State of Wisconsin
Department of Natural Resources

Aquatic Invasive Species (AIS) Control Grant Application

Form 8700-307 (5/09)

Notice: Use of this form is required by the DNR for any application filed pursuant to ch. NR 198, Wis. Adm. Code. Personal information collected on this form, including such data as your name, address, phone number, etc., will be used for management and enforcement of DNR programs, and is not intended to be used for any other purpose. Information may be made accessible to requesters under Wisconsin's Open Records laws (s. 19.32-19.39, Wis. Stats.) and requirements.

Section I: Application Type

Check one:

☐ Education, Prevention & Planning ☐ Early Detection & Response ☒ Established Infestation Control

Legislative District Numbers	
Senate	Assembly
10	28

To determine your legislative district, go to http://165.189.139.210/WAML//
Type in complete address, next screen shows information.

Section II: Applicant Information

Applicant
Bone Lake Management District

Waterbody Name
Bone Lake

Project County/Township/Section/Range
Polk County

Type of Eligible Applicants
☐ County ☐ Tribe ☐ Other Gov't Unit ☐ Federal
☐ City ☐ Sanitary Dist. ☐ Nonprofit Org. ☐ State
☐ Village ☒ Dist. ☐ College, School, etc. ☐ Other
☐ Town ☐ Assoc.

Authorized Representative Named by Resolution			Project Contact Name		
Robert Murphy			Phil Foster		
Authorized Representative Title			**Project Contact Title**		
Chairman			Grant Manager		
Address			**Address**		
2051 100th Street			2080C West Bone Lake Drive		
City	**State**	**ZIP Code**	**City**	**State**	**ZIP Code**
Luck	WI	54853	ST. Croix Falls	WI	54024
Daytime Phone (area code)	**Evening Phone (area code)**		**Daytime Phone (area code)**	**Evening Phone (area code)**	
(952) 932-9393	(612) 822-5187		(715) 857-5304	(715) 857-5304	
E-mail Address			**E-Mail Address**		
rmurphy@japsolson.com			philsuefoster@lakeland.ws		

Mail Check to: (if different from applicant)

Name and Title	Address		
Organization	**City**	**State**	**ZIP Code**

For DNR Use Only

Application Type	Date Received	Date Reviewed (AIS/LC/RC)	AIS/Lake /River Coordinator Approval /Date

Waterbody ID#	Adequate Public Access ☐ Yes ☐ No	Environmental Grants Specialist Approval / Date	
Eligible Project ☐ Yes ☐ No	**Eligible Applicant** ☐ Yes ☐ No	**Project Priority Rank**	**Research / Demo Project** ☐ Yes ☐ No
Prior Grant Award(s) ☐ Yes ☐ No	**Fiscal Year(s)**	**Amount Received To Date** $	**Project Awarded** ☐ Yes ☐ No

Section III: Project Information

Project Title	Proposed Ending Date
Bone Lake CLP Control	12/31/17

Other Management Units	Letter of Support	Other Management Units	Letter of Support
1. Polk County LWRD	☒	4.	☐
2. Polk County Sheriff	☒	5.	☐
3.	☐	6.	☐

Section IV: Public Access

Number of Public Vehicle Trailer Parking Spaces Available at Public Access Sites:	50
Number of Public Access Sites Including Boat Launches and Walk-ins:	2

Section V: Cost Estimate and Grant Request

Section V must be completed or application will be returned. Details in support of Section V are welcome.	**Project Costs** Column 1 Cash Costs	Column 2 Donated Value	*DNR Use Only*
1. Salaries, wages and employee benefits	0.00	960.00	
2. Consulting services	14,420.00		
3. Purchased services--printing and mailing	0.00		
4. Other purchased services (specify):	110,300.00		
5. Plant material			
6. Supplies (specify)			
7. Depreciation on equipment			
8. Hourly equipment use charges			
9. State Lab of Hygiene (SLOH) Costs			
10. Non-SLOH Lab Costs			
11. Other (specify)	0.00		
12. **Subtotals** (sum each column)	124,720.00	960.00	
13. **Total Project Cost Estimate** (sum of **column 1 plus** sum of **column 2**)	125,680.00		
14. **State Share Requested (up to 75% of total costs may be requested)**	62,840		

Subject to the following maximum grant amounts:

- Education, Prevention and Planning Projects--up to $150,000
- Early Detection and Response Projects--up to $20,000
- Established Infestation Control Projects--up to $200,000

Section VI: Attachments (check all that are included)

A. For all applicants: ***(Refer to instructions for applicability.)***

- [x] 1. Authorizing resolution
- [x] 2. Letters of support
- [x] 3. Map of project location and boundaries
- [x] 4. Lake map or river segment with public access sites identified (per Section IV of this application)
- [x] 5. Itemized breakdown of expenses
- [ ] 6. For projects that entail sending samples to the State Laboratory of Hygiene (SLOH) only: a completed SLOH Projected Cost Form
- [x] 7. Project scope/description:
  - [x] a. Description of project area
  - [x] b. Description of problem to be addressed by project
  - [x] c. Discussion of project goals and objectives
  - [x] d. Description of methods and activities
  - [x] e. Description of project products or deliverables
  - [x] f. Description of data to be collected, if applicable
  - [x] g. Description of existing and proposed partnerships
  - [x] h. Discussion of role of project in planning and/or management of lake
  - [x] i. Timetable for implementation of key activities
  - [x] j. Plan for sharing project results
  - [ ] k. Other information in support of project not described above

B. For applicants that are Lake Management Organizations (LMOs), River Management Organizations (RMOs) or Qualified Non-profit Organizations:

- [ ] 1. For first time applicant LMOs/RMOs only: A completed Form 8700-226 (Lake Association Organizational Application) or 8700-287 (River Management Organization Application)
- [ ] 2. For first time applicant Qualified Nonprofit Organizations only: Copy of IRS 501(c)(3) determination letter and copies of your Articles of Incorporation and Bylaws
- [ ] 3. List of national and/or statewide organizations with which you are affiliated
- [ ] 4. List of board members' names, including municipality and county of residence. Designate officers
- [ ] 5. Documentation of current financial status
- [ ] 6. Brochures, newsletters, annual reports or other information about your organization

C. Education, Prevention and Planning Projects: ***(No additional attachments required.)***

D. Early Detection and Response Projects:

- [ ] 1. APM Permit application

E. Established Infestation Control Projects:

- [ ] 1. Management Plan
- [ ] 2. APM Permit application

Section VII: Certification

I certify that information in this application and all its attachments are true and correct and in conformity with applicable Wis. Statutes.

Print/Type Name of Authorized Representative	Title of Authorized Representative
Robert Murphy	Chairman
Signature of Authorized Representative	Date Signed
Robert Murphy	1-4-14

RESOLUTION of the Bone Lake Management District
County of Polk, Wisconsin

WHEREAS Bone Lake is an important resource used by the public for recreation and enjoyment of natural beauty: and

WHEREAS public use and enjoyment of Bone Lake is best served by protection of Bone Lake from infestation of aquatic invasive species; and

WHEREAS we recognize the need to provide information or education about aquatic invasive species; and

WHEREAS we are qualified to carry out the responsibilities of the aquatic invasive species project.

IT IS THEREFORE, RESOLVED THAT:

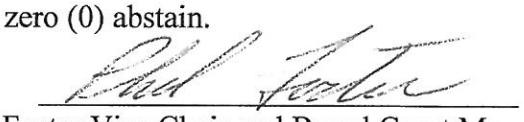
The Bone Lake Management District requests the funds and assistance available from the Wisconsin Department of Natural Resources under the "Aquatic Invasive Species Control Grant Program;" and

HEREBY AUTHORIZES, the Lake District Chair, to act on behalf of the Bone Lake Management District to: submit an application to the State of Wisconsin for financial aid for aquatic invasive species grant purposes; sign documents; take necessary action to undertake, direct, and submit reimbursement request claims along with necessary supporting documentation within six months of project completion date.

