



P.O. Box 494, Osceola, WI 54020

# Church Pine, Round and Big Lakes Protection and Rehabilitation District

## Aquatic Invasive Species Control Grant Project # ACEI-099-11

*April 1, 2011 to December 31, 2014  
(Includes 1yr Extension)*

# Final Report

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# I Project Scope

## **(From Grant Agreement)**

The Church Pine, Round and Big Lakes P&R District is sponsoring a project to implement approved activities from their Aquatic Plant Management Plan. These activities include chemically treating curlyleaf pondweed, purple loosestrife and giant knotweed, pre/post treatment monitoring and reporting. The project also includes AIS prevention like CBCW, automated video surveillance, updated signs, and expanded education / outreach.

## **II Project Goals, Objectives, Actions and Accomplishments**

### **(From Grant Application)**

Goals, Objectives and Actions are taken directly from the September 2010, Aquatic Plant Management Plan. Only those included in the grant application are listed and addressed in this report. Goal 3 of the APMP addresses maintaining navigation and Goal 5 reducing runoff are not included in this project.

### **Goal 1, Prevent introduction of aquatic invasive species and pursue any new introductions aggressively.**

#### **Objectives**

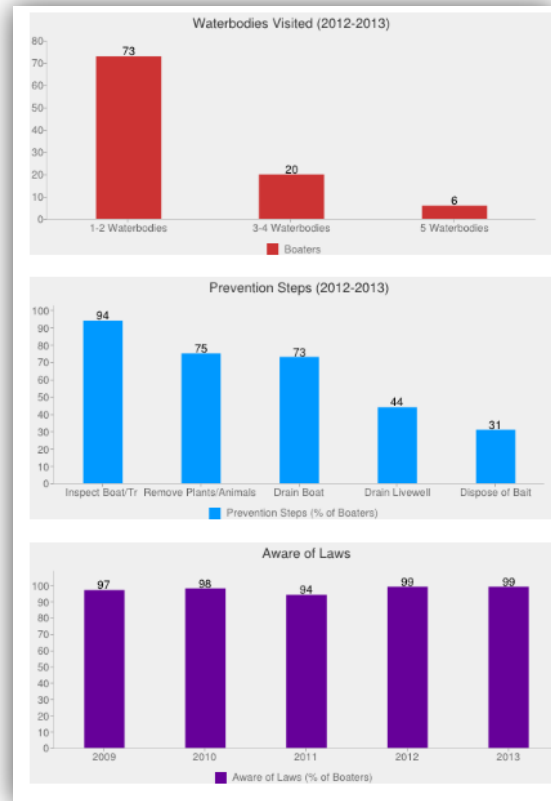
- A. Boaters inspect, clean, and drain boats, trailers and equipment.
- B. Identify new aquatic invasive species as soon as possible after introduction to the lakes.

#### **Actions**

1. Continue a successful Clean Boats, Clean Waters program.  
(Objective A)

#### **Accomplishments**

- The project provided funding for the District's Clean Boat Clean Waters (CBCW) program for the years 2012 and 2013. Results of the program are demonstrated below from the SWIM data base.



2. Monitor regularly for invasive species introduction at areas of high public use such as the boat landings using volunteers, divers, and/or other comprehensive, reliable method. (Objective B)

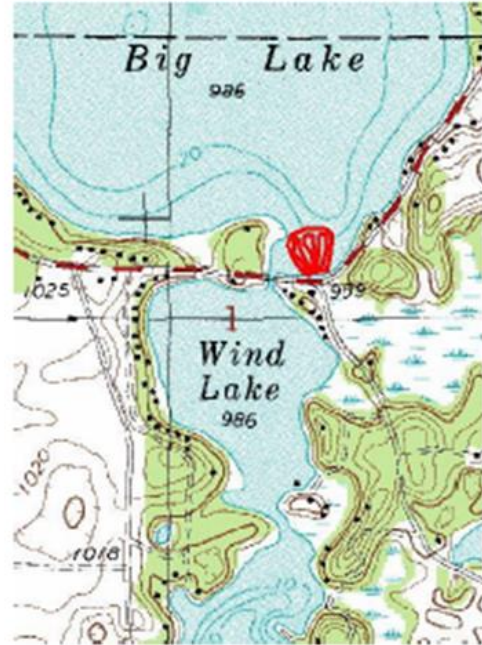
### Accomplishments

- 2011 – 2014, the littoral zone area adjacent to the boat landings on Big Lake and Church Pine Lake were monitored for AIS (special emphasis for Eurasian water milfoil (EWM) by Ecological Integrity Services, LLC (EIS). The map below shows the landing coverage through the use of SCUBA and underwater cameras. There was no evidence of any EWM or other AIS plant species. Mystery snails were observed in Big Lake.



# Annual Scuba / Camera Survey

Prevention



5. Install and monitor surveillance cameras at boat landings.  
(Objective A)

## Accomplishments

- On 08/11/11 the Lake District purchased and Environmental Sentry Protection, LLC (ESP) installed a video camera and signage at the Church Pine Boat Landing. While the project called for a second camera at the Big Lake Landing, the Polk County Highway Department would not allow the installation since the landing is in the right of way of County Road K. The funds for the second camera were reallocated to AIS treatment in the 2014 project extension.

Education

Prevention

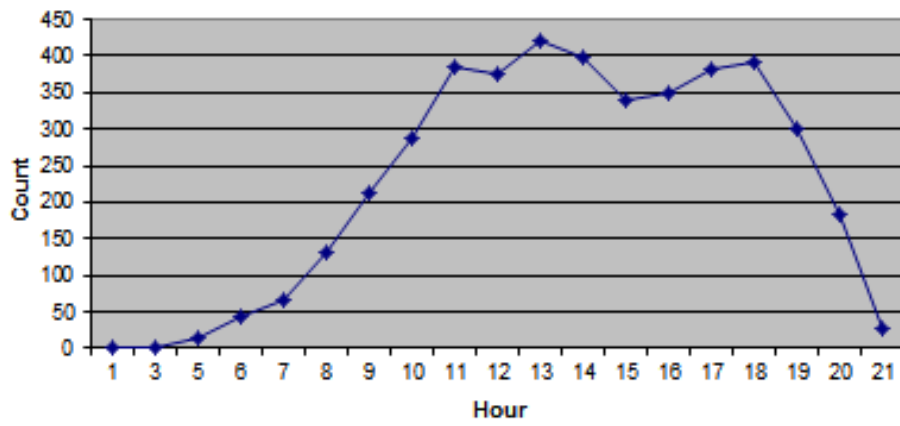
## Church Pine

- ✓ Warning Signs
  - ✓ Audio Warning
  - ✓ Video Inspection
- 
- ❖ Deterrent and Behavior Changer

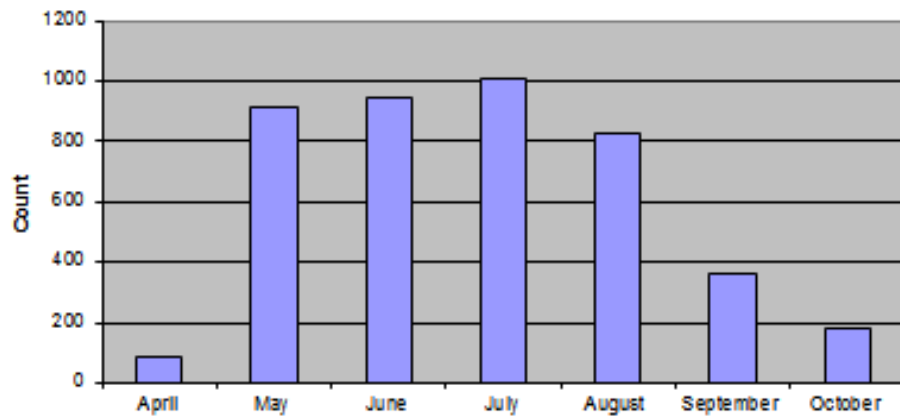


- The following graphs are representative of the annual reports provided the District by ESP regarding annual camera activity. The graphs provide valuable information to effectively align Clean Boats Clean Water staff with boater volume. The camera has effectively served as a “behavior changer” as demonstrated in videos by observing boaters removing plants.

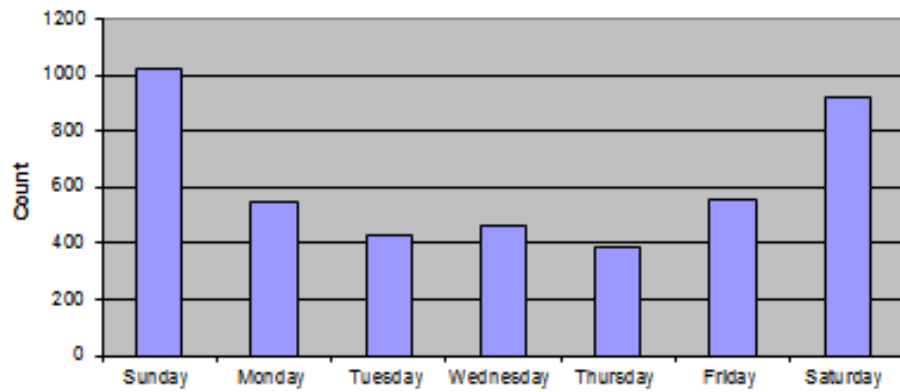
2014 Church Pine Launch Activity



2014 Church Pine Launch Activity



2014 Church Pine Launch Activity





## **Goal 2, Reduce the population and spread of curly leaf pondweed, purple loosestrife, and other invasive aquatic plants.**

### **Objectives: Curly Leaf Pondweed**

- A. (Church Pine) Eradicate curly leaf pondweed if found in Church Pine Lake.
- B. (Round) Eliminate dense growth at the north end of Round Lake
- C. (Big) Priority 1: Reduce dense growth of curly leaf pondweed in beds near the boat landing to a mean rake density less than 1.
- D. (Big) Priority 2: Reduce dense growth of curly leaf pondweed in remaining beds to a mean rake density of 1.

### **Actions: Curly Leaf Pondweed**

- 1. Hand pull any curly leaf pondweed found growing in Church Pine Lake. Use herbicide treatment only if hand pulling is not effective or practical. (Objective A)

### **Accomplishments**

- No CLP has been observed in Church Pine. However, outside of this project a complete point intercept survey of aquatic plants has been contracted for in all three lakes. The results of this survey are presently being completed and will be contrasted and compared to the 2009 survey.
- 2. Control CLP growing in dense beds using low-dose, early season Endothall treatment or other accepted method. (Objectives B, C, D)
  - a. Select tentative beds for treatment in July of previous year (APM Lead or APM Advisory Committee) *completed for 2011.*

b. Select APM contractors (Herbicide Contractor, APM Monitor) in December (Board) *completed for 2011. Northern Aquatic Services is the selected contractor*)

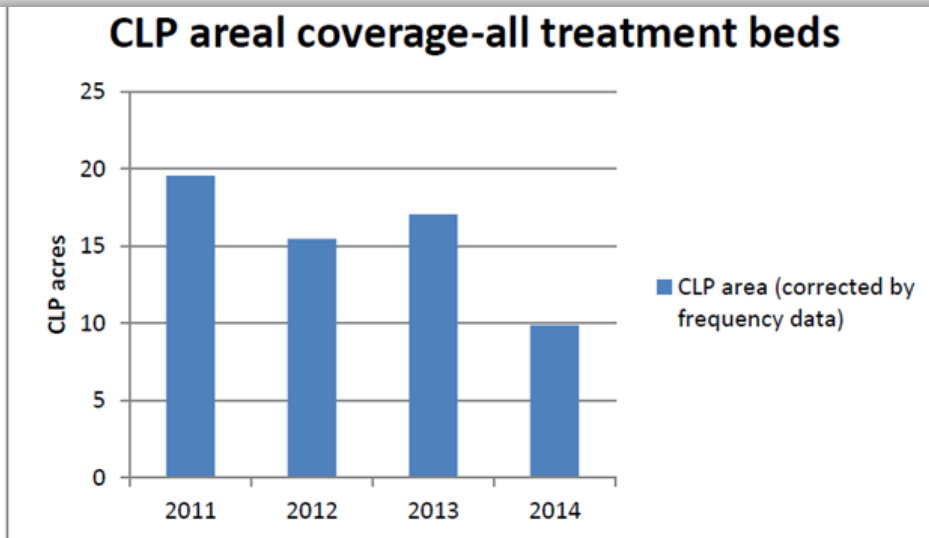
c. Apply for APM permits in January or February (*underway*)

### **Accomplishments**

- Target beds and concentrations have been selected annually by Ecological Integrity Services, LLC. Selection has been based upon their prior years post treatment and current years pre-treatment surveys. Detail results of pre/post surveys are available in Appendix A.
  - Harmony Environmental Inc. has managed procuring qualified herbicide contractors each year of this project.
  - APM permits have successfully been applied for and granted each year by the DNR
3. Conduct DNR specified and required third-party pre and post herbicide monitoring for CLP herbicide treatment. (Objectives B, C, D)

### **Accomplishments**

- Ecological Integrity Services, LLC. has conducted pre and post treatment surveys each year of the project. Detail results of pre/post surveys are available in Appendix A. Summary comments and graphs from Appendix A are below.



**Figure 10: CLP areal coverage of all beds for each year 2011-2014.**

The turion analysis shows that the decline in CLP appears to continue. The reduced turion density should result in less CLP growth in spring, 2015. Continued declines in turion density reflect long-term successful CLP reduction.

It is recommended that treatment of the beds continue based upon the early spring CLP coverage. Since turions can remain viable for many years future treatment may be needed. The turion analysis results, coupled with the pretreatment maps can be used to determine treatment in a particular year. The response to treatment and the resulting reduction in CLP in Big Lake and Round Lake has been excellent.

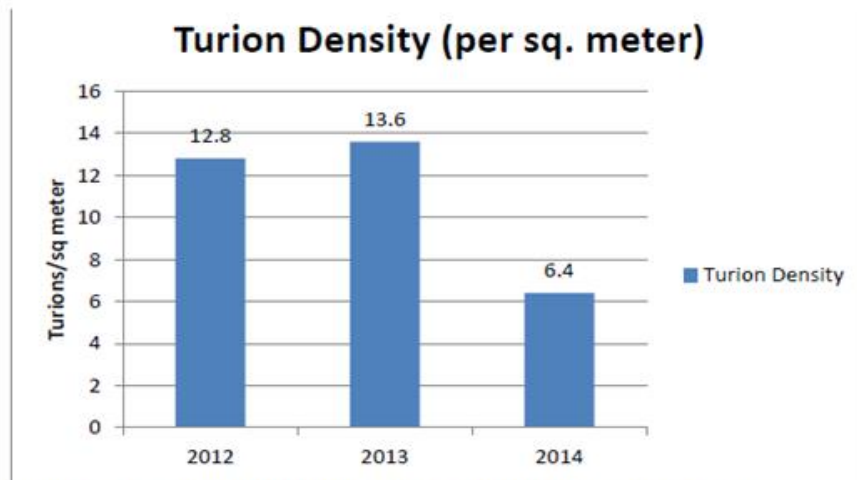


Figure 11: Graph of mean turion density (all treated beds) 2012-2014.

## Discussion

A statistical analysis of the CLP growth data from pre and post treatment surveys show that the herbicide treatment was effective in reducing the CLP growth. The reduction occurred from the spring growth before treatment (reflected in pretreatment survey 2014) to the growth after treatment (reflected in the post treatment survey 2014).

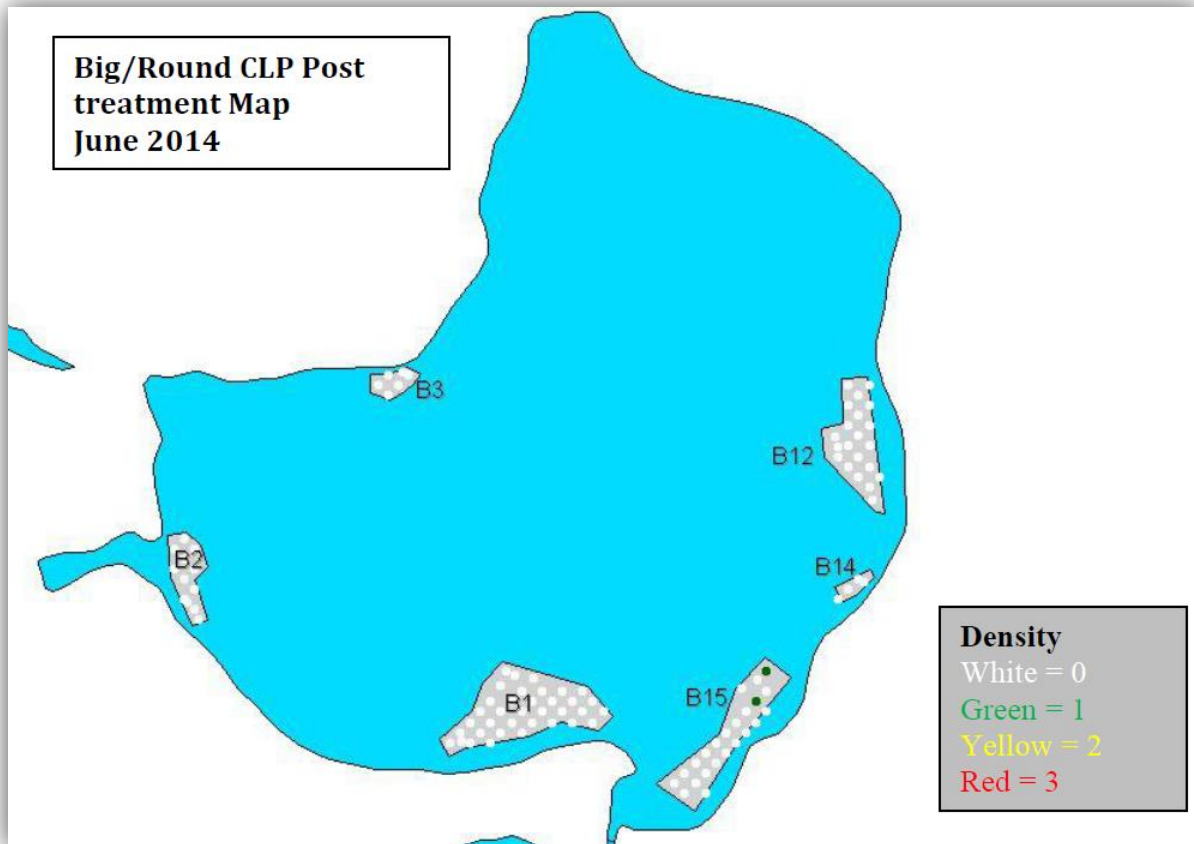
Analysis shows a small reduction in growth after treatment 2014 as compared to after treatment in 2013. This reduction was small, but was statistically significant. There was also a significant reduction in the 2013 pretreatment frequency compared to the 2014 pretreatment frequency. This supports another effective treatment in 2014, in addition to previous years having effective treatments. Figure 10 shows the areal coverage of the CLP treatment beds each spring before treatment. These areas have been corrected using the frequency of occurrence, thus reducing the area the treated area actually covered with CLP.

4. Map beds of curly leaf pondweed annually. Look for curly leaf pondweed growth in Church Pine where reported in 1997 in transects 11 and 13. (Objective A-D)

## Accomplishments

- Bed mapping has been conducted annually by Ecological Integrity Services, LLC. No CLP has been observed in Church Pine Lakes during the pre / post surveying or mapping. Detail

results of pre/post surveys and mapping are available in Appendix A. The most recent map shown below indicates a very effective 2014 treatment.



### **Objectives: Purple loosestrife**

- A. Eradicate individual plants
- B. Reduce populations in larger, established areas

### **Actions: Purple Loosestrife**

1. Hire contractor to cut/apply herbicides to individual plants/patches. (Objective A and B)

## Accomplishments

- Northern Aquatic Service has been hired each project year to cut and apply herbicide to individual plants. The contractor stated at the end of the 2014 treatment year “Really the lakes looked good except for the trouble spots like the point and Starbucks.”

## 2. Release beetles in inaccessible patches. (Objective B)

## Accomplishments

- The project funded an individual homeowner’s (Starbuck) cost to raise beetles on their property. Additionally, the District, partnered with the DNR and Meyer Middle School of River Falls on Operation Beetle. This project eliminated PL from the inaccessible area of North Creek.

