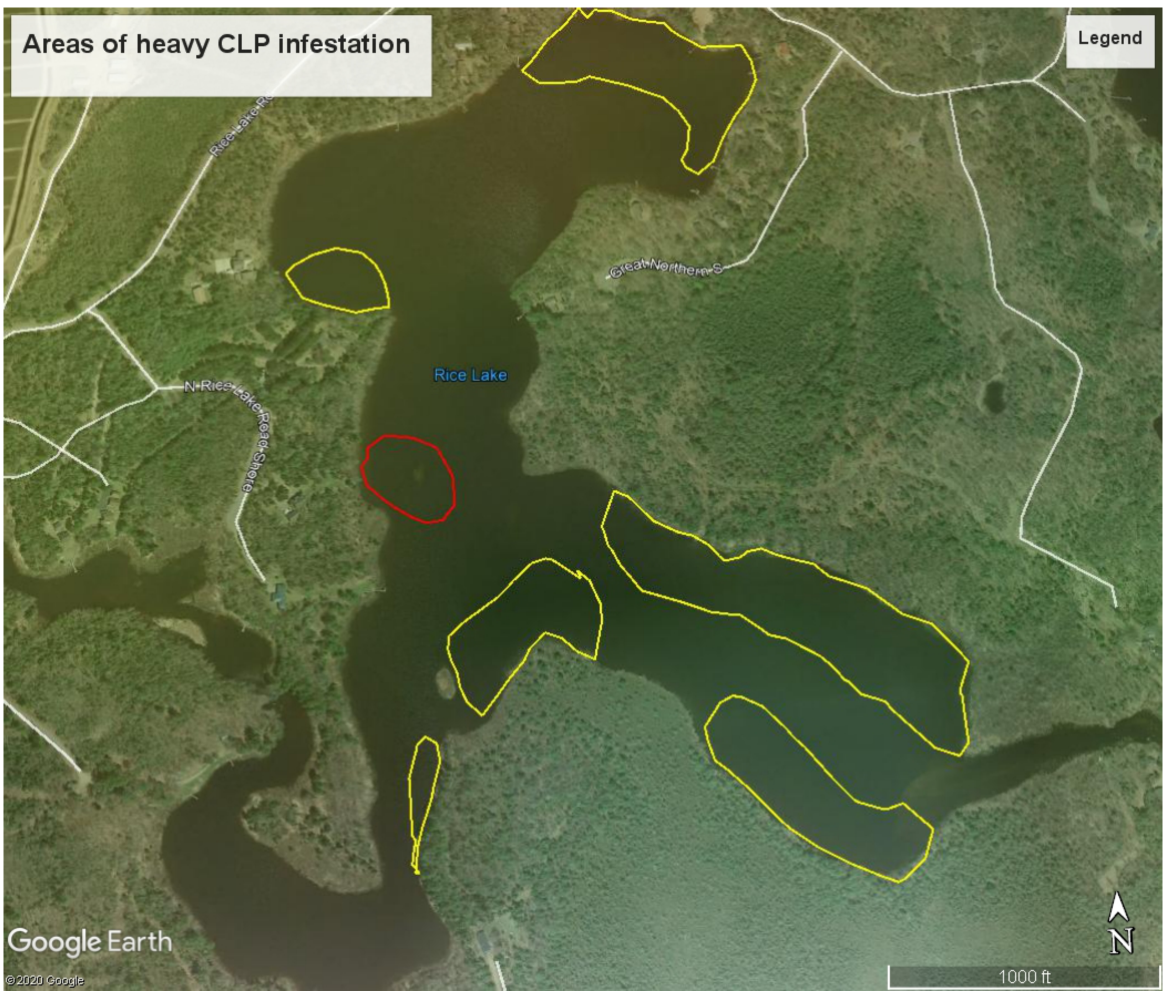


Figure 10: Areas of Curly Leaf Pondweed infestation in 2020

The presence of Curly Leaf Pondweed has been the primary concern for the residents of Rice Lake. The winter of 2019/2020 was spent developing a strategy to control its growth and limit its spread. While we know we may never eliminate CLP on Rice Lake, we are committed to its reduction by 70% in the first three years of our plan.

The yellow areas above represent approximately 43.5 acres of CLP

The red area is enlarged in the map on page 42 to show the loon nesting site.These are proposed channels. The density of the plants will be checked before final channels are delineated and part of a permit application.

There are lakes in the vicinity of Rice Lake that contain AIS. The Gile Flowage contains spiny water fleas (*Bythotrephes cederstroemi*), which was discovered in 2003.

There are some lakes in Iron County that have Eurasian water milfoil (EWM) infestations. These lakes include: Long Lake, Long Lake Creek, and Wilson Lake.

The following section will address all of the possible control methods for AIS.

We have done extensive studies on all the possible methods to control Curly Leaf Pondweed

As mentioned earlier in this report, various measures were attempted between 2013, the

year it was discovered, until 2019. Early on , DNR officials suggested a "wait and see" approach.

The thought being the aquatic plants present would overwhelm and choke out the CLP.

This of course dd not happen. Two years later, the suggestion was to hand pull.

The reality was that, because Rice Lake has such a small resident population and most of the

property owners are septagenarians , the hand pulling effort was not successful.

In 2019, after an unsuccessful grant application, the residents of Rice Lake funded a

DASH operation. This 4 day effort exhausted the treasury of the Rice Lake Association.

The obvious takeaway was that we needed help from the DNR in the form of a grant

large enough to deal with this AIS aggressively.

We hope the plan outlined will accomplish our goal to, once and for all, control the spread

of Curly Leaf Pondweed.

Management Options

Biological control

Biological control is the purposeful introduction of parasites, predators, and/or pathogenic microorganisms to reduce or suppress populations of plant or animal pests. Biological control counteracts the problems that occur when a species is introduced into a new region of the world without a complex or assemblage of organisms that feed directly upon it, attack its seeds or progeny through predation or parasitism, or cause severe or debilitating diseases (i.e., pathogenic microorganisms). With the introduction of native pests to the target invasive organism, the exotic invasive species may be maintained at lower densities.

While this theory has worked in application for control of some non-native aquatic plants, results have been varied (Madsen, 2000). Beetles (*Galerucella* spp) are commonly used to control purple loosestrife populations in Wisconsin with good success. Weevils (*Euhrychiopsis lecontei*),are used as an experimental control for Eurasian watermilfoil once the plant is established. Tilapia and carp are used to control the growth of filamentous algae in ponds. Grass carp, and herbivorous fish are sometimes used to feed on pest plant populations. Grass carp introduction is not allowed in Wisconsin.

There are advantages and disadvantages to the use of biological control as part of an overall aquatic plant management program. Advantages include longer-term control relative to other technologies, lower overall costs, as well as plant-specific control. On the other hand, there are several disadvantages to consider, including control times of years instead of weeks, lack of available agents for particular target species, and relatively strict environmental conditions for success.

Biological control is not without risks; new non-native species introduced to control a pest population may cause problem of its own.

Re-vegetation with native plants

Another aspect to biological control is native plant restoration. The rationale for re-vegetation is that restoring a native plant community should be the end goal of most aquatic plant management programs (Nichols, 1991; Smart and Doyle, 1995).
However, in communities that have only recently been invaded by non-native species, a propagule bank probably exists that will restore the community after non-native plants are controlled (Madsen, Getsinger, and Turner, 1994). Re-vegetation following plant management implementation should not be necessary as Rice Lake has extensive native populations and any management will involve selection for target species only.

