Rice Lake Aquatic Plant Management Plan: 2015-2019

APM Plan Update

Barron County, Wisconsin

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February 6, 2015

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APM Plan Update
Barron County, Wisconsin

Prepared for:
Rice Lake Protection and Rehabilitation District
Rice Lake, Wisconsin

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DEPT. OF NATURAL RESOURCES

February 2, 2015

Dan Genereau, Chairman
Rice Lake Protection and Rehabilitation District
P.O. Box 446
Rice Lake, WI 54868

Subject: Rice Lake Aquatic Plant Management Plan Approval Request

Dear Mr. Genereau,

Thank you for your efforts to understand, protect, and improve Rice Lake! This letter is to notify you that the APM Plan, dated January 2015, meets the criteria under Administrative Code NR 198.43 and thus DNR has approved the APM Plan. Approved management activities as outlined in the Plan, and summarized below, are eligible for funding under Lake Management Planning, Lake Protection and Classification, and Aquatic Invasive Species grants subject to the application requirements of those programs.

Approved management recommendations include the following:

1. AIS prevention activities including watercraft inspection and AIS monitoring
2. Species-specific AIS monitoring and control, provided it meets DNR guidelines and specifications outlined in the approved plan
3. AIS and lake educational activities

Please note: Aquatic plant control for the purposes of nuisance relief or navigation are *not* eligible grant activities, and the Department reserves the right to inspect nuisance conditions prior to permitting any management of native plants. Also, the following activities that are listed in Appendix B – Implementation Matrix are not grant eligible:

- Since harvesting isn't grant eligible, providing aid to landowners to remove fragments from harvesting and GPS tracking for harvesting aren't grant eligible
- CLMN water quality monitoring time is not grant eligible since that program is funded with state dollars
- Ongoing District administrative duties (voicemail, postings, webpage updates, etc.) are not grant eligible

Thanks to you and the lake community for your efforts to protect and improve Rice Lake.

Sincerely,

Alex Smith
Lake Biologist

CC:

Mark Sundeen, Cherie Hagen, Jane Malischke, Aaron Cole, Shelly Thomsen – WDNR
Dave Blumer – LEAPS
Lisa David – GLIFWC

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Rice Lake Aquatic Plant Management Plan: 2014-2019

APM Plan Update

Prepared for Rice Lake Protection and Rehabilitation District

1.0 Introduction

Rice Lake (WBIC 2103900) is located in Barron County in northwestern Wisconsin (Figure 1). The lake is an impoundment of the Red Cedar River covering approximately 940 acres. The water level in the lake is controlled by a dam operated by Barron County. The lake narrows at the Sawyer Street (County Road C) Bridge creating two basins, each with its own distinct set of characteristics. The maximum depth of the larger north basin (locally referred to as Upper Rice Lake) is 15 feet and it receives inflow from the Red Cedar River and Bear Creek, the primary tributaries to the lake. The smaller south basin (Lower Rice Lake) has a maximum depth of 19 feet and has a number of bays including Clear Water Bay which has a high diversity of aquatic plant life.

The lake has established colonies of curly-leaf pondweed (*Potamogeton crispus*) and Japanese Knotweed (*Polygonum cuspidatum)*. Purple loosestrife (*Lythrum salicaria*), Chinese mystery snails (*Cipangopaludina chinensis*), and Rusty crayfish (*Orconectes rusticus*) are also present. The Rice Lake, Lake Protection and Rehabilitation District (District) has an active aquatic plant management program including herbicide application and harvesting of curly-leaf pondweed and harvesting of native plant species throughout the open water season to maintain navigation and recreation channels.

The City of Rice Lake is adjacent to the lake and both are substantially impacted by each other. The lakeshore is nearly fully developed. Downtown Rice Lake is along the west shore and a significant portion of the urban storm sewer from the city drains directly to the lake. Numerous public boat launch facilities exist around the lake, with the most frequented launch facilities at Veterans Memorial Park and at the downtown launch site at the Lumbering Hall of Fame Park off Stein Street. There are a number of businesses located on the lake including hotels, resorts, bars, and restaurants, as well as manufacturing facilities. Several private residences on the lakes are operated as vacation rental units. Tourist and locals use the lake for boating, fishing, waterfowl hunting, water skiing, cross country skiing, wildlife watching, and general recreation. The main attraction to Rice Lake is the fishing, including trophy muskellunge.

Rice Lake was listed as a Wisconsin 303(d) impaired water in 2012. The Lake is listed for recreational use due to excess algal growth. Total phosphorus, a pollutant in Rice Lake, falls within the limits of the Phosphorus Total Maximum Daily Load (TMDL) Plan for Tainter and Menomin Lakes in central Dunn County, WI; two hyper-eutrophic impoundments located near the bottom of the Red Cedar River watershed.

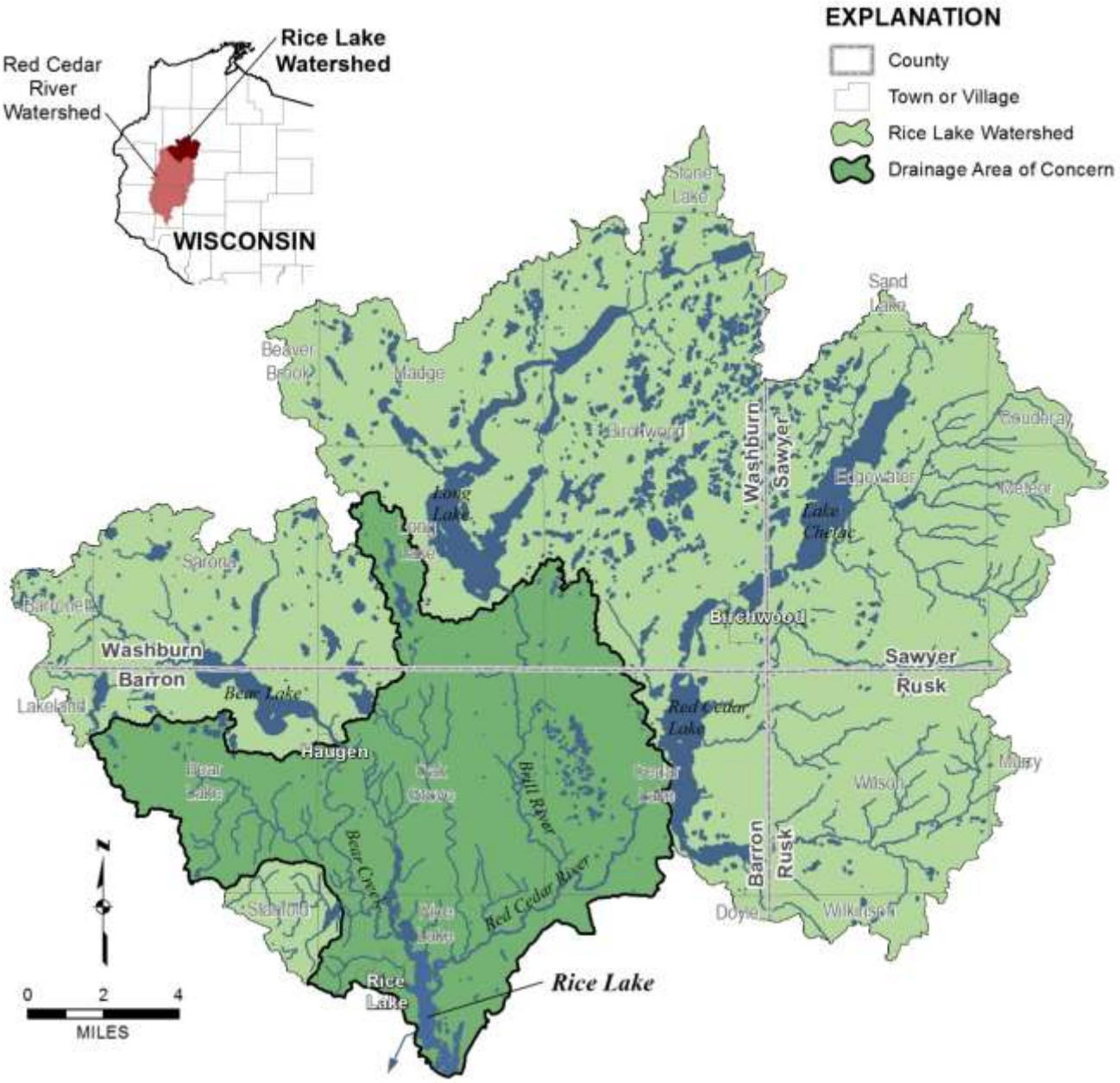

Figure 1 – Location of Rice Lake and its watershed

1.1 Management Units

The Rice Lake Protection and Rehabilitation District (District) was established in 1977 to include the municipal boundaries of the City of Rice Lake and a large portion of Rice Lake Township. The mission of the District is to represent and protect the interests of the residents and property owners of the Town and City of Rice Lake. The District seeks to protect the ecology of the lake, enhance the natural scenic beauty, control invasive species, and promote responsible boating, swimming, fishing, and recreational opportunities that Rice Lake offers to residents and visitors.

Along with the District, there are a number of other lake stewardship groups within the Rice Lake watershed. Groups with aquatic plant management plans include the Bear Lake Association along headwaters of Bear Creek, the Long Lake Preservation Association at the headwaters of the Brill River, the Red Cedar Lakes Association and Big Chetac Chain Lake Association at the headwaters of the Red Cedar River, and the Desair Lake Association along a tributary to Bear Creek (Figure 2). What happens in the larger watershed, impacts the aquatic plants in each of these lakes. Each of these groups are actively managing their lakes and watersheds in an effort to reduce nutrient loading which help to fuel nuisance aquatic plant growth, native or non-native invasive species. All of these groups are either managing aquatic plants already or are considering it in the near future. The District is addressing its portion of the watershed through a recently completed Comprehensive Lake Management Plan and through a special project funded by the WDNR and Wisconsin Department of Transportation (WDOT). It is important that the District maintain open lines of communication with other groups in the watershed to coordinate management efforts, particularly regarding water level management as most are impoundments upstream of Rice Lake.

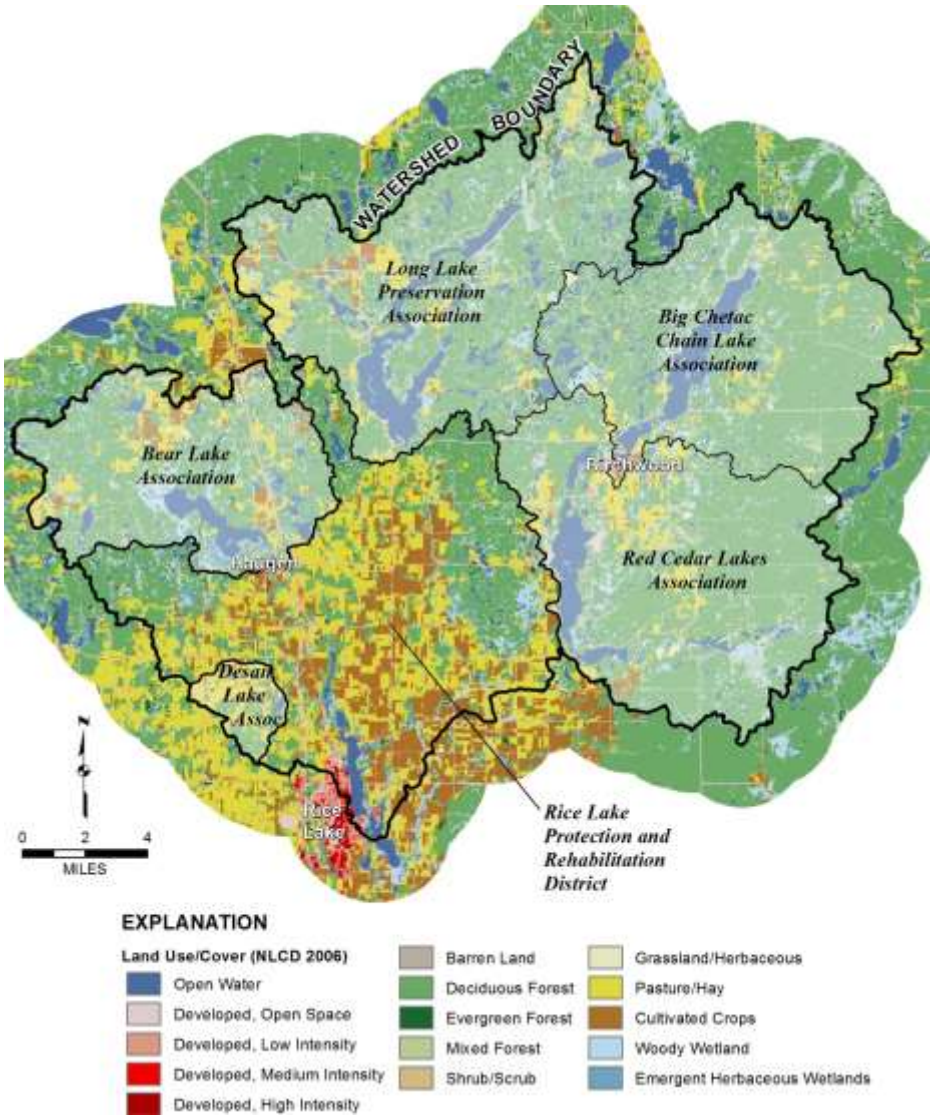

Figure 2 – Lake Management Groups in the Rice Lake Watershed.

1.2 Documentation and Need for Management

In 2008, more than 200 acres of documented, dense growth curly-leaf pondweed (CLP) posed a significant problem for Rice Lake. CLP interferes with many late spring and early summer activities on the lake, including the annual week-long City of Rice Lake Aquafest Celebration in mid-June. Dense CLP growth also negatively impacted early season native plant growth by forming dense canopies of vegetation that blocked sunlight and prevented native plant growth. In late June and early July when CLP completes its life cycle, dropping out the water column and depositing a new crop of turions (tubers for next year's growth), dies, and decays (senesces), nutrients released by the decaying plants contributed to the total nutrient loading issue in the lake and may have negatively impacted dissolved oxygen levels.

Since the implementation of the 2010 APMP, the amount of CLP in the lake has been reduced, but CLP still dominates early spring aquatic plant growth in the lake. Soon after CLP drops out of the water column, aquatic plants like coontail (*Ceratophyllum demersum*), Canadian waterweed (*Elodea Canadensis*), and water celery (*Vallisneria Americana*), and white water lily (*Nymphaea odorata*) that do well under nutrient rich (eutrophic) conditions begin to emerge and grow to nuisance levels in some places interfering with boat navigation and riparian access in the lake. Managing CLP and in some areas, native plant growth is a necessity in Rice Lake. Managing people's conception of the plant growth in Rice Lake is equally important to assure acceptance, understanding, and compliance of the management recommendations included in this planning document.

The District currently owns and operates three large aquatic plant harvesters and the bulk of the aquatic plant management they do, both for CLP and nuisance native aquatic plant growth is completed with them. A large majority of CLP growth is in the main body of the lake (Central and North Basins) however, several small and persistent CLP beds exist in the South Basin of the lake. Even with the new Narrows Bridge between the main basin and South Basin of the lake, none of the existing harvesters can be driven under the bridge, making it necessary to carry a harvester overland and launch it in the South Basin. Once it is placed in the South Basin it generally remains there, as the required process to transport the harvester overland is arduous and time consuming. The limited amount of CLP in the South Basin makes harvesting it an inefficient use of one of the harvesters. One of the keys to the success of the 2010 APM Plan at reducing CLP was making three harvesters available on the main basin of the lake to remove as much CLP as possible during the best timeframe for CLP harvest. Early season application of aquatic herbicides was used to control CLP in the South Basin.

Rice Lake is at risk for the introduction of new aquatic invasive species (AIS) including Eurasian watermilfoil (*Myriophyllum spicatum*). Although Eurasian watermilfoil was not found during the last aquatic plant survey work in 2008, or the aquatic plant survey work completed in 2013 as a part of this project, it remains a concern because of its presence in other lakes nearby, such as Shallow Lake in Washburn County, which is approximately 14 miles northwest of Rice Lake. Rice Lake is a popular destination for musky (*Esox masquinongy*) fishermen, and many of the musky lakes in the popular Hayward Lakes area, are only an hours' drive north of Rice Lake. Eurasian watermilfoil can be transported via boat traffic from infested lakes. Watercraft inspection, in-lake AIS monitoring and educational and outreach efforts are necessary to prevent the introduction and establishment of Eurasian watermilfoil and other AIS in the lake.

2.0 Management History

The District has been managing aquatic plants in Rice Lake since the early 1980's. Aquatic plant management in the lake has been guided by a series of lake and aquatic plant management plans developed for the District and approved by the Wisconsin Department of Natural Resources (WDNR), the latest which was developed in 2010. Prior to 2010, aquatic plant management consisted primarily of large-scale mechanical harvesting starting in late May and early June for curly-leaf pondweed (CLP), and continuing through the summer season with other native plants. After the 2010 Aquatic Plant Management Plan (APMP) was implemented, aquatic plant management was more integrated including physical removal, large-scale harvesting, and the use of aquatic herbicides in strategic locations.

The following is a review and revision of the 2010 APM Plan and is intended to be used to guide aquatic plant management in Rice Lake through the next five years. This final document should be considered the new 2014 Aquatic Plant Management Plan.

2.1 Aquatic Plant Management Actions Prior to 2009

A Lake Management feasibility study completed by the WDNR in 1983 resulted in a weed harvesting program which began in 1985 using pre-owned weed harvesters. An aquatic herbicide application program was also started at that time but was discontinued after two years because of concerns voiced by the general lake public. From 1992 through 1994 the District received grant money to complete an aquatic plant and general lake study project. This study was completed by Ayres Associates of Eau Claire and resulted in a 1993 Lake Management Plan. An aquatic plant management (APM) plan was completed in 1994 and included funding to purchase two 10-foot aquatic plant harvesters.

The objectives of the 1994 APM Plan included improving the lake for water-based recreation, recognizing aquatic plants as a resource to be managed and protected, and lessening the consequences of lake aging. The intent of the plan was to remove nuisance level plant growth including CLP, coontail, and common waterweed through harvesting and an annual drawdown for spring shoreline clean-up. Only nuisance level vegetation (primarily CLP) was to be harvested and areas designated "sensitive areas" were to be protected. The harvesting plan was to include 3 weeks of shoreline clean-up in late April and early May, followed by intensive CLP harvesting and then seasonal removal of other nuisance plants through September. Harvesting activities were to be concentrated in just a few areas of the lake and cutting depth was established at "5 feet or to near bottom." Off-loading sites and disposal sites were designated. District employees were to be trained on-the-job by experienced staff in "all aspects of the harvesting operation." They were also instructed to keep records related to the total tonnage and plant species harvested. During off-loading District employees were to "look for the presence of game fish, turtles, and other aquatic organisms and remove them back to the lake." Education and information of the public was to include newspaper and radio reports, monthly and annual meetings, speakers, and handouts. A procedure was put in place to District members to make complaints or appeal actions by the board.

Post harvesting plant surveys were included to determine the overall effect of the harvesting program on the aquatic vegetation in the lake. Nutrient management in the lake to lessen consequences of lake aging comprised of proper removal and disposal of the harvested plant material.

Reports from 1992 and 1993 vary in terms of the total tonnage of aquatic plants harvested. The 1993 Ayres report indicates that 316 tons were removed in 1992 and 516 tons were removed in 1993. The 1994 APM Plan indicates that 1560 tons were removed in 1992 and 1932 tons were removed in 1993. The next reported tonnage is from 2005 through 2008. During this time frame an average of approximately 1018 tons of vegetation was removed. There are no records related to what plant species were removed. From 2005-2007 harvested plants were disposed of at a landfill. In 2008, the harvested plants were delivered to an area farmer to spread on his land at a later date.

In 1998, the District submitted a Waterways Commission grant for the purchase of a third 10-foot aquatic plant harvester. The 1994 APM Plan was re-evaluated by the WDNR, and though it was approved, the grant awarded, and the third harvester purchased, several stipulations or changes were requested by the WDNR. These changes included more information about the equipment used for harvesting and a plan to replace that equipment, more information on operator qualifications, training, and safety procedures; more information on how the public is to be kept informed; procedures for complaints; and special circumstances that may warrant additional harvesting. A more detailed description of operational records including daily logs for harvesting times, acres, loads, maintenance, etc was also requested.

Variations in how the 1994 plant management plan was been implemented between 1998 and 2006, prompted WDNR officials to require the District in June 2007 to update the 1994 APM Plan. The new plan had to be in place by the 2010 season. This prompted the District to pursue grant funding in 2008 to complete a new APM plan, and to re-evaluate what can be done to reduce much of the nutrient loading to the system. From this, the 2010 APM Plan was written and approved for implementation.

2.2 Aquatic Plant Management Actions between 2009 and 2013

The 2010 APMP was written to address the concerns relative to earlier aquatic plant management operations. The goals, objectives, and actions of that plan were implemented between 2010 and 2013. The following is a summary of the aquatic plant management actions implemented over that time period. It begins with 2009, as a special request was made by the District to the WDNR asking for approval to implement a “trial” aquatic herbicide application to control CLP along Lakeshore Drive in Rice Lake.

2.2.1 2009

Curly-leaf Pondweed

Twenty acres of curly-leaf pondweed (CLP) were chemically treated in 2009. This was the first time in many years that an aquatic herbicide was used on Rice Lake to control CLP. The area included above ran from Knapp Street to Newton Street. It contains the City Front Park including the Band Shell and the City Beach. The majority of Aquafest activities take place in this section of downtown Rice Lake. Water depth in this area of Rice Lake ranges from 3 to 10 feet deep and bottom substrates are sand, gravel, and rock, covered with a thin layer of muck. This area was determined to have dense CLP growth in the June 2008 cold-water CLP Bed Mapping and Survey. The presence of native plants was not recorded in June, but a late July point-intercept plant survey identified coontail, common waterweed, northern watermilfoil (*Myriophyllum sibiricum*) , flat-stem pondweed (*Potamogeton zosteriformis*), and water celery in abundance and lesser populations of several pondweeds including leafy (*P. foliosus*), Fries’ (*P. friesii*), clasping-leaf (*P. richardsonii*), small (*P. pusillus*), Robbins (*P. robbinsii*), and Sago (*Stuckenia pectinata*).

The goal of this management was to clear the lake front of excessive exotic vegetation prior to the Rice Lake Aquafest celebration in mid-June. Harvesting in this area in past years has left the lakefront in a mess, with plant fragments washed into the shore and the bottom stirred up. In some years, harvesting was delayed until after panfish spawning in the area.

The treatment area was divided into two separate areas: one shallow (10 acres) and one deeper (10 acres). The shallow area was treated at 1.0 ppm acid equivalent (ae) using a granular formulation of endothall (Aquathol Super K). The deeper water area was treated at 1.5 ppm ae. Pre- and post-treatment survey work was completed in the treatment area. The pre-treatment survey which included 106 points did not change the proposed treatment area. The actual herbicide application took place in mid-May.

A post-treatment survey of the same points was completed approximately 4 weeks after the herbicide application. The post-treatment survey results were used to determine the impact of the herbicide management on the target plant (CLP) and on native plants in the treatment areas. The post-treatment survey showed a significant decrease in CLP coverage and density. The frequency of the CLP went from 88% of the points in the pre-treatment survey to 22% of the points (chi square determined this was a significant decrease). The mean density of all points with CLP went from 1.33 to 0.25, which a t-test determined was a significant decrease. In addition the mean density when considering only sample points with CLP in the pre-treatment survey went from 1.50 to 0.27. Again the t-test showed this to be a significant reduction.

Native Plants

The native plants seem unaffected by the herbicides. Although the analysis was limited by data points, no significant decrease in most native species seems to have occurred. If herbicide treatment takes place next spring (2010), the native species can be evaluated at all sample points. It is unknown how much CLP was harvested in 2009.

2.2.2 2010

The District was awarded one year of funding for implementing the Rice Lake Aquatic Plant Management (APM) Plan completed in 2009. The project included curly-leaf pondweed treatment with herbicides and harvesting; native plant removal; watercraft inspection; aquatic invasive species monitoring; surface water quality and tributary sampling; purchase of water testing equipment, GPS and sonar equipment, laptop computer, printer, and software; and channel marker buoys; plant density monitoring, hiring of a District Summer Position to develop shoreland improvement materials, complete shoreland improvement planning, meet with the public to discuss shoreland improvement projects, provide public awareness and information opportunities, and to assist with District operations.

Curly-leaf Pondweed

The District concentrated its early season efforts in 2010 on removing as much as 80% of the annual growth of CLP from the lake using a combined approach of chemical herbicides in strategic areas, and large-scale aquatic plant harvesting. Three large weed harvesters were used to remove more than 105 acres of CLP from the lake in 2010. In addition, four areas of the lake covering 46.6 acres of CLP were chemically treated in early May using a granular formulation of the chemical herbicide Endothall (trade name Aquathol Super K) at 1.5 ppm applied by a licensed applicator using a mechanical cyclone spreader attached to a boat. The total CLP removed was approximately 152 acres.

The pre-treatment survey was completed April 17, 18, and 21 and again in early May and 88% of the points had CLP. The depth range of samples in the pre-treatment survey was between 2 and 12-ft with CLP most concentrated between 4 and 9-ft. More than 70% of the sites sampled in the 4-9-ft depth range had CLP present, only 30% of the sites deeper than 9-ft and less than 4-ft had CLP present.

A post treatment survey was completed in early June approximately 4 weeks after the herbicide application. The post treatment survey showed a statistically significant decrease in total CLP coverage and density. Frequency dropped from 88% to 22% of all points sampled with CLP present. A year to year comparison was made in one of the beds treated in both 2009 and 2010. The change in CLP density in this bed from 2009 to 2010 showed a statistically significant decrease that went from a 0.25 to a 0.02 rake head density rating.

Several observations made during the 2010 post treatment survey suggest that the concentration of herbicide use in the 2010 treatment was too high, particularly in water less than 6-ft deep. In 2009, two different concentrations of herbicide were used, 1.5 ppm in deeper water along the outer edge of the treatment area adjacent to the river channel that flows through Rice Lake, and 1.0 ppm in the rest of the area consisting of water shallower than about 8-ft. In 2010 all areas were treated at 1.5 ppm regardless of depth and proximity to the river channel.

