Aquatic Vegetation Management Plan
2014 Update - draft

Lake Wawasee and Syracuse Lake
Kosciusko County, Indiana

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Executive Summary

Lake Wawasee and Syracuse Lake are located in Kosciusko County, Indiana near the town of Syracuse. Lake Wawasee has 3,060 surface acres with a maximum depth of 77 feet and an average depth of 22 feet. Syracuse Lake has 414 surface acres with a maximum depth of 34 feet and an average depth of 13 feet. Eurasian watermilfoil (*Myriophyllum spicatum*) and starry stonewort (*Nitellopsis obtusa*) are exotic plant species that are now present in both lakes. The following report summarizes Eurasian watermilfoil (EWM) and starry stonewort (SSW) control practices implemented on Lake Wawasee and Syracuse Lake. It also outlines a plan for future management of these exotic species.

Two tier II vegetation surveys were performed on Lake Wawasee and Syracuse Lake in 2014. The most recent survey data from August of 2014 showed that EWM site frequency was 14.2 percent in Lake Wawasee and 18.0 percent in Syracuse Lake. EWM populations in both lakes exceed the established objective of a 10 percent maximum EWM frequency each summer. However, allowable EWM treatment acreages for both lakes are not expected to reduce EWM frequency to the 10 percent threshold on an annual basis.

In August of 2014, starry stonewort (SSW) frequency was 18.9 percent in Lake Wawasee and 4.0 percent in Syracuse Lake. Both these SSW frequencies are down from August of 2013, which could be due to treatment or weather patterns. Although SSW frequency was down in August of 2014, its total coverage in the lakes had increased since 2013.

Despite large scale efforts to control SSW, its acreage has increased steadily each year since 2009. In August of 2009, total SSW acreage in Lake Wawasee was estimated at 15 acres. In the fall of 2014, total SSW acreage in Wawasee was estimated at 200.3 acres. Total SSW acreage in Syracuse Lake was estimated at 48.2 acres in the fall of 2014. Chemical applications temporarily control SSW, but no long term control of the plant has been observed. Multiple applications are needed in the same treatment area throughout the course of the season to keep SSW suppressed.

Starry stonewort may be considered the highest treatment priority for these lakes based on the large amount of perceived available habitat into which it could still expand in both of these lakes. It appears to be very aggressive and severely inhibits lake use in shallow water. While EWM can be very problematic, it has been present in the lakes for decades and is likely already present in most areas of suitable habitat. Currently, total EWM acreage in Lake Wawasee is estimated at 579 acres. Any treatment of EWM must also be balanced against the possibility that SSW could expand into areas where EWM is controlled.

In 2015, all areas of nuisance SSW infestation should be treated if possible. Realistically, it may be difficult to fund multiple treatments of all areas that have nuisance levels of SSW in these lakes. If the decision is made not to treat all areas of nuisance SSW infestation, then treatment areas should be prioritized based on lake use. Boat ramps, marinas, and other high traffic areas will rank higher in treatment priority. Treating these areas will not only improve lake use but also control SSW in areas where it is most likely to be cut and spread by boat propellers. Funding to treat some areas of SSW in these lakes will be available from the IDNR through a grant from the Great Lakes Restoration Initiative (GLRI). It is important to note that GLRI funding is split between a growing number of Indiana lakes that are infested with SSW, and there will not be enough GLRI funding to treat all areas of SSW infestation on these lakes.

EWM could also be treated in areas where it is impeding the use of these lakes. Based on the recent classification of Syracuse Lake as important northern pike habitat by the IDNR, no more than 5 percent of the lake's total surface area is likely to be permitted for treatment. This would represent maximum treatment acreage of 25 acres for EWM in 2015 on Syracuse Lake.

In Lake Wawasee, approximately 40 acres are likely to be permitted for EWM treatment in 2014, based on conversations with the IDNR. These 40 acres may be prioritized based on lake use and EWM severity in 2015. LARE treatment funding for both of these lakes will likely be considered "maintenance funding." In this case, there is a 50/50 cost share between LARE and the lake association for all treatment costs with LARE supplying a maximum of $5,000 towards treatments.

All survey and planning costs for Lake Wawasee and Syracuse Lake will be fully funded by the GLRI in 2015, and there will not be any out-of-pocket costs to the lake associations for surveying and updating the AVMP.

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Problem Statement

Starry stonewort (SSW) and Eurasian watermilfoil (EWM) are impacting the use of Lake Wawasee and Syracuse Lake in many areas. Both SSW and EWM form dense mats in many areas, which can inhibit fishing, swimming, and boating. Observations from Lake Wawasee and Syracuse Lake over the past 5 years indicate that SSW is extremely aggressive and even appears to be out-competing EWM in many areas. These invasive plants beds may also prevent the growth of beneficial native species which often provide less recreational interference and better quality fish habitat. Starry stonewort is currently present in at least 200.3 surface acres on Lake Wawasee and 48.2 acres in Syracuse Lake.