Physical control

In physical management, the environment of the plant is manipulated, which in turn acts upon the plants. Several physical techniques are commonly used: dredging,

draw down, benthic (lake bottom) barriers, and shading or light attenuation.
Because they involve placing a structure on the bed of a lake and/or affect lake water level, a Chapter 30 or 31 DNR permit is required.

Dredging removes accumulated bottom sediments that support plant growth. Dredging is usually not performed solely for aquatic plant management but to restore lakes that have been filled in with sediments, have excess nutrients, need deepening, or require removal of toxic substances (Peterson, 1982). Dredging is not a viable option for Rice Lake since this isn't recognized as an aquatic plant management tool alone and is not regarded as an effective tool for these lakes.

Drawdown, or significantly decreasing lake water levels can be used to control nuisance plant populations. Essentially, the water body has all of the water removed to a given depth. It is best if this depth includes the entire depth range of the target species. Drawdowns, to be effective, need to be at least 1 month long to ensure thorough drying (Cooke 1980a). In northern areas, a draw down in the winter that will ensure freezing of sediments is also effective. Although draw down may be effective for control of hydrilla for 1 to 2 years (Ludlow 1995), it is most commonly applied to Eurasian watermilfoil (Geiger 1983; Siver et al. 1986) and other milfoils or submersed evergreen perennials (Tarver 1980). Drawdown requires that there be a mechanism to lower water levels.

Although it is inexpensive and has long-term effects (2 or more years), it also has significant environmental effects and may interfere with use and intended function (e.g., power generation or drinking water supply) of the water body during the drawdown period. Lastly, species respond in very different manners to draw down and often not in a consistent fashion (Cooke 1980a). Drawdowns may provide an opportunity for the spread of highly weedy or adventive species, particularly annuals.

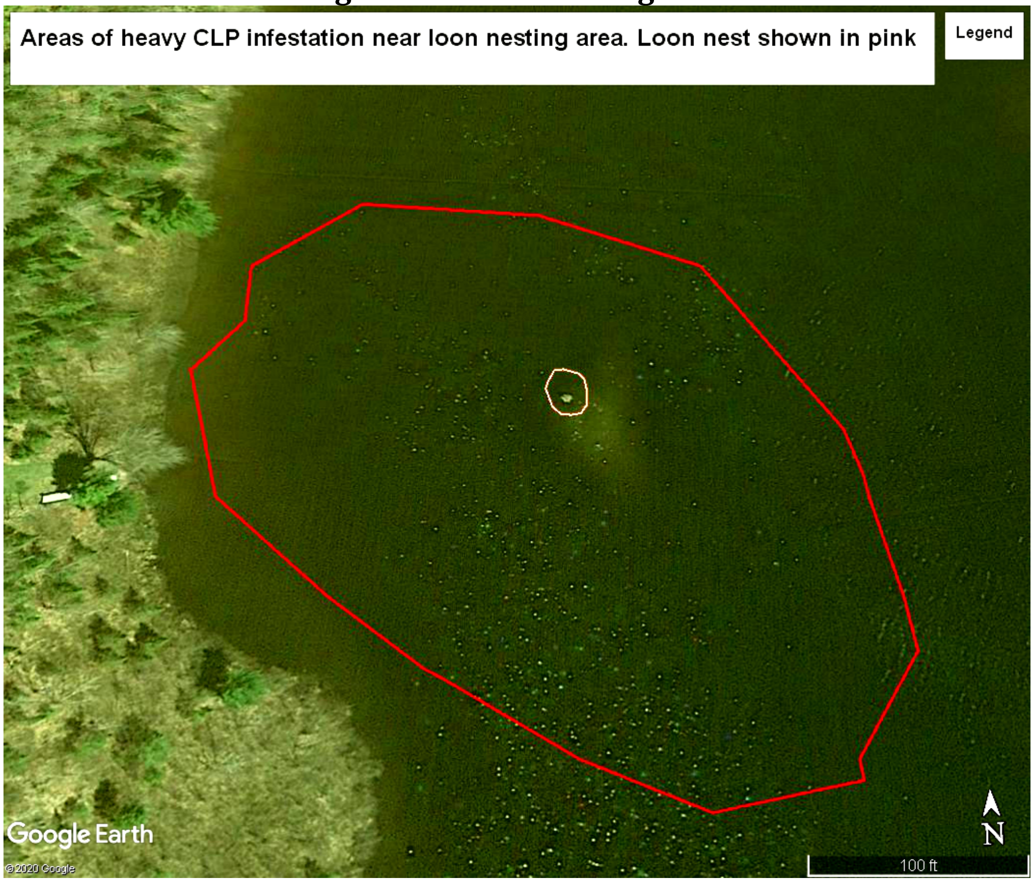
There is a simple rock dam below Rice Lake which cannot be used to adjust the level of Rice Lake. Also, this is a very dramatic management tool to use in a lake that has such a large diversity of aquatic plants. Drawdown would likely adversely affect this diversity and as a result would not be a desirable tool.

Benthic barriers or other bottom-covering approaches are another physical management technique. The basic idea is that the plants are covered over with a layer of a growth-inhibiting substance. Many materials have been used, including sheets or screens of organic, inorganic and synthetic materials, sediments such as dredge sediment, sand, silt or clay, fly ash, and combinations of the above (Cooke 1980b; Nichols 1974; Perkins 1984; Truelson 1984). The problem with using sediments is that new plants establish on top of the added layer (Engel and Nichols 1984). The problem with synthetic sheeting is that the gasses evolved from decomposition of plants and sediment decomposition collects under and lifts the barrier (Gunnison and Barko 1992). Benthic barriers will typically kill plants under them within 1 to 2 months, after which they maybe removed (Engel 1984). Sheet color is relatively unimportant; opaque (particularly black) barriers work best, but even clear plastic barriers will work effectively (Carter et al. 1994). Sites from which barriers are removed will be rapidly re-colonized (Eichler et al. 1995). In addition, synthetic barriers may be left in place for multi-year control but will eventually become sediment-covered and will allow colonization by plants. Benthic barriers, effective and fairly low-cost control techniques for limited areas (e.g., <1 acre), may be best suited to high-intensity use areas such as docks, boat launch areas, and swimming areas. However, they are too expensive to use over widespread areas, and heavily affect benthic communities by removing fish and invertebrate habitat. A Department of Natural Resources permit would be required.

A benthic barrier may be a potential option for Rice Lake around the aforementioned Loon nesting area. Since the main use of this management tool would be to retard and stop the early development of CLP and because that area of the lake cannot be easily hand harvested due to nesting of the loons it is considered a viable option.
The area is small enough to be financially feasible even though a permit would be required. The barrier would be installed pre- nesting period and removed in two months, after hatching of the loons has occurred. This timeframe fits the recommendation of the manufacturer of the barrier. The area is delineated in a map attached which will show the size of the mat to be approximately 600 sq. ft.

The map below shows the location of the Loon nesting site on Rice Lake

Figure 11: Loon Nesting area



Shading or light attenuation reduces the light plants need to grow. Shading has been achieved by fertilization to produce algal growth, by application of natural or synthetic dyes, shading fabric, or covers, and by establishing shade trees (Dawson 1981, 1986; Dawson and Hallows 1983; Dawson and Kern-Hansen 1978; Jorga et al. 1982; Martin and Martin 1992; Nichols 1974). During natural or cultural eutrophication, algae growth alone can shade aquatic plants (Jones et al. 1983).
Although light manipulation techniques may be useful for narrow streams or small ponds, in general these techniques are of only limited applicability. As a result, management of Rice Lake will not use this management tool.