Native Plants

It appears that several native plant species showed a statistically significant decline after treatment. Growth of several other species of pondweed also seems to have declined. It cannot be said definitively that the application of chemical herbicide caused these declines, but it is entirely possible. Growth of several native species did increase in the treated areas, including one less desirable species, filamentous algae.

All three harvesters were used in 2010 to remove CLP from the North and Central Basins of Rice Lake. No CLP was harvested from the South Basin in 2010. The best time to harvest CLP is when it has gotten close to maturity and before it has started to produce turions. Late May and early June is generally the time during the year when harvesting can be best utilized. CLP growth in 2010 did not reach the levels it did in 2008. Rice Lake harvesting operations removed approximately 105 acres above and beyond the nearly 50 acres that were chemically treated. Harvesting began on May 10th, 2010 and continued through June 28th. A total of 312 hours of harvesting time was put in taking out 59 loads, or about 236 tons of CLP.

Native Plant Harvesting

CLP harvesting ended June 28, 2010. At this time the focus of the harvesting program changed to providing navigational and nuisance relief from dense growth of native plants in designated channels around the lake. Two harvesters were left on the North and Central Basins, and one harvester was transported to the South Basin to complete late season harvesting there. Native plant harvesting officially began on July 6th, 2010 and was ended on September 8th, 2010. Approximately 412 hrs of harvesting time was spent keeping approximately 45 acres of channels open around the lake. District employees recorded the removal of 75 loads of native plants accounting for approximately 209 tons of vegetation.

2.2.3 2011

Curly-leaf Pondweed

Based on 2010 post treatment survey work and historic areas of CLP growth, a 2011 early season CLP chemical treatment of 58.55 acres along lake shore drive in the main basin of the lake and in two smaller beds in the south basin of the lake was proposed. Pre-treatment survey work that was completed reduced the proposed treatment area to 41.56 acres. Aquathol Super K, a granular formulation of the active ingredient endothall was applied by licensed pesticide applicators from Midwest Aquacare on May 19th, 2011. The herbicide was applied at 0.75 ppm in shallow water less than 5-ft deep, and at 1.0 ppm in deeper water.

Three large weed harvesters were used to remove approximately 139 tons of CLP from approximately 110 acres of the lake in 2011. Harvesting began on May 31, 2011 and continued through July 5th. The total CLP removed from Rice Lake in 2011 covered approximately 160 acres.

Post treatment survey work was completed approximately 4 wks later in late June. Survey results indicated a statistically significant reduction in CLP from pre treatment levels when all treatment areas were considered. However, not all of the treated beds had statistically significant changes when considered individually. Overall, the treatments were less effective in 2011 than in 2010 in several areas near Lakeshore Drive and additional CLP growth was documented outside of the 2011 treatment areas, in essence having been missed by the application.

Native Plants

Native plants did not appear to suffer as greatly in 2011 as compared to the 2010 treatment. The frequency of occurrence was significantly lower from pre to post treatment for four species forked duckweed (*Lemna triscula*), water celery, white water crowfoot (*Ranunculus aquatilis*), and Robbin's pondweed. This reduction could have been due to seasonal variations (plants still dormant) or sampling variation from one year to the next. It is unlikely due to herbicides (although could be) because the target species was not reduced very much in many areas. There was a significant increase in two species clasping-leaf pondweed and small pondweed.

The concentrations used in 2011(0.75 ppm and 1.0 ppm) were much lower than the concentration used in the 2010 treatment (1.50 ppm). It appears that the lower concentration in 2011 was less effective at killing CLP than in 2010. However, native plants in the treatment areas faired a bit better than they did in 2010.

Native Plant Harvesting

The 2011 native plant/late season harvesting plan for Rice Lake allowed nearly 65 acres of navigation channels varying in width from 20 to 160 ft. The total area harvested for navigation and nuisance relief was substantially less than what was planned for 2011. Several areas were not harvested including the west shore north of Lake Shore Drive, the two narrower channels alongside the wider navigational channel again marked with buoys in 2011, and in Hanson's Bay in the south basin. Due to excess growth of common waterweed (*Elodea Canadensis*) in the area between Fireworks Island and the west shore along Lakeshore Drive, an additional channel was established through that area midway through the season.

District employees and the Lake Educator monitored particularly dense areas of vegetation and tried to address land owner concerns. 287 hours were spent cleaning up shorelines and harvesting approximately 60 acre of navigational channels. Nearly 326 tons of native aquatic plants were harvested from July 6th through September 15th, 2011. Wild celery, coontail, and common waterweed were the most frequently removed aquatic plants.

2.2.4 2012

Curly-leaf Pondweed

Based on 2011 post treatment survey work and historic areas of CLP growth, a 2012 early season CLP chemical treatment of 58.55 acres that included areas along Lakeshore Drive in the main basin of the lake and in two smaller beds in the south basin of the lake was proposed. South basin herbicide use allows the RLPRD to keep all three harvesters on the main basin of the lake during the active CLP harvesting period. Three harvesters allow for faster removal, better clean-up of fragments, and less wear and tear on all three machines. Herbicide use along Lakeshore Drive improves the aesthetics of the lake shore area for visitors and during the mid-June Aquafest events.

Pre-treatment survey work completed in late April 2012, reduced the proposed treatment area to 46.65 acres. The purpose of a pre-treatment aquatic plant survey is to determine if the target plant (CLP) in present in enough quantity to warrant treatment. 252 points within and near the proposed treatment area were evaluated.

Aquathol Super K, a granular formulation of the active ingredient endothall was applied by licensed pesticide applicators on April 30th, 2012. The herbicide was applied at 1.25 ppm. Three large weed harvesters were used to remove approximately 138 tons of CLP from approximately 110 acres of the lake in 2012. Harvesting began on May 10, 2012 and continued through July 2nd. Approximately 233 hours were put in harvesting nearly 60 harvester loads of CLP. The total CLP removed from Rice Lake in 2012 was approximately 157 acres.

Post treatment survey work was completed approximately 4 wks later in late May. Survey results indicated a statistically significant reduction in CLP from pre-treatment levels when all treatment areas are considered. A significant reduction in CLP is also indicated when comparing 2011 post treatment to 2012 post treatment.

Native Plants

Native plants did not appear to suffer greatly in 2012. There was no significant reduction in any native species, although 6 species showed a slight decrease. Two native species showed a significant increase (common waterweed and northern watermilfoil) and a third species, slender waterweed (*Elodea nutalli*), showed a significant increase although the plant survey person is not completely sure that all of the nutalli he identified truly was nutalli. It could have been common waterweed (*Elodea canadensis*).

The concentrations used in 2012 (1.25ppm) were much lower than the concentration used in the 2010 treatment (1.50 ppm), but higher than the concentration used in 2011 (0.75ppm and 1.0ppm). It appears the adjusted 2012 rate was effective at reducing CLP and protecting native species.

Native Plant Harvesting

A native plant/late season harvesting plan was completed by SEH for Rice Lake. It allowed nearly 65 acres of navigation channels varying in width from 20 to 160 ft. The total area harvested for navigation and nuisance relief was less than what was planned for 2012 (61.7 acres). No additional channels were proposed for harvesting in 2012. Common waterweed, coontail, and water celery were the three most common native plants species removed from the lake during harvesting.

District employees and the AIS Coordinator monitored particularly dense areas of vegetation and tried to address land owner concerns. 422 hours were spent cleaning up shorelines and harvesting approximately 60 acres of navigational channels. Between July 3rd and August

30th, 2012, 272 tons of vegetation was removed, down from nearly 326 tons of aquatic plants that were harvested between July 6th and September 15th, 2011.

2.2.5 2013

Curly-leaf Pondweed

From 2009 to 2012, intensive CLP management was completed along Lakeshore Drive using aquatic herbicides (Aquathol Super K) with good results. As a result, no herbicide application was originally planned in 2013 in order to see how the lake would respond. However, during the post-treatment survey in 2012, two small areas of CLP near Hospital Bay inside of what was considered Bed B were identified as not having been impacted (or missed) in the 2012 treatment. As a result, 5.5 acres of CLP was recommended for chemical treatment in 2013. Instead of using granular endothall, liquid endothall was used to save money, and to see if it could be as effective as the granular had been. Since a liquid herbicide has the potential to dilute faster in small areas, reducing the target contact time, the concentration used was increased from 1.25 ppm granular in 2012, to 1.5-2.0 ppm liquid in 2013. The liquid herbicide was applied on the surface (not by hose under the surface) by a licensed applicator.

No pre and post treatment survey work was completed in 2013, however anecdotally (based on comments from District personnel, the treatment was less effective than those completed in past years. Harvesting of CLP in 2013 was delayed until early June due to ice, snow, and cold weather lasting into mid-May. Approximately 214 hours were spent harvesting 33 harvester loads equating to approximately 65 tons of CLP harvested from June 10 to July 8, 2013.

A point-intercept survey was completed in early July to identify points with CLP. In the areas that were chemically treated over the course of the last 4 years (2009-2013), CLP was less dense and less widely distributed. Total density and distribution was down significantly from 2008. How much of this can be attributed to the integrated management program implemented in the 2010 APM Plan is not quantifiable.

Native Plants

The impact of the 2013 CLP chemical application on native plants was not measured, as no pre- or post-treatment survey was completed.

Native Plant Harvesting

A native plant/late season harvesting plan was completed for Rice Lake. It allowed nearly 65 acres of navigation channels varying in width from 20 to 160 ft. The total area harvested for navigation and nuisance relief was less than what was planned for 2013. No additional channels were proposed for harvesting in 2013, instead further restrictions were placed on the channel harvesting up the river due to the presence of wild rice in 2013. During the 2013 whole lake point-intercept survey, two locations (both in the river upstream of the lake) were identified with very sparse (a couple individual plants) growth of wild rice. Common waterweed, coontail, and water celery were again the three most common native plants species removed from the lake during harvesting.

District employees and the Lake Educator monitored particularly dense areas of vegetation and tried to address land owner concerns. 404 hours were spent cleaning up shorelines and harvesting approximately 50 acres of navigational channels. Between July 9 and September 11, 2013 only 138 tons of vegetation was removed, making it the lightest year since the 2010 APM Plan was implemented.

2.2.6 Curly-leaf Pondweed Turion Density Monitoring

Measuring the total density of CLP turions (turions/m2) in the sediment in managed areas can add to the determination of a successful management program. Turion density is not affected by annual growing conditions like the actual biomass of vegetative growth can be. To determine turion density, a Ponar sediment sampler was used to grab sediment from the bottom of Rice Lake at 45 to 60 randomly generated points within the chemically treated areas of the lake. The sediment samples were "washed" to remove sediment and then a count of all turions present completed. The area of the sampler was then extrapolated to provide a suggested density of turions in a square meter of the lake bed.

CLP turion density was measured each year for three years (2010 – 2012) in four treatment areas: Bed A (between Fireworks Island and the lake outlet); Bed B between Bed A and the old Hospital Bay; Bed C (Hanson's Bay in the South Basin); and at the entrance to Clearwater Bay in the South Basin). Over a three year period, three of the four beds (B, C, and D) saw a decline in turions present. Only Bed A saw an increase in turions from 14.9 turions/m^2 to 22.9 turions/m^2. No turion density monitoring was completed in 2013.

2.2.7 Aquatic Plant Harvesting Efforts (2010-2013)

From 2010 to 2013, there was a steady decline in the amount of CLP harvested from Rice Lake annually. In 2010, 209 tons of CLP was harvested; in 2011, 139 tons was harvested; in 2012, 138 tons was harvested; and in 2013, only 65 tons was harvested.

Since 2011, there has been a steady decline in the amount of native or late season aquatic vegetation that was removed annually. In 2011, 326 tons of late season vegetation was harvested; in 2012, 272 tons was harvested; and in 2013, only 138 tons was harvested.

According to the results of the 2013 whole lake aquatic plant point-intercept survey and water quality monitoring since 2010, the high quality aquatic plant population has remained, and water quality has not suffered.

2.3 Aquatic Plant Management Strategy

The WDNR aquatic plant management guidelines and the Northern Region Aquatic Plant Management Strategy formed the framework for the development of this APM plan. All existing and new APM plans and the associated management permits (chemical or harvesting) are reviewed by the WDNR. APM plans developed for northern Wisconsin lakes are evaluated according to the Northern Region APM Strategy goals that went into effect in 2007. Additional review may be completed by the Voigt Intertribal Task Force (VITF) in cooperation with the Great Lakes Indian Fish and Wildlife Commission (GLIFWC).

The VITF is composed of nine tribal members and a chairperson. The VITF recommends policy regarding inland harvest seasons, resource management issues, and budgetary matters to the Board of Commissioners. The VITF addresses matters that affect the treaty rights of the member tribes in the 1837 and 1842 Treaty ceded territories. The VITF recommends harvest seasons and regulations for each inland season. Those recommendations are then taken to the respective tribal councils for ratification prior to becoming an ordinance.

GLIFWC is an agency of eleven Ojibwe member tribes from Minnesota, Wisconsin, and Michigan, who retain off-reservation treaty rights to hunt, fish, and gather in treaty-ceded lands. GLIFWC exercises powers delegated by its member tribes and assists member bands in implementing off-reservation treaty seasons and in the protection of treaty rights and natural resources. GLIFWC provides natural resource management expertise, conservation

enforcement, legal and policy analysis, and public information services. All member tribes retained hunting, fishing and gathering rights in treaties with the U.S. government, including the 1836, 1837, 1842, and 1854 Treaties.

This Aquatic Plant Management Plan supports sustainable practices to protect, maintain and improve the native aquatic plant community, the fishery, and the recreational and aesthetic values of the lake. This plan also lays out a strategy to prevent the introduction of new AIS not currently known to be in Rice Lake, which includes a monitoring program to aid in early detection of any new AIS. This five-year plan is intended to be a living document to be evaluated on an annual basis and revised as needed to ensure goals and community expectations are being met.

3.0 Public Participation and Input

The District provided input, support and review of draft documents during the development of this aquatic plant management plan. Further public input was collected throughout the implementation of the 2010 APM Plan. The Draft Aquatic Plant Management Plan was released for a three-week plus public review and comment period from October 5, 2014 through October 31, 2015. The APM Plan was put in paper copy at the Rice Lake Public Library, Rice Lake Town Hall, and Rice Lake City Hall for public review, and posted on the District webpage at www.rllakedistrict.org. Reviewers were directed to send their comments via email, phone, or in person to Lake Education and Planning Services, LLC or any of the present District Board Members. A press release announcing the availability of the plan and dates of the public comment period was placed in the Rice Lake Chronotype. The availability of the APM Plan for review was also announced on three different dates during radio interviews conducted the month of October. Comments were again asked for at the Rice Lake – Lake Protection and Rehabilitation District annual meeting held at the Rice Lake City Hall on October 15, 2014.

By the end of the public review period, no public comment had been made.

The Rice Lake – Lake Protection and Rehabilitation District Board approved the APM Plan during their September 2014 Board Meeting by unanimous decision.

4.0 Aquatic Plants in Rice Lake

4.1 Aquatic Plant Comparison: 2008 and 2013

In June and late July 2013, a full lake aquatic plant survey using the point intercept method was conducted on Rice Lake in Barron County Wisconsin. The last full lake aquatic plant survey using the point intercept method was completed in July 2008.

4.1.1 Curly-leaf Pondweed

From 2008 to 2013 there was a significant reduction of curly-leaf pondweed density and distribution in Rice Lake. Although an early season point intercept was not conducted for CLP in 2008, the plant beds were mapped. By overlaying these beds and the sample points, it is estimated that there would have been a minimum of 235 sample points with CLP in 2008, and most of these points would have been given a rake head density rating of 2 (moderate) or 3 (dense), the highest values. In the early season point intercept survey conducted for CLP in 2013 only 153 sample points had CLP, and only 39% of these had a density rating or 2 or 3. These numbers could be skewed by the fact that harvesting and herbicide application in 2014 all took place prior to the early season point intercept survey. However, this apparent reduction in CLP is also supported by CLP harvesting totals since 2010, with total tonnage in 2013 down more than 70% from the total tonnage in 2010. And in three of the four areas where CLP management using aquatic herbicides was implemented since 2009, CLP turion density is also down.

Growing conditions for all aquatic plants were less than favorable in 2013, giving rise to the possibility that the declines in CLP identified here could have been impacted by the weather in 2013. No herbicide management of CLP was completed in 2014, although harvesting did. It was expected that CLP growth in 2014 would rebound to some degree, but still remain below levels identified in 2008.

As expected, CLP harvesting totals in 2014 remained low, actually below 2013 levels, with only 36 tons of CLP harvested. As planned, no herbicide management was completed in 2014. If CLP density and distribution appears to increase in subsequent years, management actions have been identified in this new APM Plan.

4.1.2 Native Plants

There were a number of similarities and difference in the statistics from the 2008 and the 2013 surveys. The exact sample locations used in 2008, were used in 2013. However, due to GPS location error, sample locations can vary by several feet. The surveys showed the same or similar values with Simpson's diversity index and species richness. This shows that the plant diversity is basically the same in both surveys.

The maximum depth of plants is different in the two surveys. In 2008 this depth was 16.2 feet and in 2013, it was 2+ feet shallower at 14.1 feet. Since the maximum depth of plants in 2013 is less, the number of sites within the littoral (plant growing) zone is less as well when compared to 2008. The frequency of occurrence within the littoral zone was higher in 2013. A number of plants were sampled at fewer points than in 2008 however their relative frequencies when compared to the other plants also sampled in 2013 were mostly the same. The relative frequency value shows plants that are the dominant species in the lake. The higher the relative frequency the more common the plant is compared to the other plants and therefore the more frequent in the plant community. In 2013, 11 plant species with a relative frequency of 2.0% or greater made up 83.37% of all the plants in the lake. In 2008, 10 plant species with a relative frequency of 2.0% or greater made up 79.81% of all the plants in the lake.

Eight plant species are common to both years. In both surveys, coontail (*Ceratophyllum demersum*) in the most dominant plant in the lake with a relative frequency in both surveys right around 24%.

The Simpson's Diversity Index, a measure of how diverse the plant community is, is the same in both surveys at 0.89. This value can run from 0 to 1.0. The greater the value, the more diverse the plant community is in a particular lake. In theory, the value is the chance that two species sampled are different. An index of "1" means that the two will always be different (very diverse) and a "0" would indicate that they will never be different (only one species found). The higher the diversity in the native plant community, the healthier the lake ecosystem.

There is virtually no difference in the Floristic Quality Index (FQI) and average Coefficient of Conservatism (C) values obtained in 2008 and 2013. The FQI for Rice Lake in 2008 was 38.21 and in 2013 it was 38.59. The average C value in 2008 and 2013 was 6.2.

The Floristic Quality Index (FQI) is a measure of the plant community in response to development and other human influence on the lake. It takes into account the species of aquatic plants sampled and their tolerance for changing water quality and habitat quality. The index uses a conservatism value assigned to various plants ranging from 1 to 10. A high conservatism value indicates that a plant is intolerant while a lower value indicates tolerance. Those plants with higher values are more apt to respond adversely to water quality and habitat changes, largely due to human influence (Nichols, 1999). The FQI is calculated using the number of species and the average conservatism value of all species used in the index. A higher FQI indicates a healthier aquatic plant community, which is an indication of better plant habitat. The number of species included in the calculation of the FQI for Rice Lake in 2008 was 38; in 2013, 39 species were included. In both years, 41 different aquatic plant species were identified on the rake during the survey.

These values can be compared to the same values for other lakes in the assigned eco-region. There are four eco-regions used throughout Wisconsin. Rice Lake is included in the Northern Lakes and Forests Region, and for flowages (lakes impounded with a dam) Rice Lake is about average in its C value, and way above average for number of species and FQI value. So, although there were some significant changes in the frequencies of some plants between 2008 and 2013, the FQI does not reflect any significant differences in the quality of the plant community in Rice Lake.

4.2 Wild Rice

Wild rice (*Zizania palustris*) is an annual aquatic grass that produces seed that is a nutritious source of food for wildlife and people. As a native food crop, it has a tremendous amount of cultural significance to the Wisconsin and Minnesota Native American Nations. Wild rice pulls large amounts of nutrients from the sediment in a single year and the stalks provide a place for filamentous algae and other small aquatic plants to attach and grow. These small aquatic plants pull phosphorous in its dissolved state directly from the water. Wild rice can benefit water quality, provide habitat for wildlife, and help minimize substrate re-suspension and shoreland erosion.

In Wisconsin, wild rice has historically ranged throughout the state. Declines in historic wild rice beds have occurred statewide due to many factors, including dams, pollution, large boat wakes, and invasive plant and animal species. Renewed interest in the wild rice community has led to large-scale restoration efforts to reintroduce wild rice in Wisconsin's landscape. Extensive information is available on wild rice from GLIFWC and the WDNR.

Rice Lake is a wild rice lake. The presence of wild rice is limited, but it was found in the 2013 aquatic plant survey near the Red Cedar River inlet. As a result late season native plant nuisance and navigation harvesting channels were modified in 2013 and again in 2014.

Wild rice is afforded numerous protections due to its ecological and cultural significance. Management is therefore focused on harvest goals and protection of the resource rather than removal. Any activity included in a comprehensive lake or aquatic plant management plan that could potentially impact the growth of wild rice in any body of water that has in the past, currently has, or potentially could have wild rice in the future requires consultation with the Tribal Nations. This consultation is usually completed by the WDNR in cooperation with GLIFWC during their review of lake management documents. Final approval of this document is dependent on WDNR and Tribal acceptance of the plan. It is the WDNR responsibility to make this document available for Tribal review, and it is assumed that with WDNR approval, Tribal approved has also been gained.

4.3 The Importance of Aquatic Plants in the Lake Ecosystem

A healthy lake is dependent on a healthy lake ecosystem. Native aquatic plants and animals, the wetland fringe, and fallen trees help to maintain and protect a healthy overall lake ecosystem. When management is recommended for a lake, care must be taken to protect, maintain, and if possible enhance the overall ecosystem. Aquatic plants, also known as macrophytes, are a natural part of most lake communities and provide many benefits to fish, wildlife, and people. Plants have many important functions and values in the lake ecosystem. They are the primary producers in the aquatic food chain, converting the basic chemical nutrients in the water and soil into plant matter, which becomes food for all other life.

Aquatic plants provide valuable fish and wildlife habitat. More food for fish is produced in areas of aquatic vegetation than in areas where there are no plants. Insect larvae, snails, and freshwater shrimp thrive in plant beds. Panfish eat aquatic plants in addition to aquatic insects and crustaceans. Plants also provide shelter for young fish. Northern pike spawn in marshy and flooded areas in early spring and bass, sunfish, and yellow perch usually nest in areas where vegetation is growing.

Many submerged plants produce seeds and tubers (large roots) which are eaten by waterfowl. Bulrushes, sago pondweed, wild celery, and wild rice are especially important duck foods. Submerged plants also provide habitat to a number of insect species and other invertebrates that are, in turn, important foods for brooding hens and migrating waterfowl.

The lake aesthetic valued by so many is enhanced by the aquatic plant community. The visual appeal of a lakeshore often includes aquatic plants, which are a natural, critical part of a lake community. Plants such as water lilies, arrowhead, and pickerelweed have flowers or leaves that many people enjoy.

Aquatic plants improve water clarity and water quality. Certain plants, like bulrushes, can absorb and break down polluting chemicals. Nutrients used by aquatic plants for growth are not available to algae, thus reducing algae abundance and improving water clarity. Algae, which thrive on dissolved nutrients, can become a nuisance when too many submerged water plants are destroyed. Aquatic plants also maintain water clarity by preventing the re-suspension of bottom sediments. Aquatic plants, especially rushes and cattails, dampen the force of waves and help prevent shoreline erosion. Submerged aquatic plants also weaken wave action and help stabilize bottom sediment.

Native aquatic plant communities also offer protection from non-native aquatic invasive species. Current scientific literature generally accepts the concept that invasions of exotic plants are encouraged, and in some cases induced, by the disruption of natural plant communities. Curly-leaf pondweed, which is present in Rice Lake, is an opportunistic plant. Much like lawn and agricultural weeds that germinate in newly disturbed soil, curly-leaf pondweed is more likely to invade areas in which the native plant community has been disturbed or removed. Removing the natural competition from native plants may also open up the door to new invasive species and less desirable plant communities.

As a natural component of lakes, aquatic plants support the economic value of all lake activities. Wisconsin's $13 billion tourism industry is anchored by 15,081 lakes and 12,600 rivers and streams which draw residents and tourists to hunt, fish, camp, and watch wildlife on and around lakes. According to the WDNR, the world class fishery lures more than 1.4 million licensed anglers each year, supports more than 30,000 jobs, generates a $2.75 billion annual economic impact, and $200 million in tax revenues for state and local governments.

5.0 Water Quality

The water quality in Rice Lake was assessed throughout the implementation of the 2010 APM Plan. Prior to 2010, the extensive harvesting by the District negatively impacted water quality by eliminating aquatic vegetation that would use up some of the available nutrients in the water and by re-suspending bottom sediments during harvesting operations. The reduction in harvesting activity in the 2010 APM Plan was expected to reduce the negative impacts caused by the harvesting program.

The 2008 Lake User Survey revealed that poor water quality was one of the main concerns of lake users, second only to dense aquatic plant growth. Phosphorus and chlorophyll *a* sampling in 2012 exceeded the Wisconsin Consolidated Assessment and Listing Methodology (WisCALM) criteria for recreational use. As a result, Rice Lake was listed as an Impaired Waterbody in accordance with the Clean Water Act Section 303(d) in 2013.

There are a number of monitoring sites on Rice Lake that are monitored by citizen volunteers since the early 1990s including 12 boat launches and three in-lake water quality monitoring sites (Figure 3). The primary in-lake monitoring sites, those with the most extensive datasets, are Site B Central Basin and Site C South Basin and are discussed in greater detail below. Water clarity data have also been collected consistently from the North Basin site and data have been collected from various sites in the lake since 1995.