BE IT FURTHER RESOLVED that the Bone Lake Management District will meet the obligations of the aquatic invasive species control project including timely publication of the results and meet the financial obligations of an aquatic invasive species grant, including the prompt payment of our 50% commitment to aquatic invasive species control project costs.

Adopted this 5th day of October 2013.

By a vote of (5) in favor, zero (0) against, zero (0) abstain.

By: 

Phil Foster, Vice Chair and Board Grant Manager
Bone Lake Management District

POLK COUNTY LAND CONSERVATION COMMITTEE

100 POLK PLAZA – SUITE 120, BALSAM LAKE WI 54810
PHONE: 715-485-8699 FAX: 715-485-8601

Dean Johansen, Chairman
Larry Jepsen, Vice-Chairman
William Johnson IV
Herschel Brown
Dale Wood – FSA Representative

January 8th, 2014

Alex Smith
WDNR
810 W. Maple St.
Spooner, WI 54801

Dear Mr. Smith,

The Polk County Land Conservation Committee fully supports the Bone Lake Management District in their application for an AIS Control Grant. This grant will allow the District to continue their CLP control and monitoring program. The District has chosen priority sites for treatment based on replacing CLP with native plants, navigation concerns, and minimizing the release of phosphorus associated with CLP. This grant project will also continue efforts to identify and control knotweed around Bone Lake.

Goal 1, Objective 1A of the Polk County Land and Water Resource Management Plan, adopted by the County Board and approved by the state is to "Prevent, control, or eliminate aquatic invasive species to protect the integrity of our surface water resources." In addition, Goal 3 is to "Support and develop the human resources in Polk County that manage our natural resources—both LWRD and volunteer management groups." The support of this grant application advances both of these goals.

LWRD will provide assistance with AIS identification and EWM boat landing surveillance.

Sincerely,

Dean Johansen
Chairman, Land Conservation Committee

POLK COUNTY SHERIFF'S OFFICE

"Integrity, Honor, and Courage"

1005 WEST MAIN, SUITE 900, BALSAM LAKE, WI 54810 -4403

PETER M. JOHNSON, SHERIFF
STEVEN B. MOE, CHIEF DEPUTY

BUSINESS OFFICE TELEPHONE (715) 485-8350
BUSINESS OFFICE FAX NUMBER (715) 485-8355
DISPATCH TELEPHONE NUMBER (715) 485-8300
DISPATCH FAX (715) 485-8300

January 15, 2014

Alex Smith
Department of Natural Resources
810 W. Maple Street
Spooner, WI 54801

Dear Alex:

I understand that the Bone Lake Management District is applying for a grant to control aquatic invasive species in the lake. I am writing to support this application.

The Polk County Sheriff's Office is a partner in the Bone Lake Management District's efforts to prevent the introduction of invasive species into Bone Lake. We currently review video from landing cameras that is first screened by the Polk County Land and Water Resources Department. We will continue to take appropriate enforcement action under the Do Not Transport Ordinance when warranted based on this video and photo surveillance.

Sincerely,

Peter M. Johnson
Polk County Sheriff

Public Boat Access Sites Bone Lake

Legend

Verified Boat Access Sites

- RAMP
- CARRY-IN
- UNKNOWN

Un-Verified Boat Access Sites

- Not Verified
- Local Roads
- Rivers and Streams
- County Boundary
- 24K Open Water

Municipalities

- Village
- City

DNR Managed Lands

- Fee
- Easement
- Lease

0 5500 11000 16500 ft.

Scale: 1:58,840

CLP Management				
	Cash	**Hours**	**In-Kind**	
Salaries				
APM Lead Oversight (20 hours per year)		80	$ 960	
Consulting				
Pre and post monitoring (4 years @ $1,840)	$ 7,360			
Turion monitoring (4 years @ $820)	$ 3,280			
Coordination (4 years @ $400)	$ 1,600			
Map CLP beds (4 years @ $545)	$ 2,180			
		$ 14,420		
Purchased Services				
CLP treatment costs (4 years @ 26,000)	$ 104,000			
Permit and notification (4 years @ $825)	$ 3,300			
		$ 107,300		
Knotweed ID and Control	$ 3,000			
	$ 124,720		**$ 960**	**$ 125,680**
Grant request recommended: $62,840				
50% grant				
Remaining from ACEI-104-12	$ 3,779			

Bone Lake Curly Leaf Pondweed Control

AIS Grant Application

February 1, 2014

Project Scope/Description

Overview

This project continues a successful curly leaf pondweed treatment using treatment procedures adapted to enhance success. Past success is demonstrated through statistically significant reductions in CLP frequency and density from year to year and significant reductions in sediment turion density. The Bone Lake Management District is requesting 50 percent grant funding for this project. **(Point H1)**