2

Manual removal

Manual removal involving hand pulling, cutting, or raking plants will remove plants from small areas. It is likely that plant removal will need to be repeated during the growing season. Best timing for hand removal of herbaceous plant species is after flowering but before seed head production. For plants that possess rhizomatous (underground stem) growth, pulling roots is not generally recommended since it may stimulate new shoot production. Hand pulling is a strategy recommended for Rice Lake. Since Curly Leaf Pondweed is present in large populations it will be necessary to employ a large group of workers for harvesting. It is estimated that 25 workers in boats equipped with long handled rakes working for up to two weeks will be needed to gather a sufficient quantity of CLP. As mentioned earlier in this report, we had some success this past spring using this method. See **Appendex A**

Mechanical control

Larger-scale control efforts require more mechanization. Mechanical cutting, mechanical harvesting, diver-operated suction harvesting, and rotovating (tilling) are the most common forms available. Department of Natural Resources permits under Chapter NR 109 are required for mechanical plant removal.

Aquatic plant harvesters are floating machines that cut and remove vegetation from the water. The cutter head uses sickles similar to those found on farm equipment, and generally cuts from one to six feet deep. A conveyor belt on the cutter head is always in motion, bringing the clippings onboard the machine for storage. Once full, the harvester travels to shore to discharge the load of weeds off of the vessel.

Harvesters come in a variety of sizes, with cutting swaths ranging from four to twelve feet in width. The onboard storage capacity varies as well, and is measured in both volume and weight. Harvester storage capacities generally range from 100 to 1000 cubic feet of vegetation by volume, or from one to eight tons. They are usually propelled by two paddle wheels that provide excellent maneuverability and will not foul in dense plant growth.

Mechanical harvesting of aquatic plants presents both positive and negative consequences to any lake. Its results—open water and accessible boat lanes—are immediate, and can be enjoyed without the restrictions on lake use which follow herbicide treatments. In addition to the human use benefits, the clearing of thick aquatic plant beds may also increase the growth and survival of some fish. By eliminating the upper canopy, harvesting reduces the shading caused by aquatic plants. The nutrients stored in the plants are also removed from the lake, and the sedimentation that would normally occur as a result of the decaying of this plant matter is prevented. Additionally, repeated treatments may result in thinner, more scattered growth.

Aside from the obvious effort and expense of harvesting aquatic plants, there are many environmentally-detrimental consequences to consider. The removal of aquatic species during harvesting is non-selective. Native and invasive species alike are removed from the target area. This loss of plants results in a subsequent loss of the functions they perform, including sediment stabilization and wave absorption. Shoreline erosion may therefore increase. Other organisms such as fish, reptiles, and insects are often displaced or removed from the lake in the harvesting process. This may have adverse effects on these organisms' populations as well as the lake ecosystem as a whole.

While the results of harvesting aquatic plants may be short term, the negative consequences are not so short lived. Much like mowing a lawn, harvesting must be conducted numerous times throughout the growing season. Although the harvester collects most of the plants that it cuts, some plant fragments inevitably persist in the water. This may allow the invasive plant species to propagate and colonize in new, previously unaffected areas of the lake. Harvesting may also result in re-suspension of contaminated sediments and the excess nutrients they contain.

Disposal sites are a key component when considering the mechanical harvesting of aquatic plants. The sites must be on shore and upland to make sure the plants and their reproductive structures don't make their way back into the lake or to other lakes. The number of available disposal sites and their distance from the targeted harvesting areas will determine the efficiency of the operation, in terms of time as well as cost.

Timing is also important. The ideal time to harvest, in order to maximize the efficiency of the harvester, is just before the aquatic plants break the surface of the lake. For curly leaf pondweed, it should also be before the plants form turions (reproductive structures) to avoid spreading the turions within the lake. If the harvesting is conducted too early, the plants will not be close enough to the surface, and the cutting will not do much damage to them. If too late, turions may have formed and may be spread, and there may be too much plant matter on the surface of the lake for the harvester to cut effectively.

We spent additional time discussing this option because it had been used previously on Rice Lake. Later in this report under the title Historical Plant Management we discuss the use of harvesters on Rice Lake. They were used to clear around dock areas prior to the discovery of CLP. In the final analysis, it was decided we would not use this option in the future. The cutting dispersed huge quantities of plant fragments that contributed to more plant growth. The cost was considered excessive in relation to its benefits and the concern that new species may have been introduced by the harvester not being cleaned properly before entering the lake.

Diver Plant Siphoning operations use pump systems to collect plant and root biomass. The pumps are mounted on a barge or pontoon boat. The dredge hoses are from 3 to 5 inches in diameter and are handled by one diver. The hoses normally extend about 50 feet in front of the vessel. Diver dredging is especially effective against pioneering infestations of submersed invasive plant species. When a weed is discovered in a pioneering state, this methodology should be considered. To be effective, the entire plant, including the subsurface portions, should be removed.

Plant fragments can be formed from this type of operation. Fragmentation is not as great a problem when infestations are small. Diver dredging operations can be an ongoing mission. When applied toward a pioneering infestation, control can be complete. However, periodic inspections of the lake should be performed to ensure that all the plants have been found and collected.

Lake substrates can play an important part in the effectiveness of the operation. Soft substrates are very easy to work in. Divers can remove the plant and root crowns with little problem. Hard substrates, however, pose more of a problem. Divers may need hand tools to help dig the root crowns out of hardened sediment. Rice Lake had used a DASH boat in 2019 with very limited success and at a very high cost. With that in mind, Rice Lake would consider this method following year three(3) of our plan if the monitoring done by our consultants indicates smaller, less established populations of CLP making the cost more manageable

Rotovation involves using large underwater rototillers to remove plant roots and other plant tissue. Rotovators can reach bottom sediments to depths of 20 feet. Rotovating may significantly affect non-target organisms and water quality as bottom sediments are disturbed. However, the suspended sediments and resulting turbidity produced by rotovation settles fairly rapidly once the tiller has passed. Tilling sediments that are contaminated could possibly release toxins to the water column. If there is any potential of contaminated sediments in the area, further investigation should be performed to determine potential impacts from this type of treatment. Tillers do not operate effectively in areas with many underwater obstructions such as trees and stumps. There may be a need to collect the plant material that is tilled from the bottom. If operations are releasing large amounts of plant material, harvesting equipment should be on hand to collect this material and transport it to shore for disposal.

Rotovation would release too much sediment and too many plant fragments and therefore would not be a good method for Rice Lake. Also, potential treatment of non-native plants by rotovation is not a good option as it could increase spreading of non-native plants while not selecting the target species.
Rotovation is not likely to get permitted by the Wisconsin DNR.

Herbicide and algaecide treatments

Herbicides are chemicals used to kill plant tissue. Currently, no product can be labeled for aquatic use if it poses more than a one in a million chance of causing significant damage to human health, the environment, or wildlife resources. In addition, it may not show evidence of biomagnification, bioavailability, or persistence in the environment (Joyce, 1991). Thus, there are a limited number of active ingredients that are assured to be low risk for aquatic use (when used according to the label) (Madsen, 2000).

An important caveat is that these products are low risk when used according to the label. The U.S. Environmental Protection Agency (EPA)-approved label gives guidelines protecting the health of the environment, the humans using that environment, and the applicators of the herbicide. In most states, additional permitting or regulatory restrictions on the use of these herbicides also apply. Most states require these herbicides be applied only by licensed applicators. Wisconsin Department of Natural Resources permits under Chapter NR 107 are required for herbicide application.