Compared to the other monitoring stations, the south basin site has lower concentrations of chlorophyll *a* and total phosphorus, and higher water clarity than the central and north basin sites in Rice Lake. Mean summer water clarity values classify Rice Lake as a eutrophic system. Water quality modeling suggests that a 50% reduction in phosphorus loading would lead to a 24% increase in Secchi depth (James, 2001).

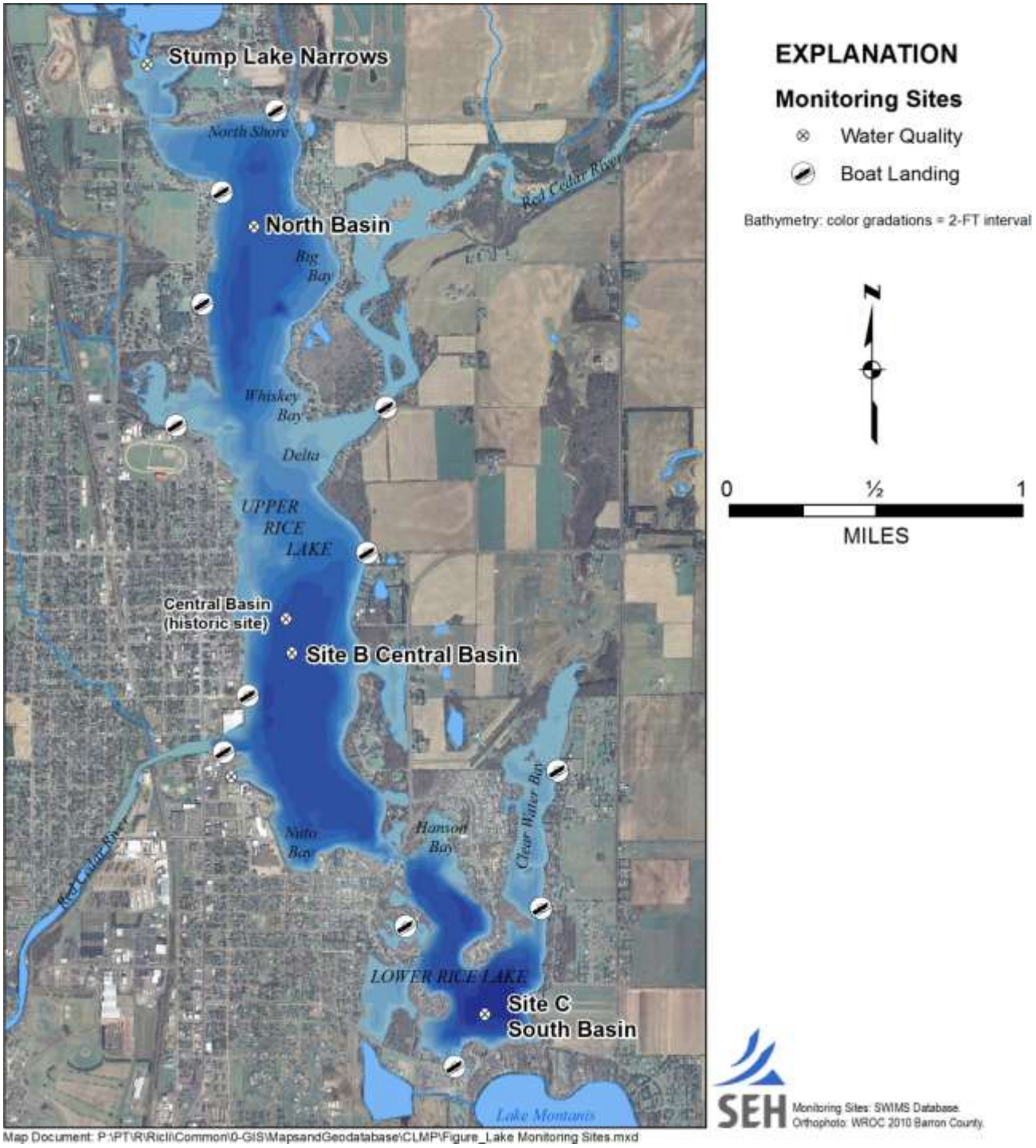

Figure 3 – Water Quality and Boat Access Monitoring Sites

5.1 Temperature and Dissolved Oxygen

The northern basin of Rice Lake develops weak thermal stratification but the water column mixes due to wave action and flow. The southern basin is dimictic, meaning the lake thermally stratifies during the summer and under the ice in the winter and is fully mixed for short periods during the spring and fall. During the summer months, the thermocline develops at about 15 feet below the lake surface which isolates the lake bottom from interactions with the water column. Dissolved oxygen levels below the thermocline approach zero and above the thermocline dissolved oxygen levels are closer to saturation.

5.2 Water Clarity

Water clarity is measured by lowering a black and white Secchi disk into the water and recording the depth of disappearance. The disk is then lowered slightly more and slowly raised until it reappears. The Secchi depth is the mid-point between the depth of disappearance and the depth of reappearance. Because light penetration is usually associated with algae growth, a lake is considered eutrophic when Secchi depths are less than 6.5 feet. Secchi depths vary throughout the year, with shallower readings in summer when algae become dense and limit light penetration and deeper readings in spring and late fall when algae growth is limited.

Water clarity measurements were taken consistently at the three primary monitoring sites from 2007 through 2013 (Figure 4). Changes incorporated in the aquatic plant management program in 2010 (primarily using herbicides for CLP control and reducing the total acreage of aquatic plant harvesting) were implemented to limit the re-suspension of sediment in the lake. The average summer (June-August) water clarity in all three basins (North, Central, and South) is trending towards higher water clarity, but has not undergone any significant changes over the last 4 years of aquatic plant management. The low average summer depth in 2012 may be due to the large sediment release from the Hwy 53 & V interchange construction site into Bear Creek upstream of Rice in June and early July of that year.

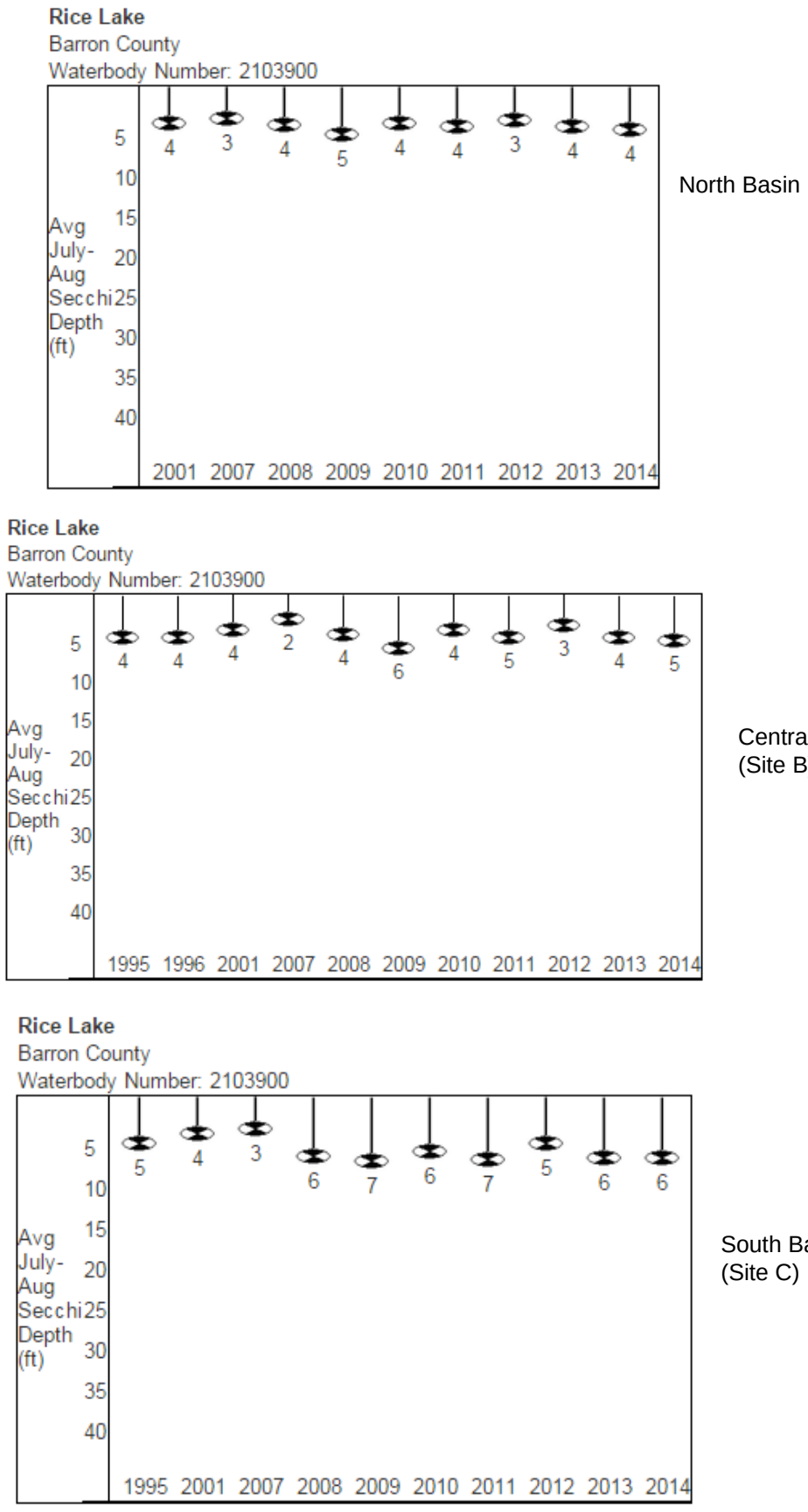

Figure 4 – Average Summer (July-August) Secchi Depths in Rice Lake

5.3 Total Phosphorus and Chlorophyll *a*

Phosphorus is an important nutrient for plant growth and is commonly the nutrient limiting plant production in Wisconsin lakes. When phosphorus is limiting production, small additions of the nutrient to a lake can cause dramatic increases in plant and algae growth. Phosphorus can become biologically available to aquatic plants and algae through external or internal means of nutrient loading. Internal loading of phosphorus is made possible when the water-sediment interface becomes anoxic (no oxygen) or when the water-sediment interface is oxic (oxygen present) and the pH is high.

Chlorophyll *a* is a measurement of algae in the water. The concentration varies throughout the year, generally peaking in late summer. A detailed limnological analysis of Rice Lake in 2001 found a peak chlorophyll *a* concentration in mid-July and a secondary peak in early September (James, 2001). The preferred method of determining the trophic status of a lake is by converting the measured concentration to the chlorophyll *a* trophic state index.

A continuous record of total phosphorus and chlorophyll *a* are available for the Central Basin and South Basin from 2008 through 2013 (Figure 5). Rice Lake can be classified as mesotrophic to eutrophic with the lake falling in the eutrophic category most years. Similar to water clarity, there have been no significant changes in total phosphorus or chlorophyll *a* concentrations since implementation of the 2010 Aquatic Plant Management Plan, although there appears to be a slight downward trend. However, this downward trend has been seen in previous years so additional monitoring is necessary to confirm continuation of this trend. Slight increases in the 2012 level could be the result of the Hwy 53 & V interchange construction site into Bear Creek upstream of Rice in June and early July of that year.

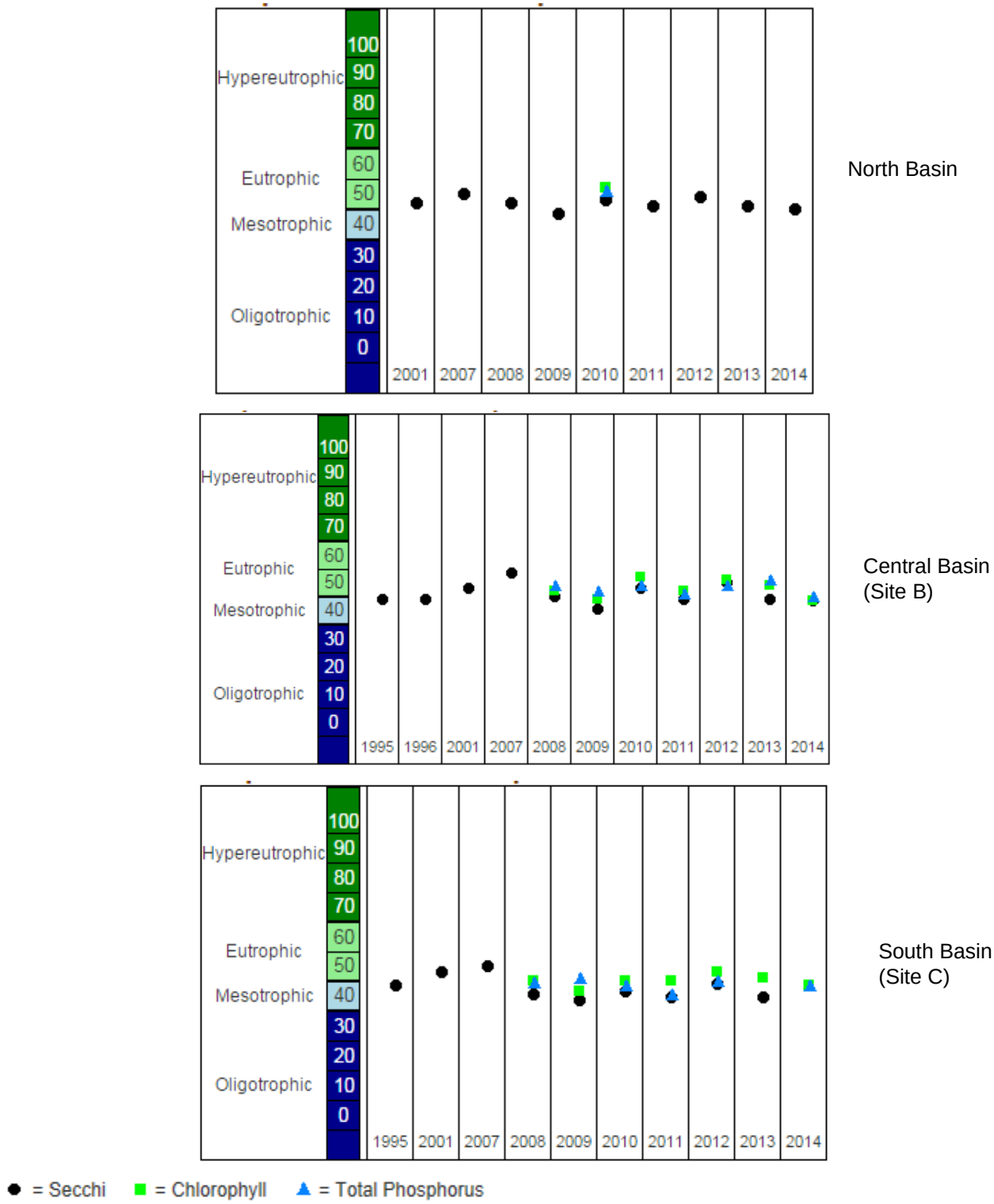

Figure 5 – Tropic State Index Graphs for Rice Lake

6.0 Fishery

A survey of District residents in 2008 revealed fishing to be the main recreational use of Rice Lake. However, many respondents also voiced concerns that the panfish population was stunted. The 2010 APM Plan documents verbal communications with the WDNR Fisheries Biologist for the area and supports survey respondents concerns about a stunted, yet abundant, panfish population. At that time, WDNR recommended increased predation on panfish possibly by imposing larger size limits on the bass population. These larger size limits should result in a higher bass population and thus greater predation on panfish.

Complex interactions among fish are at play in lakes with abundant structural habitat. Aquatic plants, or macrophytes, provide important structural habitat to fish and their food sources. Rice Lake is abundant in macrophyte growth, thereby supporting complex interactions among fish species. For example, as macrophyte complexity increases, prey capture tends to decrease (Savino and Stein, 1982) but predacious fish are attracted to underwater shade to better see approaching prey and to remain hidden (Helfman, 1981 and Engel, 1990). Theoretically, an intermediate abundance of macrophyte cover provides forage areas and hiding spaces for prey fish (such as bluegills) but does not impede the mobility of predacious fish (for example, bass, northern pike, and muskellunge). The ongoing efforts to decrease curly-leaf pondweed abundance may also support a fishery with less stunted panfish. However, it is worth noting that many of the studies exploring predator-prey interactions among macrophytes are supported by independent studies that have not yet yielded consistent results (Heck and Crowder, 1991).

6.1.1 Historic Fishery Management

Muskellunge, largemouth bass, and northern pike are common in Rice Lake while walleye, smallmouth bass, and panfish (crappies, bluegill, rock bass, sunfish) and are present as are bullheads and various minnow species (WDNR 2013, RLPRD, 1994). According to the 2008 Lake User Survey, Rice Lake is mainly used for fishing, including trophy musky fishing (RLPRD, 2013). Spring and summer surveys were completed by the WDNR in 2008 and the results are shown in Table 1. Historic fish stocking records are shown in Table 2.

Table 1
WDNR fish survey results from 2008

	Species	Abundance
May 1-8, 2008 **Early Spring Walleye & Muskellunge Survey** **Fyke Net**	Northern Pike	63
	Smallmouth Bass	45
	Muskellunge	44
	Largemouth Bass	26
	Walleye	9
May 19-20, 2008 **Late Spring Bass and Panfish Survey** **Boom Shocker**	Bluegill	489
	Black Crappie	36
	Rock Bass	27
	Largemouth Bass	23
	Pumpkinseed	11
	Smallmouth Bass	8
	Yellow Perch	7
June 16-17, 2008 **Summer Panfish Survey** **Fyke Net**	Bluegill	604
	Pumpkinseed	78
	Black Crappie	8
	Rock Bass	4
	Pumpkinseed X Bluegill	2

Table 2
Fish stocking in Rice Lake

Year	Species	Age Class	Average Fish Length (in)
2011	Muskellunge	Large Fingerling	10.1
2009	Muskellunge	Large Fingerling	10.1
2007	Muskellunge	Large Fingerling	12.2
2005	Muskellunge	Large Fingerling	10.5
2003	Muskellunge	Large Fingerling	12.0
2001	Muskellunge	Large Fingerling	10.4
1999	Muskellunge	Large Fingerling	11.3
1997	Muskellunge	Large Fingerling	10.0
1995	Muskellunge	Fingerling	11.9
1993	Muskellunge	Fingerling	10.0
1991	Muskellunge	Fingerling	10.0
1990	Muskellunge	Fingerling	9.0
1989	Muskellunge	Fingerling	7.0
1988	Muskellunge	Fingerling	9.0
1987	Muskellunge	Fingerling	9.0
1984	Northern Pike	Fry	1.0

6.1.2 Fishery Habitat

Coarse woody structure (CWS) is a type of structural habitat found in the littoral zone, or near-shore region, of lakes and is contributed as trees fall from shore into lakes. Natural addition of CWS to lakes can be a very slow process. For example, the mean germination date of eastern white pine (*Pinus strobus*) sampled from the littoral zone of a lake in Ontario was 600 years ago (Guyette and Cole, 1999). Therefore, most of the CWS in the littoral zone took 600 years to grow, senesce, and eventually fall into the lake. Many studies suggest that CWS is an important component of habitat in littoral zones. Wood provides a surface for insect larvae (Bowen et al. 1998) and provides shelter for small fish from predation (Werner and Hall, 1988).

Complex interactions among fish are at play with abundant structural habitat as discussed above. Predator and prey dynamics among varying macrophyte densities may be comparable to those occurring among CWS (Sass et al.2006), especially if most of the branches and twigs are intact. Compared to macrophytes, however, CWS as structural habitat in littoral zones is scarce. For example, a survey of 13,657 square meter quadrats in 12 lakes revealed that only 6% of quadrats had CWS within one meter (Schmidt, 2010). One reason for this is shoreline development. As shoreline development increases, CWS abundance decreases (Jennings et al. 2003, Christensen et al. 1996) mainly due to riparian tree removal. Despite its rarity, CWS has very little protection in Wisconsin statutes related to lakes and lake habitat. An official method for measuring CWS in lakes has not yet been adopted by the state.

Although abundant structural habitat in the form of macrophytes exists in Rice Lake, it would still be beneficial to survey and develop management goals for CWS protection. Survey methods could be developed in coordination with the state. Management goals could be based on a percentage of pre-settlement conditions. For example, Christensen et al. (1996) found an average of 555 logs/km of shoreline in lakes with no development versus a range of 57-379 logs/km in lakes with development.

7.0 Critical Habitat

Every body of water has areas of aquatic vegetation or other features that offer critical or unique aquatic plant, fish and wildlife habitat. Such areas can be mapped by the WDNR and designated as Critical Habitat. Critical Habitat areas include important fish and wildlife habitat, natural shorelines, physical features important for water quality (for example, springs) and navigation thoroughfares. These areas, which can be located within or adjacent to the lake, are selected because they are particularly valuable to the ecosystem or would be significantly and negatively impacted by most human induced disturbances or development. Critical Habitat areas include both Sensitive Areas and Public Rights Features. Sensitive Areas offer critical or unique fish and wildlife habitat, are important for seasonal or life-stage requirements of various animals, or offer water quality or erosion control benefits.

The WDNR designated eighteen Sensitive Areas in Rice Lake in 1997 (Figure 6). Management recommendations for these critical habitats include limiting macrophyte removal and littoral zone alterations, and minimizing sediment and nutrient inputs from lawns and septic systems. The Sensitive Areas report also recommends that coarse woody structure be left in the lake, promoting shoreline buffer zones, enforcing zoning ordinances, implementing “slow-no-wake” zones for watercraft, and encouraging the District to acquire property near sites D, L, and P for conservation purposes.

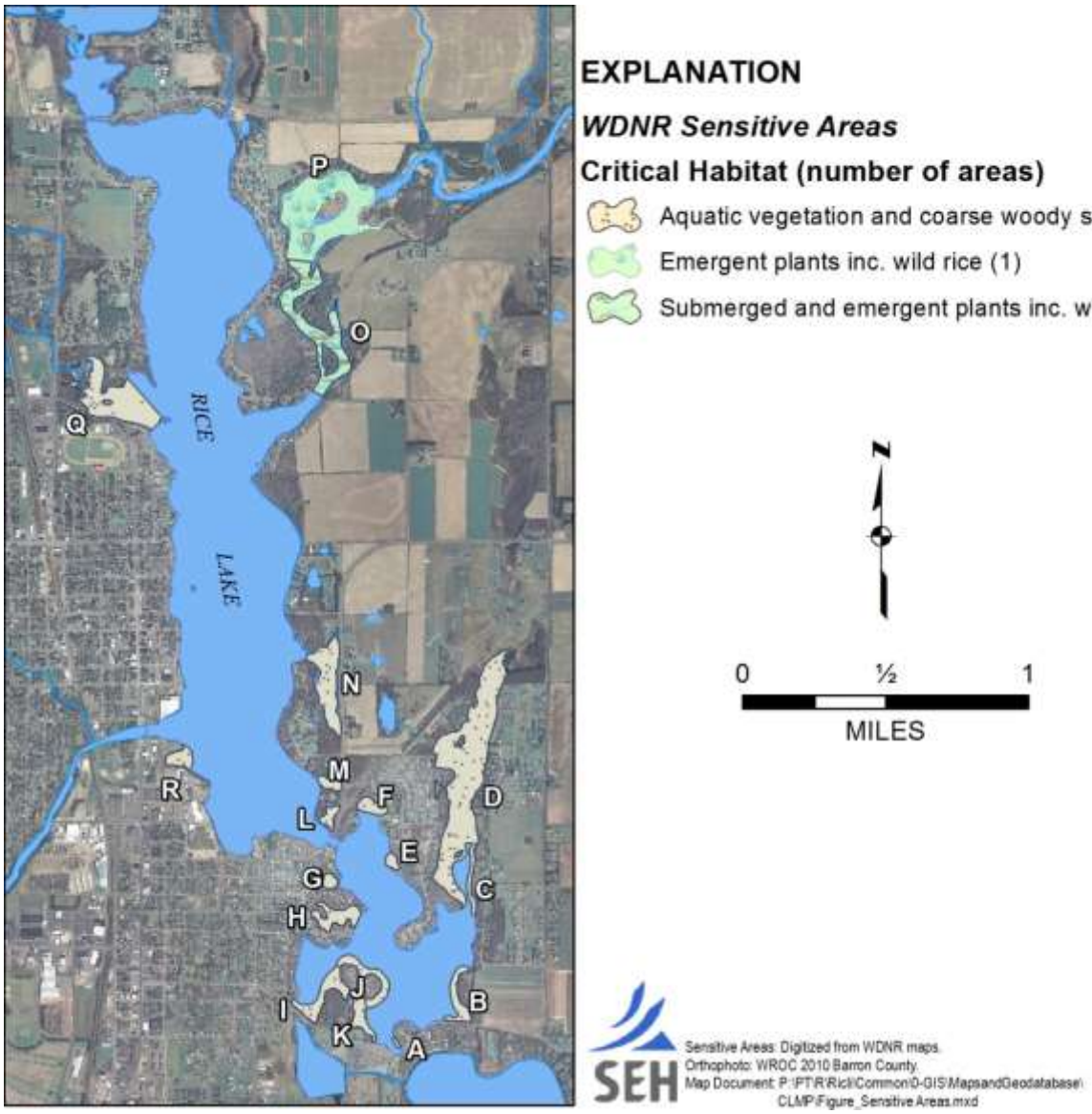

Figure 6 – Sensitive Areas in Rice Lake, Barron County

8.0 Wildlife

According to Wisconsin's Natural Heritage working list, two bird species (bald eagle and osprey), two rough fish (weed shiner and greater redhorse sucker), and three natural communities (northern sedge meadow, northern wet forest, and open bog) are found within the local township surrounding Rice Lake. Eagles and osprey are fairly common and often seen working the lake (WI-NHI Portal). Loons are often seen on the lake and occasionally baby loons are spotted with their mothers. A frog and toad survey was completed by District volunteers, and a number of frog species were identified by their calls. At least one pair of eagles nests on Rice Lake. Muskrats are common place, and can be seen just about anywhere around the shore.