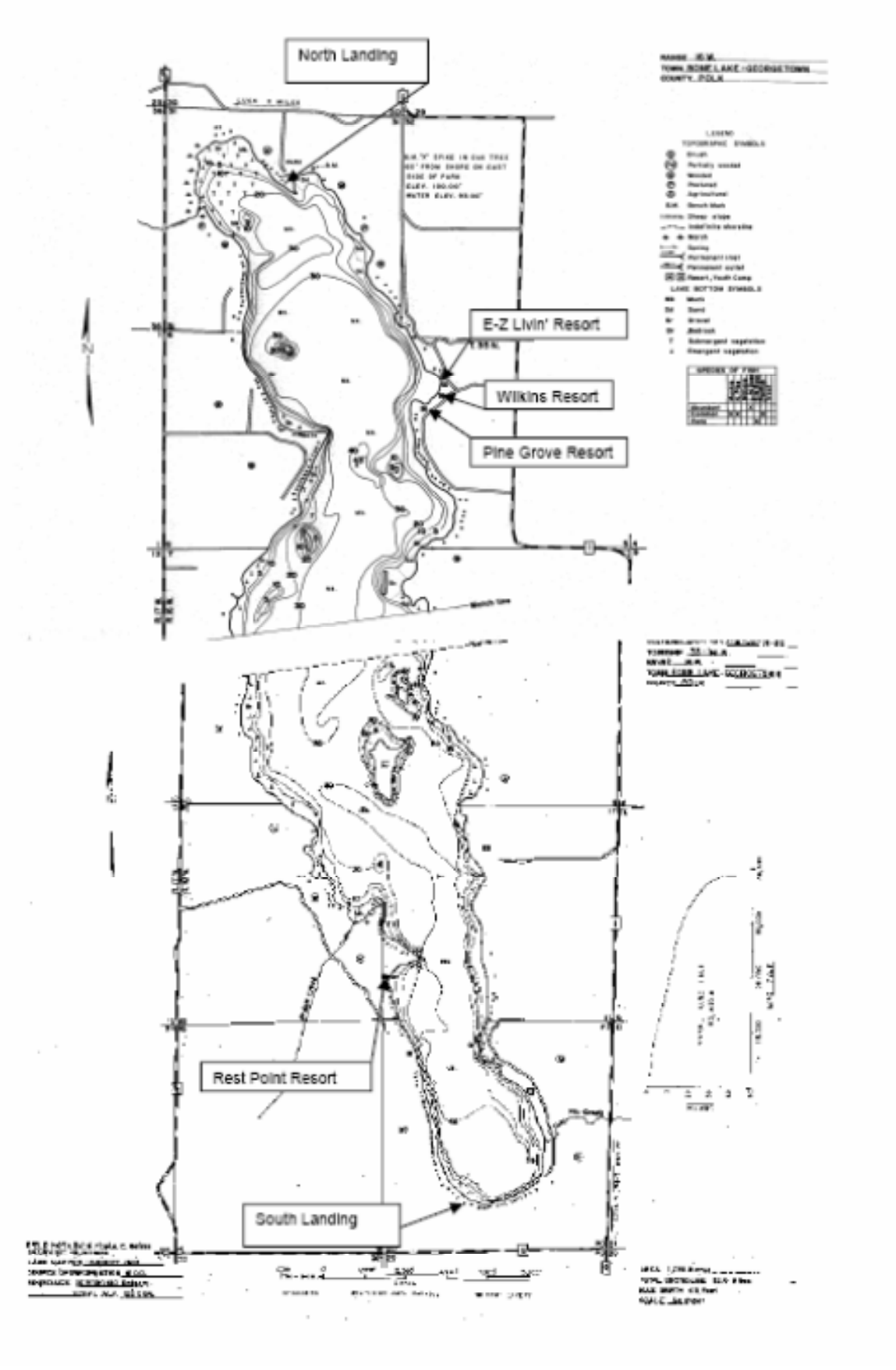
a. Project area

Bone Lake and its watersheds are located in the town of Georgetown (T35N, R16W, S5, 6, 7, 8, 17, 18, and 20) and the town of Bone Lake (T36N, R16W, S31); WBIC: 2628100 in Polk County, Wisconsin. It is a drainage lake with Prokop Creek and three intermittent streams flowing into the lake and Fox Creek flowing from the lake. Fox Creek eventually flows to the Apple River. The maximum depth is 43 feet, and the mean depth is almost 22 feet. The Bone Lake watershed is part of the Upper Apple River watershed in the St. Croix River Basin. The watershed of Bone Lake is approximately 11,977 acres.

Bone Lake is a large lake (1,781 acres) with high public use. **(Point B1b) (Point F1)** The map on the following page shows public boat landing locations along with additional private access points. The north landing includes 2 shelters with picnic tables. In addition, there are 3 private resorts on the lake. (Rest Point is no longer operated as a resort.) A map from the DNR web mapping site also illustrates the public boat landings. Bone Lake is a popular destination for transient boaters. Bass and walleye fishing tournaments occur regularly on the lake. **(Point F2)**

Bone Lake has a high number of species and FQI as compared with the North Central Hardwoods Ecoregion of the state. (Schieffer 2012) **(Point C2)**

FQI value	Eco-region median	Bone Lake 2007	Bone Lake 2012
Number of Species	14	29	34
Mean Conservatism	5.6	6.28	6.09
FQI	20.9	33.8	35.5


North Landing
E-Z Livin' Resort
Wilkins Resort
Pine Grove Resort
Rest Point Resort
South Landing

Lake District Activities

Two management plans guide Bone Lake District activities. The District updated the Aquatic Plant Management Plan in June 2013 and completed the Comprehensive Lake Management Plan in August 2009. Activities for this grant are taken from the updated Aquatic Plant Management Plan.

The Lake District uses a committee structure to implement the Comprehensive Lake Management Plan with assistance from Harmony Environmental. A brief overview of committees and their programs follow:

Evaluation and Studies Committee

The Evaluation and Studies Committee monitored the inputs to Bone Lake from its tributaries and other non-point sources within the watershed in 2010 by testing flow and nutrients in culverts and tributaries. Consultants guide testing and studies. The tributary study is now used to prioritize the work of the watershed committee. The evaluation and studies committee also assisted with a study of the impact of the die-back of curly leaf pondweed on the lake phosphorus budget in 2010.

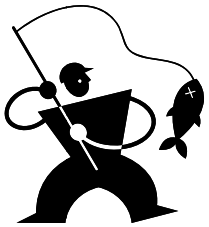
Watershed Committee

The Watershed Committee is using the culvert nutrient and flow monitoring results from 2010 to target its work. The Polk County Land and Water Resources Department is helping with this effort. Example projects completed include correcting improper placement of a private road culvert, installing a larger road culvert, stream stabilization, and creating a small settling pond. **(Point G1 – see newsletters)**

Waterfront Runoff Committee

The Waterfront Runoff Committee provides lakeshore property owners with educational materials, technical assistance, financial incentives, and encouragement to reduce runoff from their property. This committee is using innovative marketing techniques in a step-by-step manner to encourage program participation. This marketing program encourages individual site assessments that result in recommendations to reduce runoff and erosion and improve habitat along the water and has used coupons to encourage participation. Twenty-six owners were visited in 2010, nineteen in 2011, eleven in 2012 and fourteen in 2013. Projects including a shoreline buffer, rain gardens and diversions, and a rock trench were installed on 3 sites in 2011. Project installed in 2013 included rain gardens, porous pavers, and a road and ditch stabilization. The north landing is an excellent demonstration site established by the Lake District for lake residents and visitors with a diversion across the boat landing to a rain garden, a rock trench at the base of the parking area, and an extensive native planting. The Lake District is taking extra

initiative to encourage native plantings by providing a financial incentive for planting a 300 square foot area next to the water. The cost of supplies for these 10X30 plantings is split with the owners with the lake district paying up to $300. Special designs and plant lists are developed for three types of sites: woodland, prairie, and wet meadow. The Lake District also provides $1000 incentives for upgrading failing septic systems. **(Point G1 – see newsletters)**



Fisheries Committee

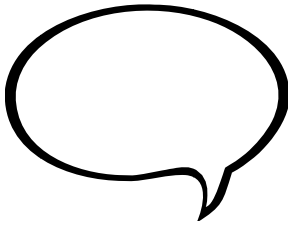
The Fisheries Committee installed 3 fish stick complexes with approximately 20 trees in each complex in the winter of 2010/11. The committee has also installed 80 half log structures throughout the lake. 12,500 small mouth bass were stocked from 2011 through 2013. **(Point G1)** One of the reasons for stocking small mouth bass is to control rusty crayfish that were recently discovered in the lake. Based on a concern for levels of winter Tribal harvest of muskies, the fisheries committee is also actively working with the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and the Wisconsin Department of Natural Resources (WDNR) Fisheries.

Wildlife and Natural Beauty Committee

The Wildlife and Natural Beauty Committee provides information to lake residents to encourage maintaining undeveloped natural areas, enhancing the natural beauty of developed areas around Bone Lake, and encouraging appropriate shoreland lighting. They sponsored a workshop featuring wildlife expert Jim Gilbert, provided free nest boxes, and conducted a spring breeding bird survey in 2011. Polk County plant lists have also been updated to reflect the wildlife each species attracts. Frog and bat studies were completed around the lake in 2012 with results shared with lake residents.

Communications Committee

The Communications Committee facilitates lake resident education through the distribution of materials and information. The communications committee manages the Bone Lake web site and newsletter.



Aquatic Plant Management Committee

A single advisory committee meeting was held April 6, 2013 to gather input to update the Bone Lake Aquatic Plant Management (APM) Plan. The group met to learn about APM planning requirements, the status of various aspects of the plan, and to provide input to guide the plan update. The 2008 plan was developed with extensive input from an advisory committee which met four times during 2007 and 2008

Bone Lake Property Survey

The Bone Lake Management District completed a survey of Bone Lake property owners with assistance from the Polk County Land and Water Resources Department and without grant funding. 246 out of 530 surveys were returned completed, a response rate of 46 percent.

The number one concern of property owners was new invasive species entering the lake. Eighty-eight percent of property owners favored continuing to treat curly leaf pondweed. Increasing the CLP treatment acreage was favored by 67% of responders.

b. Problems to be addressed by project

1) Threat of Eurasian water milfoil and other invasive species introduction

There is a high risk that Eurasian water milfoil and other aquatic invasive species may become established in Bone Lake. The north landing is heavily used, and there are four resorts on the lake. The lake is a popular lake for bass fishing – including tournament fishing. Many fishermen travel from the Twin Cities, Minnesota metropolitan area, and access the lake at the boat landings. With Eurasian water milfoil present in many urban Twin Cities lakes, the danger of transporting plant fragments on boats and motors is very real.