Herbicide use is a possible management tool for Rice Lake after year three. Depending on the size of a management area and other parameters, herbicide use may or may not be the best option. For example, if there is a rather large area treated later in the summer and it is assumed the plant biomass would be high, a sudden decomposition of large amount of herbicide killed plants could cause a nutrient release and/or deplete oxygen in the lake. If areas are small or treatment occurs earlier in the spring, then these issues would not be as much of a concern.

~General descriptions of chemical control are included below~

Contact Herbicides

Contact herbicides act quickly and are generally lethal to all plant cells that they contact. Because of this rapid action, or other physiological reasons, they do not move extensively within the plant and are effective only where they contact plants. For this reason, they are generally more effective on annuals (plants that complete their life cycle in a single year). Perennial plants (plants that persist from year to year) can be defoliated by contact herbicides but they quickly resprout from unaffected plant parts. Submersed aquatic plants that are in contact with sufficient concentrations of the herbicide in the water for long enough periods of time are affected, but regrowth occurs from unaffected plant parts, especially plant parts that are protected beneath the sediment. Because the entire plant is not killed by contact herbicides, retreatment is necessary, sometimes two or three times per year.
Endothall, diquat and **copper** are contact aquatic herbicides.

Systemic Herbicides

Systemic herbicides are absorbed into the living portion of the plant and move within the plant. Different systemic herbicides are absorbed to varying degrees by different plant parts. Systemic herbicides that are absorbed by plant roots are referred to as soil active herbicides and those that are absorbed by leaves are referred to as foliar active herbicides. Some soil active herbicides are absorbed only by plant roots. Other systemic herbicides, such as glyphosate, are only active when applied to and absorbed by the foliage. **2,4-D, dichlobenil, fluridone, and glyphosate** are systemic aquatic herbicides. When applied correctly, systemic herbicides act slowly in comparison to contact herbicides. They must move to the part of the plant where their site of action is. Systemic herbicides are generally more effective for controlling perennial and woody plants than contact herbicides. Systemic herbicides also generally have more selectivity than contact herbicides.
Because Rice lake is is connected to other water systems downstream there is consistent movement of water through the watershed. These herbicides would likely not stay in place long enough to be effective.

Broad spectrum herbicides

Broad spectrum (sometimes referred to as nonselective) herbicides are those that are used to control all or most vegetation. This type of herbicide is often used for total vegetation control in areas such as equipment yards and substations where bare ground is preferred. **Glyphosate** is an example of a broad spectrum aquatic herbicide. **Diquat, Endothall, and fluridone** are used as broad spectrum aquatic herbicides, but can also be used selectively under certain circumstances. While glyphosate, diquat and endothall are considered broad spectrum herbicides, they can also be considered selective in that they only kill the plants that they contact. Thus, you can use them to selectively kill an individual plant or plants in a limited area such as a swimming zone. As mentioned above, the consistent movement of water in Rice lake would not allow a Broad spectrum herbicide to be effective

Selective herbicides

Selective herbicides are those that are used to control certain plants, but not others. A good example of selective aquatic herbicide is 2,4-D, which can be used to control water hyacinth with minimum impact on eel grass. Herbicide selectivity is based upon the relative susceptibility or response of a plant to an herbicide. Many related physical and biological factors can contribute to a plant's susceptibility to an herbicide. Physical factors that contribute to selectivity include herbicide placement, formulation, and rate of application. Biological factors that affect herbicide selectivity include physiological factors, morphological factors, and stage of plant growth.

Environmental Considerations

Aquatic communities consist of aquatic plants including macrophytes (large plants) and phytoplankton (free floating algae), invertebrate animals (such as insects and clams), fish, birds, and mammals (such as muskrats, otters, and manatees). All of these organisms are interrelated in the community. Organisms in the community require a certain set of physical and chemical conditions to exist such as nutrient requirements, oxygen, light, and space. Aquatic weed control operations can affect one or more of the organisms in the community that can in turn affect other organisms or it can affect water chemistry that in turn affects organisms. The effects of aquatic plant control on the aquatic community can be separated into direct effects of the herbicides or indirect effects.

After a thorough discussion of the use of herbicides on Rice lake and on the advise of conservation personnel in Iron county and elsewhere, this committee has made the decision to forego the use of herbicides on Rice Lake.

We have included the list of herbicides we studied and considered but will refrain from their use in this three year effort. We will leave open their consideration after we assess the success of our current plan.

Table 7: Summary of chemical herbicide names and uses.

Brand Name(s)	Chemical	Target Plants
Cutrine Plus, $CuSO_4$, Captain, Navigate, Komeen	Copper compounds	Filamentous algae, coontail, wild celery, elodea, and pondweeds
Reward	Diquat	Coontail, duckweed, elodea, water milfoil, and pondweeds
Aquathol, Aquathol K, Aquathol Super K, Hydrothol 191	Endothall	Coontail, water milfoil, pondweeds, and wild celery as well as other submersed weeds and algae
Rodeo	Glyphosate	Cattails, grasses, bulrushes, purple loosestrife, and water lilies
Navigate, Aqua-Kleen, DMA 4 IVM, Weed-Rhap	2, 4-D	Water milfoils, water lilies, and bladderwort

Historical Plant Management

Aquatic invasive species were managed through mechanical harvesting in the years 2004 and 2005. In 2004, approximately 10 tons of vegetation were removed. In 2005, approximately 5 tons of vegetation was removed. Access lanes 35 feet by 100-150 feet were cut to designated piers and a general use navigation lane (14 to 28 feet wide) which led to approximate harvesting total of 3.85 acres. Figures 12 and 13 show maps outlining the harvesting locations. All of this harvesting was done prior to the discovery of CLP in Rice lake and was a result of land owners concern over excess vegetation around docks and in navigation lanes. At the time there were no AIS concerns. This merely gives a historical perspective on activities related to aquatic plant control.