### ‘Operation Beetle’ project to battle invasive plant

To help eradicate an invasive plant species called Purple Loosestrife, the Lake District of Churchpine, Round and Big Lakes recently partnered with the Wisconsin DNR and Meyer Middle School of Riverfalls Wisconsin on a project called ‘Operation Beetle.’

River Falls Meyer Elementary school science teacher, Karen Ye was contacted by Bruce Balck a resident of Churchpine lake and member of the lake district’s aquatic plant committee about the possibility of this project. Balck said that “Ms. Ye immediately volunteered because this project paralleled her lesson plan objectives that she teaches as a part of her science curriculum”. In mid-April the Purple Loosestrife root balls and beetles were obtained and were raised in the school’s greenhouse by Karen’s students.

The beetles called Galericella were obtained from Brock Woods of the Wisconsin Department of Natural Resources (DNR). Karen said that “Brock has been an incredible resource on this project from providing the



and Asian origin found in 47 states of the the United States and is commonly found along marshy areas and shorelines. Purple loosestrife is a significant problem because it displaces native wetland plants and can become the dominant plant, thereby reducing plant diversity and changing the ecosystem of a

wetland. A single purple loosestrife plant with multiple stems can produce up to two million seeds that are easily dispersed along rivers and waterways.

The leaf-feeding beetles reduce the growth and reproduction of purple loosestrife. The adult beetles feed on the leaves of purple loosestrife and lay their eggs. Once the eggs have hatched, the larvae feed on the leaves and stems as they move down into the soil. The larvae cause the most damage to the plant and reduce the number of seeds produced.

The beetles feed primarily upon purple loosestrife and either move on or die without the presence of Purple Loosestrife. The beetles were released the first week of June on the north marsh area of Big Lake. “It may take several years for the Loosestrife to be completely eradicated but is well worth the effort” Balck said.

For further information on the use of the biological control of Purple Loosestrife: [http://www.dnr.state.wi.us/org/es/science/publications/ss981\\_2003.htm](http://www.dnr.state.wi.us/org/es/science/publications/ss981_2003.htm)

**Lake residents Gary Ovick, David Zanick, Bruce Black and Meyer Elementary teacher Karen Ye. Submitted photo**

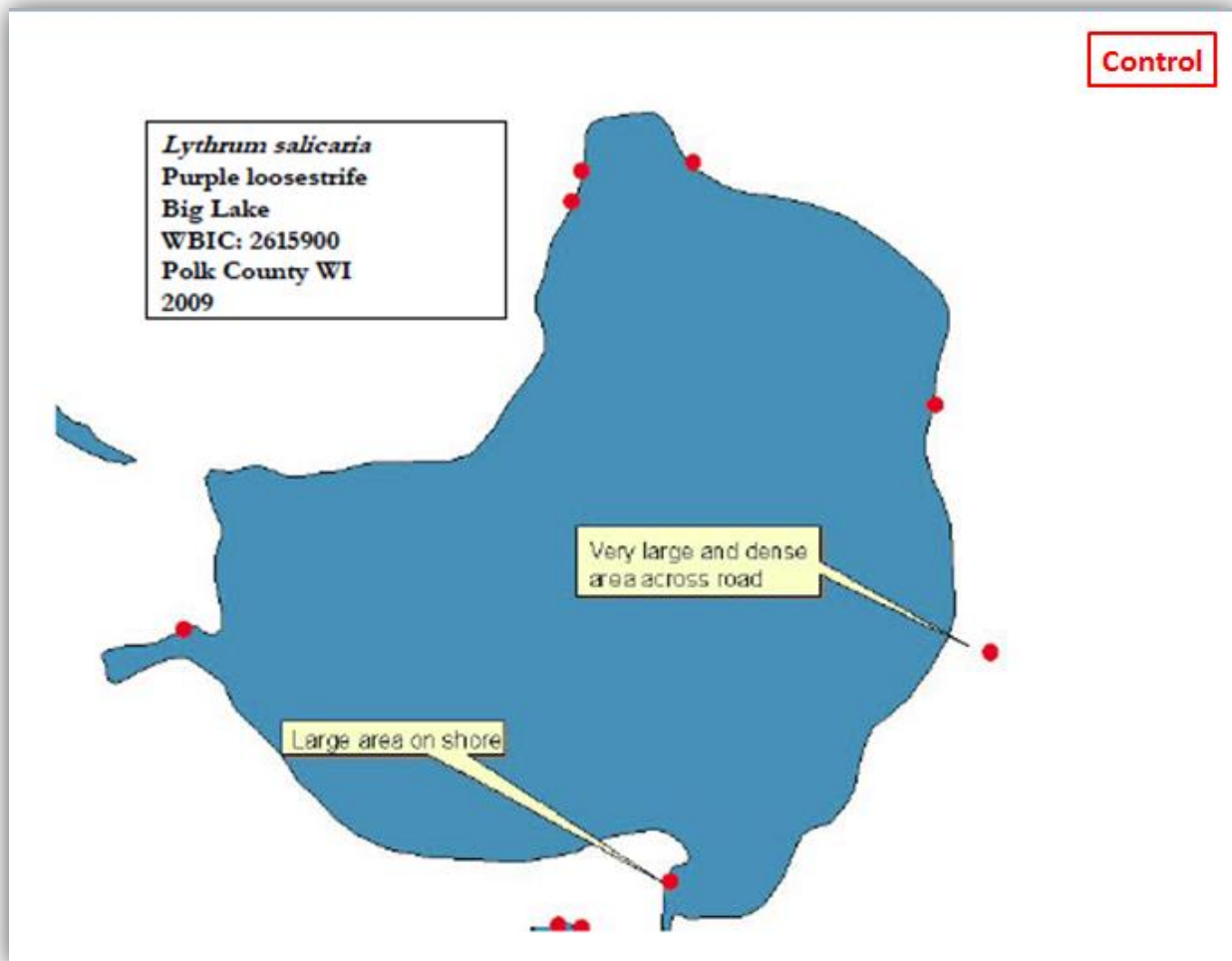
beetles and netting as well as providing a wealth of educational materials.”

Purple loosestrife is an aggressive perennial plant of European

3. Map purple loosestrife growth (how often) to monitor progress toward objectives. (Objective A, B)

## Accomplishments

- Northern Aquatic Services used the survey below provided by Ecological Integrity Services, LLC as the basis for annual treatment. Northern Aquatic Services, District officials and APM committee members annually monitored and directed treatments to attack remaining infestations.



## **Goal 4, Preserve our diverse native aquatic plant community.**

### **Objectives**

- A. Maintain native plants to prevent AIS introduction.
- B. Protect native plant sensitive/critical habitat areas – especially areas with emergent vegetation like rushes and cattails.
- C. Increase residents' understanding of the role and importance of aquatic plants and their impacts on them.

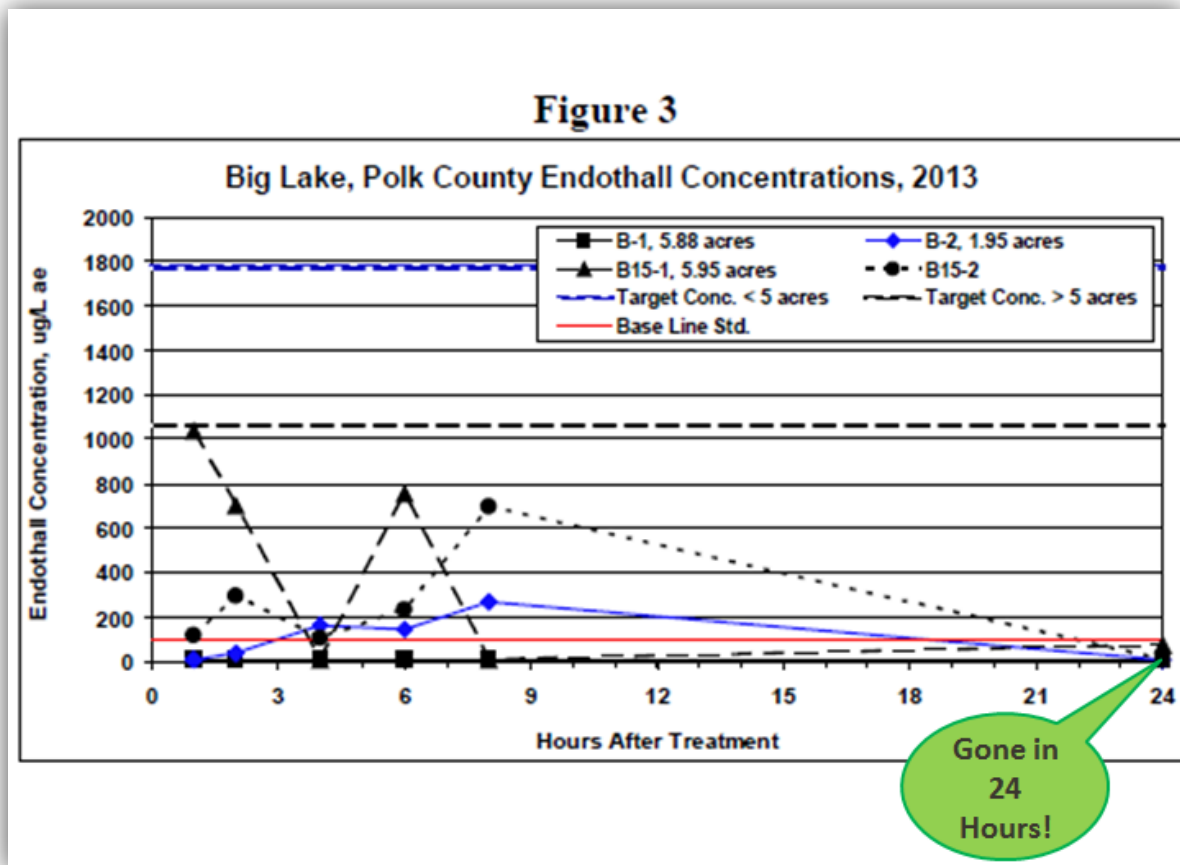
### **Actions**

- 2. Implement strict adherence with treatment standards (early CLP treatment prior to native plant growth) and monitoring methods prior to and following herbicide treatment. (Objective A, B)

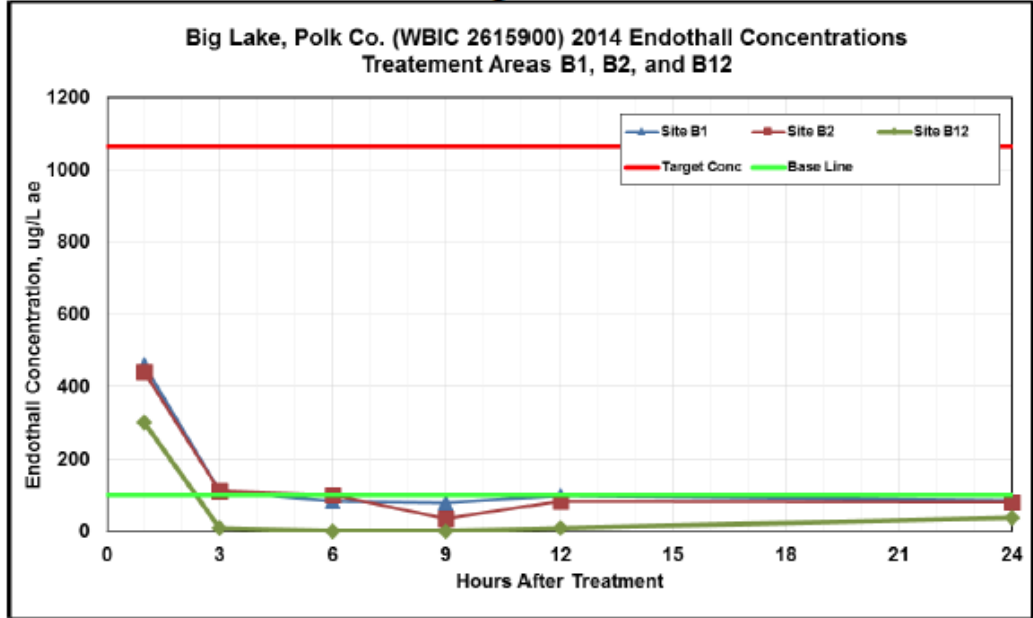


## Accomplishments

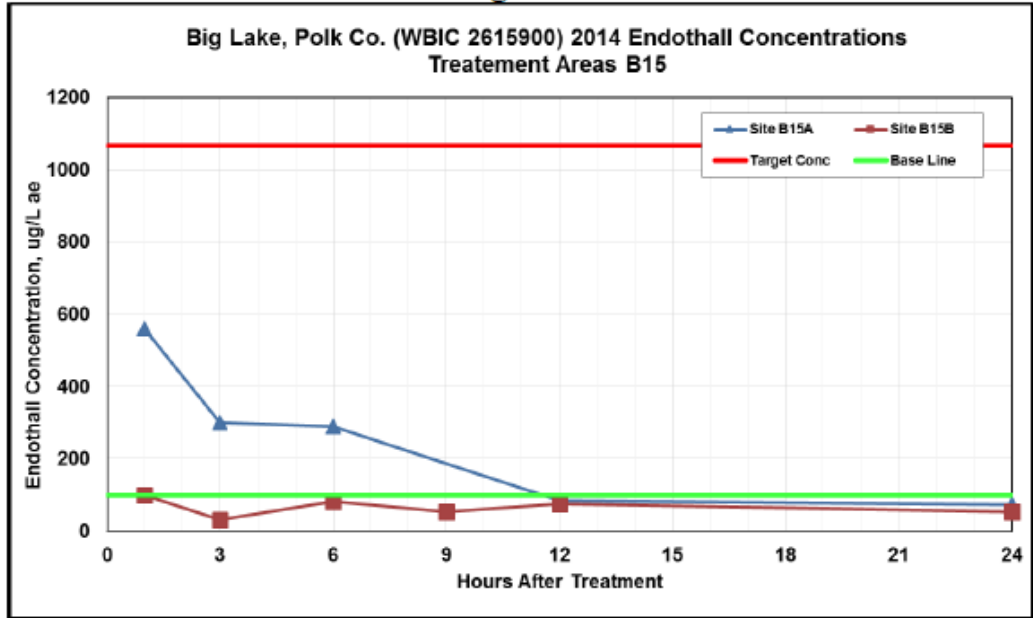
- At the request of the DNR, the District conducted post treatment herbicide concentration surveys in 2013 and the 2014 extension year. The results are shown below.



**Figure 2**



**Figure 3**



- See Appendix A .... Another goal of the herbicide treatment is to target the CLP with little or no detrimental effect on the native plant community. In order to determine if there was potential impact on the native plants, a comparison in native plant frequencies is done from one year to the next; in this case 2013 to 2014. A chi-square analysis is then conducted to determine if the change is statistically significant and not just from chance or random variation. The post treatment survey resulted in **no reduction** in native plant frequency from 2013 to 2014. This shows that the CLP was targeted with little or no effect on the native plant community. This is the goal of any AIS treatment; target the AIS without harming the native plants. The table below summarizes the native plant data and distribution maps are at the end of this analysis.

Species	2013 freq	2014 freq	change	Significant Reduction?
<i>Ceratophyllum demersum</i> (coontail)	0.89	0.95	+	n/a
<i>Elodea canadensis</i> (waterweed)	0.18	0.30	+	n/a
<i>Heteranthera dubia</i> (stargrass)	0.00	0.04	+	n/a
<i>Lemna triscula</i> (forked duckweed)	0.01	0.12	+	n/a
<i>Myriophyllum sibiricum</i> (northern water-milfoil)	0.04	0.01	-	No(p=0.15)
<i>Nymphae odorata</i> (white lily sim)	0.04	0.02	-	No(p=0.24)
<i>Potamogeton gramineus</i> (variable pondweed)	0.01	0.00	-	No(p=0.40)
<i>Potamogeton illinoensis</i> (Illinois pondweed)	0.02	0.05	+	n/a
<i>Potamogeton praelongus</i> (whitestem pondweed)	0.06	0.05	-	No(p=0.68)
<i>Potamogeton richardsonii</i> (clasping pondweed)	0.01	0.01	n/c	n/a
<i>Potamogeton robbinsii</i> (fern pondweed)	0.01	0.00	-	No(p=0.40)
<i>Potamogeton zosteriformis</i> (flat-stem pondweed)	0.01	0.00	-	No(p=0.04)
<i>Vallesnaria americana</i> (wild celery)	0.00	0.01	+	n/a

4. Use methods outlined in Goal 6 to deliver messages regarding native plant values. (Objective C) See Goal 6.

## Goal 6, Educate the public regarding aquatic plant management.

### Actions

6. Post signs and distribute brochures to encourage lake users to clean plants from boats and equipment and to drain live wells and to inform them about aquatic transport laws.

### Accomplishments

- “AIS Educational Kiosks” are maintained at both boat landings with the latest documentation. These kiosks create an obvious professional presence for the display of AIS related material, including signs related to the “do not transport” ordinances. Additionally, the kiosks serve as a presentation tool for CBCW Inspectors. Second only to having inspectors present, installing the kiosks has had the most impact on our AIS prevention program.



- Custom literature was produced and distributed at boat landings by CBCW inspectors.

**Church Pine, Round and Big Lake**

**Church Pine Lake**  
Acres 107  
Total Shoreline: 2.4 miles  
Maximum Depth: 45 feet

**Round Lake**  
Acres 38  
Total Shoreline: .83 miles  
Maximum Depth: 22 feet

**Big Lake**  
Acres 259  
Total Shoreline: 3 miles  
Maximum Depth: 24 feet

Town of Alden, Town of Garfield, Polk County, Wisconsin

**TOPOGRAPHIC SYMBOLS**  
Marsh  
Submerged vegetation  
Emergent vegetation  
Floating vegetation  
Steep slope  
Public Access

**LAKE BOTTOM SYMBOLS**  
Gravel  
Muck  
Rubble  
Sand

**SPECIES OF FISH PRESENT**  
Rock Bass  
Walleye  
Largemouth Bass  
Pike

Produced by the Church Pine, Round and Big Lake Management District. For more information about the lakes visit [www.bigroundpines.com](http://www.bigroundpines.com). Printed on waterproof paper. July 2012

### Stop aquatic hitchhikers...

Clean your boat and equipment to prevent the spread of invasive species!

**STOP AQUATIC HITCHHIKERS!**

In Wisconsin it's the law\*... failure to follow these steps can lead to fines up to \$2000.

**Before you leave a body of water:**

- Inspect boats, trailers, and equipment.
- Remove all attached aquatic plants, animals, and mud before launching and before leaving the water access.
- Drain all water from boat, motor, bilge, live wells, bait containers and equipment before leaving the water access.
- Never move plants, live fish, bait, or fish eggs away from a water body.
- Buy minnows from a Wisconsin licensed bait dealer.
- Dispose of unwanted bait in the trash, not in the water or on land.

**Additional steps**

- Spray, rinse, or dry your boat and equipment to remove or kill species not visible. Spray/rinse with hot or high pressure water OR dry your boat for 5 days before entering another lake or river.
- Disinfect boats and equipment to kill species and fish diseases using a mixture of two tablespoons of household bleach to one gallon of water.

**Polk County Sheriff**  
715-485-8300  
(non emergency)  
**EMERGENCY DIAL 911**

\*State of Wisconsin: Section 30.2715 Wis Act 16 prohibits launching a boat or placing a boat or trailer in navigable waters if it has aquatic plants or animals attached.  
\*Polk County Ordinance 29-11: prohibits launching or operating on a public roadway any boat, boat trailer, or hunting, trapping, fishing, or boating equipment, including canoes, lines, anchors, nets, droops, and waders if aquatic plants or invasive animals are attached.

Source: Wisconsin Department of Natural Resources. For more information check these sources: DNR WI GOV search "Aquatic Invasives", [WWW.IWSP.EDUCATION.WISCONSIN.GOV](http://WWW.IWSP.EDUCATION.WISCONSIN.GOV), [WWW.SCAURWET.MNSC.EDU](http://WWW.SCAURWET.MNSC.EDU), [WWW.PROTECTYOURWATERS.NET](http://WWW.PROTECTYOURWATERS.NET)

**DO YOUR PART**

**THESE BOTTLENECK INVASIVES ARE HARMING OUR FISHERIES!**

**Round Goby**  
Devours game fish eggs

**Zebra Mussel**  
Filters the bottom of food chain

**Eurasian Watermilfoil**  
Destroys native fish habitats

DO YOUR PART TO PREVENT THE SPREAD OF INVASIVE SPECIES

**BEFORE YOU ENTER OR LEAVE ANY BODY OF WATER:**

- Remove any visible mud, plants, fish or animals from equipment.
- Drain water from equipment.
- Clean and dry anything that comes into contact with water (boats, trailers, equipment, etc.).
- Never release plants, fish or animals into a body of water unless they came out of that body of water.