Giant and Japanese Knotweed

Giant knotweed (a prohibited species listed in NR40.04(2)) and Japanese knotweed will be managed cooperatively with the Polk County LWRD for this grant. **(Point B2)** A recently completed (December 2013) Polk County rapid response grant project located giant knotweed on the west side of Bone Lake in 2010 as shown in the map. This location was found during one of the waterfront runoff visits. This is considered a pioneer population because it was found less than 10 years ago and is less than 5 acres. **(Point D1)** The waterfront visits provide another important opportunity to inform lake residents about invasive species identification and recommended control measures.

2) Impacts of Curly leaf pondweed

Curly leaf pondweed is spread throughout Bone Lake as shown in the map of curly leaf pondweed beds to the right. These beds have estimated mean CLP density of 2+ and were growing at near the surface when mapped in June 2013. Those beds that have CLP at or near the surface, more sporadic coverage and the mean density estimated to be less than 2 are mapped as "less dense" beds.

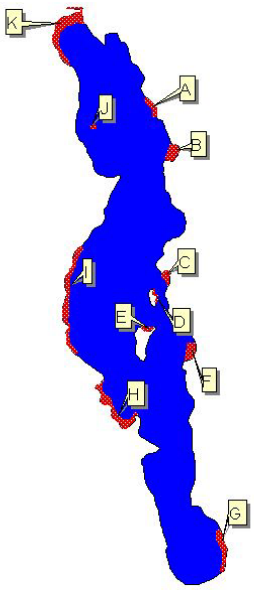
Curly leaf pondweed beds June 2013

The CLP mapping resulted in an area of 48.4 acres of dense beds (red) and 4.7 acres of less dense beds (yellow). Historically the CLP coverage has varied immensely from year to year. In past years more than 80 acres were mapped, while other years had around 50 acres mapped. This year had a total of 53.1 acres mapped. The reduction in the treatment beds (through an effective treatment) resulted in much less coverage since the treatment areas totaled about 30.5 acres.

The littoral zone of Bone Lake is about 531 acres. The CLP mapped in 2013 totaled only 10% of the littoral zone (53.1/531 acres). Even with areas controlled with herbicide, the CLP totaled only (83.6/531 acres) 16% of the littoral zone. **(Point D2)**

Sensitive Areas **(Point C2)**

Many of the areas designated by the Department of Natural Resources as sensitive areas have curly leaf pondweed present.



DNR Sensitive Areas

Curly Leaf Pondweed Study Results[1]

A 2010 study provided information regarding the extent and impact of CLP. Forty-six acres of dense beds of curly leaf pondweed were present in Bone Lake in 2010. This acreage is down from 2007 (when last measured) in part because of the success of CLP treatment efforts. CLP growth varies considerably from year to year. The amount of CLP per unit area within beds (294 g/m2) and percent phosphorus within the CLP tissue (0.34 percent) provided an estimate of 187 kg of phosphorus present in CLP in Bone Lake. These results are similar to what was reported in previous studies.

The Bone Lake study took another step: measuring the phosphorus that was released to the water column during the early summer. Two methods were used: 1) phosphorus measurements taken near beds of curly leaf pondweed and in areas of native plant growth and 2) phosphorus measurements taken in enclosed cylinders - one with curly leaf pondweed and the other with native plants. Phosphorus measurements taken near CLP beds in June showed higher concentrations of phosphorus than near native plants. However, the concentrations fluctuated greatly, probably as a result of wave action. The cylinder results were especially enlightening. They demonstrated that only 21% of the phosphorus available in plant tissue was released into the water column. Remaining phosphorus likely returned to the bottom and was unavailable for algae growth. It is this 21% or about 40 kg that used in the phosphorus budget for 2010.

In-lake measurements at the deep hole of the lake showed a spike in phosphorus July 5th, shortly after CLP died back in 2010. This spike was likely largely due to CLP dieback. The lake was stratified at the time, so the phosphorus didn't come from the bottom sediments. Calculations of loading from the tributaries and culverts showed these amounts were contributing factors, but not the main cause of the spike.

In conclusion, while the contribution of P from CLP is relatively small over the course of a year (about 3%) it comes at a time when the lake waters are warm and algae can grow. The potential for P loading from CLP varies with CLP growth each year. A successful management program to minimize the amount of CLP in the lake, could potentially delay an algae bloom in Bone Lake.

[1] Complete study methods and results are available in the report *Contribution of Potamogeton crispus to the Phosphorus Budget of Bone Lake, Polk County WI*. June 2010.

Curly Leaf Pondweed Management[2]

The Bone Lake Aquatic Plant Management Plan (2008) established an early season herbicide treatment of curly leaf pondweed beginning in 2008. Plan implementation for curly leaf pondweed management (Goal 3) emphasizes alleviating specific spring navigation concerns, addressing CLP growth in front of individual properties, testing the effectiveness of ongoing treatment methods, and protecting native plant populations.

The treatment strategy followed accepted practices of using a low dose of the herbicide Endothall to control CLP before native plants are growing and before the CLP has formed reproductive structures (turions). While similar treatment methods had been used in 2006 and 2007, no detailed monitoring of effectiveness was available. The plan included testing treatment effectiveness using accepted standard DNR methods for monitoring prior to and after CLP treatment (pre and post monitoring). Pre and post monitoring was conducted by Steve Schieffer of Ecological Integrity Service from 2008 through 2013.

Four beds totaling 14 acres were selected for the CLP treatment trial. These beds were originally chosen as priorities for treatment in 2006 and 2007. CLP treatment occurred in from 2008 through 2012. Because the original treatment strategy met with limited success in 2008 and 2009, changes were made.

Changes to the program focused on maintaining needed herbicide contact time over the CLP beds. A low dose of chemical had been successfully used on other lakes and was recommended for CLP treatment. However, this concentration of chemical must remain in contact with the plants for at least 12-24 hours in order to be effective. In 2008 the borders of treatment areas as marked with GPS points were modified to be sure the treatment occurred over the plants and not in deep water as previously marked. Treatment bed #1, located across the lake from bed #2 near a steep drop off was eliminated from treatment for 2009. Drop offs can cause water currents which dilute herbicides that are applied. Little success was measured in either 2008 or 2009. As a result, herbicide concentration was increased and restrictions for wind conditions (current and forecast low winds) were added for the 2010 season.

2010 Treatment Results

2010 was the third year of herbicide treatment on 3 of the 4 beds (2, 3, and 4) and the second on bed 5. The map shows the location of each bed treated and the acreage. The 2010 treatment occurred over two days in May using Aquathol K (Endothall) at a target concentration of 1.5 ppm. The herbicide treatment was effective in 2010 with a significant reduction in the density of CLP in each bed. All individual beds except bed 4 showed a statistically significant reduction in frequency. The analysis of all beds together shows a significant reduction in the frequency of CLP. Visual observation supports this reduction as no beds had CLP growth at or near the surface.

[2] Schieffer, Steve. Bone Lake Treatment Analysis 2009, 2010, 2011, 2012 and 2013.

The timing of early season treatments is selected in part to avoid damage to native aquatic plants. There was no significant change in *native* plant frequency between 2009 and 2010 in the four beds except for filamentous algae (which showed a reduction). This is not a concern as the filamentous algae is an unwanted species at high levels of growth. Filamentous algae is not affected by this herbicide, so this reduction was not due to the treatment.