Figure 12: Harvesting locations on Rice Lake in 2004

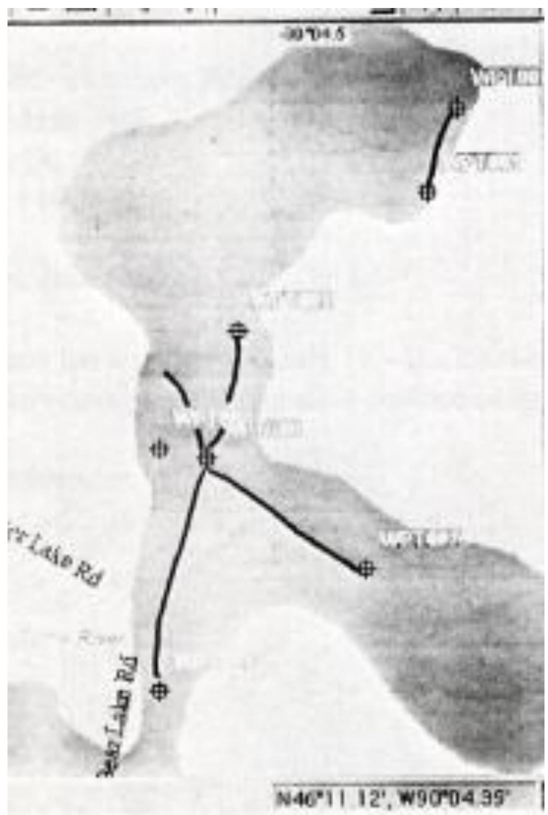
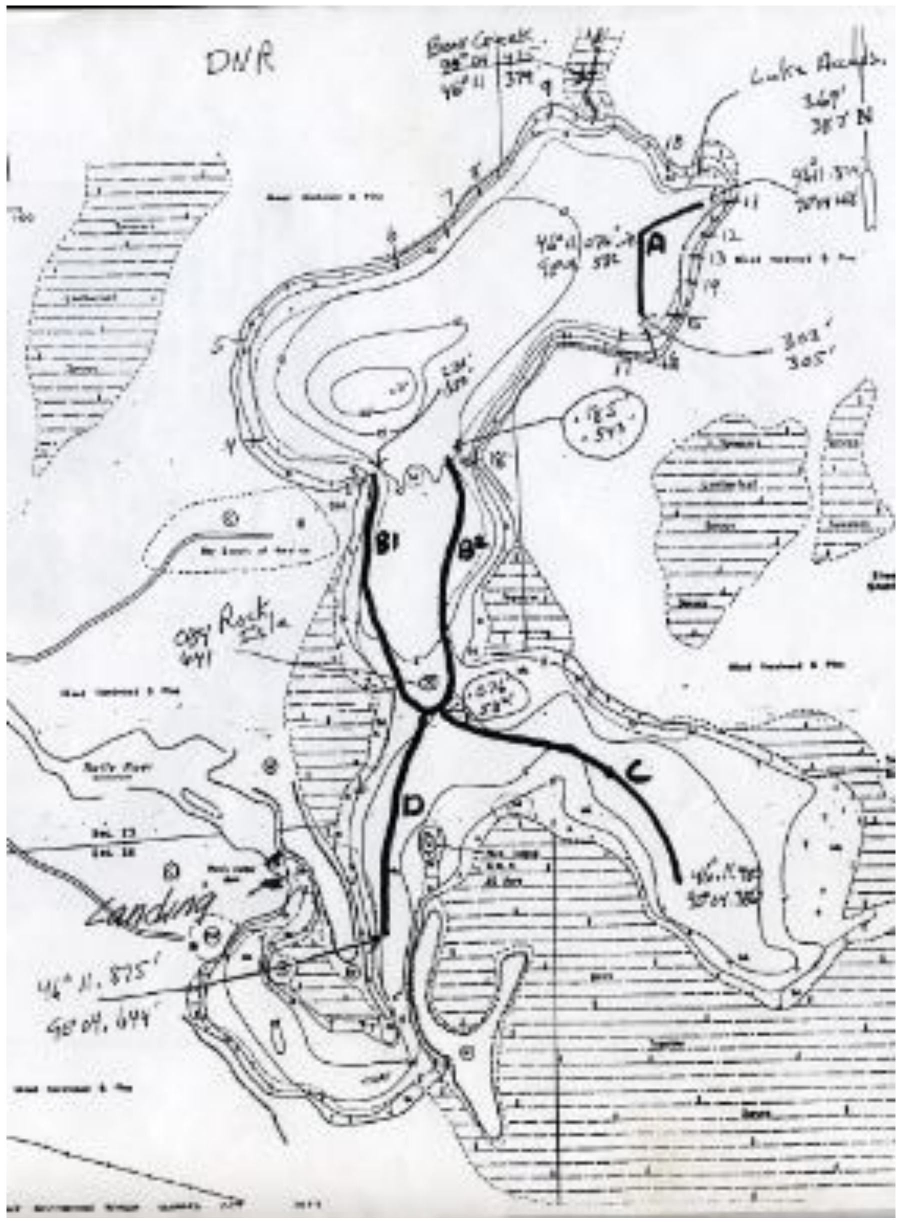


Figure 13: Harvesting locations on Rice Lake in 2005



It was noted by the harvesting company that the landing was very poor and that future harvesting would not be possible without improvements to the landing. Also, it was observed that a great deal of sediment was disturbed during harvesting due to shallow conditions.[1]

The DNR Northern Region released an Aquatic Plant Management Strategy in the

[1]This information was provided by Clifford Schmidt of Schmidt's Aquatic Plant Control who did the harvesting.

summer of 2007 to protect the important functions of aquatic plants in lakes. As part of this strategy, the DNR prohibited management of native aquatic plants in front of individual lake properties after 2008 unless management is designated in an approved aquatic plant management plan.[2] Because of the importance of the native plant population for habitat, protection against erosion, and as a guard against invasive species infestation, plant removal with herbicides as an option for individual property owners must be carefully reviewed before permits are issued. The DNR will not allow removal after January 1, 2009 unless the "impairment of navigation" and/or "nuisance" conditions are clearly documented.

Individual Corridor Access

The only time a permit is not required to control aquatic plants is when a waterfront property owner manually removes (i.e., hand-pulls or hand rakes), or gives permission to someone to manually remove, plants (except wild rice) from his/ her shoreline in an area that is 30 feet or less in width along the shore and is not within a Designated Sensitive Area. The non-native invasive plants (Eurasian water milfoil, curly-leaf pondweed, and purple loosestrife) may be manually removed beyond 30 feet without a permit, as long as native plants are not harmed. Wild rice removal always requires a permit.

Permitting requirements

The Wisconsin Department of Natural Resources regulates the removal of aquatic plants when chemical and mechanical methods are used or when plants are removed manually from an area greater than thirty feet in width along the shore. The requirements for chemical plant removal are described in Administrative Rule NR 107-Aquatic Plant Management. A permit is required for any aquatic chemical application in Wisconsin.

The requirements for manual and mechanical plant removal are described in NR 109-Aquatic Plants: Introduction, Manual Removal & Mechanical Control Regulations. A permit is required for manual and mechanical removal except when a riparian (waterfront) landowner manually removes or gives permission to someone to manually remove plants, (with the exception of wild rice) from his/her shoreline limited to a 30-foot corridor. A riparian landowner may also manually remove the invasive plants Eurasian water milfoil, curly leaf pondweed, and purple loosestrife along his or her shoreline without a permit. Manual removal means the

[2] Aquatic Plant Management Strategy. DNR Northern Region. Summer 2007.

control of aquatic plants by hand or hand-held devices without the use or aid of external or auxiliary power.

The Northern Region of the Wisconsin DNR has established a management strategy for future plant management and can affect permitting for management. Their approach is as follows:[3]

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. (Note: Minocqua Lake has several documented sensitive areas)

3. Invasive species must be controlled under an approved lake management plan, with two exceptions:

   a. Newly discovered infestations: If found on a lake with an approved plan, the invasives can be controlled via an amendment to the approved plan. Without an approved plan, they can be controlled under the WDNR' Rapid Response protocol.

   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 (are) adequately documented.

4. Control of invasive stands 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 (water temperatures of less than 60 degrees F).

5. Manual removal (by definition) is allowed. However, wild rice may not be removed.

[3] Aquatic Plant Management Strategy. Northern Region of Wisconsin DNR. 2007.

Plan Goals and Strategies

This section of the plan lists goals and objectives for aquatic plant management for Rice Lake as it pertains to the presence of Curly Leaf Pondweed. All of our efforts prior to this study and in years past were related to maintaining the Native population of Aquatic plants. While that is still an ongoing concern, these goals and objectives will direct all of our efforts to attempt to control the spread of CLP. As stated earlier, we understand the task is daunting and may not totally eliminate CLP from Rice lake. However, the greater concern should be for the watershed and the effects of this AIS spreading to Pike Lake, Lake of the Falls and eventually the Turtle Flambeau Flowage.

Goals are broad statements of direction.
Objectives are measurable steps toward the goal.
Actions are actions to take to accomplish objectives.
The **Implementation Plan** outlines timeline, resources needed, partners, and funding sources for each action item.