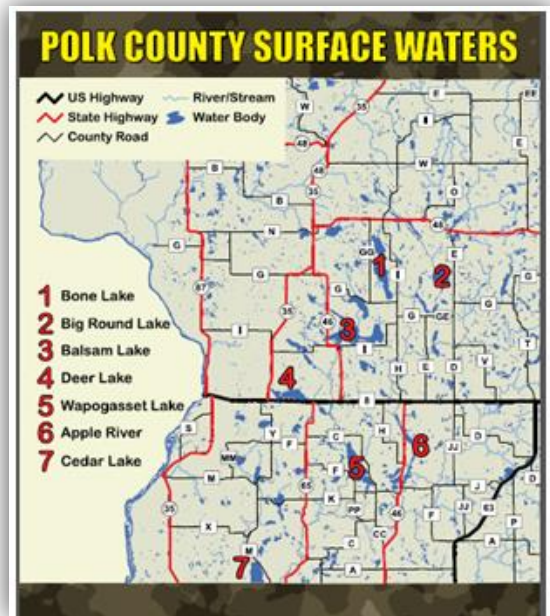
**STOP AQUATIC HITCHHIKERS!**

**Inspect** ✓ **Clean** ✓ **Drain** ✓


—your boat, motor, trailer and live wells.

DO YOUR PART

—POLK COUNTY WILDLIFE & SAGE LAKE WEAVER  
BOB WINKELMAN




- AIS literature was distributed to residents attending twice annual Lake District meetings / workshops. Presentations were given by District Commissioners and County Land and Water Resource Department representatives. Topics included:
  - Pictures of AIS to aid in identification
  - What to do if found.
  - How to prevent AIS.
  - Our CBCW prevention program.
  - AIS detrimental impact on the lake and property values.
  - Funding of AIS programs.
- . (Presentation excerpts are below)

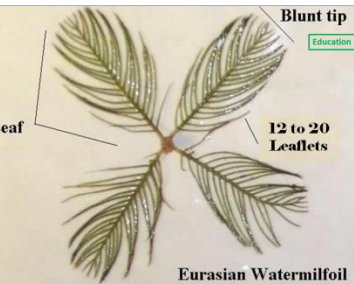


**Curly-Leaf Pondweed** Control

Serrated leaf margin & angled veins




**Purple Loosestrife** Control




**Eurasian Watermilfoil** Education

Blunt tip

12 to 20 Leaflets



**Japanese Knotweed** Control



**Zebra Mussels** Education



**What if you think you found Eurasian Water Milfoil (EWM)?** Education

1. Mark the location
2. Bag the sample
  - Do not fragment the plant ... it spreads by fragmentation!
3. Contact Lake District EWM ID Volunteers
  - Mike Reiter (715) 294-3950
  - Steve Oswald (715) 294-3135 (651) 248-8827 Cell
  - Gary Ovick (715) 294-3988 (715) 417-1770 Cell
4. If positive ... The Lake District Board will execute the Rapid Response Protocol per the Aquatic Plant Management Plan



**APMP Implementation Summary**

**Control**


- CLP treatment reducing nutrients from adult decay & turion production
- Purple Loosestrife treatment / beetles eliminated most populations

**Prevention**

- Scuba or underwater camera inspection of vulnerable areas (launches)
- Clean Boats Clean Waters boat inspections at both landings
- Volunteer Spotters (*Volunteers needed for 2015*)
- AIS Rapid Response Plan

**Education**

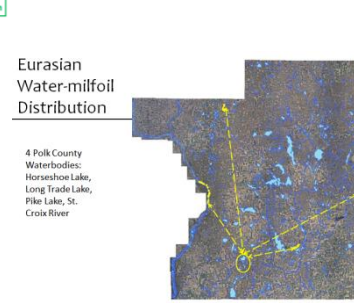
- AIS Educational Kiosks at both landings
- Signs, Audio Warning & Video Camera deterrent at Church Pine 24/7
- Clean Boats Clean Waters education at both landings
- General Meeting education on AIS



**Aquatic Invasive Species (AIS)** Education

*Existing & Potential*

- **Existing Aquatic Invasive Species**
  - Curly Leaf Pondweed
  - Purple Loosestrife
  - Japanese Knotweed
  - Chinese Mystery Snails
- **Potential Aquatic Invasive Species**
  - Eurasian Water milfoil
  - Zebra Mussels
  - Asian Carp



**Eurasian Water-milfoil Distribution**

4 Polk County Waterbodies:  
Horseshoe Lake,  
Long Trade Lake,  
Pike Lake, St. Croix River

Presentations, AIS information, Aquatic Plant & Lake Management Plans are available on our website. The website became our new showcase for AIS and CBCW activities, replacing the costly, inefficient and ineffective newsletter. <http://www.bigroundpine.com/>

## Welcome

Church Pine, Round and Big Lake Protection and Rehabilitation District website



**Breathing News**

**Lake & Cabin Life- Pictures Needed**  
Do you have some pics from our events around the lakes this year? We'd like to post them on the website. They could range from the July 4th parade, to a big fish caught, or another fun community event. Send them please to provided link.  
[Link for attached photos >](#)

**Camping Events**  
Free Fishing Weekend January 17th & 18th, 2015 [more info >](#)  
Big Lake Fishing Contest Saturday February 28th, 2015 10AM-3PM

**Local Heroes**



Pictured above (left to right) are local heroes: Front row: Ed Gaffney, Jack Gaffney and Daniel Gaffney. Middle row: Dennis Gaffney, Amanda Driskman, Carmen Paulsen, Heidi and Joel Hazzard. In the Back is the man the aforementioned heroes avoid Dan Gaffney.  
**Download News Article**  
Courtesy of County Ledger  
by Lynda Berg Olds >

**Photos of the Spring Dinner May 17<sup>th</sup> 2014 at the Village Pizzeria**  
[See the photos >](#)

**On 12/03/13, The Wisconsin DNR approved our new Lake Management Plan.**  
[Download pdf of the Church Pine, Round, and Big Lake Management Plan, November, 2013 >](#)

**Volunteers Wanted**  
Volunteer hours count towards qualified District expenditures/grants: Print Volunteer Time Sheet and send to your committee chair.  
[Download time sheet >](#)

**Fish Stocking History by lake and species since 1997.**  
[Download pdf file >](#)

**Current Committee Chairs and Members list.**  
[Download list >](#)

**2014 Annual Operating Plan**  
[Download pdf file >](#)

**About Our Lakes**



Find out unique information on each of the Lakes such as size, habitat and more...

**Swap Meet**



See what your neighbors are selling in gently used and new items.

**Photo Album**



Meet your neighbors, submit photos of District and family events.

**District Meetings**  
[Download the latest District Calendar](#)  
2014-15 District Calendar

**Board Meetings**  
Board Meetings are held monthly (except January, February and November) on the dates noted in the District Calendar. The Board Meetings start at 8 pm at the Alden Town Hall located at 183 155th Street, Star Prairie, WI 54028. All District Members are invited to attend. Minutes and Agendas are posted [here](#).

**General Meetings**  
Spring Informational Meeting: Saturday, May 16, 2015  
Fall Annual Meeting: Saturday, August 22, 2015  
Minutes and Agendas are posted [here](#).

**The Bulletin Board**  
Check for meetings, classes, social events, etc...



**Aquatic Plant & Water Quality Mgt.**  
Current and past Aquatic Plant Management Study Surveys and Plans.



**District Business**  
Shoreline management, invasive species control, good stewardship, District Fun Facts.



**District History Overview**  
Thought you were done with Geology, History and Geography? The three lakes are steeped in it - read on!



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Have you seen me? Check out the varied local flora, fauna and mammals.



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Average temps, migrations and hibernation patterns, etc.



**Miss Manners**  
Pointed tips and broad hints for keeping our lakes clean and safe!



**Links to Websites**  
Making it easy for you to buy a boating, snowmobile or fishing license, find maps, and navigate Wisconsin laws.



**Recreation Page**  
Places to go, people to see, things to do...



**Aerial Photos of the Lakes**  
View aerial photos of our lakes



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Can't find something? Maybe it's in our archives



**Garden Photos**  
Scenes from local gardens - your submissions welcome!



Home | About Our Lakes | Swap Meet | Photo Album | District Meetings | The Bulletin Board | Aquatic Plant & Water Quality Management | District History Overview | Miss Manners | Recreation District Business | Local Flora and Fauna | Naturalist's Calendar | Links to Websites | Archives | Contact Us

Site Designed & Developed by Beyond Pixels



- AIS Bait Container Stickers were acquired and supplied to the owner of the Big Lake Store (adjacent to the boat landing) who will educate the public by applying them to all bait containers sold.



### III Aquatic Plant Management Summary



Education

## Aquatic Plant Management Plan "Implementation Update"

Accomplishments To Date	2011	2012	2013	2014
<b>AIS Control</b>				
CLP Treatment	05/14/11	04/20/12	05/20/13	05/22/14
PL Treatment	August	August	August	August
<b>AIS Prevention</b>				
Diver / Camera Inspection	July	August	August	August
Camera Installed a C. P. Lake	08/11/11	NA	NA	NA
<b>AIS Education</b>				
AIS Educational Kiosks	08/24/11	Updated	Updated	Updated
AIS Identification Training	05/21 & 08/27	05/19 & 08/25	05/18 & 08/24	05/17 & 08/25

# IV Project Financials

State of Wisconsin  
 Department of Natural Resources  
 Box 7921  
 Madison, WI 53707-7921

**Grant Payment Request**  
 Form 8700-001 (R 6/06) Page 1 of 2

Print

Next >

Clear Form

Notice: Project Sponsors are required to provide information requested on this form when applying for payment of a grant funded by the Department. See Reporting Requirements on reverse. The Department will not process your payment request unless you provide all information requested. This information will be used to determine the amount of your payment and issue your check. Personally identifiable information collected will be used for program administration and may be made available to requesters as required under Wisconsin's Open Records law [ss. 19.31-19.39, Wis. Stats.]. Submit one copy of this request form, your completed Grant Payment Worksheet (Form 8700-002), and required documentation, listed on reverse, to your DNR Grant Specialist. See the DNR web site for additional information: <http://www.dnr.state.wi.us/org/caer/cra>

**Project Sponsor Information**

Project Sponsor / Management Unit Name Church Pine, Round, Big Lake P&R District	Grant Number ACEI-099
---	--------------------------

Project Name APM Plan Implementation	County Polk
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The DNR will mail the check to the name identified on the application as "Check Recipient." Questions? Contact DNR Grant Specialist.

Type of Request:  
 Partial  Final  Supplemental (Snowmobile Only)

**Payment Information (see reverse for instructions)**

A. Payment Record to Date	Amount	This Column for DNR Use Only
1. Amount of Grant (from original or amended Grant Agreement)	93,220.50	
2.a. Advance Payment Received, if any		
2.b. Total Payments Received after Advance Payment, if any	85,108.36	
2.c. Total Payments Received to Date (Lines 2.a. + 2.b.)	85,108.36	
3. Funds Remaining (Line 1 minus Line 2.c.)	8,112.14	

**B. Cost Share Amount**

4. Total Eligible Project Costs this Period. Transfer data from "Total Project Costs" field on Worksheet (Form 8700-002)	\$ 6,373.78	
5. Your Share of Costs. <i>See Line 5 instructions on reverse.</i>	\$ 1,593.45	
6. State Share of Costs (Line 4 minus Line 5) NOTE: This line cannot exceed the amount in Line 1.	\$ 4,780.34	

**C. This Payment Request and Grant Balance Remaining**

7. Amount of Advance Payment Received (from Line 2a) (if no advance payment received or already accounted for, enter \$0)	\$ 0.00	
8. Amount Eligible this Claim (Line 6 minus Line 7) NOTE: This line cannot exceed the amount in Line 3.	\$ 4,780.34	Amount approved this claim →
9. Grant Balance Remaining (Line 3 minus Line 8)	\$ 3,331.81	

Lake & River Grants Only: Does project include State Lab of Hygiene Sample Analysis?  Yes  No

**Certification**

I certify that, to the best of my knowledge and belief, the eligible costs requested are in accordance with the terms of the grant agreement and that all expenditures are based on actual payments of record. This reimbursement represents the grant share due that has not been previously requested.

Name of Authorized Representative - type or print Gary Ovick	(Area Code) Telephone Number (715) 294-3988
Signature of Authorized Representative	(Area Code) FAX Number (715) 294-3988
Date Signed 12/31/2014	E-mail Address Garyovick@aol.com

**Space Below this Line for DNR Use Only**

Grant Specialist Signature	Reimbursement Approval Date
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# Appendix A

## Herbicide Treatment Analysis for *Potamogeton crispus* (CLP)

Big Lake  
Polk County, WI

June, 2014

*Prepared by: Ecological Integrity Service, LLC  
Amery, WI*

## Abstract

On May 22 2014, an endothall herbicide treatment targeting *Potamogeton crispus*-curly leaf pondweed (CLP) was conducted on Big Lake, Polk County Wisconsin. A total of 14.06 acres was treated. A pretreatment survey was conducted in May to determine/verify CLP growth in designated bed polygons which were mapped using GIS. A post treatment survey was conducted approximately three weeks after treatment (June 11) to determine the effectiveness. A chi-square analysis was used to determine the statistical significance of any reductions. The treatment was determined to be effective with a very significant reduction ( $p=1.2 \times 10^{-24}$ ) in frequency of occurrence of CLP in the post treatment compared to the pretreatment, 2014. The reduction from 2013 to 2014 (post treatment) was small but found to be statistically significant ( $p=0.04$ ). The treatment was also effective in 2012 and 2013, so the frequency has been consistently low in all post treatment surveys. There was also a slight reduction in frequency from the 2013 pretreatment frequency to the 2014 pretreatment frequency, reflecting long-term reduction. It was also determined that there was no significant reduction in any native plant species as compared to the 2013 post treatment survey. A turion analysis resulted in a reduction in an overall mean turion density from 13.6 turions/m<sup>2</sup>(2013) to 6.4 turions/m<sup>2</sup>(2014).

## Introduction

On May 22, 2014 a total of 14.06 acres of *Potamogeton crispus*-curly leaf pondweed (CLP) beds were treated with herbicide (endothall-K) for the fourth year on Big Lake in Polk County Wisconsin (Township 32,33, Range 18 Section 36). Figure 1 shows the location of the beds. The treatment comprised of concentrations ranging from 1.5-2.5 ppm of endothall K. Table 1 shows the statistics for each treatment bed.

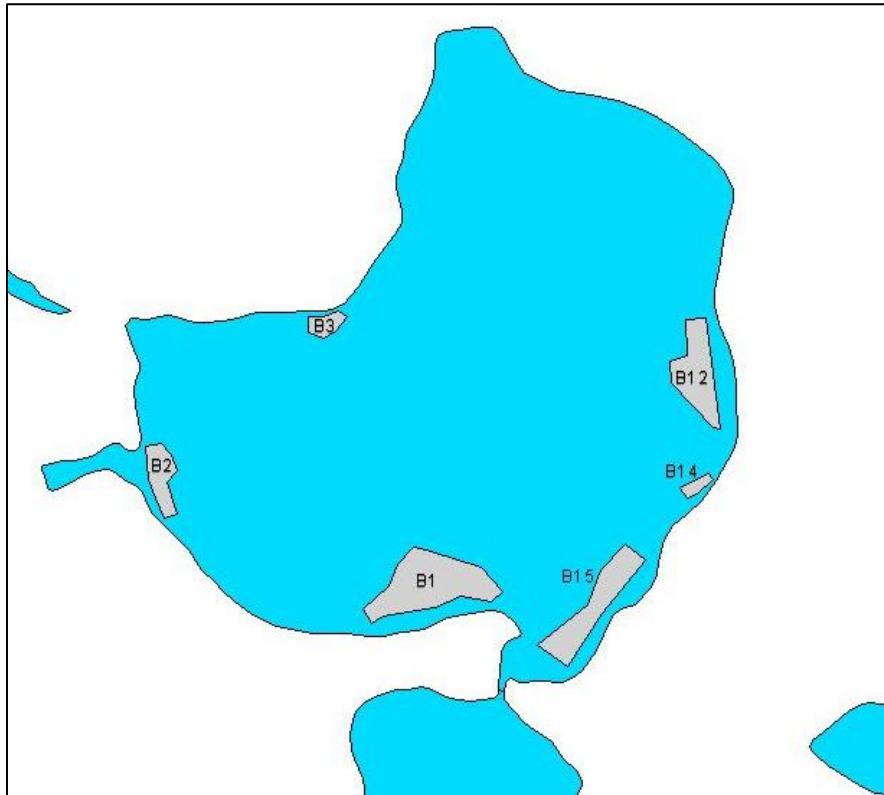


Figure 1: Map showing 2014 CLP treatment beds

<i>Big Lake 2014 CLP</i>					
Big Lake	Acres	Mean Depth(ft)	Acre-foot	Gallons applied*	Target conc.* (ppm)
<b>B1</b>	5.18	5.87	30.41	30.4	1.5
<b>B2</b>	1.50	6.10	9.15	9.15	1.5
<b>B3</b>	0.65	6.95	4.52	7.23	2.5
<b>B12</b>	3.00	7.25	21.75	21.75	1.5
<b>B14</b>	0.36	6.13	2.21	3.54	2.5
<b>B15</b>	3.37	6.70	22.58	22.58	1.5
<b>Big Lake Total</b>	<b>14.06</b>		<b>90.61</b>	--	--

\*As reported by applicator

Table 1: Summary of 2014 treatment bed statistics.

<b>Bed</b>	<b>Description</b>
<b>B1</b>	Bed B1 is just north of the narrows between Big Lake and Round Lake, This is the second largest bed and was very dense from the start of the treatment in 2011. The bed ranges from 3.5 feet to 11 feet in depth. The density/frequency has been declining each year but has had quite high turion densities. Pretreatment frequency is starting to go down, largely along the bed edges.
<b>B2</b>	This bed is on the western shoreline of Big Lake. It is 1.9 acres in size. The bed transitions quickly from a high nutrient, muck sediment to a hard, sandy substrate on the western edge of the bed. The CLP growth stops abruptly here. In 2010, this bed was quite dense in the middle portions of the bed, but has responded well to treatment.
<b>B3</b>	Bed B3 is on the northern shoreline of Big Lake. It originally had high density pockets of CLP with scattered growth between the pockets. The lake side edge borders very deep water and drops fast. There is no growth in this deeper water and defines the lake side boundary abruptly.
<b>B8 (not treated 2014)</b>	B8 is a narrow bed on the northeast shore of Big Lake. It had medium density CLP which warranted treatment. It has responded to treatment, but turions keep showing up and providing CLP growth each year. It has the highest mean depth. No CLP was located in the pretreatment and only one point had CLP present in 2013, so it was not recommended for treatment in 2014.
<b>B12</b>	Bed B12 came about from combining B12 and B13 from previous treatment years. CLP growing between these beds that were observed in quite high density in May 2013 warranted changing this bed (it is back to its original size from 2011). This bed responded less to treatment than other beds and had the highest frequency of CLP in 2013. It is a wider bed than ½ of the beds and ranges from about 4 ft. to 11 ft. in depth. The most CLP growth in this bed is the outer ½ of the bed in 7-10 feet of water depth.
<b>B14</b>	B14 is on the eastern shore. This narrow bed has been responding to treatment well, but keeps having CLP return, warranting more treatment. It ranges from 4 ft. to about 7.5 feet in depth.
<b>B15</b>	B15 is the largest bed treated. It encompasses much of the southeastern shoreline and extends out to Bed B1 and into the channel between Big Lake and Round Lake. This bed has a history of dense CLP and high turion production. The CLP density and turion density have both declined steadily.
<b>R1(not treated 2014)</b>	R1 is in Round Lake. It is a very small bed and was treated as it is the only CLP bed in Round Lake. It has been nearly eliminated, but keeps growing new CLP in very low amounts each year. Treatment has continued to try and eradicate this lone small bed in Round Lake. There was no CLP found in the pretreatment survey and have only had a couple of plants in the previous year, so no treatment was recommended for 2014.