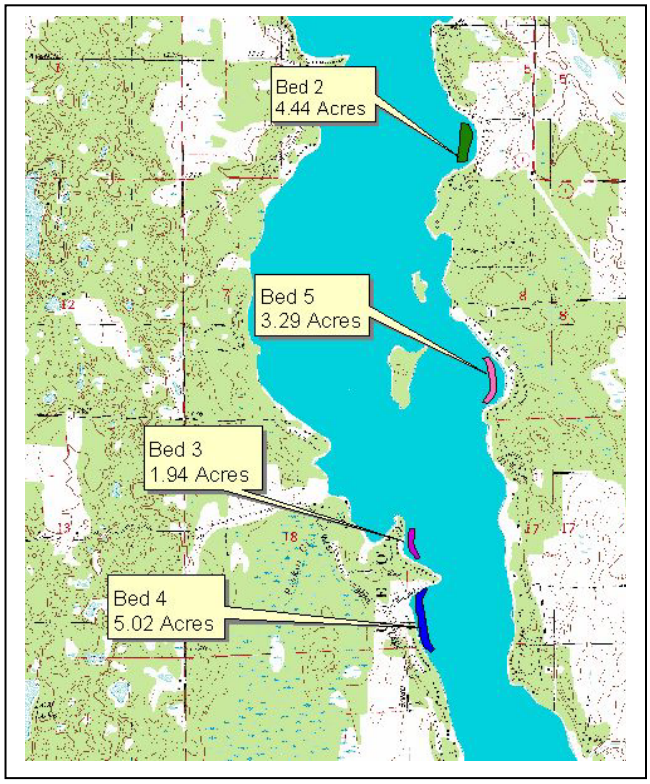


Figure 1. CLP Treatment Areas 2009 – 2012

2011 Treatment Results

The 2011 CLP treatment occurred on May 17 and May 19. Target treatment concentration was 1.5 ppm or 1 gallon per acre foot.

Bed	Treatment Date	Water Temp	Wind Speed/ Direction	Reported Treatment	Acre Feet	Gal/Acre Foot
2	5/17/11	51.3 º F	3-6 mph SSE	31.52 gal	28.0	1.12
3	5/19/11	54.8 º F	3-6 mph ESE	15.97 gal	16.3	.98
4	5/19/11	54.9 º F	2-5 mph ESE	43.72 gal	45.5	.96
5	5/17/11	51.1 º F	2-6 mph SSE	22.98 gal	24.1	.95

Treatment in 2011 was less effective than in 2010 even though specified treatment conditions were followed. Reductions were shown between the pre and post monitoring for each bed. However, there was no significant reduction in CLP frequency between 2010 and 2011 overall or in any of the individual beds.

There was significantly less growth in three native species: forked duckweed, wild celery, and flat-stem pondweed between 2010 and 2011. However, this difference is likely due to a late spring in 2011 rather than a reduction due to the herbicide treatment.

2012 Treatment Results

An early season CLP treatment occurred on May 8 and May 16, 2012 with 12.7 acres of CLP treated. Target treatment concentration was increased to 2.0 ppm.

The treatment surveys show that the overall treatment was statistically significant in reducing CLP frequency. When comparing the 2011 post treatment to the 2012 post treatment, all beds combined had a reduction in frequency and density. However, the total area of CLP beds lake-wide increased from 56 acres (2011) to 68 acres (2012), most likely due to annual variability rather than ineffective treatment.

Comparison of 2011 and 2012 CLP Post Treatment Frequency

	2011 post	*2012 post*	*Decrease?*	*Significant?*
Plot 2	0.31	0.35	NO	---
Plot 3	0.60	0.12	YES	---
Plot 4	0.61	0.06	YES	---
Plot 5	0.79	0.39	YES	---
All Beds	0.59	0.22	YES	YES*

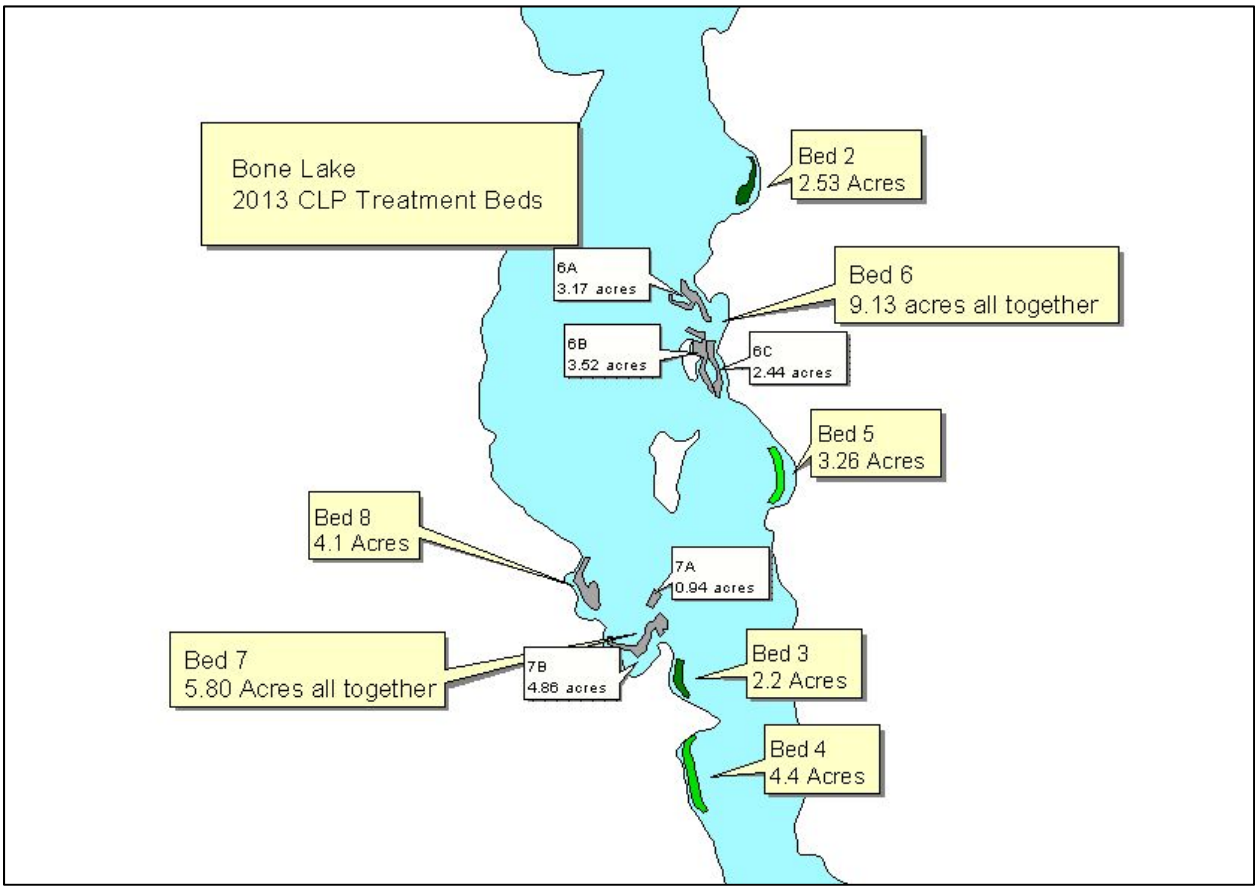
No statistically significant impacts to native plants were found within the treatment beds between the 2011 and 2012 post treatment surveys. In fact, northern water milfoil had a significant increase in frequency.

2013 Treatment Results

Expanded CLP treatment occurred in 2013 and is planned for 2014 as outlined in the Table and shown in the **Error! Reference source not found.** below.