Goals for Rice Lake's Aquatic Invasive Species Management Plan

1. ***Develop and implement a plan for removal of 70% of the CLP present on Rice Lake as of 2020***

2. ***Preserve native plants and protect sensitive areas of Rice lake***

3. ***Monitor native plants occurring in navigation channels and recreational areas around docks***

4. ***Evaluate and preserve water quality in Rice lake to limit increase in macrophyte density.***

5. ***Educate Rice lake residents on the value of aquatic plants and the potential outcomes of an unbalanced environment.***

Goal 1: Develop and implement a plan for removal of 70% of the CLP on Rice Lake

Over a period of the next three years we will carry out the plan to remove 70% of the CLP from the lake through manual removal and Benthic barriers.

Other management options considered included biological control, revegetation with native plants, dredging, drawdown, mechanical controls and herbicides. All of these options were discarded as not appropriate for the lake except herbicides and diver plant siphoning, which may be considered in a future plan. The aggressive action toward Curly Leaf Pondweed will be considered the primary objective of the management plan. All other aspects of this report will be considered essential to best practices for ordinary lake management from a natural resources perspective.

The entire CLP removal effort will be monitored and reported on by White Water Associates. They were chosen because of our previous experiences with their work. Most recently they were the consultant used by Rice lake on the Rapid Response grant that Rice lake sponsored for Pike Lake. Pike lake did not have a lake association and thus were not eligible to apply for a grant. Due to the presence of CLP in Rice lake this AIS showed up in the Turtle River and Pike lake, both downstream from Rice lake. We believed it was our responsibility to help Pike lake with this problem since it originated in Rice lake.

Previously, in 2005, White Water Associates conducted an environmental study for Rice lake and Echo lake. We believe they are a well established company with the resources to accomplish our goals and is the primary reason we chose them again. As stated, the entire emphasis on CLP control will center around hand pulling and use of Benthic water barriers. Pre and post surveying will monitor our degree of success each year and we will rely on the consultant to recommend changes in our plan to create greater success. Those changes specifically relate to employing herbicides and/or DASH boat usage. We believe we need at least 3 years of studying our results before we consider altering our methods.

Goal 2: Preserve native plants and protect sensitive areas of Rice Lake

<u>Objective 2.1</u>- Evaluate sensitive and critical habitat areas in and around Rice Lake. Once established, these areas will be preserved and any adverse effects of management will be avoided.

A Sensitive Habitat Survey was conducted in August 2013 by Ecological Integrity Services, LLC that evaluated and mapped regions that have sensitive plants, plants that have high importance for fish and wildlife habitat and areas that will enhance fish recruitment and rearing.

A full lake PI survey conducted in 2020 will allow for the evaluation of any changes in the native plant community. In the following years, surveys performed by our consultant will enable us to follow the development of native plants and their ability to displace the CLP that was removed. We wold also evaluate the use of the Benthic barriers around the Loon nesting site for their effectiveness in future years.

Objective 2.2 -Enhance the Clean Boats/Clean Waters program.

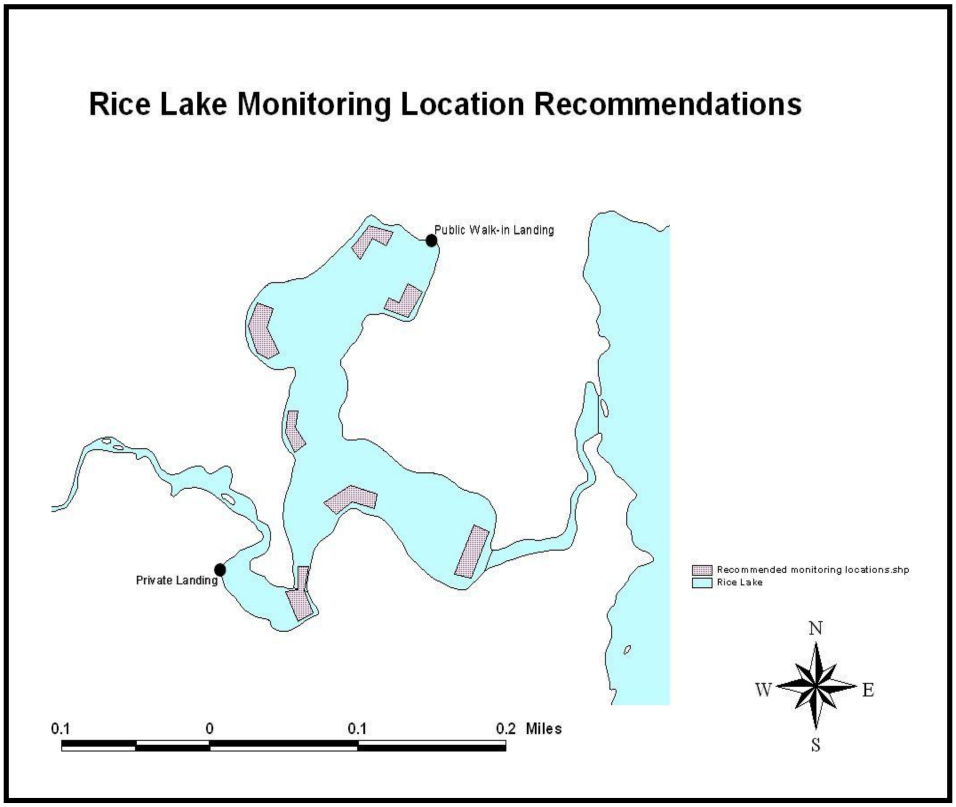
The Clean Boats/Clean Waters program is an excellent way to reduce the chance of AIS being introduced into a lake. The program typically involves having volunteers/ hired personnel making contact with boaters using the landing. Since Rice Lake lacks a public landing other than a carry-in site, this is not possible. As a result, they will implement a modified version.

This modified version will involve signs at the public walk-in landing and talk to the private landing owner about putting signs there too. They will also make contact with boaters on the water from the channel leading from the private landing to the lake. Although this contact could occur after the boat launched with AIS, it is hopeful that the education of boaters will heighten awareness with Rice Lake boaters/ recreation users. We also intend to contact the Echo Lake Association which is immediately upstream of Rice Lake and encourage them to institute a CBCW program on their lake. With the help of the Iron County Conservation office in Hurley we hope to schedule meetings designed to educate Echo Lake property owners on the importance of this program for the conservation of the entire turtle River Watershed.

Objective 2.3- Monitor Rice Lake for AIS throughout the summer months starting in Mid-May at ice-off until end of July. Follow the implementation guidelines listed in this report. The aggressive action to control Curly Leaf Pondweed will be considered the primary objective of the management plan. All other aspects of this report will considered essential to meet best practices for ordinary lake management from a natural resources perspective

The entire lake will be monitored as best as possible. However, since nearly the entire lake is littoral zone, a map with key areas has been created to identify key areas. These areas are based upon inflowing water and incoming boat traffic, which would be the most probable areas for AIS to come into Rice Lake. These areas will be monitored throughout the summer months by volunteers as a control measure. Those areas are defined in figure 12 below.