**Table 2: Description of treatment beds.**

## Methods

To conduct and analyze the treatment, two surveys are conducted following the Wisconsin DNR treatment protocol outlined in 2009 by the Wisconsin DNR. The first survey is referred to a pretreatment survey. This involves going to predetermined GPS coordinates within the proposed treatment area. A high definition underwater camera as well as a rake is used to determine the presence of CLP at that sample point. Density is not measured as the plants are typically very small and density is very subjective. The presence of CLP is simply determined. There are many points checked outside of the bed delineation to assure the boundary is correct.

The second survey is referred to as the post treatment survey. This survey involves going to the same GPS coordinates as the pre-treatment survey and doing a rake sample at the point. If any CLP is on the rake, the density of the CLP is recorded (see fig 2 for reference). All other species are also recorded from the rake sample in order to verify no damage to the native plants.



Figure 2: Density rating system and example CLP rake sample.

When the surveys are complete, the frequency of occurrence is determined as well as the mean density for each bed as well as all beds combined. The frequency of occurrence for each native plant species sampled is also calculated. A chi-square analysis is then used to determine if the change in frequency is statistically significant ( $p < 0.05$ ). The goal is to find the chi-square analysis show that the frequency of CLP is significantly reduced and the native plants are not significantly reduced.

The comparison for reduction is three-fold. First, the result from the previous year's post treatment survey is compared to the present year post treatment survey. This reflects a long-term effectiveness. As more treatments are done in annual succession, these frequency values can become very similar since the CLP growth is reduced so much. This can make it appear the treatment is not progressing successfully since the frequency appears to not be reduced. Each year, new turions can germinate in the fall/winter creating new growth. The result is a low frequency in the post treatment survey, but in the next spring the CLP has grown immensely, and results in a high frequency.

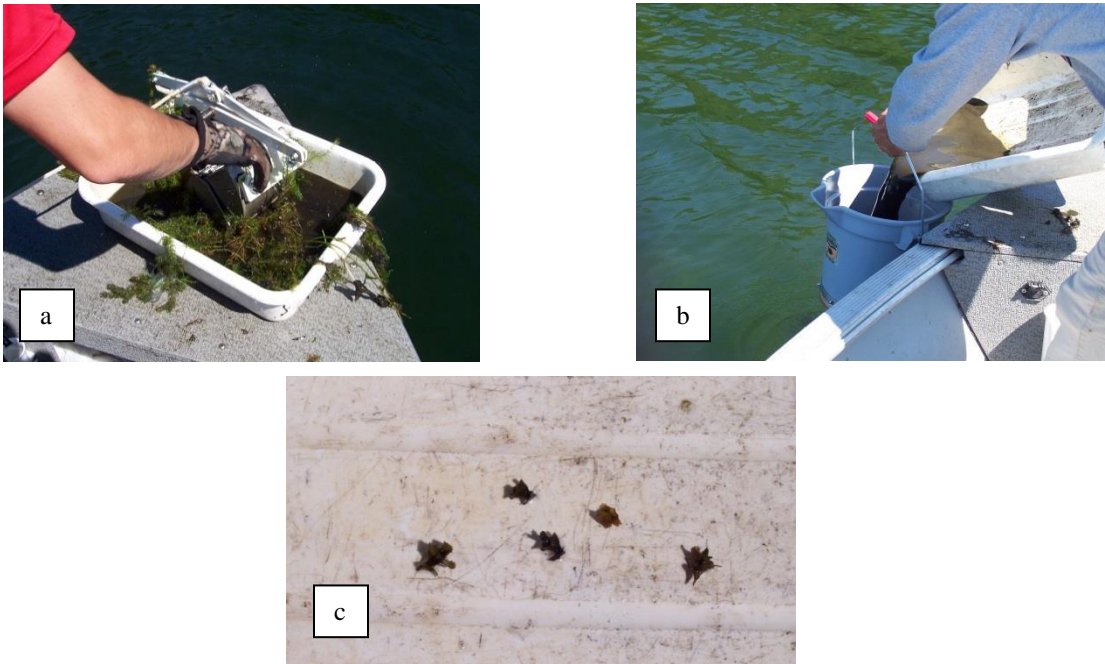
In order to reflect that new growth and the effect the treatment has on it, a second comparison is done. This compares the frequency of CLP in the spring, pre-treatment survey to the post treatment results in that same year. This shows what the CLP growth really was just before treating and the result after treatment. To show long-term reduction, the pretreatment frequency can be compared between treatment years. If the pretreatment frequency is going down from year to year, then the CLP is being reduced through turion reductions, thus resulting in less growth that spring.

In the end, we want to see a statistically significant reduction when comparing the pre-treatment frequency to the post treatment frequency. We would also like to see a consistent frequency reduction from year to year, depending on how low it is. If the frequency in any post treatment survey is very low (less than 10% as an example), then lowering it even more may not be realistic,



but is the goal. Turions can remain viable for several years, which can affect reduction amounts achieved.

In order to further reflect potential future growth and the cumulative success of treatments, a turion analysis is conducted. This analysis involves going to sample points near the middle of the CLP bed (assuming this will reflect the highest density). At each sample point a sediment sampler is lowered to the lake sediment and a sediment sample is obtained. Two samples are obtained from each side of the boat at each location. The samples are then separated with a screened bucket to isolate the turions. The turions are then counted and the density of turions is calculated in turions/square meter. Consistently successful treatments should so a trend of reduced turion density each year. This way we know the treatments are killing plants prior to turion production, resulting in overall reduction in CLP in those beds.



**Figure 3: Pictures showing turion density methods. (a) shows sediment sample;(b) shows separation; (c) shows separated turions.**

## Results

### CLP reduction

The pretreatment survey resulted in eliminating some treatment beds from 2013. With low turion density in 2013 and the lack of any CLP growth in 2013, beds B8 and R1 were eliminated for 2014. Some minor adjustments were made to beds B1 and B15 to reflect lack of growth in some areas. This is based upon the fact that if CLP is growing just outside the polygon border, these areas are included or added, while if an area is consistently not showing any CLP growth, that portion of the polygon is reduced.

The frequency of CLP in the treatment beds was much higher in the pretreatment survey of 2014 than the frequency in the post treatment survey of 2013. This shows that the CLP filled in the beds again, due to germination of turions.

Bed	2014 pre treat freq (0-100%)	2014 post treat freq (0-100%)	2013 post freq. (0-100%)	2013 pre freq. 0-100%)	2014 mean density (0-3)
<b>B1</b>	75.0%	0.0%	12.5%	73.7%	0.0
<b>B2</b>	81.8%	0.0%	0.0%	92.8%	0.0
<b>B3</b>	71.4%	0.0%	0.0%	80.0%	0.0
<b>B8</b>	0.0%	nt	11.1%	75.0%	nt
<b>B12</b>	63.6%	0.0%	26.1%	82.6%	0.0
<b>B14</b>	50.0%	0.0%	0.0%	62.5%	0.0
<b>B15</b>	66.7%	9.5%	2.3%	72.7%	0.1
<b>All beds</b>	<b>70.3%</b>	<b>2.0%</b>	<b>9.3%</b>	<b>81.4%</b>	<b>0.02</b>

**Table 3: Frequency changes reflected in pre and post treatment surveys.**

The post treatment survey showed that the frequency of CLP growth was very small in all treatment beds. Bed 15 showed the only remaining CLP growth after treatment with 9.5% of the sample points having CLP present. All samples were of low density (1). This frequency is a small increase from 2013 (9.3% vs 2.3%). Treatment beds B1 and B12 showed a smaller frequency in 2014 than what was present in 2013. Overall, the cumulative effect was a slight reduction in frequency from 2013 to 2014, but was found to be significant ( $p=0.04$ ).

The frequency reduction from the 2014 pretreatment CLP growth to the 2014 post treatment growth was significant ( $p=1.2 \times 10^{-24}$ ). All beds showed a reduction, most of which were quite substantial. The overall reduction (all beds considered) was from a frequency of 70.3% to a frequency of 2.0%. This demonstrates an effective reduction of CLP growth from herbicide treatment.

Bed	Pre to post (2014) reduction and significance?	Post 2013 to Post 2014 reduction significance?	Pre 2013 to Pre 2014 Reduction Significance?
<b>B1</b>	-75%	-12.5%	+1.3%
<b>B2</b>	-81.8%	n/c	-11.0%
<b>B3</b>	-71.4%	n/c	-8.6%
<b>B12</b>	-63.6%	-26.1%	-19.0%
<b>B14</b>	-50.0%	n/c	-12.5%
<b>B15</b>	-57.2%	+7.2	6.0%
<b>All beds</b>	-68.3% Yes (p=1.2X10 <sup>-24</sup> )	-7.3% Yes (p=0.04)	-11.1% Yes (p=0.04)

Table 4: Summary of statistical analysis of CLP reduction.

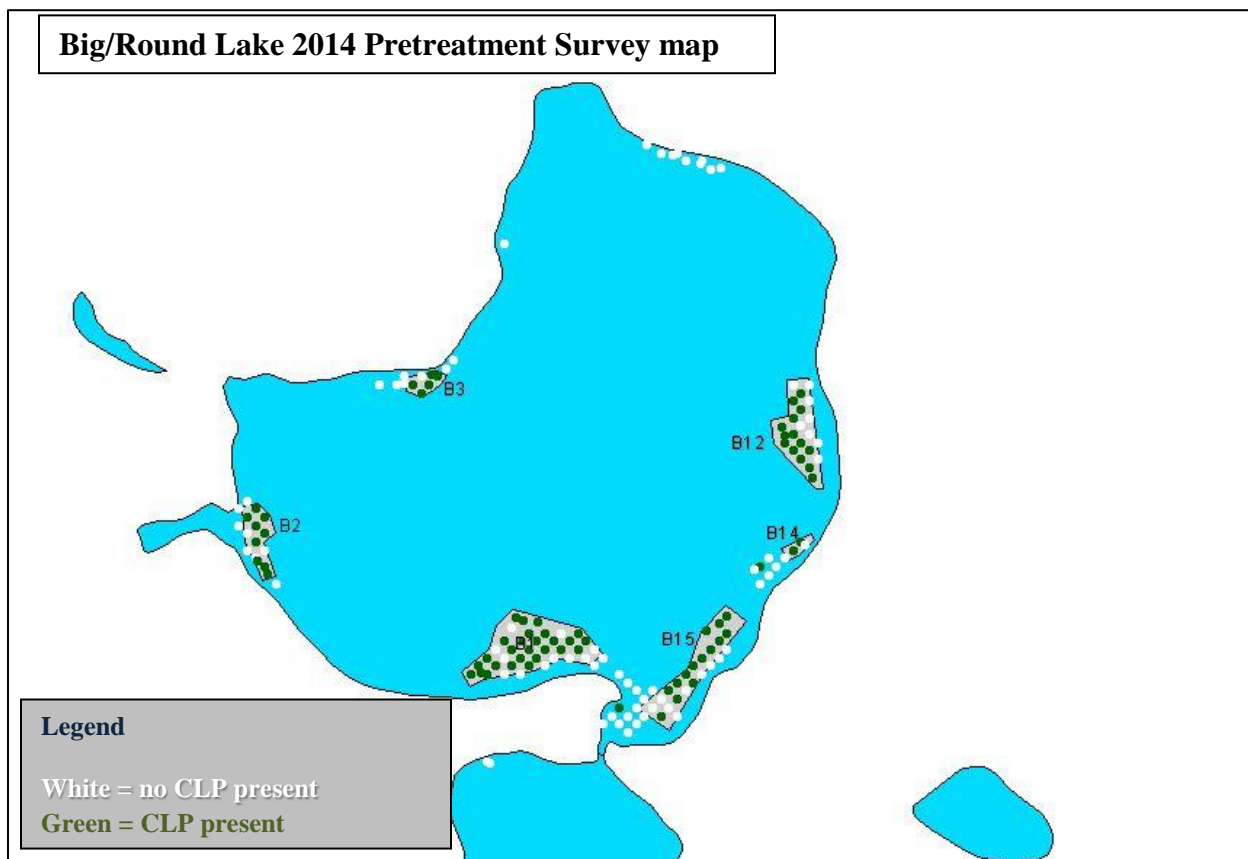


Figure 4: Map showing absence and presence of CLP growth from pretreatment survey, May 2014.

In addition, a frequency reduction occurred from the pretreatment survey in 2013, to the pretreatment survey in 2014. This reduction was quite small, but the chi-square analysis indicates it was statistically significant (p=0.04). This is a good indication of long-term CLP reduction.

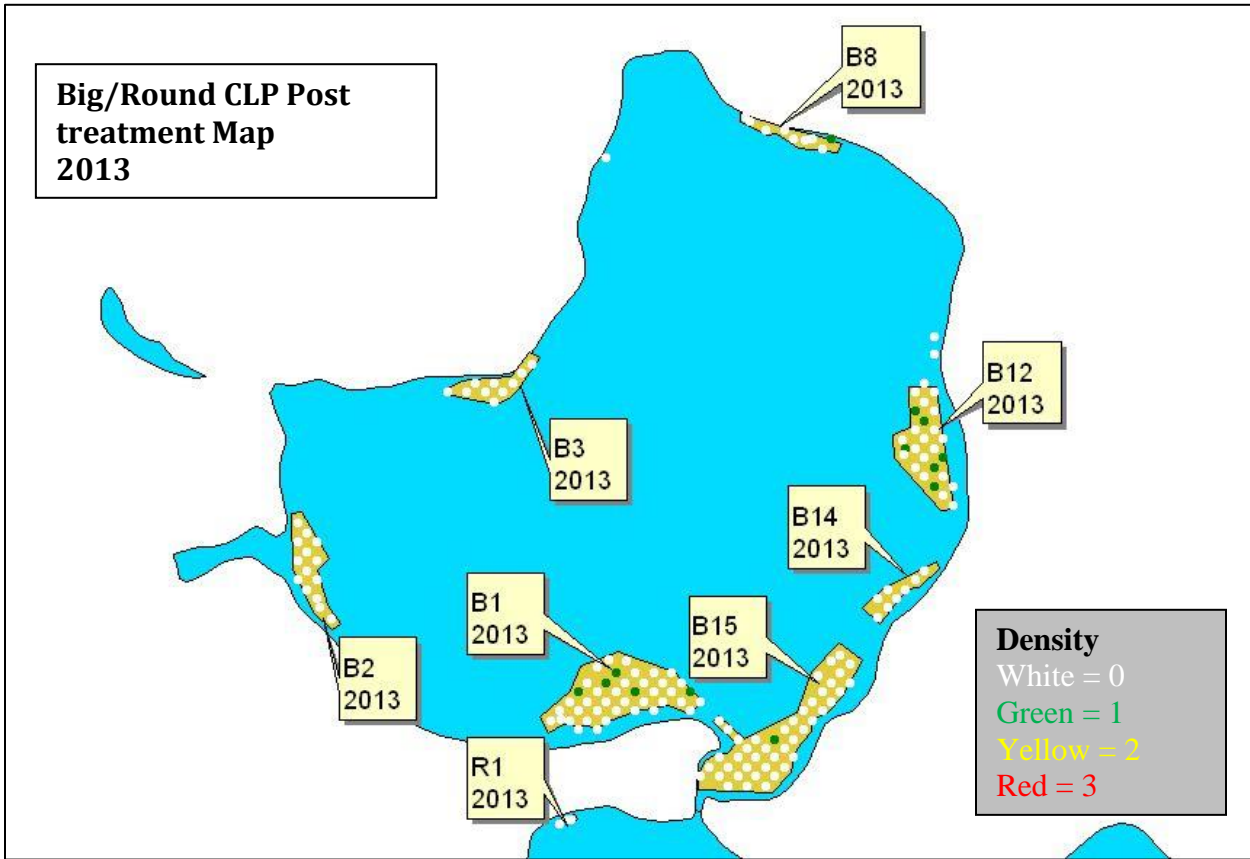


Figure 5: Map showing CLP density from post treatment survey June 2013.

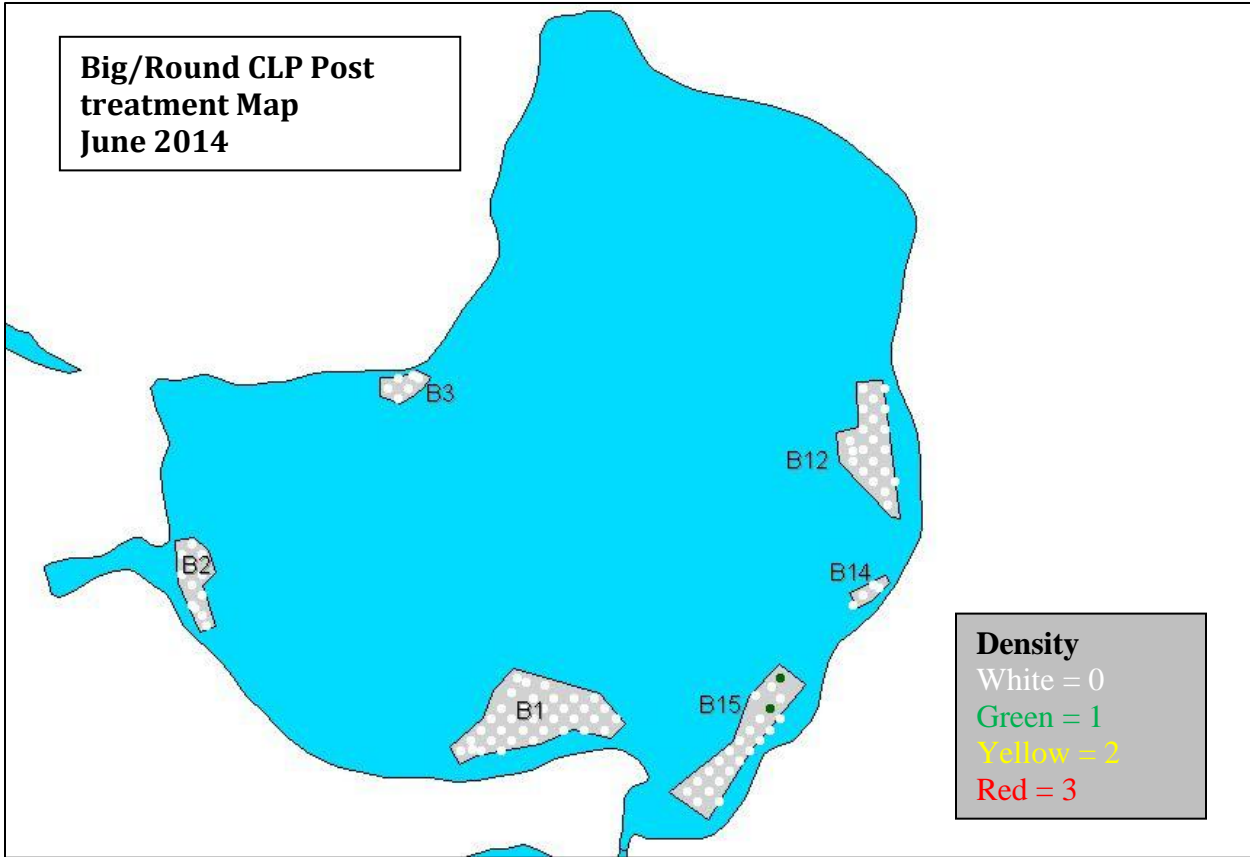


Figure 6: Map showing CLP density from post treatment survey June 2014.