CLP Treatment Bed Characteristics (2013 and Projected 2014)

Bed	Area (acres)	Mean Depth (ft)	Acre feet	Treatment Date	Target concentration
2	2.53	9.1	23.02	6/7/2013	2 ppm
3	2.2	7.4	16.28	6/7/2013	2 ppm
4	4.4	8.5	37.40	6/7/2013	2 ppm
5	3.26	8.2	26.73	6/7/2013	2 ppm
6	9.13	7.3	66.65	6/7/2013	2 ppm
7	5.8	9.1	52.78	6/7/2013	2 ppm
8	4.1	8.2	33.62	6/7/2013	2 ppm
Total	**30.46**		**375.11**		



2013 CLP Treatment Beds

The CLP herbicide treatment for 2013 was effective. The 30.45 acres of CLP treated went from high frequency, extensive coverage to only a small number of locations where CLP was found after treatment. The reduction in frequency of occurrence was found to be statistically significant through a chi-square analysis. The density was also reduced immensely. The survey also showed a significant reduction in one native species, but it is speculated that this is due to the late spring and not the herbicide application.

Summary of CLP Treatment Results 2012 and 2013

Bed	2013 pretreat	2013 posttreat	2012 posttreat	2013 pre to post freq. reduction significance	2012 post to 2013 post freq. reduction significance
2	77.7%	22.0%	35.0%	**Yes** (p=0.002)	No (p=0.28)
3	82.4%	11.8%	11.8%	**Yes** (p=0.0004)	n/c
4	61.8%	2.9%	6.0%	**Yes** ($p=1.12 \times 10^{-6}$)	No (p=0.55)
5	70.0%	0.0%	39.0%	**Yes** ($p=2.42 \times 10^{-7}$)	
6	93.5%	7.8%	not treated	**Yes** ($p=1.99 \times 10^{-26}$)	n/a
7	97.9%	8.5%	not treated	**Yes** (3.90×10^{-18})	n/a
8	100.0%	18.2%	not treated	**Yes** ($p=1.38 \times 10^{-11}$)	n/a
All beds (2-5)		**7.8%(beds 2-5)**	**22.0%**	**n/a**	**Yes** (p=0.008)
All beds (2-8)	**87.0%**	**9.3%(all beds)**		**Yes** ($p=3.86 \times 10^{-66}$)	n/a

Turion Monitoring

Turions are the reproductive structures from which new CLP plants will germinate in late summer, fall, and early spring. CLP turions can live in lake sediments for many years. A primary objective of the CLP herbicide treatment program is to kill CLP plants before they can form turions, thereby depleting the turion bank in the sediments and preventing future CLP growth.

Turion monitoring measures the density of turions in the sediment. Turion sediment monitoring is conducted late in the summer after CLP plants die back. A sediment sampler is used to collect bottom sediment at several randomly selected sample points within the treatment beds. The sample is then filtered with a filter bucket, and the turions are counted. Because the sample collection area is known, the number of turions per square meter of lake bed can be estimated.

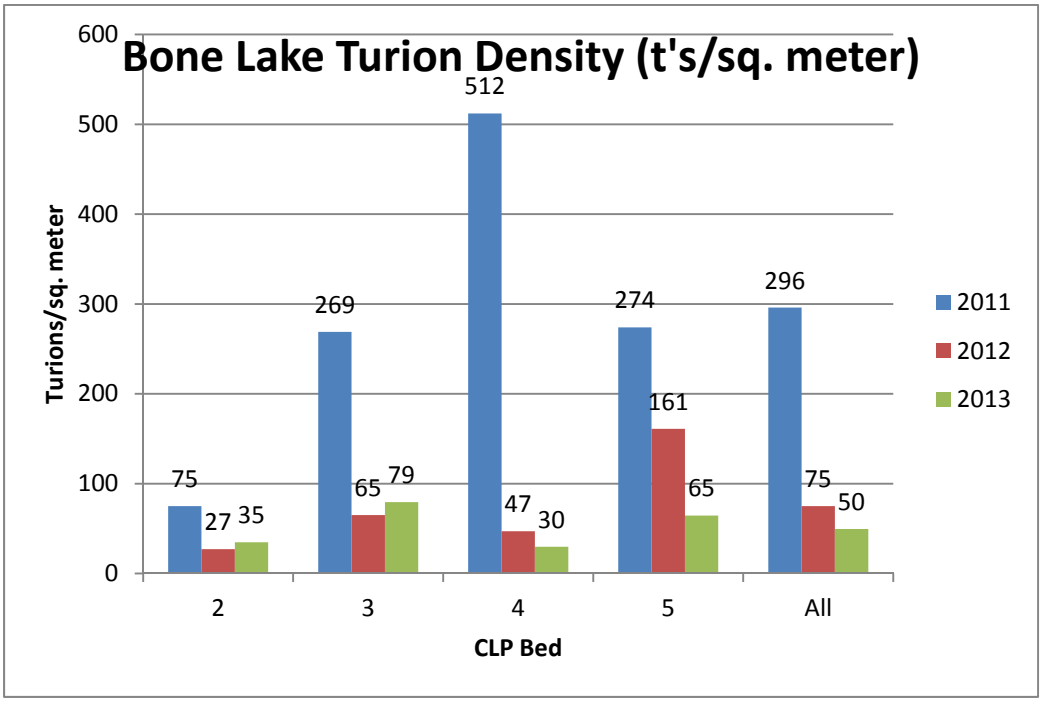
Repeated years of turion density measurements provide a means to predict the following year's CLP growth and to evaluate the long term effectiveness of the herbicide treatment program. The data will aid in decisions regarding continuation or suspension of herbicide treatment. Turion monitoring was recommended for Bone Lake CLP management with the updated implementation plan for 2011. Sediment turions were analyzed within the

CLP treatment beds in 2011 and 2012. The sediment turion analysis revealed a density reduction from 2011(296 turions/m^2) to 2012 (75 turions/m^2).

The turion analysis revealed a further reduction in turion density in beds 2-5 in 2013. The table below shows that the turion density has decreased immensely in these beds from the initial analysis in 2011. The turion density in beds 6-8 (newly treated beds) shows a very high density and allows a comparison of how much of a reduction may have occurred in the treated areas of beds 2-5. As more successful treatments occur in the future, the turion density should decrease, resulting in less CLP growth each spring (in the treatment areas).

Turion Density Changes 2011 to 2013

Bed	2011 Turions/m^2	2012 Turions/m^2	2013 Turions/m^2
2	**75**	27	35
3	269	65	79
4	512	47	30
5	274	161	65
All(2-5)	**296**	**75**	**50**
6	*n/a*	*n/a*	422
7	*n/a*	*n/a*	165
8	*n/a*	*n/a*	489
All (2-8)	*n/a*	*n/a*	**259**



c. Project goals and objectives

The project goals and objectives are taken directly from the Bone Lake Aquatic Plant Management Plan (June 2013). The plan was developed with funding from an AIS Education and Planning Grant.

Goal 2. *Prevent the introduction of Eurasian water milfoil and other invasive aquatic plants.*

Objective: Be ready to rapidly respond to the introduction of aquatic invasive plant species.

Objective: Raise lake user and resident awareness to prevent Eurasian water milfoil introduction.

Objective: Monitor to detect early Eurasian water milfoil and other AIS colonization.

Goal 3*. Manage curly leaf pondweed to minimize navigation problems, prevent its spread, and protect native plant populations.*

Objective: Improve Bone Lake water quality

Objective: Protect native plant populations

Objective: Alleviate spring navigation concerns

Objective: Improve early season swimming and boat access

Objective: Reduce turion density in targeted beds to 5-10 turions/m2.

Objective: Continually improve CLP management on Bone Lake

Goal 4. *Protect the natural functions of diverse native plants including fish and waterfowl habitat, sediment stabilization, protection against invasion by non-native species, and natural aesthetics.*

Objective: Implement strict adherence with treatment standards and monitoring methods prior to herbicide treatment

Objective: Increase resident's and lake user's understanding of the role and importance of aquatic plants in Bone Lake and their impacts on them.