Osprey have been doing exceptionally well. There are eight nesting platforms that have been erected in the Rice Lake area. Of these, only two were inactive in 2009. In addition, osprey continue to nest on power poles in the area. Osprey need water with good fish populations and enough water clarity to allow them to fish. Rice Lake and the surrounding area has provided these needs. Just recently several osprey chicks were removed from area nesting platforms for relocation to Iowa. Wisconsin offspring, including several from the Rice Lake area are being used to help re-populate osprey in other states including Iowa and Kansas (Kevin Morgan, WDNR Wildlife Manager, 2009 Communication).

Waterfowl are abundant. Many species of ducks either migrate through in the spring and fall, or stay all year. Feeding ducks is a popular pastime in many of the City Parks, even though signs in these areas specifically request that visitors not feed the ducks. In the spring and early summer broods of ducklings are commonplace. Rice Lake has a substantial muskie population which often target ducklings for feeding.

Along with an abundant duck population, there is an excess of Canada geese. Many lake residents voiced complaints related to the excessive goose population. Geese fowl the shoreline with their waste and eat huge amounts of vegetation both on shore and in the water.

9.0 Wetlands

In Wisconsin, a wetland is defined as an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation, and which has soils indicative of wet conditions (Wisconsin Statue 23.32(1)). Wetlands contain a unique combination of terrestrial and aquatic life and physical and chemical processes. Wetlands are protected under the Clean Water Act and state law and in some places by local regulations or ordinances. Landowners and developers are required to avoid wetlands with their projects whenever possible; if the wetlands can't be avoided, they must seek the appropriate permits to allow them to impact wetlands (for example, fill, drain or disturb soils).

Wetlands are located throughout the Rice Lake watershed (Figure 2), with forested/shrub and emergent wetlands located along many streams and drainage ways. Emergent wetlands are wetlands with saturated soil and are dominated by grasses such as redtop and reed canary grass, and by forbs such as giant goldenrod. Forested/shrub wetlands are wetlands dominated by mature conifers and lowland hardwood trees and are important for stormwater and floodwater retention and provide habitat for various wildlife.

Wetlands serve many functions that benefit the ecosystem surrounding Rice Lake. Wetlands support a great variety of native plants and are more likely to support regionally scarce plants and plant communities. Wetlands provide fish and wildlife habitat for feeding, breeding, resting, nesting, escape cover, travel corridors, spawning grounds for fish, and nurseries for mammals and waterfowl. Contrary to popular belief, healthy wetlands reduce mosquito populations; natural enemies of mosquitoes (dragonflies, damselflies, backswimmers, and predacious diving beetles) need proper habitat (that is, healthy wetlands) to survive.

Wetlands provide flood protection within the landscape by retaining stormwater from rain and melting snow and capturing floodwater from rising streams. This flood protection minimizes impacts to downstream areas. Wetlands provide groundwater recharge and discharge by allowing the surface water to move into and out of the groundwater system. The filtering capacity of wetland plants and substrates help protect groundwater quality. Wetlands can also stabilize and maintain stream flows, especially during dry months.

Wetland plants and soils provide water quality protection by storing and filtering pollutants ranging from pesticides to animal wastes. Wetlands also provide shoreline protection by acting as buffers between the land and water. Wetland plants protect against erosion by absorbing the force of waves and currents and by anchoring sediments. This is important in waterways where high boat traffic, water currents, and wave action may cause substantial damage to the shore.

Although some small (two acres or less) wetlands may not appear to provide significant functional values when assessed individually, they may be very important components of a larger natural system. Not only do small wetlands provide habitat functions, they also store phosphorus and nitrogen and trap pollutants such as heavy metals and pesticides. Draining these small wetlands, which often do not appear on maps, not only requires the proper permits, but can also release the once-stored pollutants and nutrients into lakes and streams.

10.0 Summary of 2010 – 2013 Aquatic Plant Management Plan Implementation

The 2010 Aquatic Plant Management Plan for Rice Lake focused on removing large amounts of CLP while only completing enough native plant removal to provide limited navigation and nuisance relief. Water quality in Rice Lake is dependent on having a healthy and diverse distribution of native plants to help use up excess phosphorous entering the system from the watershed. Protecting and enhancing the positive effects of native plants and reducing the negative effects caused by invasive species was the overall goal of 2010 APM Plan. Watershed improvements were included in the 2010 APM Plan, but until 2014, no management actions were implemented except where dictated by the State during the construction of the Hwy 53 & V Interchange in 2012 and 2013.

The following is a list of the goals, objectives, and actions of the 2010 APM Plan and summarizes what was completed since the plan was implemented in 2010.

Goal 1 – Reduce the Total Amount of Curly-leaf Pondweed in Rice Lake by Combining the Use Aquatic Herbicides and Large-Scale Mechanical Harvesting

Objective 1 – Determine the restorative capacity of Rice Lake by removing at least 80% of the total CLP surface area coverage in each year of this plan.

Summary of Achievements
This objective was met. During the 2008 point-intercept aquatic plant survey, 200 acres of dense growth CLP was identified in Rice Lake. CLP management actions from 2010-2013 included the use of aquatic herbicides and large-scale harvesting. The levels of CLP managed were close to the objective set in the plan. In 2010, 152 acres (78%) of CLP was managed; in 2011, 160 acres (80%) of CLP was managed; in 2012, 157 acres (78.5%) of CLP was managed; and in 2013, only 115 acres of CLP was managed due to poor growing conditions leading to less harvesting (only 110 acres) and less herbicide use (5.5 acres).

Objective 2 – Restore that area of the Upper Basin along the City owned lakefront and in the Lower Basin to state where CLP has minimal impacts and treatment of any kind may be reduced or eliminated.

Summary of Achievements
This objective was met. Point intercept aquatic plant survey work completed in 2013 clearly showed a reduction in the density and distribution of CLP in the areas referred to in this objective. The majority of the City of Rice Lake lakeshore along Lakeshore Drive had CLP density ratings greater than 2 (moderate) in 2008. In 2013, the majority of points surveyed had density ratings below 2 (moderate), with only a handful having a density rating greater than 2. This is true for both the area along Lakeshore Drive, and the two beds that were chemically treated in the South Basin. In 2013, only 5.5 acres of CLP was chemically treated along Lakeshore Drive, down from more than 40 acres in the three prior to 2013. No CLP was chemically treated in the South Basin in 2013. Harvesting of CLP did occur along Lakeshore Drive, but not in the South Basin, and as already stated, total acreage managed was only 110 acres, 40-50 acres less than what was managed in the previous three years.

Objective 3 – Reduce turion numbers in the sediment in chemical treatment area by 75% and in the harvesting areas by 50% by the end of this 4-yr Project.

Summary of Achievements
This objective was not met. CLP turion density was measured each year for three years (2010 – 2012) in four treatment areas: Bed A (between Fireworks Island and the lake outlet); Bed B between Bed A and the old Hospital Bay; Bed C (Hanson's Bay in the South Basin); and at the entrance to Clearwater Bay in the South Basin). Over a three year period, three of the four beds (B,C,D) saw a decline in turions present, but not the decline that was planned for. Bed B declined by 30.5%; Bed C by 34.7%, and Bed D by 26.4% based on a 2010/2013 comparison. Only Bed A saw an increase in turions from 14.9 turions/m^2 to 22.9 turions/m^2 (56.8%). It is not known what the turion density was in 2013, as no turion density monitoring was completed in 2013. Changes in turion density in areas of the lake that were harvested are unknown as no turion density monitoring was completed in these areas during this project.

Objective 4 – Complete no CLP harvesting in the Lower (South) Basin.

Summary of Achievements
This objective was met. No harvesting of CLP was completed in the South Basin during this project.

Objective 5 – Provide land owner relief for plant fragments washed into shore.

Summary of Achievements
This objective was met. Fewer complaints were made to the District Hotline and District Board Members during the 4 years the 2010 APM Plan was implemented. In the first year of implementation, residents upstream in the Red Cedar River complained about what they saw as an oversight in management operations to take place in the river. This was addressed by extending designated harvesting channels up the river. Once CLP began to decline along Lakeshore Drive, native plant growth expanded. An additional channel was added between the lakeshore and Fireworks Island. Another channel was added along the northwest shore just before traveling under the Hwy 48 bridge between Stump Lake and Rice Lake to relieve nuisance aquatic plant growth that impeded boat traffic in this area. The channels coming out of the river into the Delta were modified in an attempt to reduce the amount of vegetation that is carried into Whiskey Bay by natural currents.

Action 1 – Early season chemical treatment in the Upper basin in an area along the City of Rice Lake lakefront from Mounds Park to the Moose Club along the western shore using the granular form of Endothall, trade name Aquathol Super K at a concentration of 1.0 mg/L.

Actions Taken: Early season chemical treatment was completed in each year (2010-13) of the 2010 Plan using Aquathol Super K (2010-2012) and Aquathol K (2013). The concentration used was modified in each year to provide better results. In 2012, 1.25 ppm (mg/L) was used and seemed to provide the best results. The concentration of Aquathol K used in 2013 was increased to 1.5 ppm expecting that a liquid herbicide would dissipate quicker than the granular. Treatment results in 2013, at least anecdotally, were not as good as previous years, though no pre- and post-treatment survey work was completed.

Action 2 – Early season chemical treatment in the Lower basin in Hanson Bay and the entrance to Clearwater Bay using the granular form of Endothall, trade name Aquathol Super K at a concentration of 1.0 mg/L.

Actions Taken: Early season chemical treatment was completed in these areas in each year (2010-12) of the 2010 Plan using Aquathol Super K. Treatment concentrations were modified base on each year's results. In 2012, 1.25 ppm (mg/L) was used and seemed to provide the best results. No chemical treatment was completed in these areas in 2012. In 2013, the density of CLP in these areas was still less than it was in 2008.

Conditions – All chemical will be applied prior to the third week in May (based on weather conditions, water temperature, and CLP growth stage) in each of the next four years (2010-2013).

Management Timing
Except for in 2013, all chemical application to control CLP was completed early to mid May. In 2013, due to very late ice out, the application of herbicides was delayed until late May.

Applicator – Currently, Midwest Aquacare is the professional applicator chosen by the District to administer the treatment. Midwest Aquacare satisfactorily completed a similar early-season chemical treatment in Rice Lake in 2009. The WDNR will be informed should a new applicator hired, or if licensed District employees are going to take over chemical application.

Status
The Rice Lake Protection and Rehabilitation District continues to contract with Midwest Aquacare to provide early season chemical treatments.

Monitoring and Assessment – The area to be treated will be mapped in the fall of the previous year based on existing CLP survey work. Plant surveying will be completed in the area prior to the chemical treatment to confirm the presence of CLP, to determine if it is far enough along in its growth to be effectively killed by the herbicide, and to identify any native plants that may be present at this time. Dan Graf, a local high school biology teacher will complete the pre-treatment survey along with his students based on GPS points set up by this consulting agency and its sub-contracted post treatment plant surveyor. Post-treatment plant surveying and turion density and viability sampling will be completed by Ecological Integrity Service, LLC in Amery, WI.

Currently, chemical residual testing program for Endothall is not required by the State of Wisconsin however, one will be set up by the second year of the chemical treatment program. Knowing what the herbicide is doing once applied to the water is an important part of the maintaining public support for this management alternative.

Management Status
Pre- and post-treatment aquatic plant surveying was completed in each year (2010-2012) in all areas chemically treated. Pre- and post-treatment aquatic plant surveying was not completed in 2013, as it was not required, and grant funds were limited. Ecological Integrity Services, LLC completed all of the post treatment survey work and the pre-treatment survey work after 2010. In 2010 and 2011, Dan Graf, a high school biology teacher completed the pre-treatment survey work.

No chemical residual work was completed during the implementation of this project.

Permitting – A WDNR Chemical Application Permit is required before implementing a chemical control program and will be applied for by the District.

Status: this was done.

Action 3 – Landowner funded requests for CLP chemical treatment outside the District sponsored treatment

Status: this was not done, as no requests were made.

Action 4 – Annual large-scale mechanical harvesting of up to 150 acres of dense CLP growth outside the chemical treatment area in the Upper basin.

Actions Taken: All three harvesters owned and operated by the District were used to support the CLP harvesting season in the North and Central Basins. No CLP harvesting was completed in the South Basin during the implementation of this plan.

Monitoring and Assessment – Depth finders are to be installed on all harvesters prior to beginning the 2010 harvesting season. GPS units capable of tracking the movements of the harvesters will be installed on or, at a minimum, carried with the operator whenever harvesting is occurring and must be turned on. At the end of each day, a tracking log will be downloaded from the GPS unit for each harvester used and stored in digital form either on a computer or data disk. Daily log sheets will be kept including the following harvesting information: estimated total daily tonnage, number of loads, surface acres covered, plant ID list, percentage of plant species removed, and plant bed density information.

Status
Two hand held GPS units were purchased for use by harvester operators to track their movements on the lake. No data has been provided as to whether or not the operators carried these devices with them on the harvesters. Daily log sheets were kept estimating the daily tonnage, number of loads, surface acres covered, most frequently removed plant species, and plant density. Copies of these reports were sent to the WDNR at the end of each management season.

Goal 2 – Prevent the Spread and Establishment of Aquatic Invasive Species Already Present Along the Shores of and in the Wetlands Adjacent to Rice Lake

Objective 1 – Purple loosestrife monitoring and removal.

Summary of Achievements
This objective was met. Monitoring and removal was completed in each year of implementation.

Objective 2 – Japanese knotweed monitoring and control.

Summary of Achievements
This objective was met. The District did monitor the shoreline for Japanese knotweed and none was found. The District was not directly involved in Japanese Knotweed control work, but did offer support.

Action 1 – District employees, volunteers of the Citizen Lake Monitoring Network (CLMN), and National Lumbering Hall of Fame (a non-profit organization managing the new Lumbering Hall of Fame Park and boat landing at Stein Street) representatives will monitor the shoreline of the lake for purple loosestrife in July and August. Purple loosestrife will be pulled where possible, or cut and sprayed if not. In the event a larger patch of purple loosestrife is identified where physical and chemical control is not feasible, biological control will be implemented.

Action Taken: District Employees and volunteers surveyed the lake for purple loosestrife annually during the implementation of the APM Plan. Any plants that were identified were physically removed. No biological or chemical control was implemented.

Action 2 – District employees, volunteers of the Citizen Lake Monitoring Network (CLMN), and National Lumbering Hall of Fame representatives will monitor the shoreline of the lake for Japanese knotweed throughout the summer season. The National Lumbering Hall of Fame non-profit organization and Barron County have already taken up the cause to try and get this invasive species under control.

Action Taken: Physical and financial support for the removal of Japanese knotweed and other non-native species was provided by the District. The majority of these efforts were focused on the Lumbering Hall of Fame Park.

Rusty Crayfish and Chinese Mystery Snails – Both of these species are known to be in Rice Lake. Currently no management is planned.

Action Taken: None

Goal 3 – Eurasian Watermilfoil Rapid Response Planning

Objective 1 – Provide a plan of action for the District to follow should Eurasian watermilfoil be identified in Rice Lake

Summary of Achievements
This objective was met. An action plan was developed and implemented by District personnel, first from the District Board, and then by the Lake Educator hired by the District to support aquatic plant, invasive species, and lake education with the constituency. No EWM was discovered in Rice Lake over the duration of this Plan.

Action 1 – Provide Training for District employees and lake volunteers on how to identify EWM and how to monitor the lake for EWM.

Action Taken: Training was provided to District employees in the first year of implementation by the District chosen consultant. Refresher training was completed by the Lake Educator in all successive years of this Plan.

Action 2 – District employee monitoring of the entire Rice Lake shoreline every two months from May to October following Citizen Lake Monitoring Network EWM Monitoring Protocol.

Action Taken: The entire shoreline of Rice Lake was monitored for EWM at a minimum of once a month in every year of this project. This was generally done on a Friday afternoon by the District Operations Team or the Lake Educator. No EWM was found.

Action 3 – District employee monitoring of all public access points once a month from May to October.

Action Taken: All public access points were monitored by the District Operations Team or the Lake Educator every two weeks during the harvesting season throughout the duration of this project. No EWM was found.

Goal 4 – Provide Native Aquatic Plant Management That Protects and Enhances Native Plant Growth and Diversity in Rice Lake

Objective 1 – Limit the harvesting of native aquatic plants to navigation and nuisance relief only in areas designated as high traffic and high public use.

Summary of Achievements
This objective was met. Harvesting of native plants generally starting in early July was completed in each year of this project. Navigation channels were set up in areas designated as high traffic and/or high public use prior to the beginning of native plant harvesting every year. Slight modifications were made in each year to accommodate reasonable comments/requests from the District Constituency, observations of the District Operators, and comments made by the WDNR. In year one of implementation (2010) designated channels included 65 acres to be harvested. In no year (including the first year, was the total acreage in the annual harvesting plan exceeded.

Objective 2 – Increase native plant diversity and distribution in areas of the lake currently with 3 or less identified native plant species in July by at least one native plant species in each of the next 4 years.

Summary of Achievements
This objective was not met. In 2008, the average number of all plant species identified at each point with vegetation was 3.52 different species. In 2012, this value was slightly lower at 3.03. Fewer points had vegetation present in 2013 (342 pts) than in 2008 (368 pts).

Objective 3 – Provide land owner relief for plant fragments washed into shore.

Summary of Achievements
This objective was met. District Operation employees were able to spend more time addressing the pickup of plant fragments washed into the shore, and as a result fewer complaints were heard over the duration of this project.

Objective 4 – Improve boating navigation through the shallow, plant dominated area between Hospital Bay and the Red Cedar River Delta.

Summary of Achievements
This objective was met. A long and wide navigation channel in this area was marked with 8 buoys beginning in 2010 and continuing in each year of this project. The purpose of these buoys was to mark two sides of a 160-ft wide high-speed boater navigation channel that extends north and south for approximately 2400-ft. This channel was purposely established to encourage boat traffic going north and south to pass through this channel and to discourage random travel through extensive beds of vegetation that exist on either side of this channel. This area of Rice Lake is shallower than other areas and generally has vegetation that extends nearly the entire distance west to east across the lake. The channel was kept clear of vegetation by the harvesting program to provide a plant free north-south navigation channel where directed boat traffic may also aid in deepening the channel. It appears that the depth in this channel has not decreased.

Action 1 – Annual designation of navigation and nuisance relief channels of varying width in both the Upper and Lower basins in the fall of the year based on the current seasons placement of channels and expected lake use in the coming season.

Action Taken
Maps of the designated harvesting channels were prepared at the beginning of each year (2010-13) included in this project. In 2010, navigation and nuisance relief channels covered approximately 65 acres throughout the lake however none of the channels extended up into the river. Only 45 acres of navigation channels were harvested in 2010. Two side channels parallel to the wider high-speed boater navigation channel were eliminated from the 2010 plan as it was determined they were not necessary.

In 2011, additional channels were added up into the river channel and along the far northwest shoreline just before or south of the Hwy 48 bridge between Stump Lake and Rice Lake. The channel that entered into what is known as Clearwater Bay was split to provide better navigation to property owners on both sides of the bay. Approximately 60 acres of channels were harvested.

In 2012, a channel was added between Fireworks Island and the shore along Lakeshore Drive because native vegetation which grew in place of the CLP caused boater navigation issues, and nuisance conditions that interfered with "from shore" activities like fishing and swimming. Approximately 60 acres of channels were harvested.

In 2013, the District was required to modify it channels in the river out of concerns for the wild rice that was present. Approximately 50 acres of channels were harvested.

In 2014, channels are expected to be the same as they were in 2013.

Conditions – Total surface area opened up by these channels should not exceed 15% of the littoral or plant growing area of the lake. The 15% figure is an arbitrary value based on the expected 2010 total surface area created by channels harvested in order to provide an appropriate amount of navigation and nuisance relief, and is subject to re-evaluation in each year of this APM Plan.

Channel widths are also arbitrary, but based on increments of 10-ft which is the width of the harvesters presently owned by the District. A twenty foot wide channel allows a harvester to cut in one direction and then return in the opposite direction maximizes its efficiency.

In sensitive areas of the lake, navigation channels are not to exceed 20-ft in width. Channel widths in the majority of the lake are currently set at 60-ft. A large channel in the center of the lake between Hospital Bay and the Red Cedar River Delta is currently set at 160-ft to allow two high-speed watercraft to pass each other at a distance of more than 100-ft. An 80-ft wide channel will be created on each side of the 160-ft wide center channel, and will likely be designated as "no-wake" to allow for undisturbed fishing in the channel and to protect small craft and non-motorized boat traffic from larger, faster boat traffic using the center channel.

Management Implementation
At no point in the four years of implementation included in this project did the area of native plants harvested reach or exceed 15% of the littoral zone. In 2008, the littoral zone of Rice Lake covered approximately 734 acres so harvesting of native plants was limited to no more than 110 acres. In 2013 the littoral zone has shrunk to approximately 692 acres, primarily due to the fact that the maximum depth with aquatic plant growth changed from 16.2 feet in 2008 to 14.1 feet in 2013. So, no more than 104 acres of native plants could be harvested.

Channel width included in each year's harvesting plan remained within the conditions set in the 2010 Plan. As previously mentioned, the channels running parallel to the high speed boater navigation channel were not harvested in any year of implementation.

Action 2 – Mark navigation channels in the area between Hospital Bay and the Red Cedar River Delta with red and green channel marker buoys and no-wake buoys. High speed boat traffic will be directed through the larger center channels marked with the green and red buoys.

Action Taken: Eight buoys were purchased in 2010 and installed by the District in each year of this project under a permit applied for by the District.

Conditions – The District will purchase all buoys. Channel and no wake buoys will be placed in the lake, no later than June 30th, and be removed no later than November 1st.

Permitting – A buoy placement permit is required from the WDNR before buoys can be placed and will be applied for by the District.

Status: The buoys installed annually met the conditions stated above.

Action 3 – District employees will monitor weed beds throughout the summer season and be trained in bed density determination and basic plant identification. Should the District wish to harvest native plants in an area not included in the pre-determined plan for that year, justification must be sent to the WDNR, and their approval gained before harvesting can begin.

Action Taken: All District Operations personnel, and the lake educator hired by the District were trained in basic aquatic plant identification and in bed density determination. This training, in combination with photo data recording was used to request the few changes in the harvesting plan that were made.

Monitoring and Assessment – At the end of each day, a tracking log will be downloaded from the GPS unit for each harvester used and stored in digital form either on a computer or data disk. Daily log sheets will be kept including the following harvesting information: estimated total daily tonnage, number of loads, surface acres covered, plant ID list, percentage of the total of each plant species removed, and plant bed density information.

Monitoring Status
District Operation employees recorded the daily harvesting records and then compiled them into a report sent to the WDNR at the end of the harvesting season. The report included how much was harvested, when, what vegetation was the main focus of harvesting efforts, and requests for any changes to be made.

Goal 5 – Improve Record Keeping, Monitoring, and Assessment for All Plant Management Activities

Objective 1 – Regular and comprehensive lake and tributary water quality testing completed by District employees and CLMN volunteers.

Summary of Achievements
This objective was met. Water quality testing was completed at three sites in Rice Lake: North Basin, Central Basin, and South Basin. In all three basins, water clarity (Secchi), total phosphorus (TP), orthophosphates (ortho), Total Kjeldahl Nitrogen (TKN), NH3, NO3+NO2, chlorophyll a (Chl), turbidity, dissolved oxygen (DO), and temperature profiles (Temp) data was collected and analyzed in 2010. From 2011 to 2013 only Secchi, DO, and Temp were measured in the North Basin. In the Central and South Basins, Secchi, TP, Chl, DO, and Temp data was collected and analyzed in each year 2011-2013.

Tributary data was only collected in 2010 and included three sites: Stump Lake Narrows, Unnamed Trib North Shore, and the Red Cedar River at Hwy M. A full suite of nutrient data was collected including TP, ortho, Total Kjeldahl Nitrogen (TKN), NH3, NO3+NO2, and total suspended solids (TSS).

At least three District volunteers working through the Citizen Lake Monitoring Network (CLMN), District Operations Employees and the Lake Educator combined to collect lake and tributary water quality data for this project.

Objective 2 – Complete annual pre and post treatment point-intercept plant monitoring following WDNR protocols.

Summary of Achievements
This objective was met. Pre- and post-treatment aquatic plant survey work was completed each year (2010 – 2012) but not in 2013. The size of the proposed and then final treatment did not require it. On the water surveys and final reports were completed by Ecological Integrity Services, LLC.

Objective 3 – District employee identification of basic native and non-native plant species found in Rice Lake for the purpose of keeping better records of the type and quantity of aquatic plant species removed by harvesting.

Summary of Achievements
This objective was met. District employees were trained in the identification of basic native and non-native aquatic plants common to Rice Lake. This training was used to help identify the aquatic vegetation that was the cause of navigation and nuisance issues.

Objective 4 – District employee monitoring of large plant beds and rake-head density ratings to help determine annual plant harvesting areas, or to document nuisance conditions in a request to the WDNR to expand an existing harvesting area.

Summary of Achievements
This objective was met. District Operations employees and the Lake Educator monitored the lake for areas of dense aquatic vegetation that maybe causing navigation and/or nuisance level impairments to the lake and its users. When an area was identified, modifications to annual management actions were considered.

Objective 5 – Complete annual CLP turion sampling in pre-determined locations within both chemical treated and harvested areas of CLP.

Summary of Achievements
This objective was partially met. CLP turion density was measured each year for three years (2010 – 2012) in four treatment areas: Bed A (between Fireworks Island and the lake outlet); Bed B between Bed A and the old Hospital Bay; Bed C (Hanson's Bay in the South Basin); and at the entrance to Clearwater Bay in the South Basin). Over a three year period, three of the four beds (B,C,D) saw a decline in turions present. Only Bed A saw an increase in turions from 14.9 turions/m^2 to 22.9 turions/m^2. No turion density monitoring was completed in 2013.

Objective 6 – In-lake aquatic invasive species monitoring EWM and other AIS not currently known to be in Rice Lake

Summary of Achievements
This objective was met as the entire littoral zone of Rice Lake was monitored for EWM at a minimum of once a month in every year of this project. This was generally done on a Friday afternoon by the District Operations Team or the Lake Educator. No EWM was found.