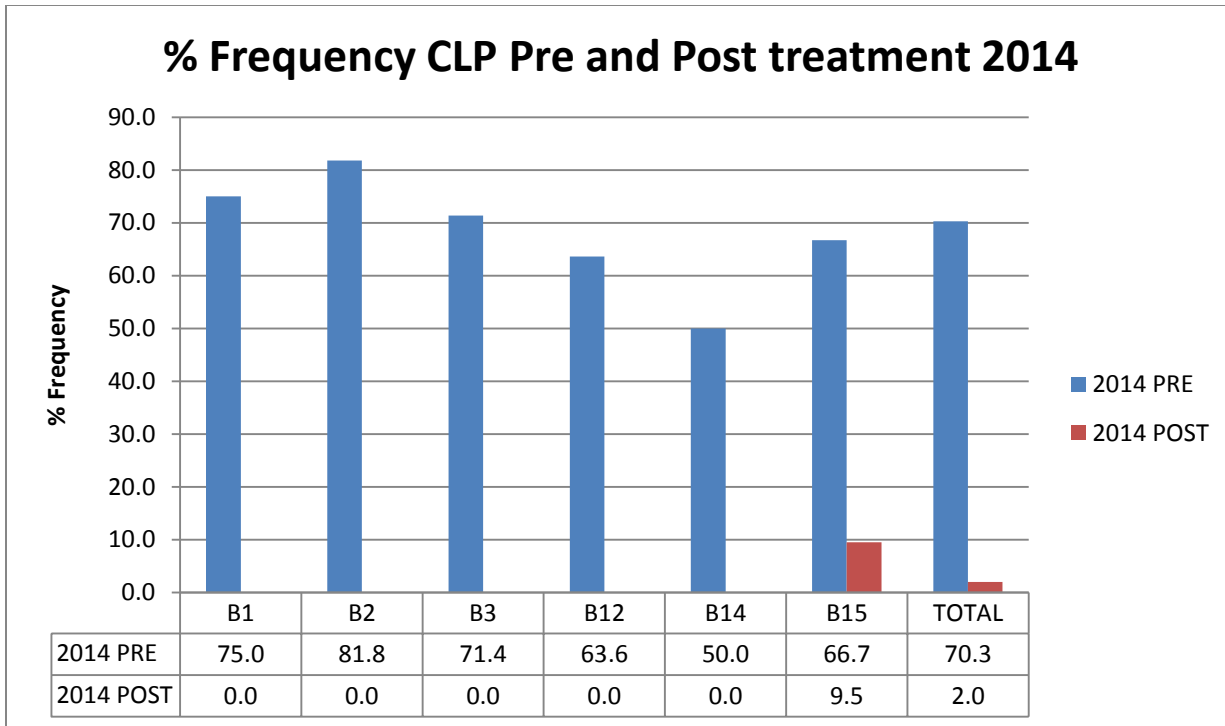


Figure 7: Graph depicting the reduction in CLP growth from pre to post treatment 2014.

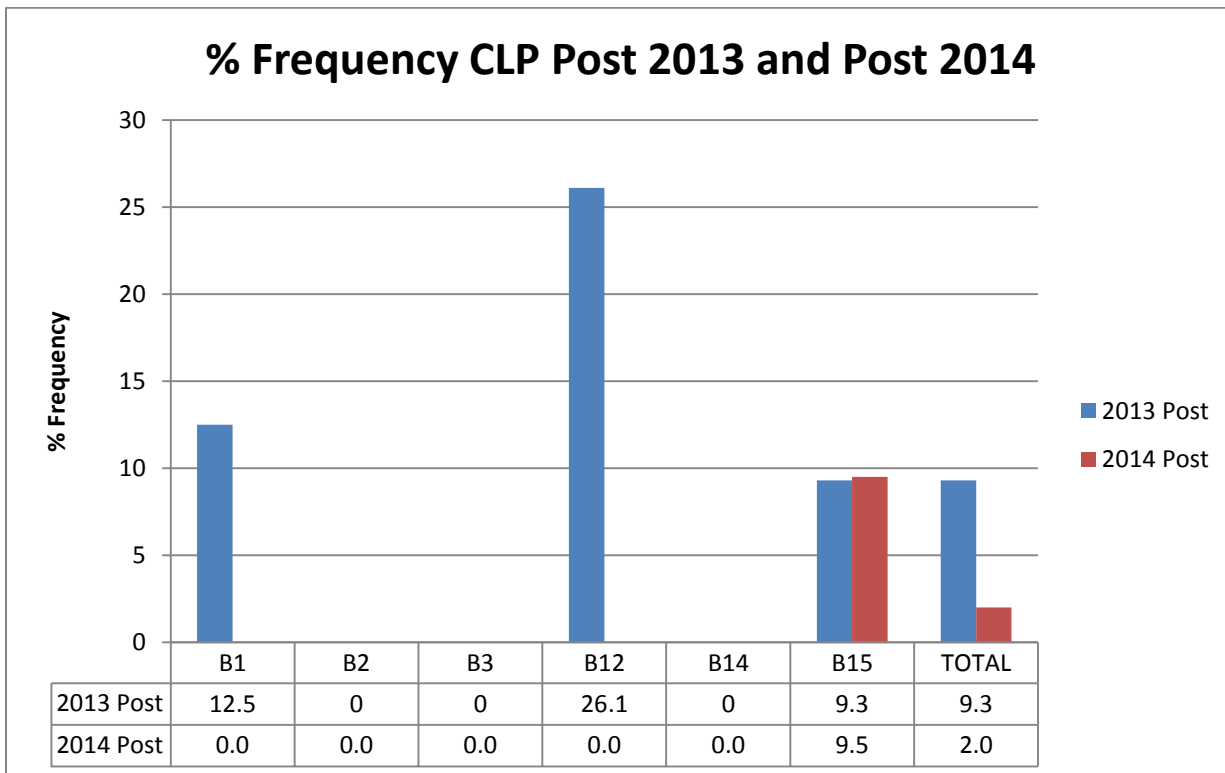
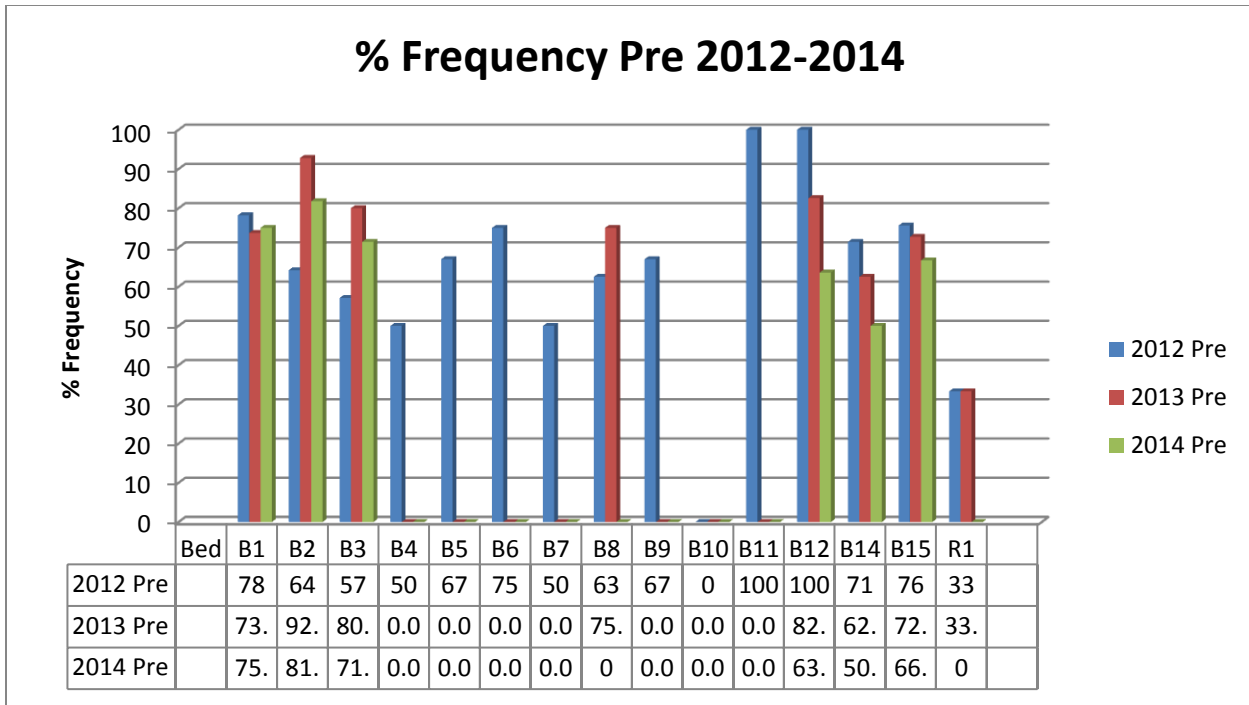


Figure 8: Graph depicting the change in CLP frequency from 2013 to 2014, post treatment.



**Figure 9: Graph showing the pretreatment CLP frequency in each bed, 2012-2014. Note the lack of frequency of beds in 2013 and 2014. This shows the CLP has been significantly reduced in those beds.**

### Native plant species

Another goal of the herbicide treatment is to target the CLP with little or no detrimental effect on the native plant community. In order to determine if there was potential impact on the native plants, a comparison in native plant frequencies is done from one year to the next; in this case 2013 to 2014. A chi-square analysis is then conducted to determine if the change is statistically significant and not just from chance or random variation.

The post treatment survey resulted in no reduction in native plant frequency from 2013 to 2014. This shows that the CLP was targeted with little or no effect on the native plant community. This is the goal of any AIS treatment; target the AIS without harming the native plants. Table 5 summarizes the native plant data and distribution maps are at the end of this analysis.

Species	2013 freq	2014 freq	change	Significant Reduction?
<i>Ceratophyllum demersum</i> (coontail)	0.89	0.95	+	n/a
<i>Elodea canadensis</i> (waterweed)	0.18	0.30	+	n/a
<i>Heteranthera dubia</i> (stargrass)	0.00	0.04	+	n/a
<i>Lemna triscula</i> (forked duckweed)	0.01	0.12	+	n/a
<i>Myriophyllum sibiricum</i> (northern water-milfoil)	0.04	0.01	-	No(p=0.15)
<i>Nymphae odorata</i> (white lily sim)	0.04	0.02	-	No(p=0.24)
<i>Potamogeton gramineus</i> (variable pondweed)	0.01	0.00	-	No(p=0.40)
<i>Potamogeton illinoensis</i> (Illinois pondweed)	0.02	0.05	+	n/a
<i>Potamogeton praelongus</i> (whitestem pondweed)	0.06	0.05	-	No(p=0.68)
<i>Potamogeton richardsonii</i> (clasping pondweed)	0.01	0.01	n/c	n/a
<i>Potamogeton robbinsii</i> (fern pondweed)	0.01	0.00	-	No(p=0.40)
<i>Potamogeton zosteriformis</i> (flat-stem pondweed)	0.01	0.00	-	No(p=0.04)
<i>Vallesnaria americana</i> (wild celery)	0.00	0.01	+	n/a

Table 5: Summary of native plant changes from 2013 to 2014, post treatment.

### Turion Analysis

The 2014 turion analysis showed that the turion density declined from 2013 to 2014. The mean turion density for all treated areas was 13.6 turions per m<sup>2</sup> in 2013 and was 6.4 turions per m<sup>2</sup> in 2014. There were slight increases in beds B2 and B3. This is likely due to sampling variation since there was no CLP observed in these areas in the post treatment survey to produce and release turions. The reduction likely occurs because the 2014 CLP growth resulted from germinated turions. Effective treatment kills the CLP plants prior to turion production, thus resulting in no net turions added. This is the desired result in treatment and should result in even less CLP growth in spring, 2015.



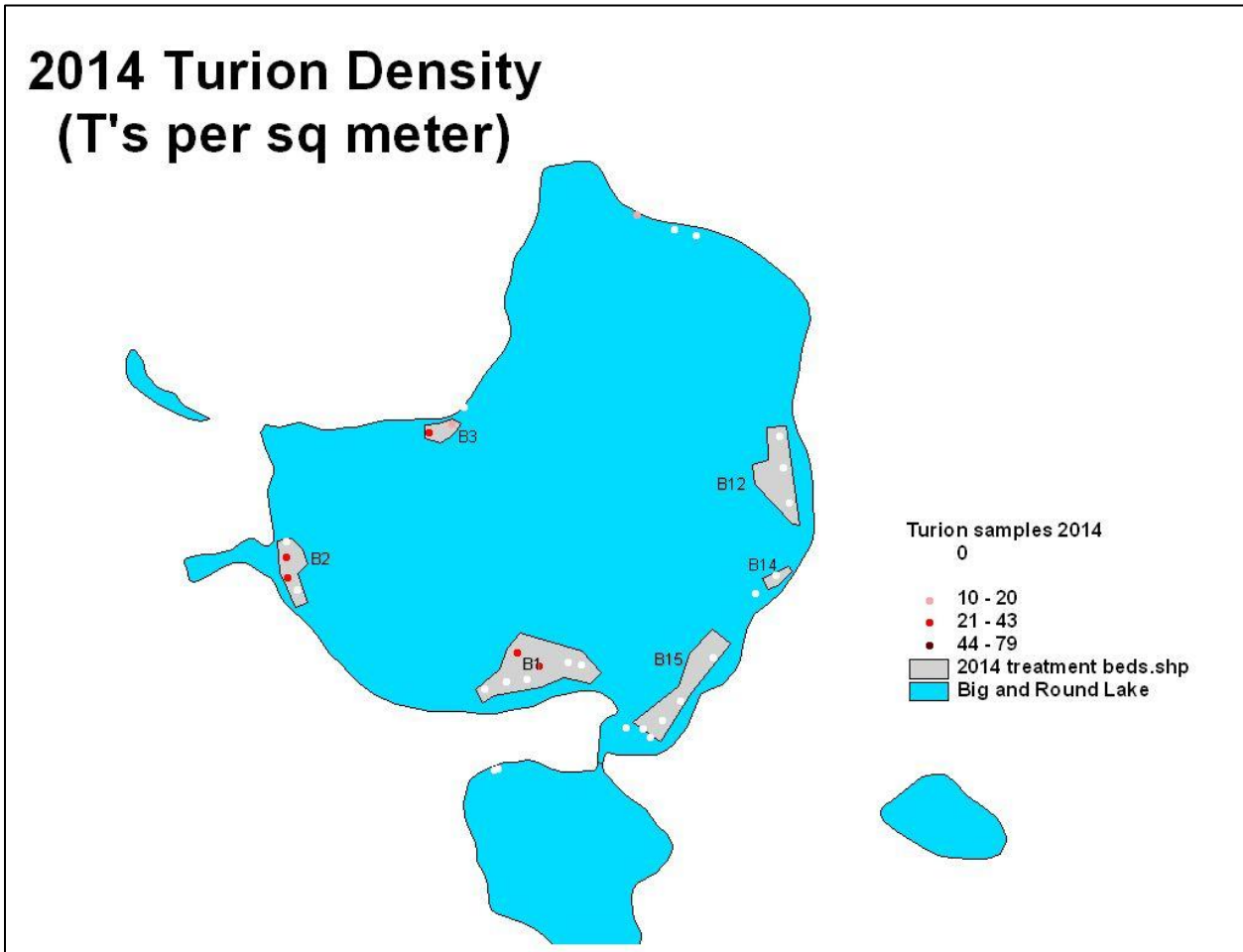


Figure 10: Map of turion density in treatment beds-2014.

Bed	2012	2013	2014
<b>B1</b>	30.7	27	12.4
<b>B2</b>	32.28	4	10.9
<b>B3</b>	7.1	15	21.7
<b>B8</b>	0	6.7	n/a
<b>B12</b>	28.7	39.7	0
<b>B14</b>	0	20	0
<b>B15</b>	30.7	16.7	0
<b>R1</b>	0	20	n/a
<b>All Treated</b>	<b>12.8</b>	<b>13.6</b>	<b>6.4</b>

Table 6: Mean turion density by beds, 2012 through 2014.

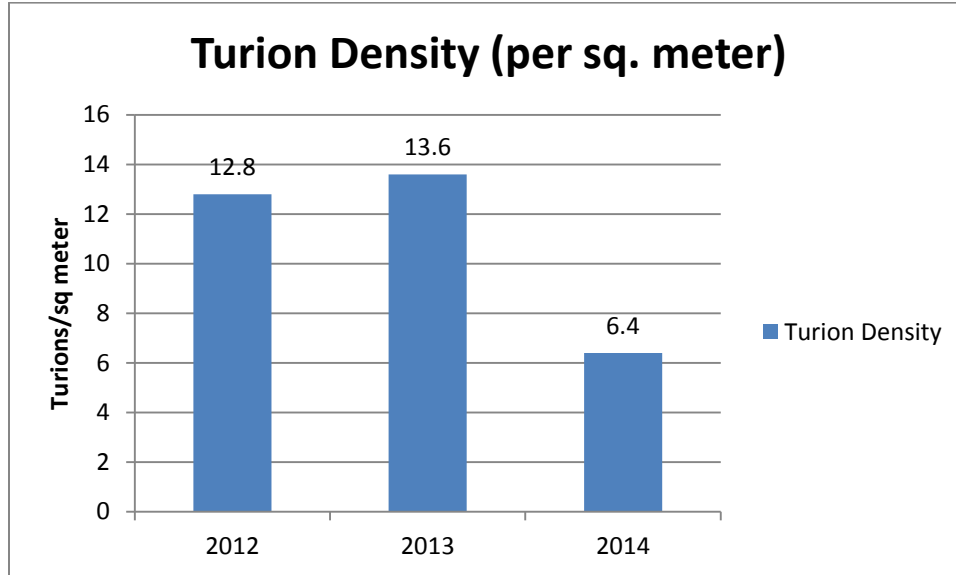
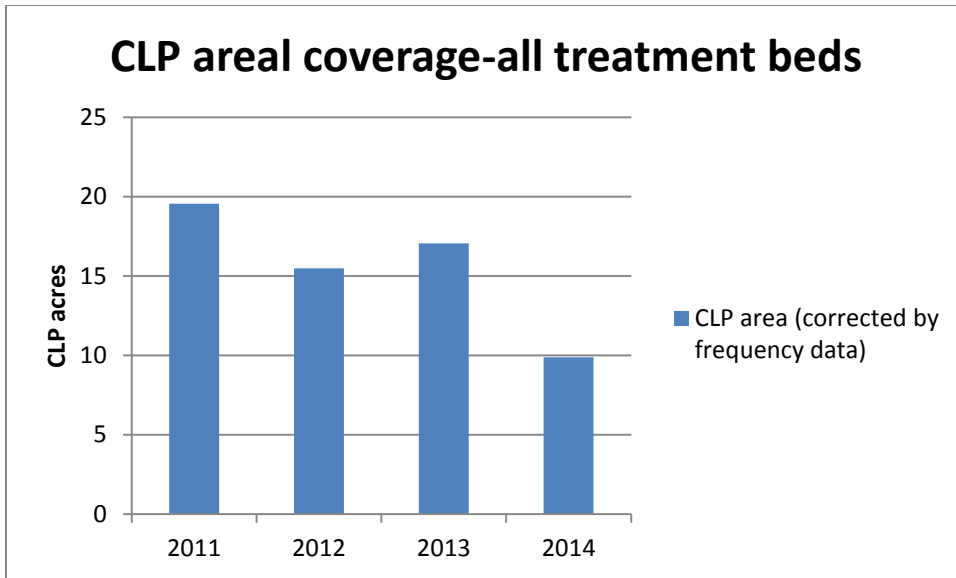


Figure 11: Graph of mean turion density (all treated beds) 2012-2014.

## Discussion

A statistical analysis of the CLP growth data from pre and post treatment surveys show that the herbicide treatment was effective in reducing the CLP growth. The reduction occurred from the spring growth before treatment (reflected in pretreatment survey 2014) to the growth after treatment (reflected in the post treatment survey 2014).

Analysis shows a small reduction in growth after treatment 2014 as compared to after treatment in 2013. This reduction was small, but was statistically significant. There was also a significant reduction in the 2013 pretreatment frequency compared to the 2014 pretreatment frequency. This supports another effective treatment in 2014, in addition to previous years having effective treatments. Figure 10 shows the areal coverage of the CLP treatment beds each spring before treatment. These areas have been corrected using the frequency of occurrence, thus reducing the area the treated area actually covered with CLP.



**Figure 10: CLP areal coverage of all beds for each year 2011-2014.**

The turion analysis shows that the decline in CLP appears to continue. The reduced turion density should result in less CLP growth in spring, 2015. Continued declines in turion density reflect long-term successful CLP reduction.

It is recommended that treatment of the beds continue based upon the early spring CLP coverage. Since turions can remain viable for many years future treatment may be needed. The turion analysis results, coupled with the pretreatment maps can be used to determine treatment in a particular year. The response to treatment and the resulting reduction in CLP in Big Lake and Round Lake has been excellent.

## References

Borman, Susan, Robert Korth and Jo Tempte. *Through the Looking Glass*. University of Wisconsin-Extension. Stevens Point, Wisconsin. 1997. 248 p.