Goal 5. *Educate lake residents and visitors about the role of aquatic plants in the lake, the management strategies found in the plan, and appropriate plant management actions.*

d. Methods and activities

Plan Goal 2. Prevent the introduction of Eurasian water milfoil and other invasive aquatic plants.

Action Items from the APM plan

Implement *Protocol for Confirmation and Response to Suspected Eurasian Water Milfoil* detailed in Appendix D.

Continue invasive species education program including Clean Boats, Clean Waters boat monitoring at landings.

Install camera at south landing. Monitor videos and pursue enforcement in cases where plants are clearly identified.

Continue volunteer monitoring to detect presence of Eurasian water milfoil and other aquatic invasive species. Periodic sampling will cover strategic locations emphasizing areas near public access points and resorts, where northern water milfoil is present, and in areas of mucky sediment.

Continue educational programming as outlined in the educational goal including maintaining signs at boat landings, special events and workshops, newsletter articles, and web site pages.

These activities are funded in a separate education and planning AIS grant (AEPP-319-12)

Management Efforts to Date

There are four major elements of the Bone Lake Management District program to prevent invasive species: education to lake users, Clean Boats Clean Waters, lake monitoring for new invasive species, and rapid response for any new invasive species.

Education to Lake Users

Education efforts focus on identification and prevention of new invasive species. The AIS Committee has held AIS workshops, created and improved signage at the public landings and private boat launch areas, created a laminated lake map with an AIS message, created an AIS float in the annual boat parade, and established and maintained the Bone Lake District web site. The Lake District web site includes AIS education materials. AIS prevention and identification information along with committee efforts are frequently highlighted in the semi-annual Bone Lake Management newsletter.

Clean Boats Clean Waters (CBCW) Program

Clean Boats Clean Waters educators provide boaters with information on the threat posed by Eurasian Milfoil and other invasive species. They offer tips on how to keep boats, trailers and equipment free of aquatic hitchhikers. They also collect information on boater behavior, concerns, and knowledge of existing local and state laws related to anti-AIS measures. Volunteers supported the program in 2006 (24 volunteers), 2007 (30 volunteers), and in 2008 (26 volunteers). Clean Boats, Clean Waters staff now attend both the North and South Landings. Dick Mackie provides training for student staff, and one of the students coordinates the scheduling and data entry. **(Point A1)**

In 2013 there were 558 boats inspected with 259 hours spent at the North Landing.

Landing Surveillance Cameras

The video camera at the north end public landing was operational May 4, 2012. A second camera was installed at the south landing in 2013. The cameras are positioned to record watercraft being launched with vegetation attached. Violations of the ordinance that prohibits transporting and launching boats and trailers with vegetation attached are enforced in cooperation with the Polk County Sheriff. The cameras also serve as a reminder for boaters to check their equipment before launching and serve in that capacity as an educational tool. Videos are reviewed for potential violations.

Lake Monitoring (Point A3)

The objective of lake monitoring is to look for new invasive species, track the spread of curly leaf pondweed, and perform lake chemistry and Secchi disk measurements. Volunteers work in teams. In 2013, 24 volunteers accumulated 142 hours of monitoring time. In the years 2006 to 2010, from 27 to 50 volunteers worked on monitoring teams logging from 146 to 250 hours.

In 2011 divers surveyed the north end landing for AIS. The intent is to survey both landing areas for AIS each year. In 2013, the landings were surveyed from a boat using an underwater scope. No invasive species were found in these surveys.

Planned for Grant Period

- Continue lake monitoring teams
- Expand diver monitoring to the south landing
- Workshops to train lake monitors

Rapid Response for New Invasive Species

The activity is intended to control any new invasive species that are found in the lake. The Lake District owns two EWM buoys, which will alert boaters to stay out of an area where EWM is growing.

Rusty crayfish (*Orconectes rusticus*) an aquatic invasive species, was discovered in Bone Lake on August 31, 2012. An email list, the web site, and newsletter were used to alert lake residents.

Japanese and giant knotweed will be controlled as part of this grant project. Polk County Land and Water Resource staff identified and used herbicide to treat a colony of plants on a Bone Lake waterfront property as part of their rapid response grant project. **(Point D1)** This colony was identified by Polk County staff as giant knotweed with a fair degree of certainty. This project ended December 31, 2013. The Bone Lake Management District will follow-up with herbicide treatments needed to ensure control of these plants. A licensed applicator will be hired to apply herbicide. The budget allows for control of this site in 2014-2016 and an additional 2 sites if they are located. Milestone herbicide will be used as recommended by the Polk County LWRD staff.

2014 – Initial treatment between mid August and first frost
2015 – Follow up treatment in the late summer fall
2016 – Check on site again for re-growth and follow up treatment if needed
2017 – Monitor site for re-growth

Enhanced Enforcement (Point A2)

The Clean Boats Clean Waters program and the Bone Lake web site provide information regarding state and local restrictions on transporting boats and trailers on public roads with aquatic vegetation attached (Ch 30.715). The Lake District works with local law enforcement officials (Polk County Sheriff's Department) to ensure that enforcement of local ordinances will occur. This involvement in local enforcement will continue. Extra emphasis on enforcement is especially needed (and will be completed) to encourage enforcement of violations that are captured in video by the camera. Footage is first screened by the Polk County LWRD and then sent on to the Polk County Sheriff's Office for enforcement if warranted. (A letter of support is included.)

***Plan Goal 3**. Manage curly leaf pondweed to minimize navigation problems, prevent its spread, and protect native plant populations.*

Action Items

CLP Treatment: CLP beds

Standards for when CLP treatment may be warranted:

- identified as a spring navigation concern
- May/June curly leaf pondweed stem growth reaches surface and is thick enough to impede navigation (stem height > 1 meter)
- navigable bed of CLP that is at least 400 square feet
- bed has a coverage of at least 50%
- density rating averages >2 (on a 0-3 scale)
- consideration of likely treatment success likely (not near drop-off, wide rather than narrow band, etc.)

Apply for APM permits for CLP early season Endothall treatment for spring navigation channels and CLP beds in February based on monitoring from the previous year.

Conduct treatment according to permit conditions.

Pre and post monitoring procedures to be completed by a consultant hired by the District Board and supervised by the APM Lead according to standard DNR methods.

Monitor sediment turions in treated beds. Beds currently targeted for treatment are shown on page 11 of the grant application.

Adapt treatment methods according to best available information.

- Current treatment standards specify application **rates of liquid Endothall of 1.5 to 2.0 ppm.**
- Treatment will occur when water temperatures are between 45 and 58 degrees F. **No treatment will occur once temperatures exceed 58 degrees F.**
- Herbicide must be applied when conditions are calm ***as authorized by APM lead***. The maximum wind speed at time of application will be <10 mph as measured on-site. The forecast wind speed (including gusts) for the 24 hours following application will not be greater than 15 mph.

Individual corridor access

Respond to requests from owners for verification of curly leaf pondweed along individual access corridors.

Identification of nuisance conditions for curly leaf pondweed will need to occur the spring prior to treatment to allow for early season treatment with Endothall.

Treatment will require strict adherence to early season treatment temperature requirements for curly leaf pondweed treatment in order to protect native plant populations.

Residents are responsible for the cost of individual corridor treatments. Treatment timing will be coordinated by the APM Lead who authorizes treatment based on specified wind and temperature conditions.