Objective 7 – Lake water sampling by District employees for the purpose of residual testing for Endothall completed by the WI State Lab of Hygiene (SLOH).

Summary of Achievements
This objective was not met. No action was completed to meet this objective.

Objective 8 – Repeat the 2008 whole lake aquatic plant survey (early season and mid season) in the last year of this APM Plan.

Summary of Achievements
This objective was met as the 2008 whole lake, point intercept aquatic plant survey was completed in 2013 and was used to complete this revision of the Rice Lake Aquatic Plant Management Plan Revision.

Objective 9 – Improve overall aquatic plant management record keeping and documentation.

Summary of Achievements
This objective was met. District Operation Employees improved their overall record keeping for both District and WDNR purposes. One of the District Board Members agreed to become the Operations Manager for the District, working with the Operations Employees to complete their record keeping and file annual reports.

Action 1 – Comprehensive and regular lake and tributary water quality monitoring will be completed at three sites in the lake, at three tributary sites, and at the dam (see Map 8). Table 5 shows the parameters that will be sampled for by the combined efforts of District employees (LD), lake volunteers (vol), and field technicians (SEH). Training and equipment will be provided by the CLMN and this consultant. All testing will be completed at the WI SLOH.

Action Taken: Lake water quality monitoring was completed in each year of this project at three sites. Tributary data was collected at three sites in 2010, but not at the dam. No other tributary data was collected during this project. Parameters monitored are listed as yes or no in Table 3 below.

Table 3
Water Quality Monitoring during 2010-2013 APM Plan Implementation

Parameter	Lake Sites	Tributary Sites
Secchi Disk	Yes (2010-13)	NA
Dissolved Oxygen	Yes (2010-13)	NA
Temperature	Yes (2010-13)	NA
Total Phosphorous	Yes (2010-13), but not in the North Basin	Yes (2010 only)
Total Nitrogen	Yes (2010 only)	Yes (2010 only)
Ortho Phosphates	Yes (2010 only)	Yes (2010 only)
Nitrite/Nitrate	Yes (2010 only)	Yes (2010 only)
Ammonia	Yes (2010 only)	Yes (2010 only)
pH	No, not completed	NA
Conductivity	No, not completed	NA
Turbidity	Yes (2010 only)	NA
Total Suspended Solids	NA	Yes (2010 only)
Water Level	Not collected, but available from the City	Yes (2010 only) staff gage
Flow		Yes (2010 only)

Action 2 – Pre and post chemical treatment plant surveys will be completed according to current WDNR protocols. A minimum of 200 survey points will be established within the chemical treatment areas and a minimum of 40 points will be established outside the chemical treatment area by this consulting agency or our subs.

Action Taken: Pre- and post-treatment survey points were established within treated areas of the lake, but not outside the treatment area, unless just on the fringes of the treated areas.

Action 3 – All District harvester operators will complete a basic aquatic plant identification training for the purposes of recording the type and quantity of specific aquatic plants removed by the harvesters or causing navigation or nuisance conditions in the lake. The training requirement can be met by attending a Plant ID course offered by the WDNR, UW-Extension Lakes Program, a local educational institution, or qualified consultant or other person.

Action Taken: District Operations employees and Board Members were trained by a qualified consultant in the first year of this project. After that, employees were trained by the Lake Educator hired by the District.

Action 4 – All District harvester operators will complete training for the purposes of learning accepted WDNR sampling protocol for determining plant bed density. This training requirement can be met by any of the methods mentioned in Action 3. District employees will complete an informal survey of the entire littoral zone in July, August, and September to help determine possible treatment areas for the following year. This training will also help to determine when additional channel harvesting may be needed to provide appropriate navigation and/or nuisance relief.

Action Taken: This action was completed. Training was provided by a qualified consultant and then updated through the Lake Educator hired by the District.

Action 5 – A minimum of 20 sampling points in the chemical treatment areas and a minimum of 40 points within the harvested areas will be randomly selected to complete turion density sampling. A reduction in the density of turions found in the sediments can be an indicator of CLP management success. Initially, CLP density sampling will be completed by this consultant or one of our subs. It is possible that a District employee could be trained to complete this action.

Action Taken: CLP Turion density sampling was completed from 2010-2012. It was not completed in 2013.

Action 6 – District employees will complete a monthly (July – October) inspection of the shoreline for new aquatic invasive species (primarily EWM) and complete an inspection of the area in front of all public accesses every two weeks (July – October). Training will be provided by the CLMN AIS Monitoring Program or by this consultant. CLMN presence/absence forms will be completed by District employees and submitted to the WDNR Surface Water Inventory Management System (SWIMS).

Action Taken: This action was completed by District Operation Employees and the Lake Educator hired by the District. Monitoring records were submitted to the WDNR SWIMS database.

Action 7 – District employees will begin collecting water samples for endothall residual testing by the SLOH in 2011. Establishment of sampling points and sample collection training will be completed by this consultant and our subs.

Action Taken: This action was not completed during this project.

Action 8 – In the last year of this APM Plan (2013) the aquatic plant survey completed in 2008 will be repeated. Results from the new plant survey will be compared to the 2008 survey to determine if significant changes have occurred in the aquatic plant community of Rice Lake. Management recommendations for the next 5-year APM Plan will be based in part on these results.

Action Taken: This action was completed in 2013.

Action 9 – District record keeping will be improved by requiring daily log and time sheets to better quantify District employee time associated with the operation and maintenance of the harvesters, and all the actions included in this portion of the APM Plan.

Action Taken: This action was completed in each year of this project.

Conditions – Annual award of permit requests for chemical application and harvesting are dependent on the District providing adequate documentation to the WDNR that they are following the APM recommendations approved in this Plan. Monthly reports of harvesting, monitoring, and assessment activities will be sent to the WDNR during the harvesting season between May and October. These reports will be assembled by the District and reviewed by this consulting agency prior to submittal to the WDNR on or before the fifteenth day of the month.

Any inadequacies in these reports will be identified and corrected. All monthly reports will be kept in a digital format and compiled at the end of the season when this consulting agency completes an End-of Year Summary. End-of year summaries are to be kept on file for a minimum of 10 years.

Status

Permit application submitted by the District to the WDNR at the beginning of each year of implementation were approved. Monthly reports during the management season were not sent to the WDNR, however at the end of each season, a full report of aquatic plant management activities during the year was provided.

Goal 6– Provide the General Public With A means to Contact the District to Request Information, Voice Concern Over Aquatic Plant and Other Issues, and Request Appropriate Service

Objective 1 – Maintain the current District Hotline program.

Summary of Achievements
The District Hotline at 715-234-9445 was maintained throughout the implementation of this project. Fewer calls were made to the hot line than in previous years.

Objective 2 – Provide a place in the newly established District Webpage for the general public to make comments and requests.

Summary of Achievements
The District did establish and maintain a web page at http://rllakedistrict.org/ to provide general lake information to the public. A Facebook account was also set up. Links to Current Issues, Notices, Ordinances, Meeting Repository (Agendas and Minutes), Reports and Surveys, District Volunteer Labor Grant Forms, FAQs, Signup for Contacts, Lake Projects, and District Programs are all available to the public on the web page.

Action 1 – Maintain the current District phone in Hotline (715.234.9445) as a means for the general public to request information or provide comment related to aquatic plant and other lake management issues, however the responsibility of responding to Hotline inquiries will be shifted to a District Board Member or other person. Inquiries will be directed to the appropriate District employee, lakes consultant, or board member for action.

Action Taken: This action was completed.

Action 2 – The ability for visitors to the District Web page (http://rllakedistrict.org) to leave comments or ask questions will be added to web page operations. A District Board Member or other person will be given the responsibility of responding to messages left.

Action Taken: This Action was completed. The District hired a website design and maintenance person to work with the web page.

Conditions – A daily log book will be kept of all Hotline inquiries including when the inquiry was left, who responded to it and when, and whether the issues was resolved, not resolved, or did not require a resolution. All daily log sheets will be compiled and included in the End-of Year Summary, and summarized for the monthly reports. A stipend will be created to help offset the added time this person or persons will be required to give to support this form of public involvement.

Action Taken: This action was completed.

Goal 7– Create an District Employee Handbook Defining Employee Qualifications and Expectations, Training Requirements, and District Contacts

Action 1 – During the first year of this APM Plan, a District Employee Handbook will be created. The hand book will outline the different responsibilities of District employees. Not all employees will be expected to do the same things, and therefore, necessary qualifications will also be different. Current employees and employees hired in 2010 will help define what goes into the handbook.

Action Taken: An Employee Handbook was completed in 2010 by the District and distributed to existing and new employees.

Goal 8 – Create a Residential and Riparian Owner Best Management Practices (BMP) Program

Objective 1 – Reduce the total shoreline that is mowed to the edge of the lake to one third of the 2008 total (6.6 mi) replacing it with buffer strips or full shoreland restorations over the next four years.

Summary of Achievements
This objective was not met. Starting with a Lake Educator hired in 2010, educational materials were gathered and made available to property owners in the District. Some individual contact was made with property owners by the Lake Educator, but most of the efforts were directed toward building a program. From 2011-2013 a new Lake Educator was hired by the District. This person contacted many property owners one-on-one to generate interest in completing best management practices to improve the shoreline and reduce nutrient loading. As many as 25 individual lakeshore property owners have expressed an interest in doing restoration work on their property, but little has been implemented due to concerns about funding. In response to this concern, the District allocated $20,000.00 from their budget for use in 2014 to implement shoreland and parcel improvement projects within the District.

In 2012, one property owner became very concerned when it was learned that the District was promoting shoreland improvement projects. This landowner assumed incorrectly that the District was going to require all property owners to put in a mandatory buffer along the lake. During the 2012 Annual Meeting, nearly 100 people showed up to learn more about the shoreland improvement push being made by the District. Other than being concerned about being forced to install a buffer, which was not ever a possibility, most attendees felt the efforts being made by the District were acceptable, even commendable.

At this time, after a large effort, few projects have actually been implemented, but it is expected that more shoreland project will be completed due to the allocated funding for 2014.

Objective 2 – Reduce the estimated percent of the total City of Rice Lake phosphorous loading attributed to residential property (currently at 47%) by 10-15% over the next four years.

Summary of Achievements
This objective has not been met. Reducing phosphorus loading to the lake from residential property is tied to the installation of best management practices by property owners. Since few of these projects have been installed, the goal of reducing the load from residential properties has not been met.

Objective 3 – Seek to re-establish emergent and floating leaf vegetation along the shoreline targeting those areas with no shoreland protection first and moving into areas where the shoreland protection is failing and then into areas where operating structures are in place.

Summary of Achievements
This objective has not been met. Other than whatever vegetation that may recover after management including both herbicides and harvesting, not other attempts have been made to re-establish aquatic vegetation along the shoreline.

Objective 4 – Provide recognition for residents within District boundaries that complete activities that will help to improve the lake.

Summary of Achievements
This objective has been partially met. Property owners and volunteers who have been involved in actions included in this project have been recognized through the annual meeting of the District in October. No specific shoreland improvement or other parcel improvement projects have been completed and acknowledged by the District.

Action 1 – The District will hire a Summer Intern in each of the next four years to administer a Land Parcel Improvement Program. This person will provide educational opportunities for and work with land owners within the boundaries of the District to design and eventually implement best management practices like buffer strips, runoff diversion systems, rain gardens, rain barrels, and full-scale shoreland restorations. A 2011 Lake Protection Grant will provide financial incentives and assistance for implementation of these projects.

Action Taken: The District has hired a summer Lake Educator in each year of this project. After the first year, a new person was hired who filled this role for the remaining three years. In 2012, the Lake Educator was funded by a separate Aquatic Invasive Species Education Grant. In 2013, the Lake Educator was funded through money allocated out of the District budget, separate from any grant.

Action 2 – The same intern will administer an Emergent Species Restoration Program to identify shoreland around Rice Lake that could benefit from the re-establishment of emergent and floating-leaf vegetation and then approach the land owner for permission in writing to work toward re-establishing these sites.

Conditions – The intern will be employed full time for 14 weeks between Memorial Day and Labor Day and be paid a minimum of $16.00/hr. The Intern will be responsible for meeting with landowners both on the lake and within District boundaries to discuss land parcel improvement and emergent species restoration projects that could benefit the lake. The intern will be expected to provide monthly updates at District Board meetings, GPS all BMP locations, provide copies of all maps, BMP plans, and complete photographic documentation of before, during, and after projects.

Action Taken: This action was completed in all four years of this project.

Action 3 – Establish a budget for the purchase and construction of “buffer blocker” systems to aide in site restoration (Langlade County Web page). Re-established plants will be both purchased and “moved” from other locations around the lake. Wild rice is just one of the species that will be included in this restoration program. Other plant species include but are not limited to rushes, sedges, smart weed, manna, horsetail, arrowhead, pickerel weed, and various floating leaf species.

Action Taken: This action was not completed. No buffer blocker system to aid in the re-establishment of native aquatic vegetation was purchased or installed during this project.

Action 4 – Approach land owners with general information about restoring wild rice on their shoreline. If enough Rice Lake land owners interested in restoring wild rice are identified in the 2010, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) may become an active partner in the restoration project. GLIFWC resource specialists would evaluate Rice Lake for appropriate habitat and provide technical assistance, tracking, and cost-sharing for the purchase of seed. The District, along with land owners and other interested parties like the UW Extension program would provide planting services. Guidelines for wild rice re-introduction were provided by Peter David of GLIFWC and can be found in.

Permitting – A permit is not needed for planting native wild rice in a body of water. However permits may be needed for restoring shorelines, transferring aquatic plants from one location to another, installing buffer blocker systems, and incorporating property changes to reduce runoff.

Action Taken: This action was not completed.

Action 5 – Good lake stewardship activities like sensible shoreland lighting, improving buffer strips, use of phosphorous-free fertilizers both in the City and on the lake shore, proper management and disposal of grass clippings and raked leaves, and septic system maintenance will be promoted through the District Webpage, annual booth at Aquafest and the Barron County Fair, through radio and newspaper ads, radio talk shows, and workshops sponsored by the District. Recognition will be awarded to those land owners incorporating best management practices on their properties.

Action Taken: This action was completed, except for recognition of land owners participating in best management practices on their properties. Recognition was given to participants and volunteer assisting with this action during the District Annual Meeting in each year of this project. The District web page does have information related to these topics on site. Annual participation in Aquafest including an event at the Park coordinated with the Rice Lake Men's Club Fishing Day and an entry into the Parade was completed. A District booth was set up in the Barron County Building at the Barron County Fair in each year of this project.

Goal 9 – Increase Public Awareness of and Involvement in the District by Improving Public Outreach, Exposure, and Image and Provide Greater Land Owner and Lake User Education

Objective 1 – Set up a District Public Communications Committee.

Summary of Achievements
This objective was not met in the four years of this project. The District Board did not implement a Committee structure during this project. It was discussed in 2013, and with a new Chair in 2014, a Committee Structure has been implemented.

Objective 2 – Take a more active role in annual celebrations including Aquafest, the Barron County Fair, Homecoming, the Christmas Parade and other city events.

Summary of Achievements
This objective was partially met. In 2010, the District participated in the Homecoming Parade and Aquafest Parade. In all other years in this project the District was in the Aquafest Parade. They also were involved in the Chetek Liberty Fest Parade in 2012. The District, through its Lake Educator, participated in other events that occurred in the City. No entry was made in the Christmas Parade in any of the years of this project. A booth was set up at the Barron County Fair during each year of this project. In 2013, the District also set up a booth during Farm Technology Days which was held in Barron County.

Objective 3 – Increase public participation and attendance at District monthly board meetings by 25% and by 50% at the Annual Meeting based on 2009 numbers.

Summary of Achievements
This objective was met. More people show up at monthly District Board Meetings and at the Annual Meeting held in October. More participation and attendance is still desired though.

Objective 4 – Sponsor a half day Lake Fair to promote District activities, public education related to aquatic invasive species, lake protection, best management practices, and good lake stewardship activities.

Summary of Achievements
This objective was met. A formal lake fair was set up in 2011. It was held at the Rice Lake City Hall in cooperation with the Annual Meeting that year. Unfortunately, it was not well attended.

Objective 5 – Continue a watercraft inspection program at all public accesses to the lake.

Summary of Achievements
This objective was met. The watercraft inspection program on Rice Lake expanded tremendously through this project, due in part to the extra efforts of the Lake Educator and several District Board Members.

Action 1 – A Public Communications Committee will be set up by the District to develop and oversee the activities designed to improve the overall public perception and involvement of the District in the community and surrounding area and will work with the Rice Lake Chamber of Commerce and the Town of Rice Lake to develop an advertising campaign to present all that is positive about the lake. An active member of the community has already agreed to chair this committee and oversee its activities.

Action Taken: This committee was not formed during this project (2010-2013). The community member willing to chair this committee became unavailable and no one else was found to take her place. In 2014, a committee was formed that includes community communications.

Action 2 – The District will sponsor a float in the Aquafest, Homecoming, and Christmas parades, set up a public information booth during the Barron County Fair, and provide a monthly radio spot with the local radio personality. A digital newsletter will be posted on this website and others, and emailed three times a year to anyone who joins the distribution list. A newspaper article will be submitted to the Rice Lake Chronotype five times a year updating District activities and highlighting upcoming meetings and special events.

Action Taken: The District participated in the Aquafest Parade in 2010, 2011, and 2013. It participated in the Homecoming Parade in 2010. It participated in the Chetek Liberty Fest in 2012. It did not participate in the Rice Lake Christmas Parade. The District had a booth at the Barron County Fair in each year of this project and in the Farm Technology Days in 2013. A newsletter and web page were set up and maintained. Newspaper articles were written by the Lake Educator, but not five a year.

Action 3 – A half day Lake Fair will be held every year in late September or early October at the Lumbering Hall of Fame Park. At least one "keynote" speaker will be on the agenda to present interesting and useful information for improving the lake. Children's activities will be included, and awards given acknowledging partners and members of the District who have contributed significantly to the health and well-being of the lake. Candidates for these awards will be sought throughout the year, and winners determined by the District. Radio, newspaper, and TV media outlets will be invited to cover the event and political representatives invited to attend.

A Lake Fair was held in 2010 at the Lumbering Hall of Fame Park in August. Another was held in 2011 at City Hall during the October Annual Meeting. A public event was held on the second Saturday of Aquafest in cooperation with the Rice Lake Men's Club Kids Fishing Day 2011-13. No awards program was set up, though community members who participated in District Events were recognized during the Annual Meeting by the Lake Educator.

Action 4 – A watercraft inspection program following Clean Boats Clean Waters (CBCW) guidelines has been put in place for Rice Lake and will continue as a part of this Lake Management Plan. At least 400 hours of watercraft inspection will be completed at public access sites around the lake. Much of this time will be completed by lake volunteers trained by certified persons in the program. The local Kiwanis Club, high school biology teacher, and others have already been volunteering time and coordination for this program. The Summer Intern position will expand the services already provided by these people.

Action Taken: This action was completed. Nearly 2500 combined hours of watercraft inspection time at four landings on Rice Lake are recorded in the WDNR SWIMS database from 2010 to 2013. More than 5300 people were contacted at the landings during this time frame.

Conditions – All CBCW data collected as a part of this APM Plan is required to be submitted to the WDNR SWIMS data base.

Status: This was done.

Action 5 – The new city boat landing facility at the Lumbering Hall of Fame Park off of Stein Street includes a very nice boat washing facility. All boaters spoken to will be referred to this landing for the purpose of completing boat washing recommendations included in the Clean Boats Clean Waters Message. In addition, signs will be posted at the exits of all other landings over the course of the three year project informing boaters that this boat washing station exists. These signs will also remind boaters that it is now illegal to transport any boat or trailer with aquatic vegetation attached to or hanging from it.

Action Taken: Rice Lake has a power wash station at the Stein Street (Lumbering Hall of Fame) landing. Only 89 of the respondents contacted through the CBCW program from 2010-2013 said they used the wash station. New signs were placed at all the access points on Rice Lake in 2010 and 2011.

Goal 10 – Implement the Activities Associated With This APM Plan Through a Combination of District and State of Wisconsin Grant Funding

Objective 1 – Use District tax levy money to fund certain "routine" activities each year.

Summary of Achievements
The District allocated funds from its regular annual budget to support Lake Educator actions, support the CLP and navigation channels harvesting program, and general expenses incurred through many of the actions included in this project. In 2013, the Lake Educator position was completely funded by the District with no grant support, and this continues into 2014. For the 2014 season, the District added $20,000.00 to its budget to support shoreland and parcel improvements throughout the territory included in the District official boundaries.

Objective 2 – Apply for a WI Lake Planning and Protection Project to fund watershed improvement activities.

Summary of Achievements
An AIS Control grant funded the last four years of this project. In 2012, an AIS Education grant funded the Lake Educator position. A Lake Protection grant is being planned for Feb 2015 to support watershed projects aimed at making improvements to the lake. This project will piggy back off of watershed projects being completed in 2014 and 2015 funded by a settlement made by the WDOT/DNR which provides $70,000 over the next two years to implement projects in the Bear and Rice Lake watersheds.

Objective 3 – Involve community and other partners in making match requirements for state grants and in supporting the activities included in this plan.

Summary of Achievements
Sufficient community and partner involvement in this project has been provided to cover all required match.

Action 1 – Annual income from a District tax levy currently generates nearly $100,000.00. This money will be used to fund many of the expenses associated with this new APM Plan. The District currently funds all CLP and native plant harvesting that occurs on the lake. It intends to continue funding all harvesting related activities including hauling, disposal, and record keeping. Basic water quality sampling from three lake sites, in-lake monitoring for EWM and other aquatic invasive species, watercraft inspection, public education and involvement, Lake Fair, and public image enhancement will be funded by the District.

Action Taken: The AIS Control grant that supported this project provided funds to help the District complete this action. Beginning in 2012, more of the actions mentioned above were completed within the regular District annual budget. In 2014, there is no existing WDNR grant funding supporting these efforts. All efforts are being funded by the District.

Action 2 – A WI Lake Protection and Planning Grant will be applied for in 2011 to help fund activities aimed at reducing nutrient contributions to Rice Lake from the immediate shoreland area, the larger watershed, the City of Rice Lake, and from internal loading. Activities to be included in this funding request are a Farmer Incentive's Program similar to the one proposed in the Turtle Lakes Lake Protection Project, funding incentives for the Residential and Riparian Owner BMP Program projects, a Lower basin alum treatment evaluation, a public beach study to determine how best to re-open it for safe public use, support for City of Rice Lake storm water management projects, and funding the for in-lake plant restoration and natural replacement of failing shoreland protection structure program. Activities associated

with the last year of the APM Plan will also be included in this grant application including a new aquatic plant survey and reevaluation of the current APM Plan.

Action Taken: A lake protection grant application is expected in February 2015.

Action 3 – Attempt to involve the Rice Lake Area School District, Barron County Campus, Wisconsin Indianhead Technical College, public institutions and organizations, other lake and river organizations, private businesses and organizations, and local and town governments in management activities associated with this APM Plan. Promote the formation of a Barron County Lakes and Rivers Association.

Action Taken: Through the Lake Educator hired from 2011-2013, the Rice Lake School District was very active in District projects. Many of the watercraft inspection hours put in at the landings was provided by high school students working to make their community service requirements. The District has reached out to other lake groups including: Bear Lake Association, Long Lake Preservation Association, Big Chetek Chain of Lakes Association, Red Cedar Lakes Association, Desair Lake Management District, Chetek Lakes Protection Association, and the Tainter-Menomin Lakes Improvement District. They have participated in the last three Red Cedar River Watershed Conferences in response to the Tainter and Menomin TMDL that references the entire Red Cedar River Watershed of which Rice Lake is a part of. The District has supported watershed improvement projects proposed by the Barron County Soil and Water Conservation District, Moon Lake Association, and Lake Montanis. The District has supported numerous City of Rice Lake events, the Lumbering Hall of Fame, and Shutlick Park projects.

A Barron County Lakes and Rivers Association has not been formed as of now.

Goal 11 – Complete Annual Project Summaries and a Final Project Evaluation

Action 1 – In December of each year this management plan is implemented, an end-of-year summary will be provided detailing the results of activities accomplished. Pre and post plant survey results, turion sampling, residual testing (if done), water quality results, and plant density results will be summarized. Plans for management including herbicide treatment areas, harvesting areas, and late season channels will be addressed preparing the District for submittal of the necessary treatment permits to the WDNR. Progress made in the Residential and Riparian Owner BMP and Emergent Species Restoration programs will be summarized. All public awareness activities will be summarized. Attendance at District functions will be tracked, documented, and compared to the previous year.

Action Taken: This action was completed. End of year summaries were prepared from 2010 through 2013.

Action 2 – Project Deliverables will include all maps, GIS documents, survey results, treatment records (both herbicide and harvesting) and results, summary reports, photographic records, public participation records, etc. They will be defined in greater detail as a part of the AIS Control and Lake Protection grant applications.

Action Taken: This action was completed.

11.0 Aquatic Plant Management Alternatives Evaluation

Nuisance aquatic plants can be managed a variety of ways in Wisconsin. The best management strategy will be different for each lake and depends on which nuisance species needs to be controlled, how widespread the problem is and the other plants and wildlife in the lake. In many cases, an integrated approach to aquatic plant management that utilizes a number of control methods is necessary.

Control methods for nuisance aquatic plants can be grouped into four broad categories:

- **manual and mechanical control**, which include harvesting, hand-pulling, and raking plants;
- **biological control**, which includes the use of organisms such as herbivorous insects, parasitic organisms, and planting aquatic plants;
- **physical habitat alteration**, which includes dredging, drawdown, lake bottom covers, and non-point source nutrient controls; and
- **chemical control**, which involves the use of herbicides.

Each of the above control categories are regulated by the WDNR and most activities require a permit from the State. Most control methods are regulated under Chapter NR 109 except for chemical control which is regulated under Chapter NR 107. Installing bottom covers, which is not a commonly accepted practice, also requires a Chapter 30 permit.