Figure 14. Recommended AIS monitoring location map

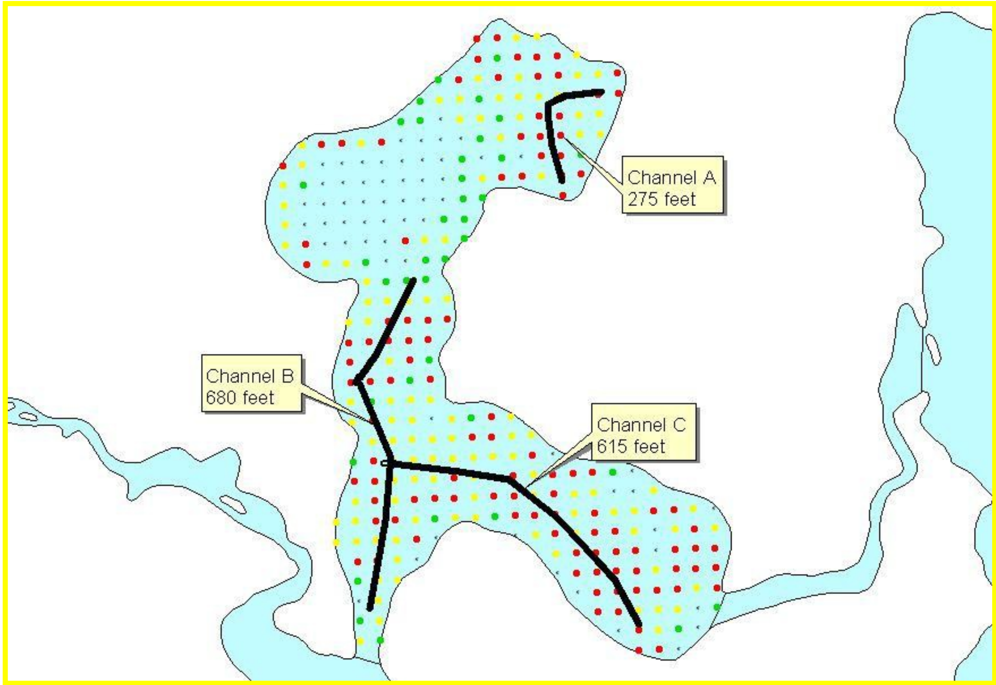


Goal 3: Monitor native plants in a responsible manner to enhance recreational activities on the lake (fishing, boating, swimming, etc.)

Objective 3.1- monitor plant density in high traffic areas where nuisance native plants are impeding navigation with boats.

Nuisance native plant growth threshold will be defined as: An area where the mean density is 2.5 or greater throughout the plant bed (meaning the majority of sample points would be a 3; the plant growth height at or near surface (common motor depth) up to the surface throughout the plant bed; the plant bed is a minimum of 30 feet in length and too wide to easily pass around (approximately 50 feet).

Figure 15: navigation channels location map with distances.



Note: The navigation channels in figure 13 are maximum proposals only and represent areas to be evaluated for high density issues. The areas that meet the nuisance requirements would be the only areas treated inspected.

In addition to the main channel mapped, there may be small (narrow) feeder channels 10 feet wide that connect riparian owners to a low-density area or to the main channel, whichever is the shortest distance. These will be based on meeting the threshold requirements and a willingness to fund the narrow channel.

The navigation channels have been located to avoid highly sensitive plants. There are two plants that have a conservatism value of "10" than have been sampled in Rice Lake. The navigation channel avoids these areas. These plants will be monitored closely along with other plants.[4] Also, the critical habitat assessment may reveal areas that need to be avoided.

Objective 3.2- Evaluate fisheries in regard to weed density and if reduction could help recruitment and growth. There is concern among anglers in Rice Lake that the weed growth may be so dense, that it is adversely affecting the fisheries. There is some evidence in fishery literature that supports this concern. However, this would need to be evaluated by a fisheries biologist.

[4] These are proposed channels. The density of the plants will be checked before final channels are delineated and part of a permit application.

It is the desire of the stakeholders to get this evaluation completed to determine if the concern is warranted. At some point in history, it was communicated to the Rice Lake Association that very high density aquatic plant cover could adversely affect fish foraging success. This is a concern of the Rice Lake Association and would like to have an evaluation done and have education provided about this issue.

Goal 4: Evaluate and preserve water quality in Rice Lake to limit increase in macrophyte density.

<u>Objective 4.1</u>-Evaluate the sources of phosphorus into Rice Lake that can contribute to higher density macrophyte growth.

There is concern over the sources of nutrients (phosphorus) into Rice Lake, especially potential loading from Bear Creek. This is largely due to the cranberry production taking place adjacent to Bear Creek. There is no history of evaluating phosphorus sources into Rice Lake. It is understood that reducing future phosphorus loading can help with reducing the density of aquatic macrophytes.

In order to complete this action, a monitoring program will be set up. This will entail collecting bi-weekly water samples from Bear Creek, in addition to 4 storm events, running from May to September. A simplistic method for estimating flow will be used to calculate loading from Bear Creek. In addition, sampling will continue at the deep hole in the lake as it has been done since 2010. The nutrient data from Echo Lake will be used to estimate the nutrients entering from the Turtle Creek. Then the Rice Lake watershed will be modeled to get an estimate for the Bear Creek (and other) contributions. Since the input of the cranberry production is not known to be into Bear Creek or Turtle Creek below the lake (or both), a delineation of the watershed around the lake is imperative. Curtailing this input from the Cranberry Bog presents a difficult scenario since Cranberry production in the State of Wisconsin is protected under various commerce laws and considered off limits. The only known successful litigation against a cranberry operation in Wisconsin was accomplished by the Bad River Tribe.

It is understood that excess nutrients can contribute to excessive macrophyte growth. By understanding the sources of nutrients, mitigation of nutrients will be more possible, which could reduce macrophyte density in the future.

Goal 5: Educate Rice Lake residents on the value of aquatic plants and the potential outcomes of an unbalanced environment.

<u>Objective 5.1</u>- Educate property owners about the importance of native aquatic plants and shoreline plants annually.

Objective 5.2- Provide education to property owners about the importance of native buffers in the riparian zone and the effects of fertilizer on increase in macrophyte density

Native plant buffers can reduce phosphorus immensely. Some literature cites reductions of up to 40%. Since Rice Lake has extensive macrophyte growth, leading to a need for reduction, mitigation of incoming nutrients could help. Since the runoff from lawns and development will run into the lake at the property owner's riparian, it could increase the macrophyte growth in that location, which is where it has the most impact on recreation use.

IMPLEMENTATION PLAN

Table 8

Actions	Timeline	Hours from volunteers	Party to oversee/manage	Comments
A-Full Lake PI Survey	June of 2020	0	Carol Warden	
B- Contact private boat landing owner about signs	Summer 2019	4 hours	Rice Lake Association/ Plant lead	
C- On water CBCW education near landing	Summer 2021 and ongoing	8 hours each	CBCW Lead Volunteers	Will need CBCW
		for 2 volunteers- 4 key dates		training earlier in 2021.
		(64 hours)		
D-employ Whitewater associates to conduct pre and post monitoring over the three year period of the grant	2021-2023		WhiteWater Associates	
E- Create volunteer monitoring crew, train and monitor lake for AIS	Summer 2021 and ongoing	2 hours training	Plant Lead	Contact AIS Coordinator from Iron County about possible training for AIS
				monitoring
		2 hours	Possibly consultant	
		every 2 weeks per volunteer to		
		monitor		
F-Implement hand pulling plan. See Appendix A	2021-2023	880 hours	Rice Lake Association	
G- Assistance in evaluation of fisheries and aquatic plant density including a fish survey	2021-2022	None	Rice Lake Association (will arrange or contact) and Wisconsin DNR	Contact fisheries staff

H- Evaluate phosphorus sources into Rice Lake, including Bear Creek and compare phosphorus source mitigation capabilities	2021-2022	40 Hours	Consultant	Apply for a small scale planning grant
I-Determine areas for Herbicide application	2023 & Beyond		Consultant	
J-Measure and map loon nesting area for mats	2021 & Beyond		Consultant	600 sq. Ft.
K-Evaluate possible limited DASH boat usage	2023 & Beyond		Consultant	

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Appendix A

Hand Pulling of CLP on Rice Lake – 2021

Proposal

In June of 2020 we conducted a test run of hand pulling of CLP on Rice Lake. Approximately 27 boat-hours* were spent in effective mass pulling. In the area covered we estimate that 90% of the weeds were pulled. The area covered is approximately 2% of the total lake, not including the river outlet.