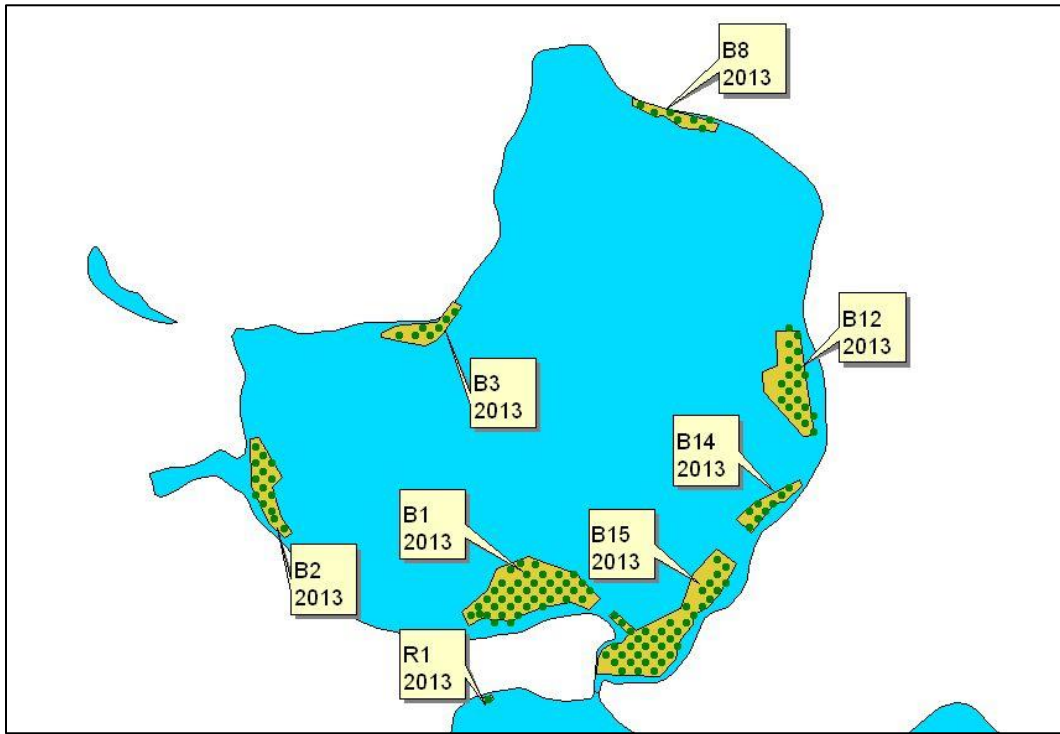
Crow, Garrett E. and C. Barre Hellquist. *Aquatic and Wetland Plants of Northeastern North America*. The University of Wisconsin Press. Madison, Wisconsin. Volumes 1 and 2. 2000. 880p.

University of Wisconsin-Extension. *Aquatic Plant Management in Wisconsin*. April 2006 Draft. 46 p.

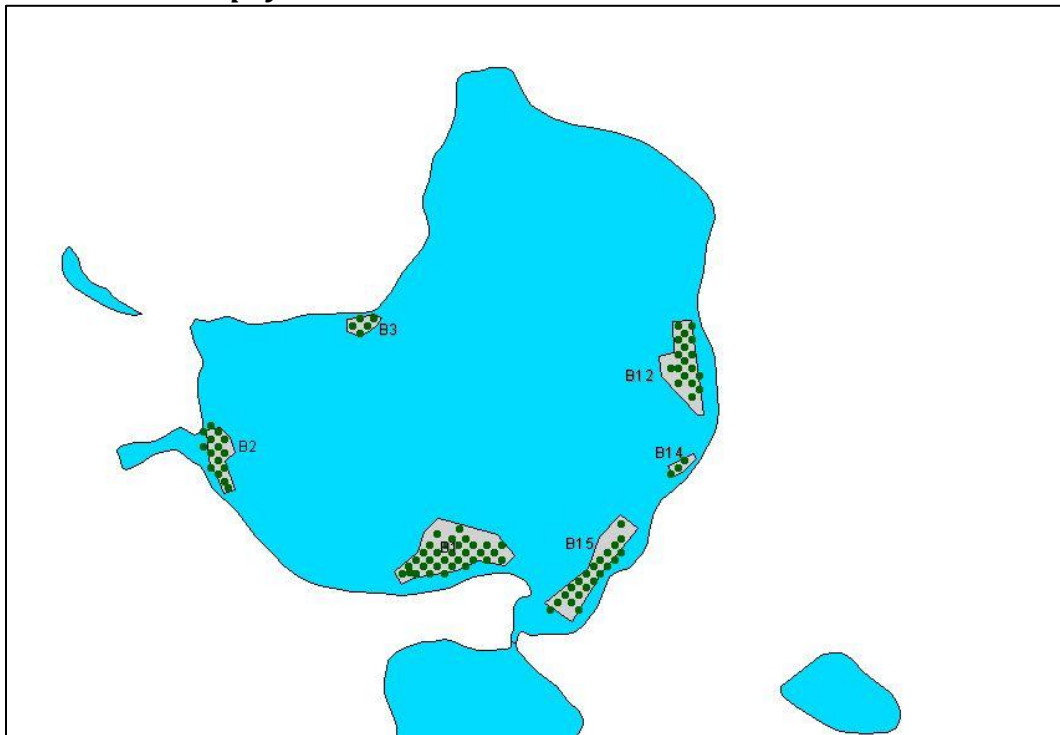
UW-Extension. Aquatic Plant Management website.

<http://www4.uwsp.edu/cnr/uwexplakes/ecology/apmguide.asp> appendix d.

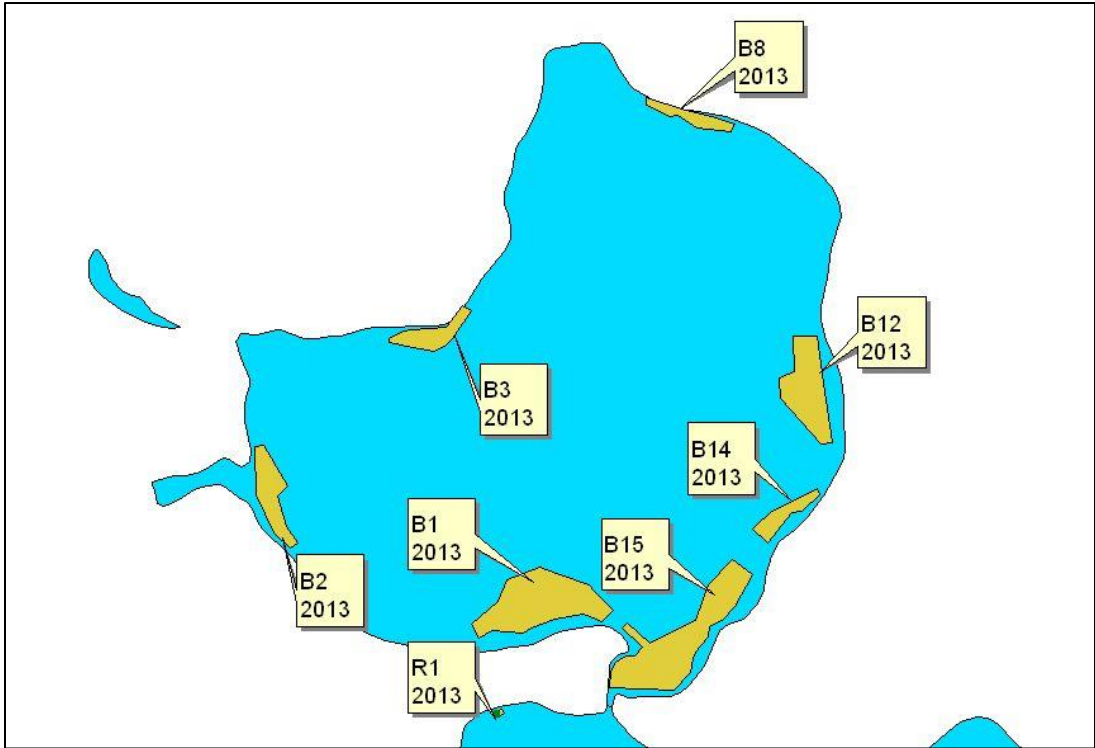
**Appendix-native plant maps-2013**



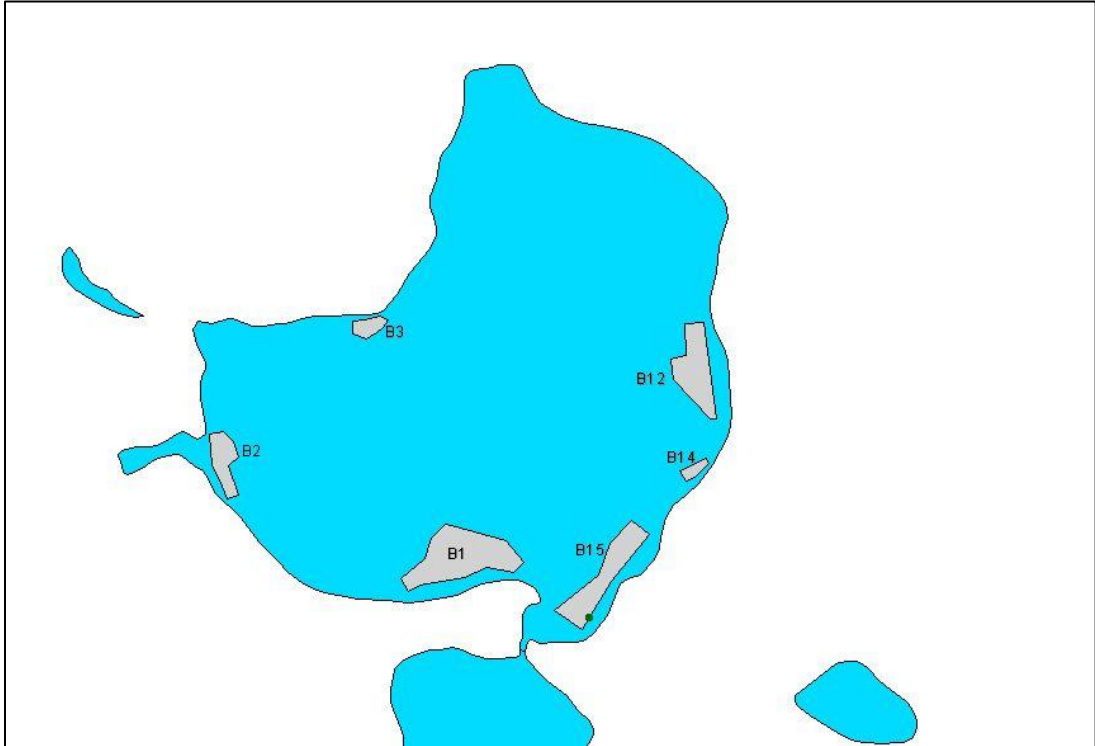
**Coontail-*Ceratophyllum demersum*-2013**



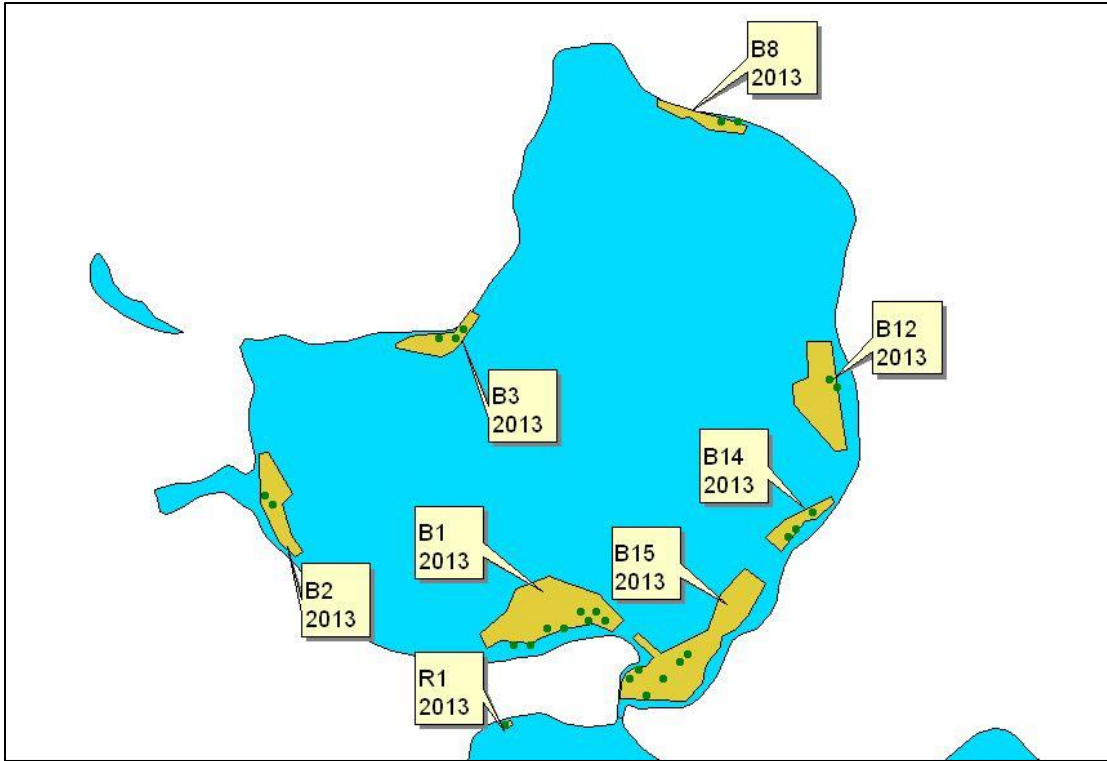
**Coontail-*Ceratophyllum demersum*-2014**



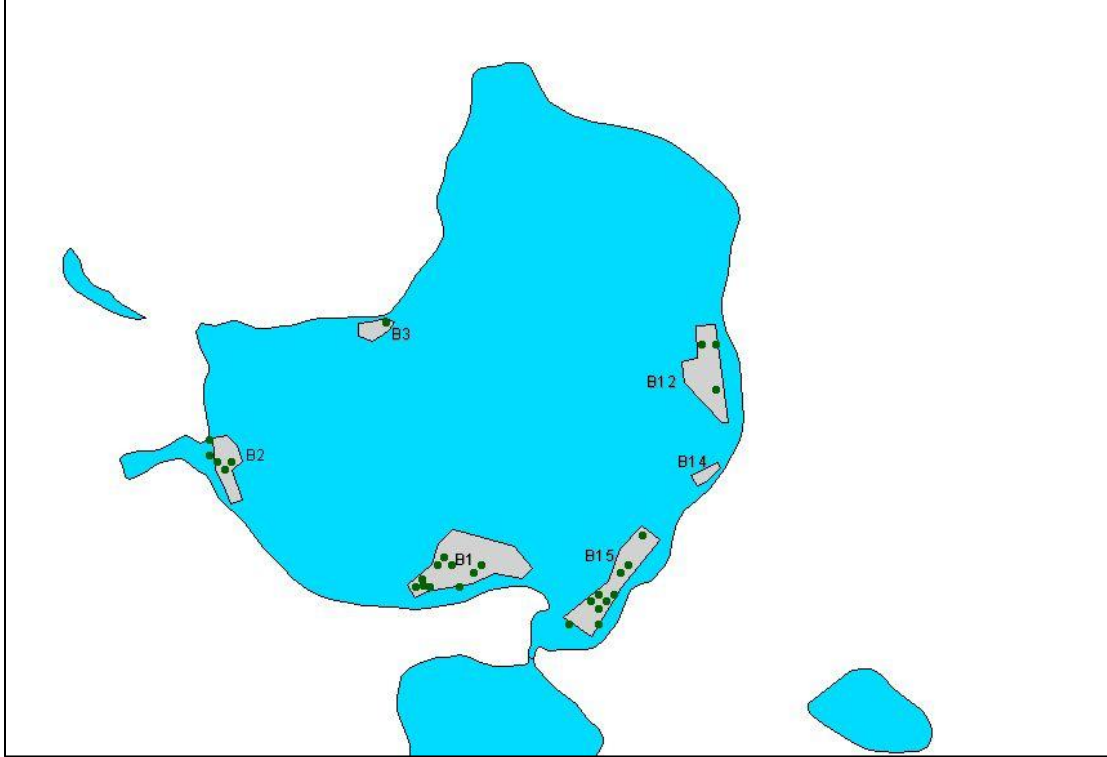
**Claspings pondweed-*Potamogeton richardsonii*-2013**



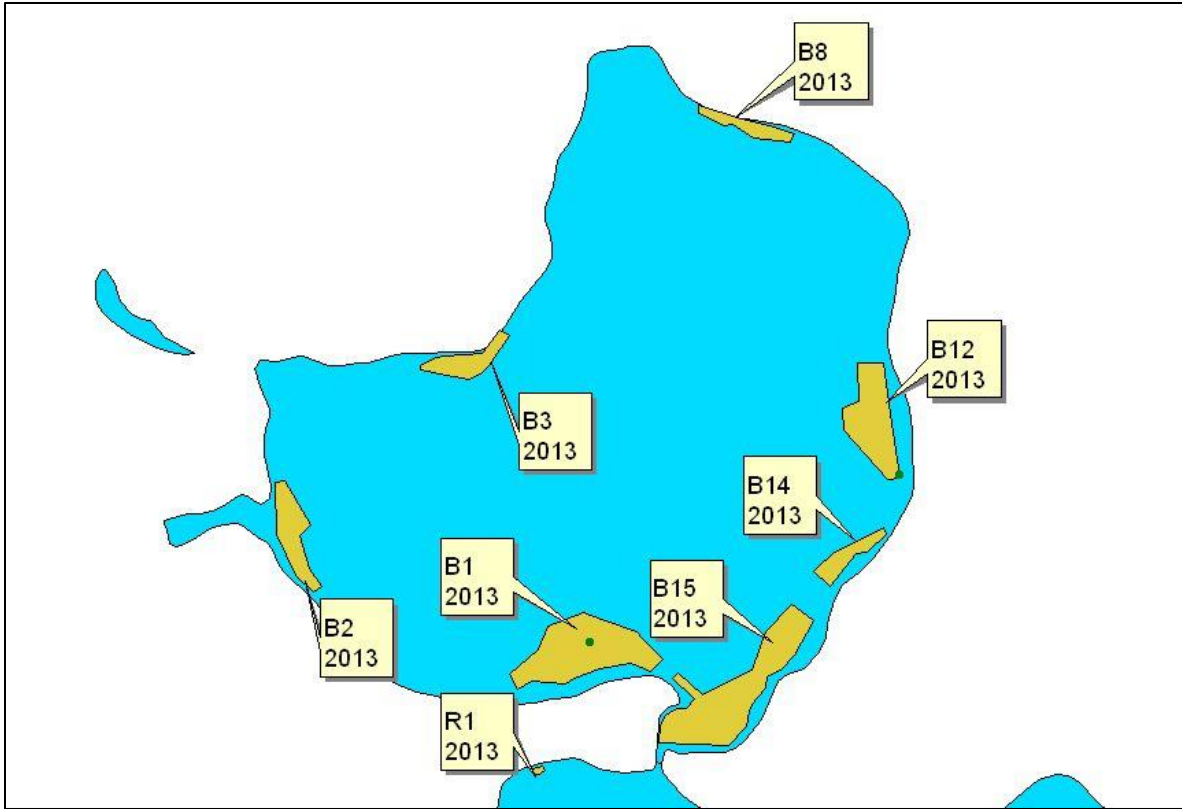
**Claspings pondweed-*Potamogeton richardsonii*-2014**