Regardless of the target plant species, native or non-native, sometimes no active management of the aquatic plant community is the best option. Plant management activities can be disruptive to native plant species and their ecological functions, and may open up areas for new invasive species to colonize. Other benefits of no management include no financial cost, no system disturbance, and no unintended effects of chemicals. Not managing aquatic invasive species, however, may allow small populations of a plant to become larger and more difficult to control.

The benefits and limitations of a number of management techniques are described below. Although many of the available control methods are currently not applicable for Rice Lake, aquatic plant management options requires an understanding of plant management alternatives and how appropriate and acceptable each alternative is for a given lake.

11.1 No Manipulation

No manipulation of the aquatic plant community is often the easiest, cheapest, and in some cases most effective aquatic plant management alternative, even for non-native invasive species like curly-leaf pondweed. Not actively managing aquatic plants in Bear Lake is recommended in areas where excess aquatic plant growth does not impact lake uses, where the benefit of management is far out-weighed by the cost of management, where water quality or other lake characteristics limit nuisance growth conditions, and where highly valued native plants or habitat would be negatively impacted (for example, areas with wild rice).

11.2 Manual and Mechanical Controls

Except for wild rice, manual removal of aquatic plants by means of a hand-held rake or by pulling the plants from the lake bottom by hand is allowed within a 30-foot-wide corridor along a 100-foot length of shoreline without a permit (as shown in Figure 7) provided the plant material is removed from the lake. Plant fragments can be composted or added directly to a garden.

Even though up to 30 feet of shore can be cleared of aquatic plants, removal should only be done to the extent necessary. Clearing large swaths of aquatic plants disrupts lake habitats, disturbs lake sediment, and creates open areas for non-native species to establish. If an aquatic invasive species such as curly-leaf pondweed is the target species, then removal by this means is unrestricted as long as native plants are not damaged or eliminated.

Manual removal can be effective at controlling individual plants or small areas of plant growth. It limits disturbance to the lake bottom, is inexpensive, and can be practiced by many lake residents. Manual removal is most effective in shallow, hard bottom areas of a lake. Pulling aquatic invasive species while snorkeling or scuba diving in deeper water can be done without a permit and can be effective at slowing the spread of a new aquatic invasive species infestation within a lake when done properly. When harvesting curly-leaf pondweed it is important that all material is removed as free-floating curly-leaf fragments can remain viable and produce turions for up to two weeks. Manual removal is a be a viable management option for certain areas in Rice Lake.

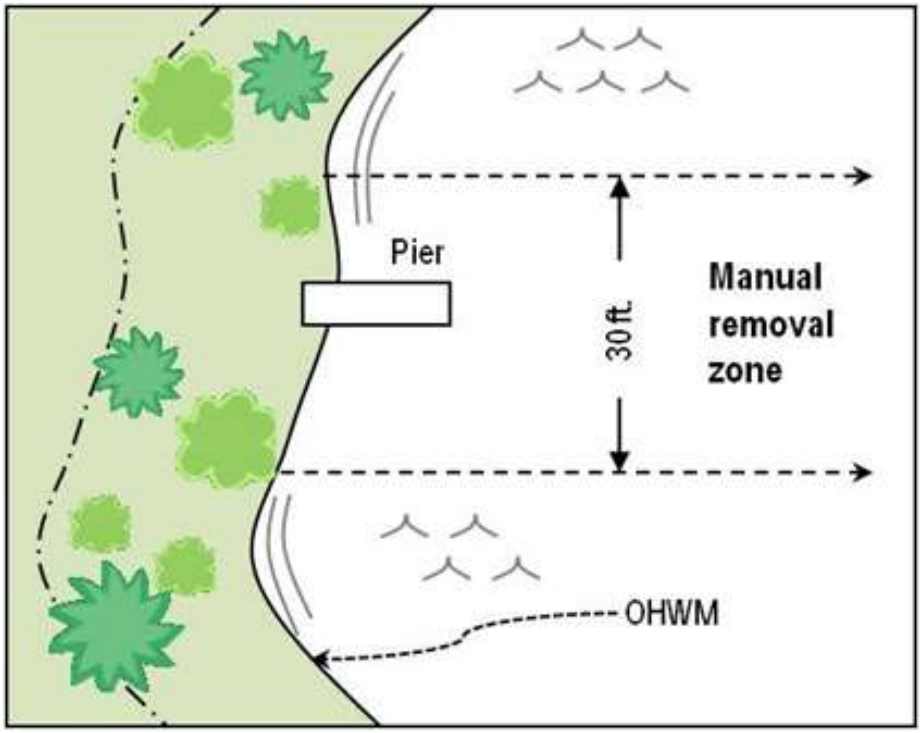

Figure 7 – Aquatic Vegetation Manual Removal Zone

11.2.1 Large-scale Manual Removal

Hand-pulling by wading or SCUBA diving is typically used when an aquatic invasive species exists as single plants or isolated beds, as in new infestations. Large-scale hand or diver removal projects have successfully reduced or controlled established aquatic invasive species populations.

One such effort is underway on Red Cedar Lake. In 2011, the Red Cedar Lakes Association performed diver removal on a dense, isolated one-acre bed of curly-leaf pondweed in Red Cedar Lake. This large-scale effort was conducted by a group of local high school students (members of the Conservation Club) and a Red Cedar Lake Association representative. Water depths and inexperience made removal difficult; however, the effort was fairly successful and the divers were able to remove a large boat load of curly-leaf pondweed.

Following the 2012 during early-summer curly-leaf bed mapping survey, it was determined, based on experience the previous year, that hand harvesting was a viable management route. In mid-summer, volunteers re-visited sites and removed on average 83% of the curly-leaf in 14 different beds.

Several lake organizations use large-scale manual removal to manage Eurasian watermilfoil. Horseshoe Lake in Barron County uses diver removal on small or isolated areas of Eurasian watermilfoil, and uses chemical herbicides on larger, more expansive sites. Early in the management phase, Sand Lake in Barron County participated in diver removal, but stopped using divers when the Eurasian watermilfoil expanded too rapidly for the divers to keep up. For several years the St Croix Flowage in Douglas County attempted to control the spread of Eurasian watermilfoil by diver removal. While successful in the first couple of years, the use of small-scale herbicide application has been added to the control regime.

A number of lakes in central Wisconsin are achieving greater success with volunteer-driven Eurasian-watermilfoil manual removal projects. This is primarily due to extensive outreach, training, and program development offered by Paul Skawinski, AIS Education Specialist, and Chris Hamerla, Regional AIS Coordinator and aggressive and prompt response to new invasions in lakes. A video is available online demonstrating the proper way to control a Eurasian watermilfoil population by manual removal efforts at: https://www.youtube.com/watch?v=CfsEDyAwQP4

Overall costs of contracted diver removal of Eurasian watermilfoil have been found to range from a high of $796 per hectare of Eurasian watermilfoil removed during a three-year intensive management effort followed by about $300 per hectare during the subsequent three-year maintenance period. This six-year effort successfully reduced the overall distribution of Eurasian watermilfoil in the lake from 16% of the littoral zone to 3%.

11.2.2 Mechanical Control

Mechanical control methods use motorized accessories to assist in vegetation removal. Mechanical control can be used for both small- and large-scale control efforts and require WDNR permits regardless of the size of the area to be managed. As with manual control, plant fragments must be removed from the water to the extent practical.

The most common form of mechanical control is the use of large-scale mechanical harvesters on the lake. The harvesters are generally driven by modified paddle wheels and include a cutter that can be raised and lowered to different depths, a conveyor system to capture and store the cuttings, and the ability to off-load the cuttings. Harvesters operate at depths ranging from skimming the surface to removing vegetation up to five feet below the surface.

Harvesters can remove thousands of pounds of vegetation in a relatively short period of time. By removing the plant biomass, harvesting also removes nutrients from a lake. Everything in the path of the harvester will be removed including the target species, other plants, macro-invertebrates, semi-aquatic vertebrates, forage fishes, young-of-the-year fishes, and even adult game fish found in the littoral zone. An advantage of mechanical aquatic plant harvesting is that the harvester typically leaves enough plant material in the lake to provide shelter for fish and other aquatic organisms, and to stabilize the lake bottom sediments (24). Large-scale plant harvesting in a lake is similar to mowing the lawn. Plants are cut at a designated depth, but the root of the plant is often not disturbed. Plant composition can be modified by cutting away dense cover which may increase sunlight penetration enough to stimulate growth of underlying species (Figure 8). Cut plants will usually grow back after time,

just like the lawn grass. Re-cutting during the growing season is often required to provide adequate annual control (25). Harvesting activities in shallow water can re-suspend bottom sediments into the water column releasing nutrients and other accumulated compounds (25). Some research indicates that after cutting, reduction in available plant cover causes declines in fish growth and zooplankton densities. Other research finds that creating deep lake channels by harvesting increases the growth rates of some age classes of bluegill and largemouth bass (26).

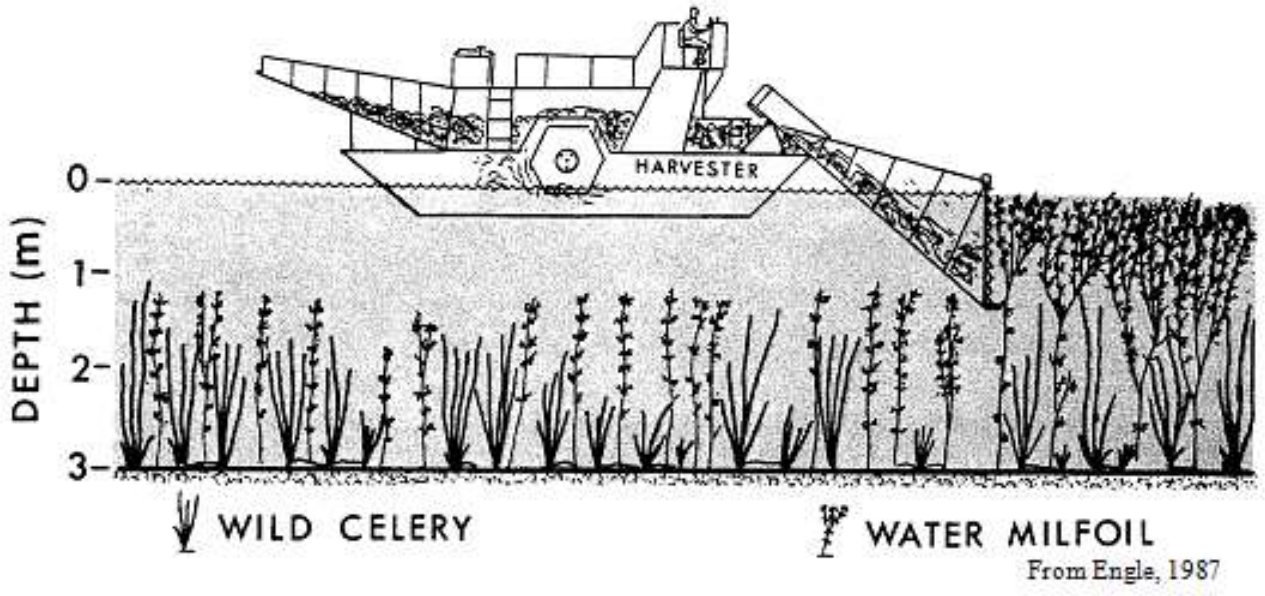

Figure 8 – Harvesting Surface Growth to Maintain Habitat and Simulate Basal Plant Growth

Recent cost per acre for contracting harvesting services average $410 per acre whereas costs for purchasing, operating, and maintaining a harvester average $567 per acre (27). In general, the cost of harvesting decreased with increasing total acreage harvested, from about $500 per acre at 40 acre sites to about $250 per acre at 160 acre sites (27). The Rice Lake Protection and Rehabilitation District in Barron County, Wisconsin owns and operates three harvesters at a cost of approximately $420 per acre harvesting a total of approximately 220 acres. The costs supporting a harvesting program administered by a given lake group may be reduced by purchasing smaller or used equipment, determining a local, low cost disposal site, increasing the amount of acreage harvested, and through other cost analyses. Large-scale plant harvesting of areas with dense CLP growth is an option for aquatic plant management in Rice Lake.

There are a wide range of small-scale mechanical management techniques, most of which involve the use of boat mounted rakes, scythes, and electric cutters. As with large-scale mechanical harvesting, removing the cut plants is required and often accomplished with a rake. Commercial rakes and cutters range in prices from $100 for rakes and cutters that can be thrown from the shore or attached to a boat to around $3000 for electric cutters with a wide range of sizes and capacities. Small-scale mechanical management may be an option for Rice Lake.

One of the best ways for riparian property owners to gain navigation relief near their docks is to actively use their watercraft to create open channels. Although not truly considered mechanical management, plant disruption by normal boat traffic is a legal method of management. Most macrophytes do not grow well in an area actively used for boating and swimming. It should be noted that purposefully navigating a boat in circles to clear large areas is not only potentially illegal, but it can also re-suspend sediments, clear paths for aquatic invasive species growth and cause ecological disruptions.

11.2.3 Suction Dredging

Suction dredging is a form of mechanical harvesting where diver-operated suction tubes connected to barge- or pontoon-mounted pumps and strainer devices are used to vacuum plants uprooted manually by SCUBA divers. This management technique is considered harvesting and not dredging because sediments are not removed from the system. Suction dredging is mostly used for control of isolated, new infestations of aquatic invasive species. Suction dredging requires good visibility for the SCUBA divers (i.e., high water clarity), would probably work best at sites with at least 10 feet of depth or more for divers to control buoyancy, and would also work best where sediment suspension would not cloud diver's vision as plants are uprooted. Furthermore, purchase and assembly of pumps and strainer devices on a pontoon would be required. If there is a committed volunteer base of SCUBA divers and means to secure equipment, suction dredging of CLP is not a viable option in Rice Lake.

11.2.4 Other Mechanical Management

The mechanical aquatic plant control methods described below are not recommended for use in Bear Lake because they are often extremely disruptive to aquatic ecosystems. These methods are, however, used in other states or inappropriately employed in Wisconsin and are therefore discussed.

Cutting without plant removal, grinding and returning the vegetation to the water body, and rotovating (tilling) are also methods employed to control nuisance plant growth in some lakes. Cutting is just like harvesting except the plants are left in the lake. Grinding incorporates cutting and then grinding to minimize the biomass returned to the lake. Smaller particles disperse quicker and decay more rapidly. Rotovating works up bottom sediments dislodging and destroying plant root crowns and bottom growth.

Bottom rollers and surface sweepers are devices usually attached to the end of a dock or pier and sweep through an area adjacent to the dock. Continued disruption of the bottom area causes plants to disappear and light sediments to be swept out. The use of rollers may disturb bottom dwelling organisms and spawning fish. Plant fragmentation of nuisance weeds may also occur. In soft bottom areas, sediment disturbance can be significant. These devices are generally not permitted in Wisconsin. A permit under Section 30.12(3) is required which governs the placement of structures in navigable waters.

Another common method for removing aquatic plants from a beach or dock area is for riparian owners to hook a bed spring, sickle mower blade, or other contraption to the back of a boat, lawn mower, or ATV and drag it back and forth across the bottom. This is a type of mechanical management that is illegal to perform in Wisconsin without a permit, and it is usually not permitted by the WDNR.

11.3 Biological Controls

Biological control for aquatic plant management involves using animals, fungi, insects, or pathogens as a means to control nuisance plants. The goal of bio-control is to develop a predator-prey relationship where the growth of nuisance plants is reduced, but not eliminated. A special permit is required in Wisconsin before any biological control measure can be introduced into a new area.

Specific biological controls of curly-leaf pondweed are not known at this time. Ongoing research on naturalized and native herbivores and pathogens that impact nuisance aquatic and wetland plants is increasing the number of potential biological control agents that could be incorporated into invasive plant management programs (28).

The grass carp (*Ctenopharyngodon idella*), which feeds on aquatic plants and has been used as a biological tool to control nuisance aquatic plant growth in other states, is not permitted in Wisconsin. These fish can severely disrupt the aquatic ecosystem and have been known to nearly wipe out all aquatic vegetation in the lakes they inhabit.

The *Galerucella* beetle (*G. calmariensis* and *G. pusilla*) has proven to be extremely effective for control of purple loosestrife. These beetles have been used across North America to manage purple loosestrife, including around Bear Lake. Use of *Galerucella* beetles for purple loosestrife management should be continued.

The milfoil weevil (*Euhrychiopsis lecontei*) is a native aquatic weevil that feeds on aquatic milfoils. Their host plant is typically northern watermilfoil, but they prefer Eurasian watermilfoil when it is available. Utilizing the milfoil weevil for Eurasian watermilfoil control has resulted in variable levels of control, with little control achieved on lakes with extensive motorized boat traffic. Researchers in Wisconsin have been developing a protocol for citizen rearing of the milfoil weevil.

Plant fungi and pathogens are currently still in the research phase. Certain species for control of hydrilla and Eurasian watermilfoil have shown promise, but only laboratory tests in aquariums and small ponds have been conducted. Methods are not available for widespread application. Whether these agents will be successful in flowing waters or large-scale applications remains to be tested (29).

Selectively planting native aquatic plants to encourage or stimulate growth of desired plant species is another form of biological control. Introducing native plants is uncommon as it is often difficult and costly and requires a fairly large source of new plants and substantial short-term labor for collecting, planting, and maintaining the stock. Maintenance of plantings may require protection from fish and birds and temporary stabilization and protection of sediment in the planting area from wind and waves. Allowing the natural re-growth of native plants in cleared areas can prevent curly-leaf and other non-native invasive plant species from establishing in those sites.

11.4 Physical Habitat Alteration

Reducing nutrient loading from the watershed (for example, reducing fertilizer use or controlling construction erosion) provides fewer nutrients available for plant growth. Runoff from development in the near-shore area and from other parts of the watershed can increase the amount of phosphorus available for plant and algae growth. Decreased light penetration due to increased algae in the water produces a favorable environment for plants that have adapted to low-light conditions, such as curly-leaf pondweed. Higher nutrient concentrations

also favor other non-native plants such as Eurasian watermilfoil and native plants that can grow to nuisance levels, such as coontail.

Research has shown that as shoreline development increases, the amount of aquatic plant growth near that lake shore decreases. In a Minnesota study of 44 lakes with varying amounts of developed shoreline, the average loss of aquatic plants in developed areas was 66% (30). On a lake wide basis, this loss of aquatic plant growth can lead to higher levels of phosphorus and an increase in the growth of algae, including filamentous algae that may attach to structures within the littoral zone or form surface mats. Reducing nutrient loading from the watershed (for example, reducing fertilizer use, controlling construction erosion, or shoreland restoration and buffers) is a viable option for Bear Lake.

Dredging is usually not performed solely for aquatic plant management but to restore lakes that have been filled in with sediments, have excess nutrients, have inadequate pelagic and hypolimnetic zones, need deepening for navigation, or require removal of toxic substances. A WDNR permit is required to perform any dredging in a waterbody or wetland. This method can be detrimental to desired plants, as all macrophytes would be prevented from growing for many years. This high level of disturbance may also create favorable conditions for the invasion of other invasive species. Dredging is not recommended for aquatic plant management Rice Lake.

Benthic barriers or other bottom-covering approaches are another possible physical management technique. Plants are covered with a layer of a growth-inhibiting substance such as sheets or screens of natural or synthetic materials, sediments such as dredge sediment, sand, silt or clay, fly ash, and combinations of the above. WDNR approval is required and screens must be removed each fall and reinstalled in the spring to be effective over the long term. Benthic barriers are not recommended for aquatic plant management in Bear Lake.

Lowering the lake level to allow for the desiccation, aeration, and freezing of lake sediments can be an effective aquatic plant management technique. Repeated winter drawdowns that last for 4 to 6 months and include a freezing period are sometimes effective for control of certain aquatic plants, such as Eurasian watermilfoil. The lowered lake levels may negatively affect native plants, provides an opportunity for adventitious species such as annuals to expand, often reduces the recreational value of a waterbody (less lake area, more exposed flats), and can impact the fishery if spawning areas are affected. The cost of a drawdown is dependent on the outlet of the lake; if no control structure is present, pumping of the lake can be cost prohibitive whereas costs can be minimal if the lake can be lowered by opening a gate. Raising water levels to flood out aquatic plants is uncommon and has a number of negative effects including the potential for shoreland flooding, shoreland erosion, and nutrient loading. Lake level alterations are not recommended for aquatic plant management in Rice Lake.

11.5 Chemical Control

Aquatic herbicides liquid or granular chemicals specifically formulated for use in water to kill plants or cease plant growth. Herbicides approved for aquatic use by the U.S. Environmental Protection Agency are considered compatible with the aquatic environment when used according to label directions. Some individual states, including Wisconsin, also impose additional constraints on herbicide use. There are a number of aquatic herbicides registered for use in Wisconsin. Factsheets for each can be found on the WDNR website at http://dnr.wi.gov/lakes/plants/factsheets/ (last accessed November 2013).

A WDNR permit is required to use chemical herbicides in aquatic environments and a certified pesticide applicator is required for application on most lakes. The WDNR requires aquatic plant surveys before and after chemical application when introducing new treatments to lakes where the treatment size is greater than 10 acres or greater than 10% of the lake littoral area and more than 150 feet from shore. The pre- and post-treatment survey protocol can be found at: http://www4.uwsp.edu/cnr/uwexlakes/ecology/APM/Appendix-D.pdf (last accessed November 2013).

The advantages of using chemical herbicides for control of aquatic plant growth are the speed, ease and convenience of application, the relatively low cost, and the ability to somewhat selectively control particular plant types with certain herbicides. Disadvantages of using chemical herbicides include possible toxicity to aquatic animals or humans, oxygen depletion after plants die and decompose which can cause fishkills, a risk of increased algal blooms as nutrients are released into the water by the decaying plants, adverse effects on desirable aquatic plants, loss of fish habitat and food sources, water use restrictions, and a need to repeat treatments due to existing seed/turion banks and plant fragments. Chemical herbicide use can also create conditions favorable for non-native aquatic invasive species to outcompete native plants (for example, areas of stressed native plants or devoid of plants).

When properly applied, the possible negative impacts of chemical herbicide use can be minimized. Early spring to early summer applications are preferred because exotic species are actively growing and many native plants are dormant, thus limiting the loss of desirable plant species; plant biomass is relatively low minimizing the impacts of de-oxygenation and contribution of organic matter to the sediments; and recreational use is generally low limiting human contact. The concentration and amount of herbicides can be reduced because colder water temperatures enhance the herbicidal effects. Selectivity of herbicides can be increased with careful selection of application rates and seasonal timing (31). Lake hydrodynamics must also be considered; steep drop-offs, inflowing waters, lake currents and wind can dilute chemical herbicides or increase herbicide drift and off-target injury. This is an especially important consideration when using herbicides near environmentally sensitive areas or where there may be conflicts with various water users in the treatment vicinity.

The most common herbicide used for control of CLP is endothall (see Appendix A). Endothall is a selective contact herbicide that has been applied in Rice Lake in the past. Endothall kills the growing green vegetation that it contacts in the water. Trade names for the acid form of endothall (technical endothall) include Aquathol, Hydrothal-47 and Hydrothal-191. Endothall can be applied in both a liquid and granular form. It is generally applied to the surface of the lake by spreader (granular) or below the surface through trailing hoses (liquid). The chemical degrades naturally by bacterial action in the water and has a half-life ranging from 5-8 days.

Chemical herbicides are recommended for control of curly-leaf pondweed in Rice Lake.

12.0 Strategic Plan: Management Goals Objectives and Actions

Due to the successes achieved through implementation of the 2010 APM Plan, many of the goals, objectives and actions in this updated plan are the same. In that plan, herbicides were used to control curly-leaf pondweed in the Lakeshore Drive area and in larger problematic beds in the South Basin. In the last two years (2013 & 2014) no herbicide was used in the South Basin or in any other portion of the lake outside of the Lakeshore Drive area. Should curly-leaf beds expand, this plan allows for the use of herbicides throughout the lake in conjunction with mechanical harvesting.

Under the 2010 APM Plan and in this new one, harvesting for CLP will not be completed in the South Basin. However it is one goal of this plan to reduce CLP distribution and density in the South Basin to no more than a few scattered plants per acre with no measurable density. Harvesting of CLP in the South Basin would require that one of the three harvesters owned by the District be moved overland to and parked on the lake as it is not possible to drive the existing harvesters under the Narrows Bridge. Leaving one of three harvesters on the South Basin during the CLP harvest season makes it unavailable for use in the larger basin of the lake where the majority of CLP growth occurs. Some consideration has been had by the District to replace one of its three harvesters with a smaller machine that would fit under the Narrows Bridge. Should that happen, harvesting of CLP could again be considered in the South Basin, but it will not be considered for the duration of this plan.

One harvester will be moved to the South Basin in late June to early July to make it available for nuisance and navigation channel harvesting of native plants. Harvested channels will remain nearly the same as in 2013, with a reduction of harvesting in the river channel to protect the wild rice growth.

The District will also re-evaluate the need for three large harvesters. As has been previously discussed by the District, it may be beneficial to sell one of the harvesters and purchase a smaller, more maneuverable unit.

It is also important for upstream dam operators to keep a line open to the District so water levels can be planned for and harvesting operations and not be interrupted during the key growth stage of curly-leaf pondweed.

The District will continue to pursue shoreland improvement and best management practice projects along the lakeshore and throughout the district. Keeping the lake free of new aquatic invasive species infestations, particularly Eurasian watermilfoil, and controlling those aquatic invasive species already present remains a high priority for the District.

12.1 Goal 1 – Reduce the Total Amount of Curly-leaf Pondweed in Rice Lake by Combining the Use Aquatic Herbicides and Large-Scale Mechanical Harvesting

Objective 1 – Reduce the distribution and density of CLP growth in the South Basin to no more than a few scattered plants per acre with no measurable density though the use of aquatic herbicides.

Objective 2 – Reduce turion density in the sediment in the South Basin by >75% based on an average turion count of 61.5 turions/m^2 from two CLP beds in the South Basin chemically treated in 2012 over the next five years.