Encourage residents to manually remove CLP for navigation. A riparian landowner may manually remove the invasive plants Eurasian water milfoil, curly leaf pondweed, and purple loosestrife along his or her shoreline without a permit. Manual removal means the control of aquatic plants by hand or hand–held devices without the use or aid of external or auxiliary power.[3] **(Point E1)**

Map curly leaf pondweed beds extent and density
Map curly leaf pondweed beds annually. The CLP beds are defined as having a density >2, an estimated aerial coverage >50%, and are navigable around the perimeter of the bed with a pontoon boat. Areas with CLP present may also be recorded. Method for mapping beds may change with guidance from the DNR.

e. Project products or deliverables

Curly leaf pondweed treatment pre and post monitoring and bed mapping results

All results to be available in MS Word and .pdf format.

f. Data to be collected

Pre and post monitoring data for CLP treatment areas
CLP bed maps
Sediment turion density in CLP beds

g. Existing and proposed partnerships

The Bone Lake Management District works closely with the Polk County Land and Water Resources Department and the Department of the Natural Resources to plan and implement lake management projects.

[3] More information regarding DNR permit requirements and aquatic plant management contacts is found on the DNR web site www.dnr.wi.gov.

h. Role of project in planning and/or management of lake

Invasive aquatic species prevention through education is a priority of the **Polk County Land and Water Plan** as shown in the goal and activity below.

> Objective 1A. Prevent, control or eliminate aquatic invasive species to protect the integrity of our surface water resources.
>
> 1. Educate water users, lake groups, and special parties (fishing groups) of the impact, spread, and peril of AIS
> 2. Monitor water bodies for the presence/absence or extent of invasion
> 3. Create a plan for invasive species management
> 4. Use volunteers and interns whenever possible
> 5. Employ strategies to keep native ecosystems intact
> 6. Work with other agencies to coordinate programs and provide information

Polk County has a **Do Not Transport Ordinance** to remind lake users about its requirements. It is illegal to transport aquatic vegetation on boats and equipment in Polk County.

i. Timetable for implementation

Treat CLP navigation channels	
Continue treatment of CLP	Late May
Complete pre and post monitoring	June
Complete turion monitoring	Aug/Sept
Apply for herbicide treatment permits and solicit contractor bids	Each February
Supervise contractor herbicide application	Annually
Map CLP beds throughout the lake	Annually
Volunteer Monitoring for EWM	Ongoing
Clean Boats, Clean Waters and other education activities	Ongoing
Knotweed Control	Ongoing

j. Plan for sharing project results

- Draft and final documents will be made available to the public and other resource agencies.
- Information regarding the planning process and plan contents are posted on the Bone Lake web site, included in Bone Lake Management District newsletter articles, and presented at the District annual meeting.
- Presentations at conferences as requested

k. Other information not described above (provided previously)

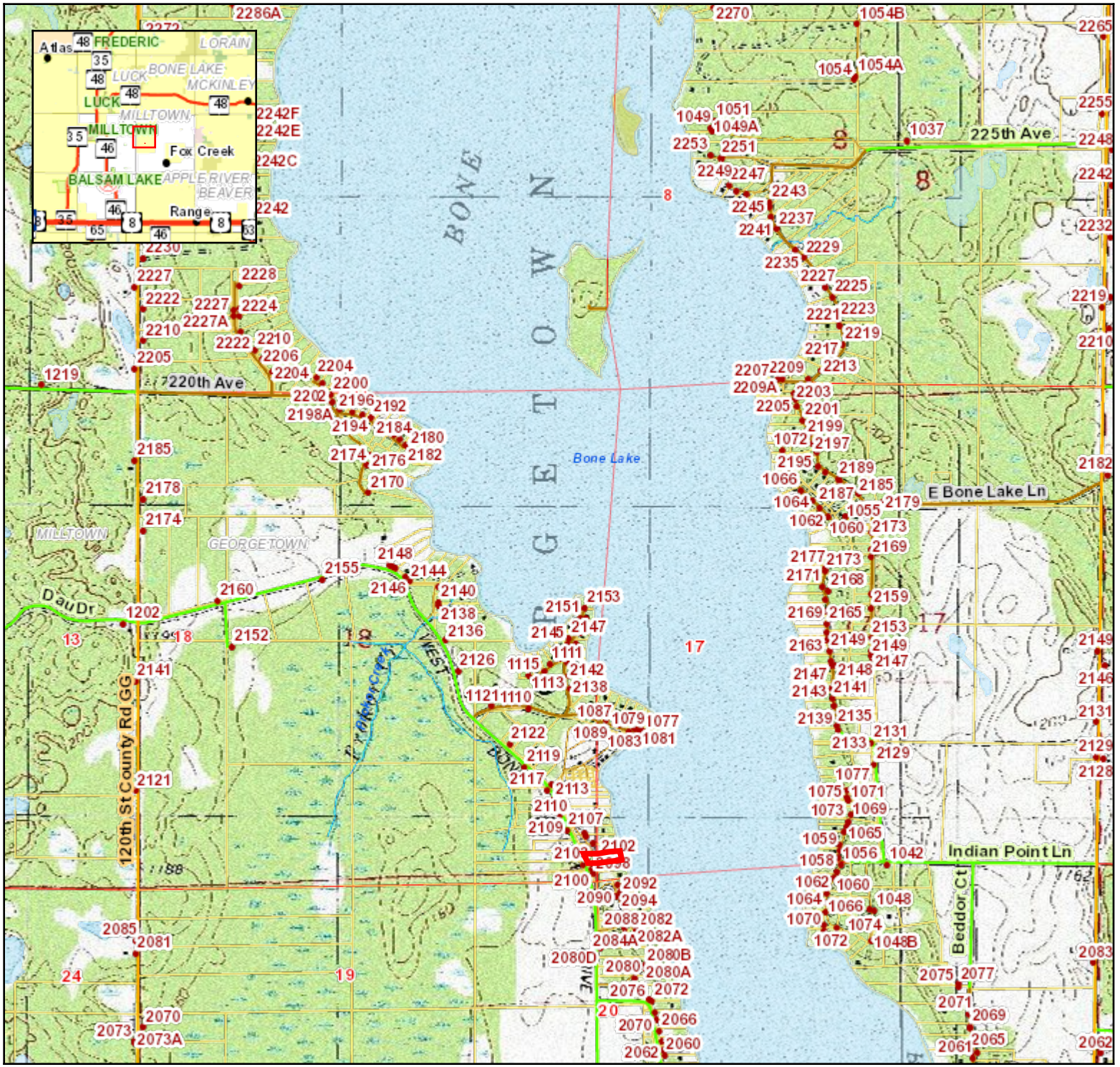
Bone Lake APM Implementation Plan (2013 – 2015)

Bone Lake CLP Treatment Analysis 2013

Spring and Fall 2013 Newsletters

Polk County Knotweed Map

Bone Lake Property Owner Survey



Parcel with Giant Knotweed in Red

Legend

- Addresses
- Lakes and Rivers
- Rivers and Streams
- Sections
- Parcels
- Railroad
- Unincorporated Village
- Cities (Scale below 25000)
- Villages (Scale below 25000)
- Towns
- TwpRgGrdweb
- Surrounding Counties
- Hospitals
- Airports
- Cemeteries
- Churches
- Government Center
- Libraries
- Polk County Information Center
- Post Offices
- Schools
- Boat Access Carry in
- Boat Access Ramp
- Public Lands
- US Highway Shield
- US Highways
- WI State Highway Shield
- State Highways
- County Road Shield
- County Roads

N

0 500 1000 1500ft

- City and Village Roads
- Highway On or Ramp
- Public Access Roads
- Private Roads
- Private Driveways
- WI Rustic Road Shield
- WI Rustic Roads
- DRG - Topo Map

DISCLAIMER: This map is not guaranteed to be accurate, correct, current, or complete and conclusions drawn are the responsibility of the user.

Author:

Date Printed: 01/14/14 2:34 PM

Sources:

COUNTY OF POLK 1853 WISCONSIN