**Waterweed or elodea-*Elodea Canadensis*-2013**



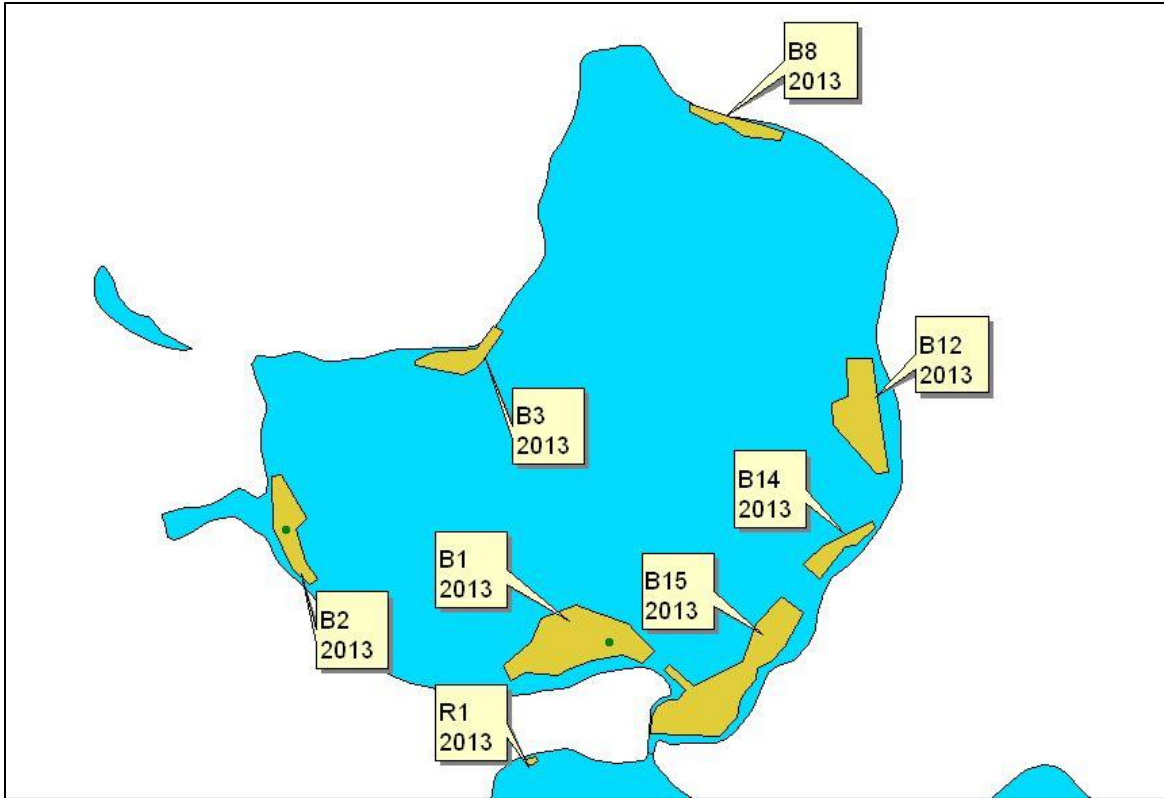
**Waterweed or elodea-*Elodea Canadensis*-2014**



**Fern pondweed-*Potamogeton robbinsii*-2013**

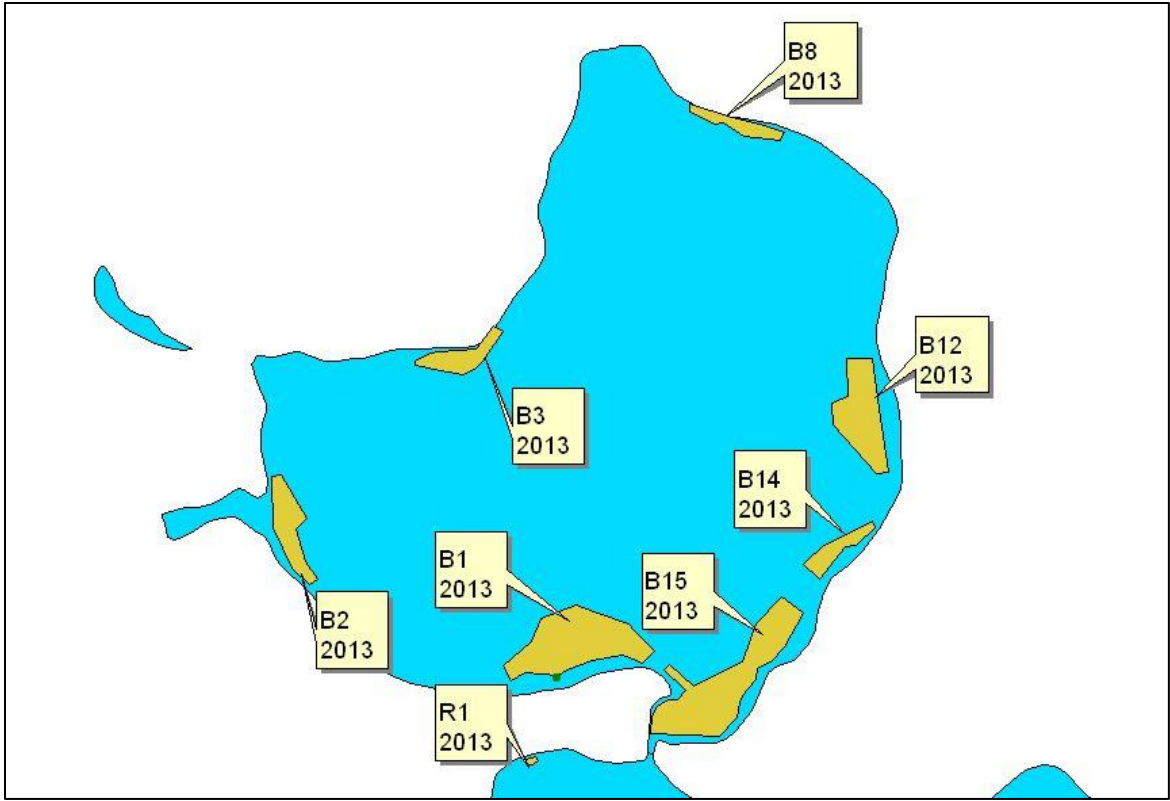
**None sampled in 2014.**



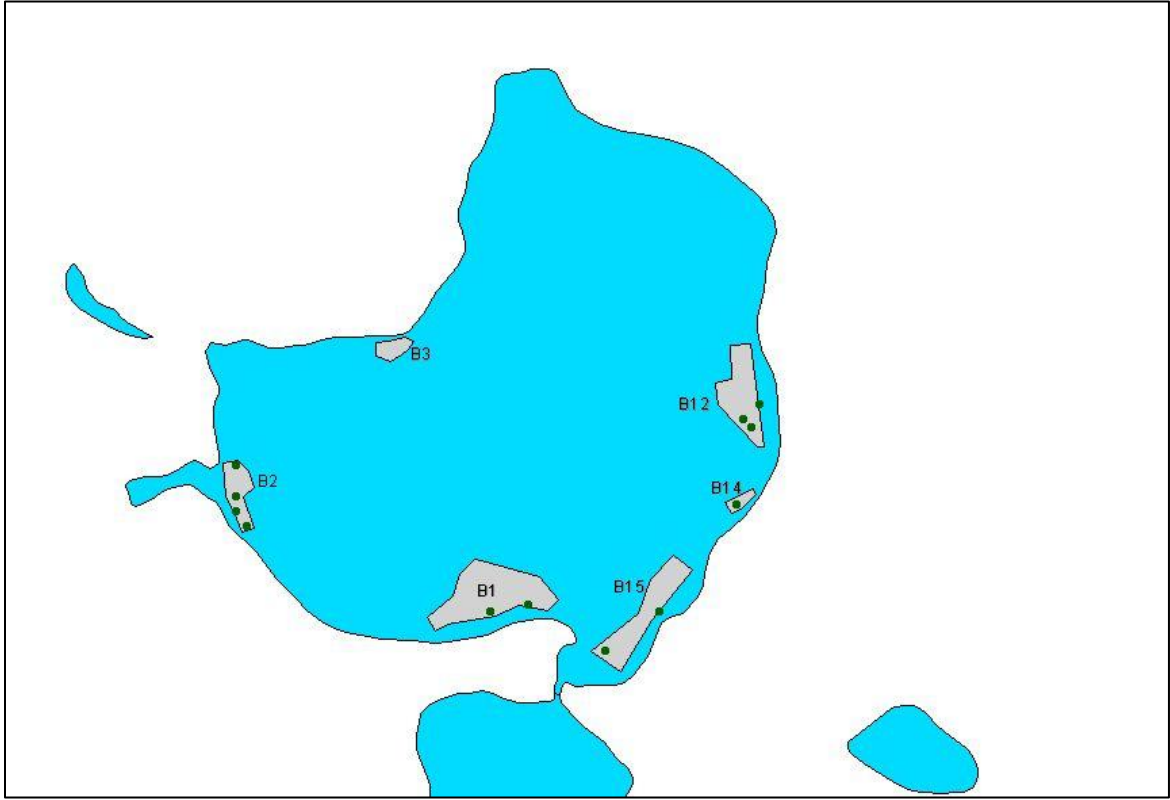


**Flat-stem pondweed-*Potamogeton zosteriformis*-2013**

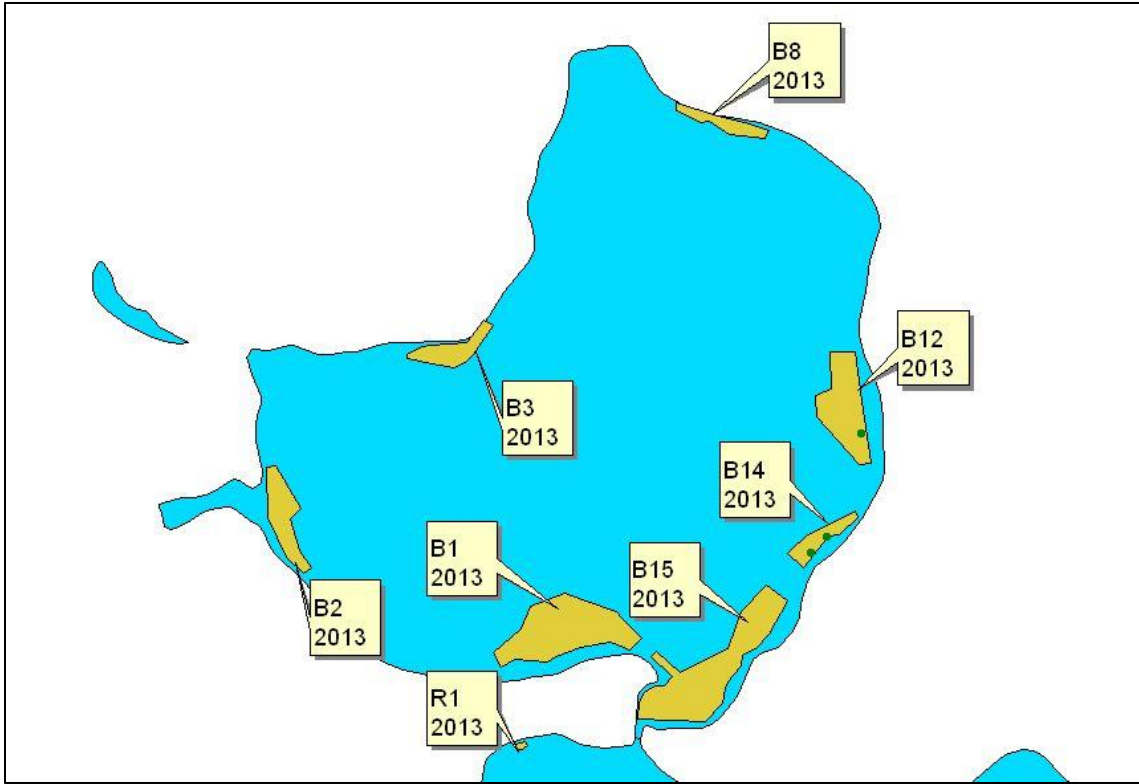
**None sampled in 2014.**



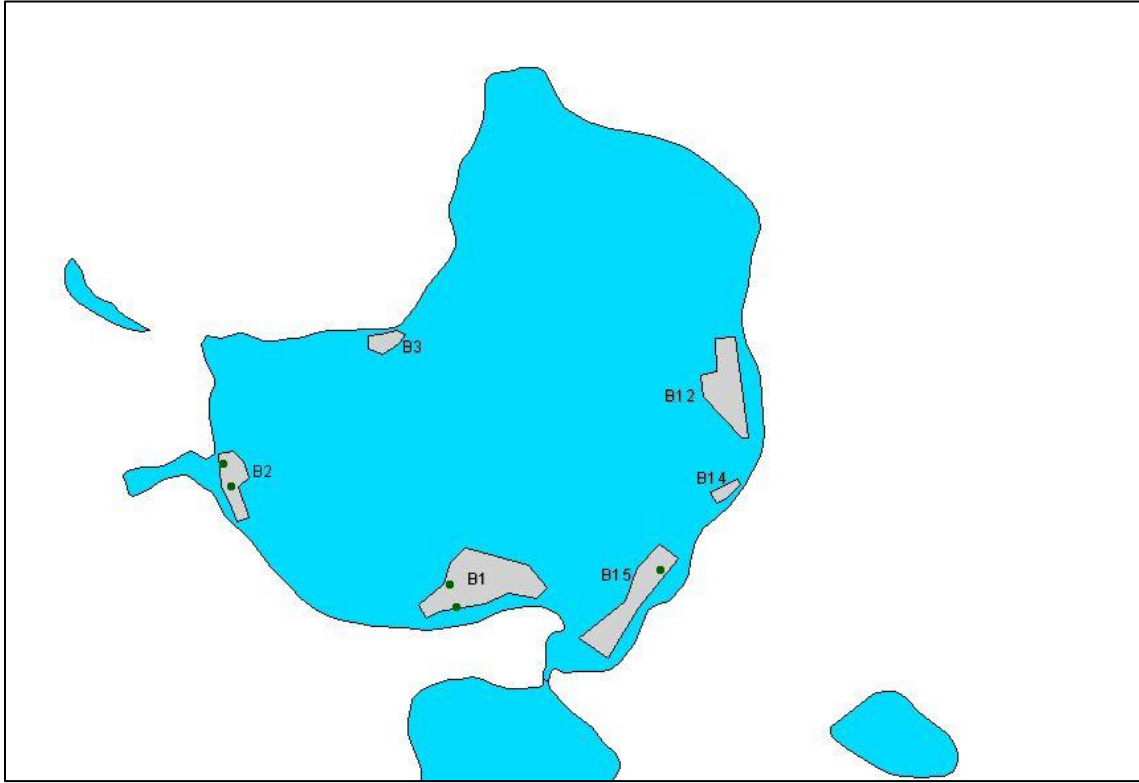
**Forked duckweed-*Lemna trisulca*-2013**



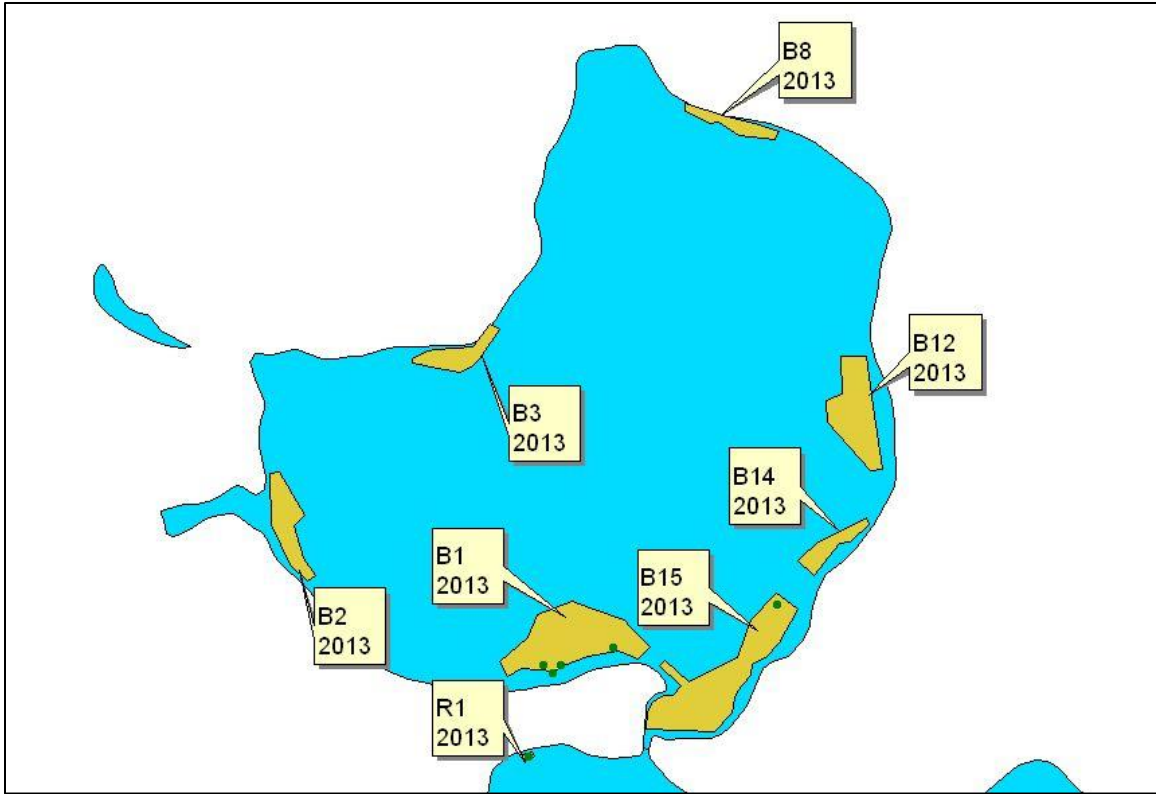
**Forked duckweed-*Lemna trisulca*-2014**



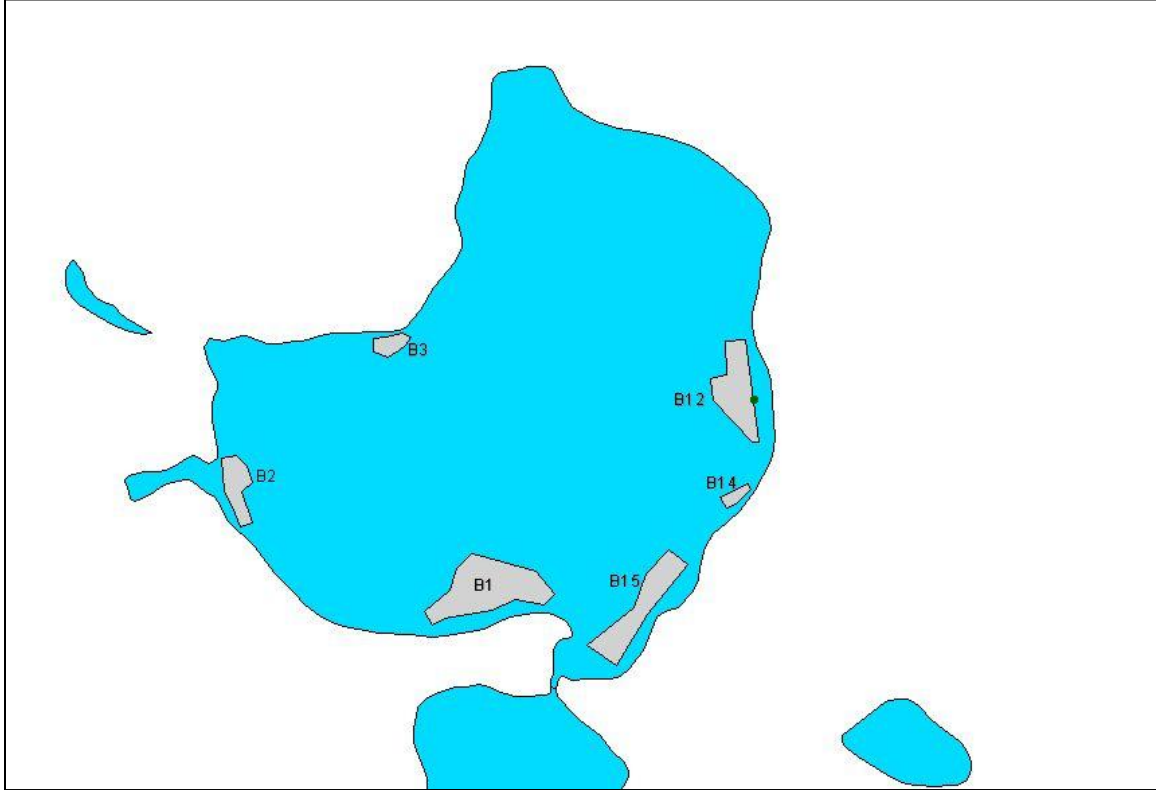
**Illinois pondweed-*Potamogeton illinoensis*-2013**