Objective 3 – Maintain or reduce CLP density and distribution in the Main Basin and along the City owned lakefront based on 2013 survey results (Relative Frequency-14.8%, PI Survey

Sites w/CLP-19.4%, 1-3 Rakehead Density-1.54) to keep CLP impacts minimized through the use of large-scale mechanical harvesting and/or the use of aquatic herbicides.

Objective 4 - Reduce turion numbers in areas managed for CLP (harvest and herbicide) in the Main Basin by 50% (based on results to be established in 2015) over the next five years.

Objective 5 – Complete annual pre- and post-treatment point-intercept plant monitoring following WDNR protocols.

Objective 6 – Complete CLP turion density monitoring in managed areas

Objective 7 – Lake samples to be collected by District employees for the purpose of concentration testing for endothall completed by the WI State Lab of Hygiene (SLOH).

Objective 8 – Provide land owner relief for plant fragments washed into shore.

Action 1 – Early season herbicide application in the South Basin will be determined in the previous year and with pre-treatment plant survey results.

Conditions – The area to be chemically treated will be determined after the prior year's management and monitoring actions have been completed by the District. Any area where the density of CLP reaches a rakehead density rating of 1 or greater will be chemically treated regardless of size. All herbicide will be applied prior to the third week in May (unless weather conditions, water temperature, and CLP growth stage dictate a later start) in each of the next five years (2015-2019).

Applicator – Currently, Midwest Aquacare is the professional applicator chosen by the District to administer the treatment. Midwest Aquacare satisfactorily completed similar early-season chemical treatments in Rice Lake from 2009-2010. The WDNR will be informed should a new applicator be hired, or if licensed District employees are going to take over chemical application.

Monitoring and Assessment – If an herbicide application is proposed, pre- and post-treatment aquatic plant survey work will be completed regardless of the treatment size. Pre-treatment aquatic plant surveying will be completed in the designated area prior to the chemical treatment to confirm the presence of CLP, to determine if it is far enough along in its growth to be effectively killed by the herbicide, and to identify any native plants that may be present at this time. Post-treatment aquatic plant surveying will be completed to determine the impact of the treatment on target and non-target aquatic plants. Pre- and post-treatment points will be set up annually to reflect proposed treatment areas. A resource professional or trained District employees/volunteers will complete the pre- and post-treatment survey following WDNR protocols. CLP bed-mapping will be completed annually in the South Basin

Permitting – A WDNR Chemical Application Permit is required before implementing a chemical control program and will be applied for by the District.

Action 2 – Annual large-scale mechanical harvesting of up to 150 acres of dense CLP growth in the Main Basin.

May – One harvester cutting early growing CLP in Hospital bay and the Red Cedar River Delta.

June – Two harvesters removing as much of the dense growth CLP in the Upper basin as they can. A third harvester will be used to assist with more intensive harvesting and to pick up floating masses of CLP fragments to help minimize wash-up onto shorelines.

July – One harvester cleaning up missed or re-growth in previously harvested areas and escaped fragment pick up. The CLP harvesting program will officially end by July 4th unless a need for continued CLP harvesting has been documented and a letter sent to and approved by the WDNR.

Off-load Sites – Six possible off-loading sites have been identified on the Upper basin. The main off-loading site is in Hospital Bay.

Disposal – All plant material removed by the harvesters will be shipped to disposal property approved by the WDNR, Barron County, and the affected local township. Disposal sites will be evaluated in each year of this plan.

Conditions – Harvesters are required to stay in at least three feet of water and operate their cutters at a maximum depth of 5-ft or two-thirds of the water column, whichever is less. When harvesting close to shore they must operate parallel to shore and remain in at least 3-ft of water. At off-loading sites, District employees will attempt to return game fish, turtles, and other wildlife back to the water. No large-scale mechanical harvesting of CLP will occur in the South Basin, unless the District purchases a smaller harvester capable of traveling under the Narrows Bridge between the north and south basins.

Monitoring and Assessment –GPS units will continue tracking the movements of the harvesters whenever harvesting is occurring. The GPS tracking log will be downloaded from the GPS unit for each harvester used and digitally archived. Daily log sheets will be kept including the following harvesting information: estimated total daily tonnage, number of loads, surface acres covered, plant ID list, percentage of plant species removed, and plant bed density information.

Permitting – A mechanical harvesting permit is required by the WDNR before a large-scale harvesting program can be implemented and will be applied for by the District.

Action 3 – CLP turion density monitoring in management areas

Conditions – Turion density sampling will be completed as a part of this APM Plan regardless of the status of treatment in the designated turion sampling areas. Goals set for decreasing the amount of turions will be based on 2012 turion density levels in chemically treated areas, and on first year data collected from harvested areas.

Monitoring and Assessment – Turion density sampling was completed in chemically treated areas for three years as a part of the 2010 APM Plan. In this new plan, turion density sampling will be completed in both chemically treated (South Basin) and harvested (Main Basin) areas. A set of at least 60 points will be established in what is normally considered a harvest area and what is considered an herbicide area. These 120 points will be monitored in each year of this plan, whether or not harvesting or the use of herbicide was completed in any given year, for the purpose of documenting turion density changes that may be the result of actual management or the lack of management. A reduction in the density of turions found

in the sediments at these points can be an indicator of CLP management success or failure, and if management is not done, an increase could be an indicator of new growth and distribution. CLP density sampling will be completed by a consultant retained by the District. In the past, this has been Ecological Integrity Services.

Action 4 – Chemical concentration testing

Conditions - Currently, chemical residual testing is not required by the State of Wisconsin. However, within the South Basin it is expected that chemical treatment will be proposed for the control of CLP and chemical concentration testing will be completed in at least the first year of implementation. Chemical concentration testing has provided valuable information on the fate of herbicides in other lakes and has helped determine adequate dosage rates. Understanding the fate of herbicide in the water has also helped maintain public support for this management alternative.

Monitoring and Assessment – In the first year during the time period covered by this APM Plan that a chemical treatment of CLP is proposed, a chemical concentration testing proposal will also be made. A request will be made to the WDNR by the District to have them set up a sampling regime according to current guidelines. Water samples required for this testing will be collected by District employees or volunteers, or by a consultant retained by the District. Lab analysis will be completed at the Wisconsin State Lab of Hygiene.

Action 5 – Harvester assisted removal of plant fragments washed up on the shoreline.

Landowners may request harvester assistance for removing large piles of plant fragments washed into their shoreline, but not for actual plant cutting and harvesting to, at, or near their docks. Harvesters may be driven perpendicular into shore within the allowed 30-ft riparian viewing corridor around a land owner's dock without operating cutting blades and provided the paddle wheels of the harvester remain in at least three feet of water, and are not operating while piles of fragments are hand-shoveled onto the conveyor belt. Paddle wheels are not to be operated in any manner to "blow out" floating piles of fragments near the shore.

Conditions – Land owner requests for assistance can be made in person, by hotline, or in writing and must be directed to specified District personnel. The land owner's request will be evaluated by District personnel trained to complete this action. No action will occur until the land owner making the request has signed a form clearly stating under what conditions this action can take place. The completed form will be kept on file with the District and is good for one season only. The land owner or another person identified by the land owner on the form must be present to assist the harvester operator with removal, or it will not be completed.

12.2 Goal 2 – Prevent the Spread and Establishment of Aquatic Invasive Species Already Present Along the Shores of and in the Wetlands Adjacent to Rice Lake

Objective 1 – Purple loosestrife monitoring and removal.

Objective 2 – Japanese knotweed monitoring and control.

Action 1 – District employees, volunteers of the Citizen Lake Monitoring Network (CLMN), and National Lumbering Hall of Fame representatives will monitor the shoreline of the lake for purple loosestrife in July and August. Purple loosestrife will be pulled where possible, or cut

and sprayed if not. In the event a larger patch of purple loosestrife is identified where physical and chemical control is not feasible, biological control will be implemented.

Action 2 – District employees, volunteers of the Citizen Lake Monitoring Network (CLMN), and National Lumbering Hall of Fame representatives will monitor the shoreline of the lake for Japanese knotweed throughout the summer season. The National Lumbering Hall of Fame non-profit organization and Barron County have already taken up the cause to try and get this invasive species under control.

Rusty Crayfish and Chinese Mystery Snails – Both of these species are known to be in Rice Lake. Currently no management is planned.

12.3 Goal 3 – Eurasian Watermilfoil Rapid Response Planning

Objective 1 – Update contact information in the EWM Rapid Response Plan as needed and review the plan of action for the District to follow should Eurasian watermilfoil be identified in Rice Lake.

Action 1 – Provide Training for District employees and lake volunteers on how to identify EWM and how to monitor the lake for EWM.

Action 2 – District employee monitoring of the entire Rice Lake shoreline every two months from May to October following Citizen Lake Monitoring Network EWM Monitoring Protocol.

Action 3 – District employee monitoring of all public access points once a month from May to October.

12.4 Goal 4 – Provide Native Aquatic Plant Management That Protects and Enhances Native Plant Growth and Diversity in Rice Lake

Objective 1 – Limit the harvesting of native aquatic plants to navigation and nuisance relief only in areas designated as high traffic and high public use.

Objective 2 – Provide land owner relief for plant fragments washed into shore.

Objective 3 – Continue to provide navigation relief through the shallow, plant dominated area between Hospital Bay and the Red Cedar River Delta.

Action 1 – Annual designation of navigation and nuisance relief channels of varying width in both the Upper and Lower basins in the fall of the year based on the current seasons placement of channels and expected lake use in the coming season.

Conditions – Total surface area opened up by these channels should not exceed 15% of the littoral or plant growing area of the lake. The 15% figure is an arbitrary value based on the expected 2010 total surface area created by channels harvested in order to provide an appropriate amount of navigation and nuisance relief, and is subject to re-evaluation in each year of this APM Plan.

Channel widths are also arbitrary, but based on increments of 10-ft which is the width of the harvesters presently owned by the District. A twenty foot wide channel allows a harvester to cut in one direction and then return in the opposite direction maximizes its efficiency.

In sensitive areas of the lake, navigation channels are not to exceed 20-ft in width. Channel widths in the majority of the lake are currently set at 60-ft. A large channel in

the center of the lake between Hospital Bay and the Red Cedar River Delta is currently set at 160-ft to allow two high-speed watercraft to pass each other at a distance of more than 100-ft. An 80-ft wide channel will be created on each side of the 160-ft wide center channel, and will likely be designated as “no-wake” to allow for undisturbed fishing in the channel and to protect small craft and non-motorized boat traffic from larger, faster boat traffic using the center channel.

Action 2 – Mark navigation channels in the area between Hospital Bay and the Red Cedar River Delta with red and green channel marker buoys and no-wake buoys. High speed boat traffic will be directed through the larger center channels marked with the green and red buoys.

Conditions – The District will purchase all buoys. Channel and no wake buoys will be placed in the lake, no later than June 30th, and be removed no later than November 1st.

Permitting – A buoy placement permit is required from the WDNR before buoys can be placed and will be applied for by the District.

Action 3 – Annual large-scale mechanical harvesting of up to 15% of the littoral zone to open up channels determined in Action 1.

July–September – One harvester on each basin will be used to open and maintain predetermined navigation and nuisance relief channels. The navigation and nuisance relief program will officially end on September 15th unless a need for continued harvesting has been documented and a letter sent to and approved by the WDNR.

Off-load Sites – Six possible off-loading sites have been identified on the Upper basin and two in the Lower basin. The main off-loading site in the Upper basin is Hospital Bay and the main off-loading site in the Lower basin is the trailer park (Map 8).

Disposal – All plant material removed by the harvesters will be shipped to disposal property approved by the WDNR, Barron County, and the affected local township.

2010 – Disposal site is located at a property previously approved by the WDNR, Barron County, the local township, and the District. Discarded plant material will be used as fertilizer/mulch on agricultural land. The District has purchased a new truck with dump box and boom loader to handle the expected increase in harvested plant material once this plan is implemented.

2011-2013 – Disposal sites will be evaluated in each year of this plan. The District is considering purchasing its own land for disposal, rather than renting or paying for disposal.

Conditions – Harvesters are required to stay in at least three feet of water and operate their cutters at a maximum depth of 5-ft or two-thirds of the water column, whichever is less. When harvesting close to shore they must operate parallel to shore and remain in at least 3-ft of water. At off-loading sites, District employees will attempt to return game fish, turtles, and other wildlife back to the water.

Within the pre-determined channels, harvesting is allowed as often as necessary to keep them open. Pick-up of floating mats of vegetation in the open water is allowed, provided no additional rooted plants are harvested. Coontail is a non-rooted, suspended or floating native

aquatic plant that is very common in Rice Lake. Floating beds or mats of coontail may not be removed from the open water (other than the pre-determined channels) unless they are floating or suspended in water deeper than 10-ft.

District employees will monitor weed beds throughout the summer season and be trained in bed density determination and basic plant identification. Should the District wish to harvest native plants in an area not included in the pre-determined plan for that year, justification must be sent to the WDNR, and their approval gained before harvesting can begin.

Monitoring and Assessment – A GPS tracking log will be downloaded from the GPS unit for each harvester used and digitally archived. Daily log sheets will be kept including the following harvesting information: estimated total daily tonnage, number of loads, surface acres covered, plant ID list, percentage of the total of each plant species removed, and plant bed density information.

Permitting – A mechanical harvesting permit is required by the WDNR before a large-scale harvesting program can be implemented and will be applied for by the District.

Action 5 – Harvester assisted removal of plant fragments washed up on the shoreline.

Landowners may request harvester assistance for removing large piles of plant fragments washed into their shoreline, but not for actual plant cutting and harvesting to, at, or near their docks. Harvesters may be driven perpendicular into shore within the allowed 30-ft riparian viewing corridor around a land owner's dock without operating cutting blades and provided the paddle wheels of the harvester remain in at least three feet of water, and are not operating while piles of fragments are hand-shoveled onto the conveyor belt. Paddle wheels are not to be operated in any manner to "blow out" floating piles of fragments near the shore.

Conditions – Land owner requests for assistance can be made in person, by hotline, or in writing and must be directed to specified District personnel. The land owner's request will be evaluated by District personnel trained to complete this action. No action will occur until the land owner making the request has signed a form clearly stating under what conditions this action can take place. The completed form will be kept on file with the District and is good for one season only. The land owner or another person identified by the land owner on the form must be present to assist the harvester operator with removal, or it will not be completed.

12.5 Goal 5 – Record Keeping, Monitoring, and Assessment for All Plant Management Activities

Objective 1 – Regular and comprehensive lake and tributary water quality testing completed by District employees and CLMN volunteers.

Objective 2 – District employee identification of basic native and non-native plant species found in Rice Lake for the purpose of keeping records of the type and quantity of aquatic plant species removed by harvesting.

Objective 3 – District employee monitoring of large plant beds and rake-head density ratings to help determine annual plant harvesting areas, or to document nuisance conditions in a request to the WDNR to expand an existing harvesting area.

Objective 4 – Complete in-lake aquatic invasive species monitoring of EWM and other AIS not currently known to be in Rice Lake.

Objective 5 – Repeat the 2008 and 2013 whole lake aquatic plant survey (early season and mid-season) in the last year of this APM Plan.

Objective 6 – Improve overall aquatic plant management record keeping and documentation.

Action 1 – Comprehensive and regular lake and tributary water quality monitoring will be completed at three sites in the lake, and at tributary sites as recommended in the 2014 Comprehensive Plan. Sampling will be completed by District employees, volunteer monitors, and resource professionals. Necessary training and equipment will be provided by the CLMN. All lab analyses will be completed at the Wisconsin SLOH. This activity will likely be funded through a lake protection grant application submitted in February 2015.

Table 4
Water Quality Monitoring Parameters

Parameter	Lake Sites	Tributary Sites
Secchi Disk	x	
Dissolved Oxygen	x	
Temperature	x	
Total Phosphorous	x	x
Total Nitrogen	x	x
Ortho Phosphates	x	x
Nitrite/Nitrate	x	x
Ammonia	x	x
pH	x	
Conductivity	x	
Turbidity	x	
Total Suspended Solids		x
Water Level	x	x
Flow		x

Action 2 – All District harvester operators will complete a basic aquatic plant identification training for the purposes of recording the type and quantity of specific aquatic plants removed by the harvesters or causing navigation or nuisance conditions in the lake. The training requirement can be met by attending a Plant ID course offered by the WDNR, UW-Extension Lakes Program, a local educational institution, or qualified consultant or other person.

Action 3 – All District harvester operators will complete training for the purposes of learning accepted WDNR sampling protocol for determining plant bed density. This training requirement can be met by any of the methods mentioned in Action 3. District employees will complete an informal survey of the entire littoral zone in June, July, August, and September to help determine possible CLP treatment areas and additional nuisance and navigation channels for the following year.

Action 4 – District employees will complete a monthly (July – October) inspection of the shoreline for new aquatic invasive species (primarily EWM) and complete an inspection of the area in front of all public accesses every two weeks (July – October). Training will be provided by the CLMN AIS Monitoring Program or by this consultant. CLMN presence/absence forms will be completed by District employees and submitted to the WDNR Surface Water Inventory Management System (SWIMS).

Action 5 – In the last year of this APM Plan (2018) the whole lake aquatic plant survey will be repeated. Results from the new plant survey will be compared to the 2008 and 2013 surveys to determine if significant changes have occurred in the aquatic plant community of Rice Lake. Management recommendations for the next 5-year APM Plan will be based in part on these results.

Action 6 – District record keeping will be improved by requiring daily log and time sheets to better quantify District employee time associated with the operation and maintenance of the harvesters, and all the actions included in this portion of the APM Plan.

> **Conditions –** Annual award of permit requests for chemical application and harvesting are dependent on the District providing adequate documentation to the WDNR that they are following the APM recommendations approved in this Plan. Seasonal reports of harvesting, monitoring, and assessment activities will be sent to the WDNR during the harvesting season between May and October. These reports will be assembled by the District and reviewed by this consulting agency prior to submittal to the WDNR.
>
> Any inadequacies in these reports will be identified and corrected. All seasonal reports will be kept in a digital format and compiled at the end of the season when this consulting agency completes a End-of Year Summary. End-of year summaries are to be kept on file for a minimum of 10 years.

12.6 Goal 6 – Maintain Public Availability

Objective 1 – Maintain the current District Hotline program.

Objective 2 – Maintain and the District webpage, including contact information for key district personnel.

Action 1 – Maintain the current District phone in Hotline (715.234.9445) as a means for the general public to request information or provide comment related to aquatic plant and other lake management issues, however the responsibility of responding to Hotline inquiries will be shifted to a District Board Member or other person. Inquiries will be directed to the appropriate District employee, lakes consultant, or board member for action.

> **Conditions –** A daily log book will be kept of all Hotline inquiries including when the inquiry was left, who responded to it and when, and whether the issues was resolved, not resolved, or did not require a resolution. All daily log sheets will be compiled and included in the End-of Year Summary, and summarized for the monthly reports. A stipend will be created to help offset the added time this person or persons will be required to give to support this form of public involvement.

Action 2 – The District will continue to post relevant information on the district web page (http://rllakedistrict.org) and update contact information as necessary. A District Board Member or other person will be given the responsibility of responding to messages left

12.7 Goal 7 – Continue development of a Residential and Riparian Owner Best Management Practices (BMP) Program

Objective 1 – Reduce the total shoreline that is mowed to the edge of the lake to one third of the 2008 total (6.6 mi) replacing it with buffer strips or full shoreland restorations over the next four years.

Objective 3 – Seek to re-establish emergent and floating leaf vegetation along the shoreline targeting those areas with no shoreland protection first and moving into areas where the shoreland protection is failing and then into areas where operating structures are in place.

Objective 4 – Provide recognition for residents within District boundaries that complete activities that will help to improve the lake.

Action 1 – The District will continue to hire a Lake Educator in each of the next four years to provide educational opportunities for and work with land owners within the boundaries of the District to design and eventually implement best management practices (for example, buffer strips, runoff diversion systems, rain gardens, rain barrels, and full-scale shoreland restorations).

Action 2 – The Lake Educator will administer the Emergent Species Restoration Program to identify shoreland around Rice Lake that could benefit from the re-establishment of emergent and floating-leaf vegetation and then approach the land owner for permission in writing to work toward re-establishing these sites. Wild rice is one of the species that could be included in this program. Other plant species include but are not limited to rushes, sedges, smart weed, manna, horsetail, arrowhead, pickerel weed, and various floating leaf species.

Action 3 – Approach land owners with general information about restoring wild rice on their shoreline. If enough Rice Lake land owners interested in restoring wild rice are identified in the 2010, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) may become an active partner in the restoration project. GLIFWC resource specialists would evaluate Rice Lake for appropriate habitat and provide technical assistance, tracking, and cost-sharing for the purchase of seed. The District, along with land owners and other interested parties like the UW Extension program would provide planting services.

> **Permitting –** A permit is not needed for planting native wild rice in a body of water. However permits may be needed for restoring shorelines, transferring aquatic plants from one location to another, installing buffer blocker systems, and incorporating property changes to reduce runoff.

Action 4 – Good lake stewardship activities like sensible shoreland lighting, improving buffer strips, use of phosphorous-free fertilizers both in the City and on the lake shore, proper management and disposal of grass clippings and raked leaves, and septic system maintenance will be promoted through the District Webpage, annual booth at Aquafest and the Barron County Fair, through radio and newspaper ads, radio talk shows, and workshops sponsored by the District. Recognition will be awarded to those land owners incorporating best management practices on their properties.

12.8 Goal 8 – Increase Public Awareness of and Involvement in the District by Improving Public Outreach, Exposure, and Image and Provide Greater Land Owner and Lake User Education

Objective 1 – Continue active role and presence in annual celebrations including Aquafest, the Barron County Fair, Homecoming and other city events.

Objective 2 – Increase public participation and attendance at District monthly board meetings by 25% and by 50% at the Annual Meeting based on 2013 numbers.

Objective 3 – Continue a watercraft inspection program at all public accesses to the lake.

Action 1 – The District will sponsor a float in the Aquafest parade, set up a public information booth during the Barron County Fair, and provide radio spots with the local radio personality. A digital newsletter will be posted on this website and others, and emailed at least two times a year to anyone who joins the distribution list. A newspaper article will be submitted to the Rice Lake Chronotype at least quarterly to provide an update on District activities and highlight upcoming meetings and special events.

Action 2 – Continue outreach event during Aquafest in cooperation with the Rice Lake Men's Club Kids Fishing Day or other activity.

Action 3 – The watercraft inspection program following Clean Boats Clean Waters (CBCW) guidelines will continue as a part of this Lake Management Plan. At least 400 hours of watercraft inspection will be completed at public access sites around the lake. Much of this time will be completed by lake volunteers trained by certified persons in the program. The Lake Educator, local Kiwanis Club, and other interested parties currently volunteer time and coordinate this program.

> **Conditions –** All CBCW data collected as a part of this APM Plan is required to be submitted to the WDNR SWIMS data base.

12.9 Goal 9 – Implement the Activities Associated With This APM Plan Through a Combination of District and State of Wisconsin Grant Funding

Objective 1 – Begin implementing the activities in this APM Plan in 2014 and continue through 2019.

Objective 2 – Use District tax levy money to fund certain "routine" activities each year, which includes the Lake Educator position and shoreland and parcel improvement projects within the District.

Objective 3 – Apply for a WI Aquatic Invasive Species Established Infestation Grant to fund additional activities.

Objective 4 – Apply for a WI Lake Planning and Protection Project to fund watershed improvement activities.

Objective 5 – Involve community and other partners in making match requirements for state grants and in supporting the activities included in this plan.

Action 1 – Annual income from the District tax levy currently generates nearly $100,000.00. This money will be used to fund many of the expenses associated with this updated. The District currently funds all CLP and native plant harvesting that occurs on the lake, the Lake

Educator position, and many other activities. It intends to continue funding all harvesting related activities including hauling, disposal, and record keeping. Basic water quality sampling from three lake sites, in-lake monitoring for EWM and other aquatic invasive species, watercraft inspection, public education and involvement, Lake Fair, and public image enhancement will be funded by the District.

Action 2 – The District will evaluate on an annual basis the need for an Aquatic Invasive Species Established Infestation Control grant to help fund activities associated with this APM Plan over the next four years. Herbicide application to control CLP for restorative purposes and all associated pre and post treatment plant surveying, turion sampling, and residual testing may be funded by the AIS grant. CLP turion sampling, more comprehensive water quality testing on the lake and within its tributaries, additional pre post treatment plant monitoring, and additional public education and image enhancement may also be funded by an AIS grant. Partners in this grant could include but are not limited to the City of Rice Lake, Town of Rice Lake, Rice Lake High School, Rice Lake Kiwanis and other organizations, the National Lumbering Hall of Fame, Barron County, and the Great Lakes Indian Fish and Wildlife Commission.

Action 3 – Continue to maintain relationships with and involve the Rice Lake Area School District, public and private institutions and organizations, other lake and river organizations, private businesses and organizations, and local and town governments in management activities associated with this APM Plan. Promote the formation of a Barron County Lakes and Rivers Association.

12.10 Goal 10 – Complete Annual Project Summaries and a Final Project Evaluation

Action 1 – In December of each year this management plan is implemented, an end-of-year summary will be provided detailing the results of activities accomplished. Pre and post plant survey results, turion sampling, residual testing (if done), water quality results, and plant density results will be summarized. Plans for management including herbicide treatment areas, harvesting areas, and late season channels will be addressed preparing the District for submittal of the necessary treatment permits to the WDNR. Progress made in the Residential and Riparian Owner BMP and Emergent Species Restoration programs will be summarized. All public awareness activities will be summarized. Attendance at District functions will be tracked, documented, and compared to the previous year.

Action 2 – An end-of-project report will be provided in the last year of this project. Whole-lake plant survey results will be compared to the 2008 and 2013 plant survey results. Changes in the plant community will be evaluated. The success of the overall project in accomplishing the goals set for it will be commented on and recommendations for possible changes in the revised or new plan made. Funding for the writing of the new or revised plan will be budgeted for by the District and may be supported by the WDNR Lakes Grant.

Action 3 – The District will archive and maintain all records of maps, GIS documents, survey results, treatment records (both herbicide and harvesting) and results, summary reports, photographic records, public participation records, etc.