Approximately 140 cubic feet of CLP (compacted) were removed.

If we were able to accomplish 800 boat-hours using our improved rakes and methods, we should be able to remove about 4,100 cubic feet and thoroughly cover a minimum area of about 87 acres. If we were to get on to the lake earlier in the CLP growth cycle, the numbers would improve.

When and How Long

First two weeks in June (or earlier), 2021 – about 80 hours of on-the-water system labor time.

Staffing

On the Water

- Approximately 24 full time persons
    - 20 in boats and pulling

    - 2-4 ferry boat persons

- Tribal Members: The Bad River Band of the Lake Superior Chippewa has expressed interest in using this operation as part of their youth training program.

- Northland College Students

- Hurley and Mercer Students (age problem?)

- Others including Rice/Pike Lake and ICLRA volunteers (11 volunteers x 80 hours (max) = 880 volunteer hours @ $12.00/hour credit = $10,560.)

Support Staff

- 2 Boat unloaders

- 1 Dump Trailer Loader/Driver

- 4 General support (organization, communications, safety, refreshments, boat cleaning, etc.)

Equipment Needed

- (10) 12-14' aluminum boats, motors, etc.

- Bags

- 10 Water Weed Rakes

- 1-2 Pontoon boats to ferry bags

- Dump Trailer

- Tractor to load dump trailer

- Port-a-pottys

- Steam Cleaning System

- Other

Facilities

One of the problems we encountered was the lack of convenient and available boat launch and removal areas. (Discuss improvement of Rice Lake Public Landing?) Beach or dock areas to keep the active boats during the two week period are needed.

Costs

✓ (20) paid on-the-water workers at $15.00/hour: (20 workers x 80 hours x $15/hour = $24,000.)

- ✓ (5) rented 14 foot aluminum boats and motors at $350/week: (5 boats x 2 weeks x $350/ week = $3,500.)
- ✓ Pontoon boats $1000(one boat will be volunteered)
- ✓ (6) Water weed rakes: $600.00
- ✓ Dump Trailer: $1,500.00
- ✓ Tractor $1000
- ✓ (1) Port-a-potty: $500.00
- ✓ (1) Steam cleaner: $1,300.00

Total estimate (as is) $31,900.00

* Boat- hours = (1) 14 foot aluminum boat with a raker and a navigator/rake clearer. Equivalent to 2 man-hours.

Appendix B
This appendix will address changes we incorporated in our plan per the DNR feedback below

DNR Feedback on Rice Lake Draft Aquatic Plant Management Plan, September 30, 2020

There are some quantitative metrics reported and a few species distribution maps but it is not clear from what survey year. And then a note that the data which UW-TLS collected out here in June 2020 is not included in this draft management plan. It seems that this most recent PI data is pretty critical to include in this draft plan which they are working to compile, especially if this plan is intended to cover them for the next ~5 years. Also, from our statewide records it looks like there were PI surveys conducted on Rice in both 2010 & 2014. It would be helpful if all the available years of PI data was compiled and available in the plan.
We included the PI survey data performed in June of 2020 and changed our plan to a three year format. These changes appear on pages #'s 21-24

Figures 8-14 do not have clear legends. And it is also not clear from which year survey these come from.
We removed these figures as they were repetitive and not relevant

The point is made that the FQI and coefficient of conservatism is high and "supports the presumption that Rice Lake's plant community appears unaffected by human development." The argument could also be made that the native plants are not ecologically affected by the presence of CLP.
The wording for this was changed on page #31

CLP seems to be the intended target species for management but where is the quantitative information (i.e., data or maps) for this species? What is the goal of CLP management? How will this goal be periodically assessed? Is there an appendix or something else that we missed?
Goal #1 and our implementation plan covers these concerns. Pages 49,55,60. Included is a map of the CLP locations.page 32. Appendex A explains our manual removal plan in detail.

Have water local reg & zoning staff been brought into the convo and allowed to proceed feedback on the proposed use of a benthic barrier? As noted, this would fall under Ch. 30 permitting, and this activity may not be something they would necessarily allow for. What size of an area is being considered? Wouldn't the installation and annual removal of a bottom barrier in this area also potentially impact the loon nesting?
Benthic barrier specifics are discussed on page #'s 35,36

Under 'manual removal' fragmentation of the plant is discussed. While caution should still be exercised, this might be more of a concern with lake with a very small population of an AIS, it may not be as concerning in Rice Lake where CLP is present throughout much of the lake.
Wording was changed on page #37

“Herbicide treatment’ is listed as an action item, but there’s no other relevant details provided here (i.e., acreage, chemical proposed to be used, timing, frequency, monitoring of efficacy/ selectivity)? This is all critical info to include in the plan.
All of the herbicide treatment options were removed from the three year plan. They were left open for consideration at the end of three years. See item I, page 56

Also under “herbicide treatment” it is not accurate to say these products are “safe” but that they determined to be low-risk when used according to the label.
“Safe” wording was changed to “low risk”

Under “Historical plant mgmt.” you mention AIS were managed through mechanical harvesting in the years 2004 and 2005. But CLP was not discovered until 2013. Which AIS was being managed? Is this section actually outlining native plant harvesting?
This was clarified on page #44
As defined in the “plans and goals strategy” section, objectives are measurable. What is being measured in Goal 1?
See page #49 for complete restructuring of goal #1
Goal 2 needs major revisions. As noted above, CLP seems to be the intended target species for management but where is the quantitative information (i.e., data or maps) for this species? What is the goal of CLP management? How will this goal be periodically assessed? There is no mention of hand pulling, DASH, or chemical herbicide in this section at all. What is measurable here? Discussion on monitoring for efficacy after each mgmt. action is implemented should be included too.
Also, it cites CBCW will occur by 2013.
Goal #2 was completely revised to show achievable methods and proper monitoring. Page #’s 49-50. We also removed the reference to 2013

In figure 18, the monitoring of ‘key areas’ vs. monitoring the littoral zone is confusing. It’s hard to clearly make out Fig 18, but it looks like a bunch of sub-PI points within smaller polygons scattered around the lake? The number individual sub-PI dots looks like a lot; it more than likely would take just as much time and effort (and maybe even less?) to conduct a lakewide PI following our standard protocol (317 points, some which will not be littoral). What is the rationale behind this monitoring approach? Is this an outdated monitoring approach from the first iteration of the plan? If so it should be updated to reflect where AIS is currently found or deemed irrelevant.
This is now figure #12. Surveying and monitoring will be accomplished by lake volunteers as explained in objective 2-3, page #50 and the map locations on page #51

Objective 3.1 defines measureable efforts to control native plants but then also says the plan committee has no plans to manage native plants. Maybe make it clear that the first part is from a historical view.
This wording has been corrected

Have any of the action items in Objective 4.1 been done since the last iteration of this plan? All results from this should be included in this plan.
This is an entirely new initiative and has not been done previously for the reasons explained in 4-1 on page #53

In general it seems like there are a lot of ideas presented here in the plan, but no actual concentrate goals or specific implementation strategies which are both very key components of the plan.