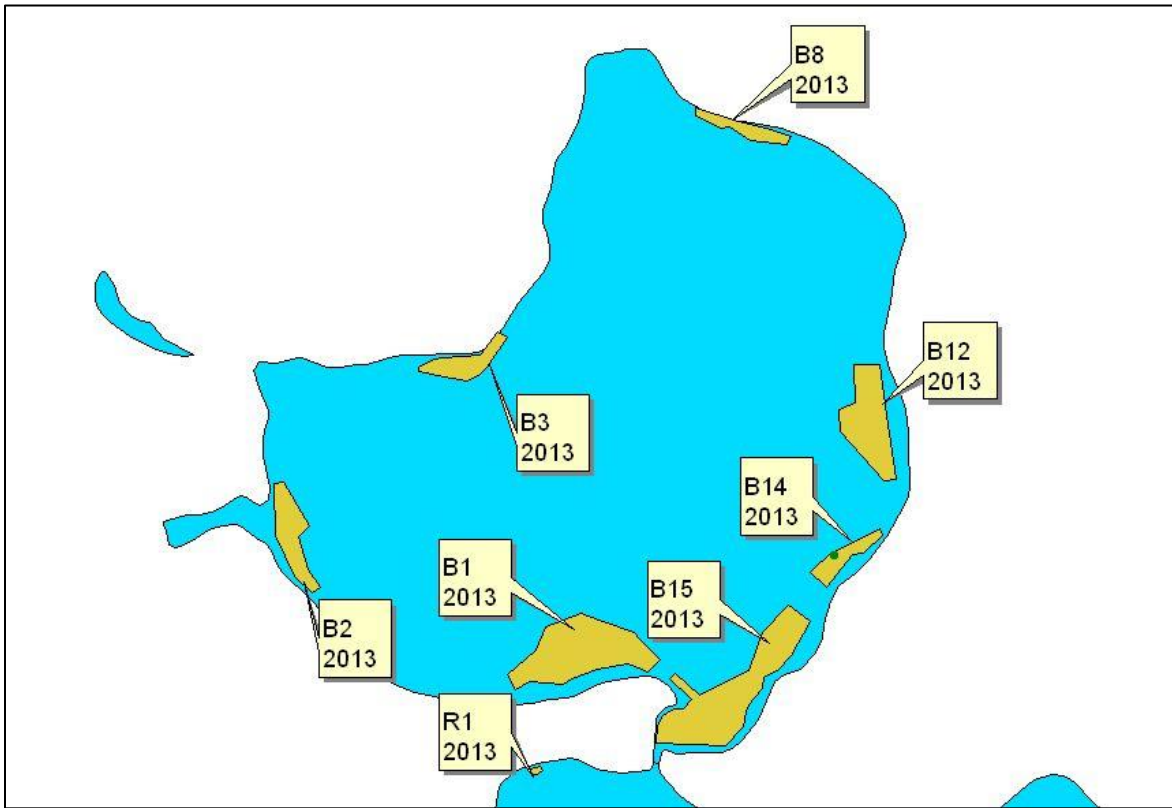
**Illinois pondweed-*Potamogeton illinoensis*-2014**



Northern water-milfoil-*Myriophyllum sibiricum*-2013

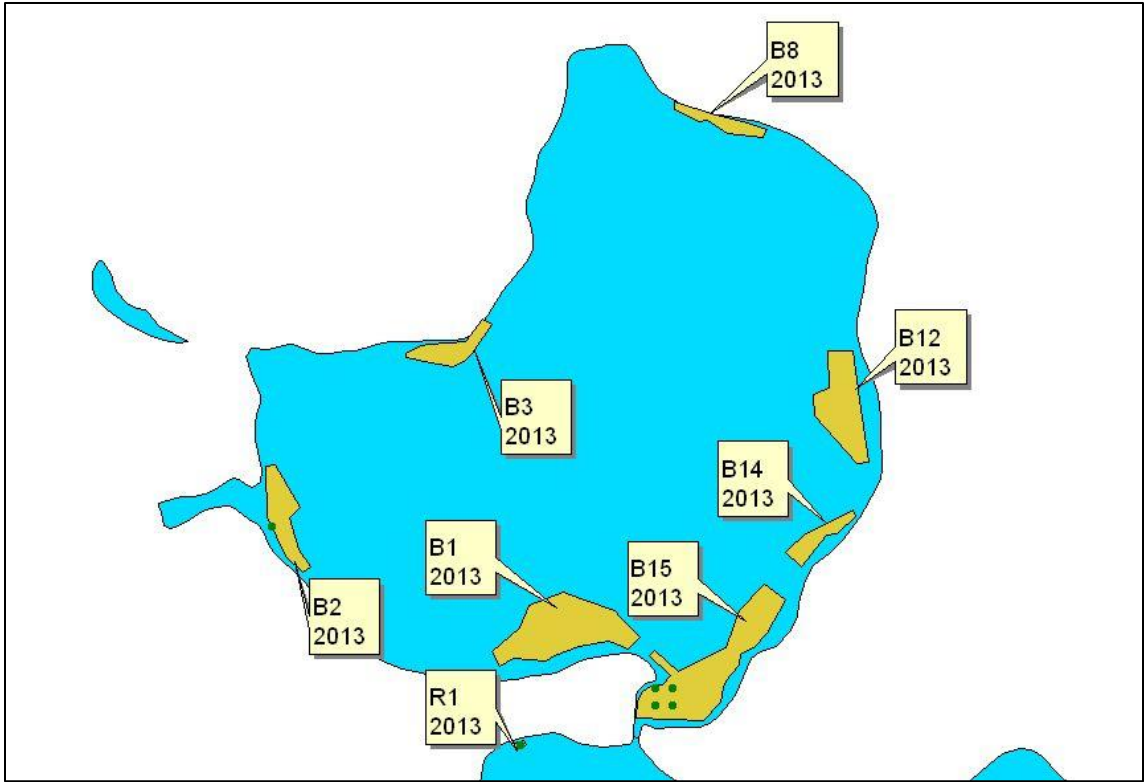


Northern water-milfoil-*Myriophyllum sibiricum*-2014

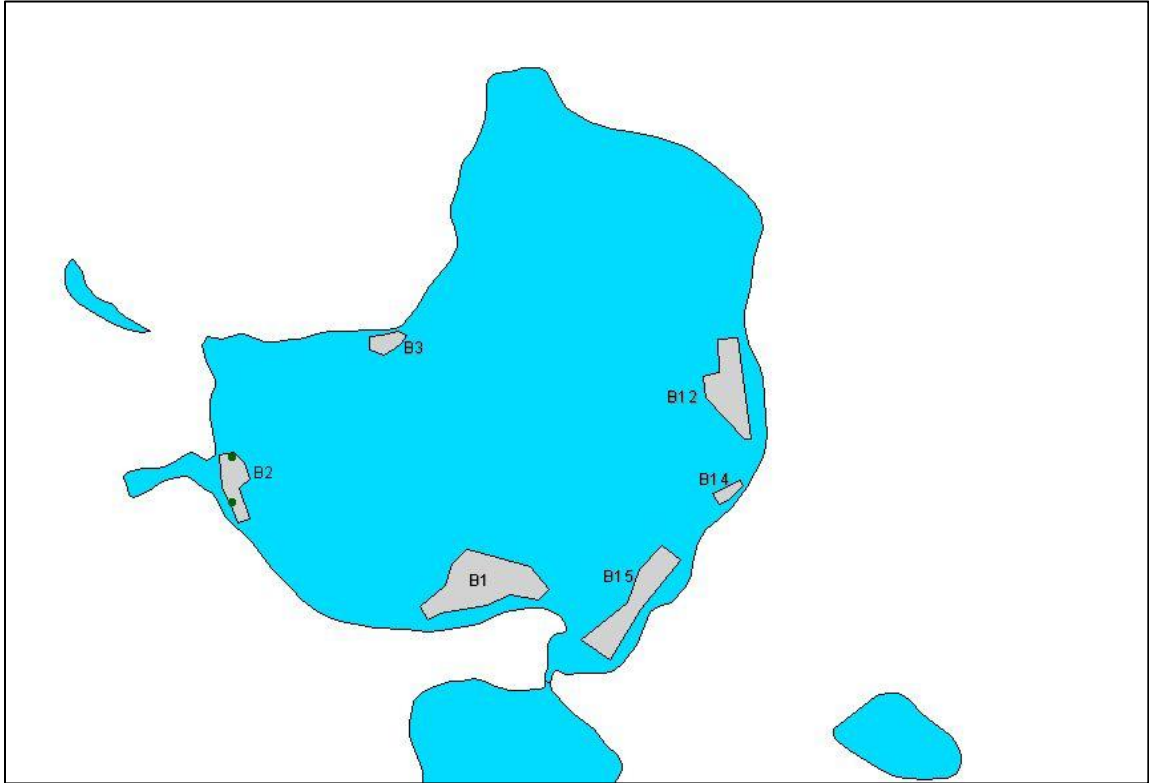


**Variable pondweed-*Potamogeton gramineus*-2013**

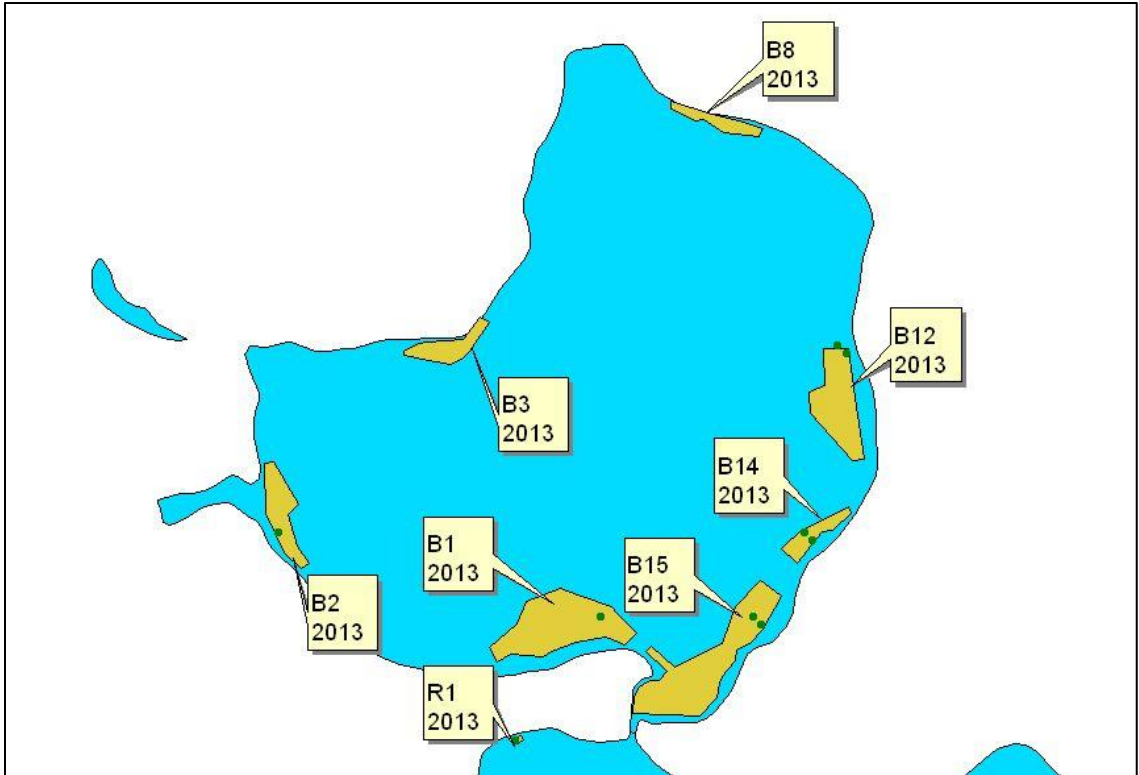
**None sampled in 2014.**



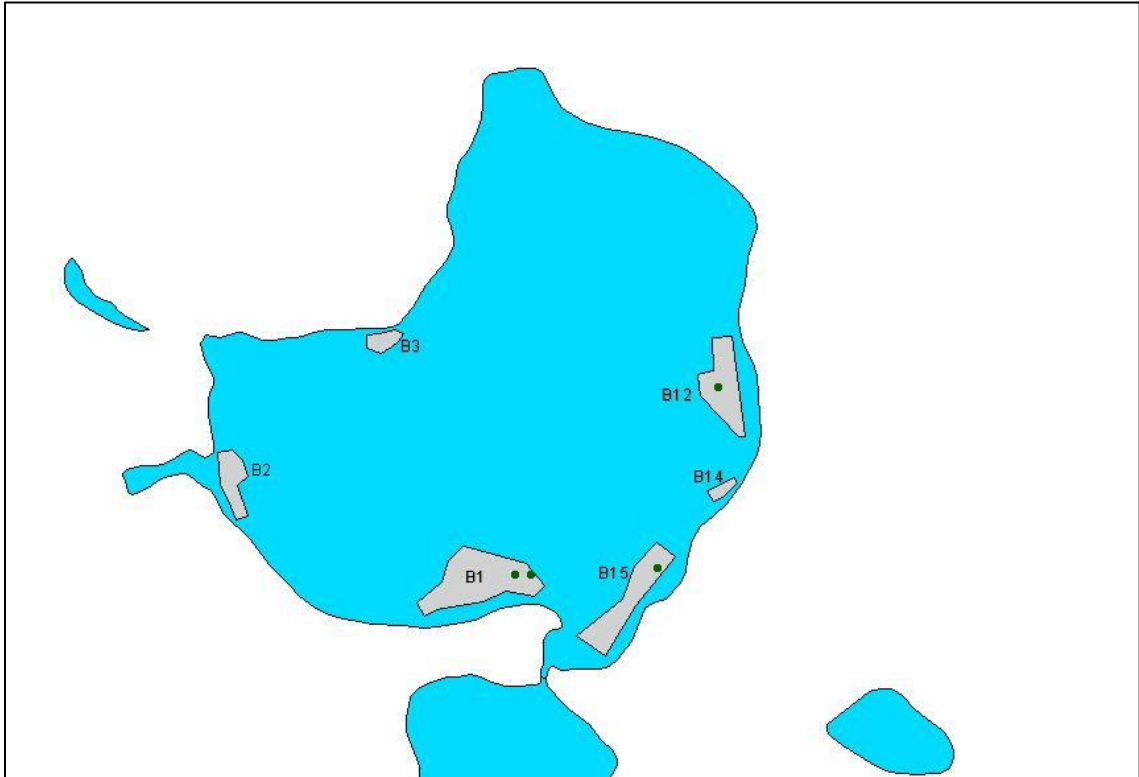
**White water lily-*Nymphaea odorata*-2013**



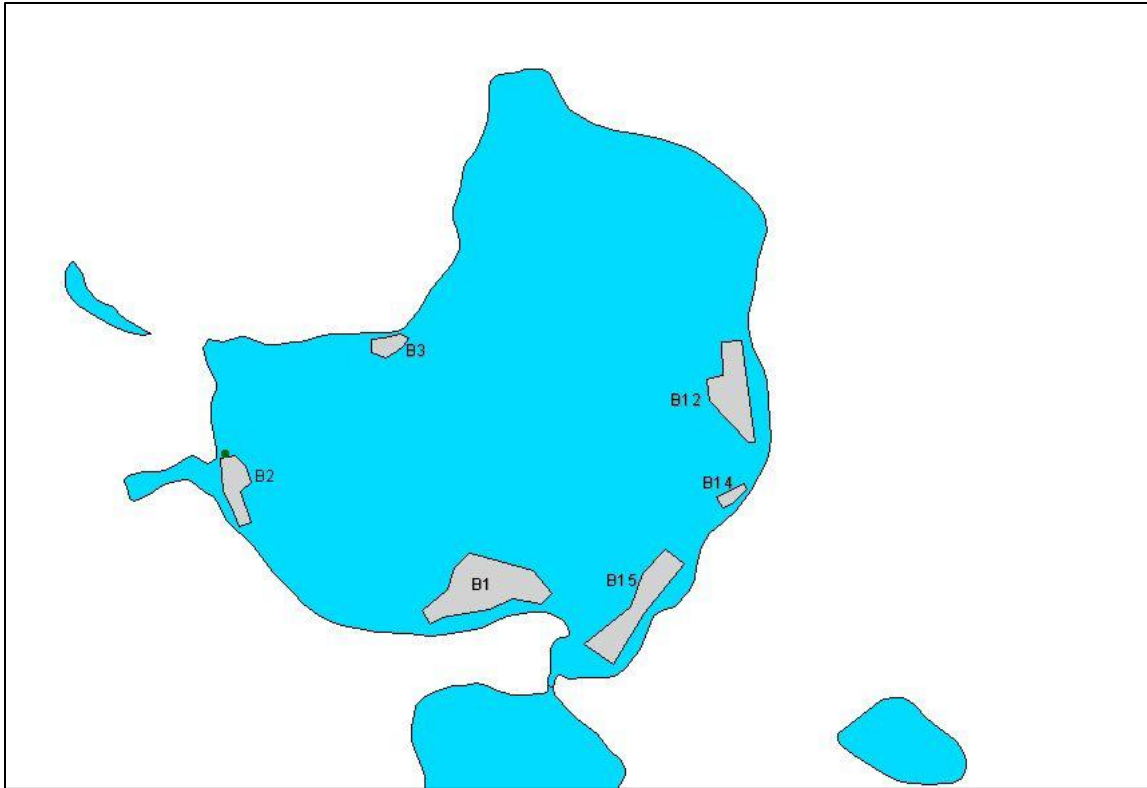
**White water lily-*Nymphaea odorata*-2014**



**Whitestem pondweed-*Potamogeton praelongus*-2013**



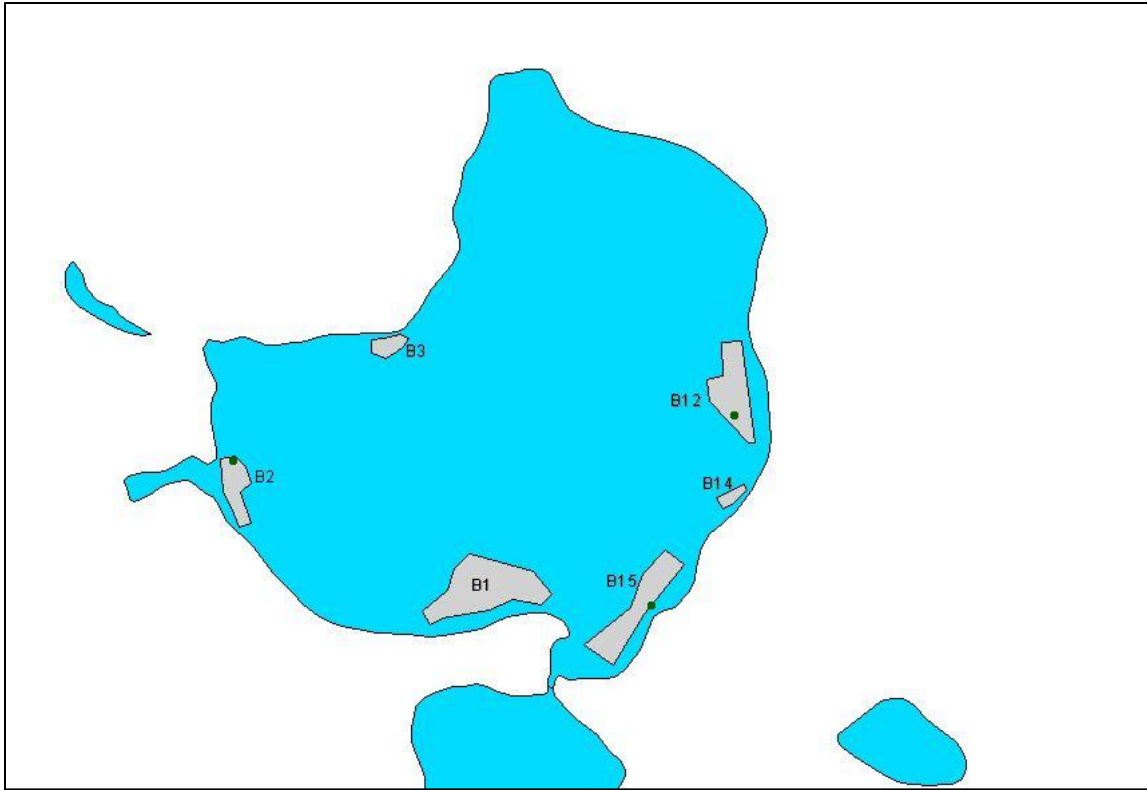
**Whitestem pondweed-*Potamogeton praelongus*-2014**



**Wild celery-*Vallisneria americana*-2014**

**None sampled in 2013.**





**Water stargrass-*Heteranthera dubia*-2014**

**None sampled in 2013.**