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Appendix A

Aquathol Super K Label

Information and Product Label for the Aquatic Herbicide Endothall

Aquathol Super K is the trade name of the aquatic herbicide recommended for use in Rice Lake to control curly-leaf pondweed (CLP). In this granular formulation, 63% of the product is the active ingredient Dipotassium salt of endothall which is combined with clay particles and other inert ingredients. When applied according to label guidelines it can be a very effective early-season tool for controlling CLP. Currently, residual testing is not required by the WDNR when using Endothall. However there are certain restrictions regarding safe water use once indicated on the product label, once it has been applied.

Human or animal drinking of water should not occur within 7 days of application. Treated water should not be used for irrigation or food washes for 7 days. There are no restrictions for swimming or human fish consumption. One day exposure health advisory level is 800 µg/L and the US drinking water equivalent level is 700 µg/L. According to the Pesticide Action Network (PAN) Endothall is not considered a carcinogen, endocrine disruptor, or as having any reproductive or developmental toxicity in humans. There is insufficient data to determine if it has any groundwater contamination potential. Table 1 lists many species for which Endothall toxicity has been studied. Residual testing could be completed to determine when concentrations in the treated area fall below 0.2 mg/L (200 µg/L) using an approved assay, but is currently not planned.

Table 1
Endothall Toxicity Ratings for Common Plant and Animal Species*

Common Name	Avg Species LC-50 (µg/L)	Rating
Amphibian (Fowler's Toad)	2200	Moderately Toxic
Crustaceans (Ostracod)	211000	Not acutely toxic
Bluegill	979339	Not acutely toxic
Largemouth bass	255000	Not acutely toxic
Fathead minnows	107550	Not acutely toxic
Channel Catfish	83765	Slightly toxic
Midge	162500	Not acutely toxic
Stonefly	4500	Moderately Toxic
Molluscs (Northern quahog)	12500	Slightly toxic
Scud (Amphipoda)	100000	Not acutely toxic
Freshwater Prawn (grass shrimp)	75	Very highly toxic
Rotifer	270000	Not acutely toxic

* http://www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC35086#Toxicity

AQUATIC HABITAT MANAGEMENT

AQUATHOL® SUPER K

GRANULAR AQUATIC HERBICIDE

ACTIVE INGREDIENT:	
Dipotassium salt of endothall*	63.0%
OTHER INGREDIENTS:	37.0%
TOTAL	100.0%

*7-oxabicyclo [2.2.1]heptane-2,3-dicarboxylic acid equivalent 44.7%

KEEP OUT OF REACH OF CHILDREN

DANGER

FIRST AID:

IF IN EYES:
- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing.
- Call a poison control center or doctor for treatment advice.

IF SWALLOWED:
- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow. Do not induce vomiting unless told by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

IF ON SKIN:
- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

HOT LINE NUMBER: Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact (303) 623-5716 for emergency medical treatment information.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

See back panel for additional Precautionary Statements.

EPA Registration No. 4581-388-82695

EPA Establishment No. 62171-MS-003

Net Weight _____

Sold by:
Cerexagri-Nisso LLC
630 Freedom Business Center • Suite 402
King of Prussia, PA 19406
1 800-438-6071 • www.cerexagri-nisso.com

Cerexagri-Nisso LLC

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS (AND DOMESTIC ANIMALS)

DANGER

CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE. MAY BE FATAL IF SWALLOWED. HARMFUL IF ABSORBED THROUGH THE SKIN. Do not get in eyes, on skin or on clothing. Wear protective eyewear (goggles or face shield). Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco. Remove contaminated clothing and wash before reuse.

ENVIRONMENTAL HAZARDS

Avoid contact with or drift to other crops or plants as injury may result.

Do not use water from treated areas for irrigation, for agricultural sprays on food crops or for domestic purposes within 7 days of treatment.

Not for use in brackish or salt water.

GENERAL INFORMATION

AQUATHOL SUPER K is a granular aquatic herbicide for use in ponds and lakes which, under field test conditions has shown to be effective against a broad range of aquatic plants with a margin of safety to fish. Dosage rates indicated for the applications of AQUATHOL SUPER K are measured in "Parts Per Million" (ppm). 1ppm as a dosage rate means that there would be 1 part of AQUATHOL SUPER K's active ingredient in 1,000,000 parts of water. Only 0.5 to 5 ppm are generally required for aquatic weed control, whereas some fish species are tolerant to approximately 100 ppm or over. For best results treat areas of one acre or more and/or margins of at least 100 feet in large bodies of water.

Thoroughly clean application equipment immediately after use.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

HOW TO APPLY:

AQUATHOL SUPER K is a contact herbicide, consequently, do not apply before weeds are present. Treat as early as possible after weeds are present and are actively growing. If an entire pond is treated at one time, or if the dissolved oxygen level is low at the time of application, decay of weeds may remove enough oxygen from the water causing fish to suffocate. Water containing very heavy vegetation should be treated in sections to prevent suffocation of fish. Sections should be treated 5-7 days apart.

Carefully measure size and depth of area to be treated and determine proper amount of AQUATHOL SUPER K to apply. For best results apply when water is quiescent and/or flows are minimal.

Apply AQUATHOL SUPER K as evenly as possible over treated areas. A cyclone spreader is useful for this purpose. In instances where the nuisance weed(s) to be controlled is an exposed surface problem (i.e., some of the broad-leaved pond weeds) coverage is important.

Necessary approval and/or permits should be obtained in states where required.

HOW TO DETERMINE DOSAGE RATE (Active Ingredient)

AQUATHOL SUPER K is recommended for the control of the following aquatic weeds at the rates indicated. Since AQUATHOL SUPER K's active ingredient is water soluble and tends to diffuse from the treated area, select the dosage rate applicable to the area to be treated. Use the lower rate in each range when the growth is young and growing and/or where the weed stand is not heavy. Marginal treatments of large bodies of water require highest rates as indicated.

WEEDS CONTROLLED AND AQUATHOL SUPER K DOSAGE RATE CHART

	RATES			
Aquatic Weed	Entire Pond/Lake or Large Area Treatment	Lbs. per Acre Ft.	Spot or Lake Margin Treatment	Lbs. per Acre Ft.
Bur Reed, Sparganium spp.	3.0-4.0 ppm	13.2-17.6 lbs.	4.0-5.0 ppm	17.6-22.0 lbs.
Coontail, Ceratophyllum spp.	1.0-2.0 ppm	4.4-8.8 lbs.	2.0-3.0 ppm	8.8-13.2 lbs.
Horned Pondweed, Zannichellia palustris	1.0-2.0 ppm	4.4-8.8 lbs.	2.0-3.0 ppm	8.8-13.2 lbs.
Hydrilla, Hydrilla verticillata	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.
Hygrophila, Hygrophila polysperma	4.0-5.0 ppm	17.6-22.0 lbs.	5.0 ppm	22.0 lbs.
Milfoil, Myriophyllum spp.	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.
Naiad, Najas spp.	1.0-3.0 ppm	4.4-13.2 lbs.	2.0-4.0 ppm	8.8-17.6 lbs.
Pondweed, Potamogeton spp.	0.5-3.0 ppm	2.2-13.2 lbs.	1.5-4.0 ppm	6.6-17.6 lbs.
Including:				
American, P. nodosus	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.
Largeleaf (Bass Weed), P. amplifolius	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.
Curlyleaf, P. crispus	0.5-1.5 ppm	2.2-6.6 lbs.	1.5-3.0 ppm	6.6-13.2 lbs.
Flatstem, P. zosteriformis	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.
Floating-leaf, P. natans	1.0-2.0 ppm	4.4-8.8 lbs.	2.0-3.0 ppm	8.8-13.2 lbs.
Illinois, P. Illinoensis	1.5-2.5 ppm	6.6-11.0 lbs.	2.5-3.5 ppm	11.0-15.4 lbs.
Narrowleaf, P. pusillus	1.0-2.0 ppm	4.4-8.8 lbs.	2.0-3.0 ppm	8.8-13.2 lbs.
Slender, P. filiformis	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.
Sago, P. pectinatus	1.0-2.0 ppm	4.4-8.8 lbs.	2.0-3.0 ppm	8.8-13.2 lbs.
Variable Leaf, P. diversifolius	1.0-2.0 ppm	4.4-8.8 lbs.	2.0-3.0 ppm	8.8-13.2 lbs.
Parrot Feather, Myriophyllum aquaticum	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.
Water Stargrass, Heteranthera spp.	2.0-3.0 ppm	8.8-13.2 lbs.	3.0-4.0 ppm	13.2-17.6 lbs.

APPROXIMATE POUNDS OF AQUATHOL SUPER K FOR ONE ACRE*
TREATMENT DOSAGE IN POUNDS FOR VARIOUS CONCENTRATIONS IN PPM

DEPTH	0.5 ppm	1.0 ppm	1.5 ppm	2.0 ppm	3.0 ppm	4.0 ppm	5.0 ppm
1 Ft. Deep	2.2 lbs.	4.4 lbs.	6.6 lbs.	8.8 lbs.	13.2 lbs.	17.6 lbs.	22 lbs.
2 Ft. Deep	4.4 lbs.	8.8 lbs.	13.2 lbs.	17.6 lbs.	26.4 lbs.	35.2 lbs.	44 lbs.
3 Ft. Deep	6.6 lbs.	13.2 lbs.	19.8 lbs.	26.4 lbs.	39.6 lbs.	52.8 lbs.	66 lbs.
4 Ft. Deep	8.8 lbs.	17.6 lbs.	26.4 lbs.	35.2 lbs.	52.8 lbs.	70.4 lbs.	88 lbs.
5 Ft. Deep	11 lbs.	22 lbs.	33 lbs.	44 lbs.	66 lbs.	88 lbs.	110 lbs.

*One acre equals approximately 208' x 208'

Where the area being treated is greater than those listed in the charts, proceed as follows:

a. Compute the approximate surface acreage
b. Determine the average depth
c. Multiply a. by b. to determine total number of acre/feet
d. Multiply the pounds required at the 1 foot depth under the rate to be used by the number of acre/feet to determine the total quantity to be used.

APPROXIMATE POUNDS OF AQUATHOL SUPER K FOR 1000 SQUARE FEET
TREATMENT DOSAGE IN POUNDS FOR VARIOUS CONCENTRATIONS IN PPM

DEPTH	0.5 ppm	1.0 ppm	1.5 ppm	2.0 ppm	3.0 ppm	4.0 ppm	5.0 ppm
1 Ft. Deep	0.05 lbs.	0.1 lbs.	0.15 lbs.	0.2 lbs.	0.3 lbs.	0.4 lbs.	0.5 lbs.
2 Ft. Deep	0.1 lbs.	0.2 lbs.	0.3 lbs.	0.4 lbs.	0.6 lbs.	0.8 lbs.	1.0 lbs.
3 Ft. Deep	0.15 lbs.	0.3 lbs.	0.45 lbs.	0.6 lbs.	0.9 lbs.	1.2 lbs.	1.5 lbs.
4 Ft. Deep	0.2 lbs.	0.4 lbs.	0.6 lbs.	0.8 lbs.	1.2 lbs.	1.6 lbs.	2.0 lbs.
5 Ft. Deep	0.25 lbs.	0.5 lbs.	0.75 lbs.	1.0 lbs.	1.5 lbs.	2.0 lbs.	2.5 lbs.

Where the depth is greater than 5 feet, multiply the depth by the appropriate rate for 1 ft. depth to determine the amount of product required per 1000 square feet.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage Instructions: Store in the original container, preferably in a locked storage area. Do not store in a manner where cross-contamination with other pesticides, fertilizers, food or feed could occur. If spilled during storage or handling sweep up spillage and dispose of in accordance with the Pesticide Disposal Instructions listed below.

Pesticide Disposal Instructions: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Disposal Instructions: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

EMERGENCY TELEPHONE NUMBERS:
CHEMTREC: (800) 424-9300
MEDICAL: (303) 623-5716 Rocky Mountain Poison Control Center

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials, resistant strains or other influencing factors in the use of the product. To the extent consistent with applicable law, all such risks shall be assumed by Buyer and User, and Buyer and User agree to hold Cerexagri-Nisso LLC, Manufacturer and Seller harmless for any claims relating to such factors. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, CEREXAGRI-NISSO LLC AND MANUFACTURER MAKE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ON THIS LABEL.

To the extent consistent with applicable law, Cerexagri-Nisso LLC, Manufacturer or Seller shall not be liable for any incidental, consequential or special damages resulting from the use or handling of this product. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF CEREXAGRI-NISSO LLC, MANUFACTURER AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF CEREXAGRI-NISSO LLC, MANUFACTURER OR SELLER, THE REPLACEMENT OF THE PRODUCT.

Cerexagri-Nisso LLC, Manufacturer and Seller offer this product, subject to the foregoing conditions of sale and limitations of warranty and of liability, which may not be modified except by written agreement signed by a duly authorized representative of Cerexagri-Nisso LLC.

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Appendix B

Implementation Matrix

Recommended Implementation Plan for the Rice Lake Aquatic Plant Management Plan 1-31-2015

	Goals/Objectives/Actions	Priority Level	AIS Control Grant Eligibility	LPL/LPT Grant Eligibility	Implementers	2015	2016	2017	2018	2019
1. Reduce the Amount of CLP in Rice Lake with Harvesting and Herbicide										
1.1 Reduce CLP density and distribution in the South Basin to no more than scattered plants/acre with no measurable density										
1	Annual bed mapping of CLP by Lake District employees and volunteers		x		LD	x	x	x	x	x
2	Chemically treat any area of CLP that reaches or exceeds a rakehead density of 1		x		RP	x	x	x	?	?
3	Early season application of Aquathol K or Super K (endothall) at 1.5-2.5 ppm by a licensed applicator		x		LD	x	x	x	?	?
4	Complete annual treatment proposals based on previous years results		x		RP	x	x	x	x	x
4	Complete physical removal of CLP via LD employees, property owners, and lake volunteers		x		LD, PO	x	x	x	x	x
1.2 Reduce CLP turion density in the sediment of the South Basin by >75% based on a 2012 turion count of 61.5 turions/m2 over the next five years										
1	Chemically treat any area of CLP that reaches or exceeds a rakehead density of 1		x		RP	x	x	x	?	?
2	Early season application of Aquathol K or Super K (endothall) at 1.5-2.5 ppm by a licensed applicator		x		RP	x	x	x	?	?
3	Complete annual treatment proposals based on previous years results		x		RP	x	x	x	x	x
4	Complete physical removal of CLP via LD employees, property owners, and lake volunteers		x		LD, PO	x	x	x	x	x
1.3 Complete annual pre and post treatment point-intercept aquatic plant surveys in any year herbicide is used for management										
1	Contract with a resource professional to complete pre and post treatment aquatic plant survey		x		LD	x	x	x	?	?
2	Set up pre and post treatment survey points based on the annual herbicide management proposal		x		WDNR, RP	x	x	x	?	?
1.4 Contract with a resource professional to complete CLP turion density monitoring										
1	Complete turion density monitoring in both chemically treated areas and harvested areas annually		x		RP	x	x	x	x	x
1.5 Maintain or reduce CLP density and distribution based on 2013 survey levels (RelFre-14.8, PI Survey Sites w/CLP-19.4%, 1-3 rakehead density-1.54) in the Main Basin										
1	Annual monitoring of CLP by Lake District employees		x		LD	x	x	x	x	x
2	Early season application of Aquathol K or Super K (endothall) at 1.5-2.5 ppm along City Lakefront if annual planning determines this will provide better results than harvesting				RP	?	?	?	?	?
3	Use three harvesters to manage CLP in the north and central basins, do not harvest CLP in the south basin				LD	x	x	x	x	x
4	Complete physical removal of CLP via LD employees, property owners, and lake volunteers		x		LD, PO	x	x	x	x	x
1.6 Reduce CLP turion density in the sediment in managed areas of the Main Basin by 50% based on results established in 2015 over the next five years										
1	Early season application of Aquathol K or Super K (endothall) at 1.5-2.5 ppm along City Lakefront if annual planning determines this will provide better results than harvesting				RP	?	?	?	?	?
2	Use three harvesters to manage CLP in the north and central basins, do not harvest CLP in the south basin				LD	x	x	x	x	x
3	Complete physical removal of CLP via LD employees, property owners, and lake volunteers		x		LD, PO	x	x	x	x	x
1.7 Complete chemical concentration testing in the first year the use of herbicide is included in CLP management actions										
1	Work with WDNR personnel to set up a chemical concentration testing program the first year of this plan where herbicide management is included		x		LD, WDNR, RP	x				
2	Contract with a resource professional to complete chemical concentration testing and process samples at the SLOH		x		LD	x				
1.8 Provide landowner relief for plant fragments washed into shore during and after harvesting										
1	Evaluate landowner request for aide in removing plant fragments dislodged during CLP harvesting		x		LD	x	x	x	x	x
2	Aid landowners where appropriate		x		LD	x	x	x	x	x
2. Prevent the Spread and Establishment of AIS Already in the Lake, Along the Shoreline, or in Adjacent Wetlands										
2.1 Complete purple loosestrife monitoring and management with a goal of zero tolerance										
1	Monitor the shoreline in July and August for the presence of purple loosestrife		x		LD, PO	x	x	x	x	x
2	Pull, cut, dig, or spray any plants identified to prevent increased distribution and density		x		LD, RP	x	x	x	x	x
3	Implement a beetle rearing and release project if larger areas (more than 25 plants) of purple loosestrife are identified		x		LD, RP, PO, BC,TRL	?	?	?	?	?
2.2 Complete Japanese knotweed monitoring and management with a goal of zero tolerance										
1	Monitor the shoreline throughout the summer season for the presence of Japanese knotweed		x		LD, RP, PO, BC,TRL	x	x	x	x	x
2	Work with other organizations/entities to manage any knotweed found to prevent increased distribution and density		x		LD, BC, TRL, CRL	?	?	?	?	?
3. Update the current Eurasian Water Milfoil Early Detection and Response Plan										
3.1 Update EWM Response Plan contacts as needed, and review existing plan										
1	Update EWM contacts on the existing EWM Early Detection and Response Plan		x		LD, RP, WDNR	x				
2	Provide EWM and other AIS monitoring and identification training for Lake District employees, lake volunteers, and interested property owners through the CLMN AIS Monitoring Program		x		RP, WDNR, UW-EX	x		x		x
3	Complete AIS monitoring of the entire littoral zone at least every two months May - October		x		LD, PO, WDNR, UW	x	x	x	x	x
4	Complete AIS monitoring in front of all public access points at least once a month		x		LD, PO	x	x	x	x	x
4. Provide Nuisance and Navigation Relief while Protecting and Enhancing Native Plant Growth										
4.1 Provide nuisance and navigation relief from dense growth native aquatic plants in pre-determined and approved channels in areas of high traffic and high use										
1	Incorporate the use of at least one harvester in the north and central basins, and one in the south basin				LD	x	x	x	x	x
2	Determine the width of channels based on lake use (20-ft in sensitive areas, 60 ft in other areas, and 160 feet in the north south channel marked by bouys)				LD, RP	x				
3	Limit the harvest of nuisance and navigation channels to 15% or less of the littoral zone				LD, RP	x	x	x	x	x

4	Mark a north south corridor for high-speed side by side passing of motor boats with green and red bouys				LD	×	×	×	×	×
4.2 GPS tracking of harvester activity										
1	Set GPS tracking at the beginning of each harvesting day, and download as necessary		×		LD, RP	×	×	×	×	×
4.3 Provide landowner relief for plant fragments washed into shore during and after harvesting										
1	Evaluate landowner request for aide in removing plant fragments dislodged during summer harvesting				LD	×	×	×	×	×
2	Aide landowners where appropriate				LD	×	×	×	×	×
5.Record Keeping, Monitoring, and Assessment for Plant Management Activities										
5.1 Complete regular and comprehensive lake and tributary water quality testing with Lake District Employees and CLMN volunteers										
1	Participate in CLMN Expanded Monitoring in the Central and South Basins, complete Secchi Disk monitoring only in the North Basin		×		LD, TRL, CRL	×	×	×	×	×
2	Collect Secchi, DO, Temperature, TP, SRP, Turbidity, and lake level monitoring at three lake sites (consider nitrogen, pH, and Conductivity testing)			×	LD, RP	?	?	?	?	?
3	Support tributary monitoring recognized in the new Comprehensive Lake Management Plan			×	LD, RP	?	?	?	?	?
4	Collect TP, nitrogen suite, suspended solids, flow and volume at all designated tributary sites			×	LD, RP	?	?	?	?	?
5.2 Complete Lake District Employee training for basic aquatic plant identification and density rating to better track vegetation harvested										
1	Provide training for existing and new Lake District employees for plant identification		×		LD, RP, WDNR, UW-	×		×		×
2	Provide training for existing and new Lake District employees on proper plant density monitoring protocol		×		LD, RP, UW-EX	?	?	?	?	?
5.3 Repeat the 2008 and 2013 whole-lake, point-intercept, aquatic plant survey again in 2018										
1	Contract with a resource professional to complete the aquatic plant survey		×		LD					×
5.4 Maintain and improve Lake District Harvesting Records and Report										
1	Seasonal reports of harvesting, monitoring, and assessment activities will be sent to the WDNR		×		LD, RP, WDNR	×	×	×	×	×
2	End of Year Summary of Lake Activities will be compiled by the Lake District or its Consultant		×		LD, RP, WDNR	×	×	×	×	×
6. Maintain Public Availability										
6.1 Maintain the current Lake District Hotline										
1	Set up a voice mail account for the LD Hotline at 715-234-9445		×		LD	×				
2	Listen to messages at least once a week during the open water season, and refer calls to the appropriate party		×		LD	×	×	×	×	×
6.2 Maintain the Lake District Webpage										
1	Update and maintain with current posts, the LD Webpage at www.rllakedistrict.org		×		LD, RP	×	×	×	×	×
7. Continue Development of a Residentail and Riparian Owner Best Management Practices Program										
7.1 Reduce the total shoreline that is mowed to the edge of the lake by 1/3 of what it was in 2008 (6.6 miles)										
1	Hire a Lake District Educator and/or support a Lake District Shoreland Improvement Committee to promote shoreline BMPs		×	×	LD	×	×	×	×	×
2	Recognize residential and riparian owners who complete shoreland improvement projects		×	×	LD	×	×	×	×	×
7.2 Seek to reestablish emergent and floating leaf vegetation along the shoreline in those areas with no shoreline protection first, and then other shoreline as time and resources permit										
1	Hire a Lake District Educator and/or support a Lake District Shoreland Improvement Committee to promote shoreline BMPs		×	×	LD	×	×	×	×	×
2	Promote the use of wild rice in restoring nearshore vegetation		×	×	LD, RP, WDNR	×	×	×	×	×
3	Recognize residential and riparian owners who complete shoreland improvement projects		×	×	LD	×	×	×	×	×
7.3 Maintain and enhance the amount of coarse woody debris in the lake										
1	Identify existing coarse woody debris in the lake by mapping the shoreline using GPS		×	×	LD, RP	×				
2	Provide educational materials to property owners related to coarse woody debris		×	×	LD, UW-EX, WDNR	×	×			
3	Work with property owners, the WDNR and other stakeholders to promote and implement coarse woody debris projects		×	×	LD, PO, RP, WDNR			×	×	×
7.4 Promote good Lake Stewardship practices like sensible shoreland lighting, proper management and disposal of grass clipping and leaf litter, etc.										
1	Educate and inform Lake District residents through public outreach events like Aquafest and the Barron County Fair		×	×	LD, RP	×	×	×	×	×
2	Provide educational materials to property owners related to good stewardship practices on the LD webpage, in the newspaper,and during radio spots		×	×	LD, RP, UW-EX	×	×	×	×	×
8. Increase Public Awareness of and Involvement in the Lake District through Public Outreach, Exposure, and Image										
8.1 Continue participation in annual celebrations including Aquafest, Barron County Fair, August Lake District Recognition Ice Cream Event, and other City, County, and Regional Events										
1	Continue to be active participants in these events		×	×	LD	×	×	×	×	×
8.2 Increase public participation and attendance at Lake District Board Meetings by 25% and Annual Meetings by 100% based on 2014 numbers										
1	Promote meetings with local radio spots, newspaper notice, and community presentations		×	×	LD, RP	×	×	×	×	×
2	Continue the August Lake District Volunteer and Community Recognition Event		×	×	LD, RP	×	×	×	×	×
8.3 Continue with a watercraft inspection program at the three main landings on Rice Lake										
1	CBCW hours on Veterans, NLHOF, and Arnolds Landings (paid and volunteer)		×		LD, UW-EX, TRL, CF	×	×	×	×	×
2	Hire a CBCW Coordinator to support a watercraft inspection program		×		LD, TRL, CRL	×	×	×	×	×
9. Complete APM Plan Implementation and Maintenance for Five Years										
9.1 Implement APM Plan from 2015-2019										
1	Support implementation with Lake District levy and state grant funds		×		LD, CRL, TRL	×	×	×	×	×
2	Develop a community network of volunteers and donated services from the RL School District and local businesses to support sponsor match		×		LD	×	×	×	×	×
10. Evaluate and Summarize Mangement Results after Five Years										
1	Complete end of project summary reporting		×		LD, RP					×

2	Repeat the Whole Lake Point-intercept Aquatic Plant Survey after five years of management		×		RP					×
3	Archive and maintain all records (maps, GIS, survey results, treatment records, reports, photo documentation, and public participation records)		×	×	LD, RP	×	×	×	×	×

Implementers: RD, Rice Lake-Lake Protection and Rehabilitation District; RP, resource professionals/consultant; BC, Barron County LWCD; TRL, Town of Rice Lake; CRL, City of Rice Lake; PO, Property Owner; UW-Ex, UW-Extension; WDNR, WI Department of Natural Resources. Note: Implementer List is not exhaustive and can change. AIS, Aquatic Invasive Species; CLMN, Citizen Lake Monitoring Network; LPL, Lake Management Planning; LPT, Lake Protection; CLP, curly-leaf pondweed; EWM, Eurasian watermilfoil; GPS, Global Position System