Objectives:

The following specific, quantifiable objectives are recommended to evaluate the success of EWM and SSW management activities at Lake Wawasee and Syracuse Lake:

1. Limit the frequency of occurrence of EWM in summer tier II sampling to 10 percent or less in both lakes (IDNR, 2013).

2. Limit the frequency of occurrence of SSW in summer tier II sampling to 5 percent or less in Syracuse Lake.

3. Limit the frequency of occurrence of SSW in summer tier II sampling to 20 percent or less in Lake Wawasee

4. Maintain a minimum of 11 native species collected each year in tier II surveys in Syracuse Lake.

5. Maintain a minimum of 13 native species collected each year in tier II surveys in Lake Wawasee.

Treating SSW and EWM will not eradicate them from Lake Wawasee and Syracuse Lake. In fact, SSW acreage in Lake Wawasee and Syracuse Lake may increase in coming years based on the perceived amount of suitable habitat available for its expansion. However, if these objectives could be met each year, the indication would be that SSW and EWM are being managed effectively on a seasonal basis without causing significant damage to the native plant community.

Aquatic Vegetation Management History

The first aquatic vegetation management plan developed for Syracuse Lake was completed in 2005, and the first plan developed for Lake Wawasee was completed in 2006. These plans focused on annual control of EWM in areas of high recreational use. At that time, SSW had not yet been discovered in either lake (Aquatic Weed Control, 2005 and 2006). Large scale EWM treatments (35-50 acres) were conducted on Syracuse Lake in 2005, 2006, 2008, 2009. Permitted EWM treatment acreage for Syracuse Lake have been reduced in 2013 and 2014. In 2013, 21.1 acres of EWM were treated, and 16.5 acres of EWM were treated in 2014.

Areas of high use in Lake Wawasee (25 -50 acres) were treated in 2007, 2008, 2009, 2013, and 2014. All EWM treatments on Lake Wawasee have used liquid DMA-4 herbicide at a rate of 2 parts per million to selectively control EWM without damaging native vegetation.

SSW was first observed in summer of 2008 on Lake Wawasee in the channels on the west side of Johnson's Bay. In August of 2009, 15 acres in Johnson's Bay were treated with Nautique herbicide for the control of SSW. Since 2008, SSW distribution has steadily increased in Lake Wawasee. Treatments for SSW on Lake Wawasee have been frequent and aggressive, especially in areas of high use and areas of dense SSW infestation. Detailed SSW treatment information is outlined in Table 1.

In 2011, SSW was first discovered in Syracuse Lake in the 4.5 acre access channel adjacent to Syracuse Park. Also in 2011, the IDNR received a grant through the Great Lakes Restoration Initiative for the control of SSW species. Since 2011, the IDNR has fully funded numerous SSW treatments on both Lake Wawasee and Syracuse Lake. These treatments have used a combination of Cutrine Ultra herbicide at a rate of 2.4 gallons per acre foot with Hydrothol 191 herbicide at variable rates to control SSW.

Despite large scale efforts to control SSW, its acreage has increased steadily each year since 2009. In August of 2009, total SSW acreage in Lake Wawasee was estimated at 15 acres. In August of 2014, approximately 200.3 acres of SSW infestation were identified in the tier II survey. Total SSW acreage in Syracuse Lake was estimated at 48.2 acres in August of 2014. Chemical applications temporarily control SSW, but no long term control of the plant has been observed. Multiple applications are needed in the same treatment area throughout the course of the season to keep SSW suppressed.

Table 1 and Table 2 summarize the treatment history of Lake Wawasee and Syracuse Lake from the beginning of their involvement with the LARE program. The two main target species have been EWM and SSW. SSW treatments have been funded 100% by the IDNR through the Great Lakes Restoration Initiative Funding, while Eurasian watermilfoil treatments were funded by the Wawasee Area Conservancy Foundation (WACF), the Syracuse Lake Association, and the LARE program.

Table 1: Lake Wawasee Treatment History

Year	Target species	Month	Acres	Areas	Herbicide	Rate
2007	EWM**	July	25 ac		DMA-4	2.0 ppm
2008	EWM	July	50 ac		DMA-4	2.0 ppm
2009	EWM	July	25 ac		DMA-4	2.0 ppm
	EWM	August	25 ac		DMA-4	2.0 ppm
	SSW	August	15 ac	Johnsons Bay	Nautique	1.0 ppm
2010	SSW	June 7	20 ac	Johnsons Bay	Nautique	0.8 ppm
	SSW	July 14	20 ac	Johnsons Bay	Nautique	0.8 ppm
	SSW	August 10	1.0 ac	A – Johnson's Bay	Cutrine ultra + Hydrothol	2.4 gal/acre foot +1qt/surface acre Hydrothol
	SSW	August 10	1.0 ac	D1 – Johnson's Bay	Cutrine ultra + Hydrothol	2.4 gal/acre foot + 1 qt/acre-foot Hydrothol
		August 10	0.6 ac	B3-Johnson's Bay	Granular Hydrothol	82 lbs/ac-foot (0.8 ppm)
2011	SSW	June 29	30.76 ac		Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol
	SSW	July 26	56.56 ac		Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	September 15	20.26 ac	1,2,3,10,11*	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	September 22	11.29 ac	Johnson's Bay	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	September 22	30.72 ac	Johnson's Bay	Captan XTR + Hydrothol	2.4 gal/acre foot +Hydrothol***
2012	SSW	May 8	20.26 ac	1,2,3,10,11*	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	June 21	67.39 ac	1,2,3,10,11*+ Johnsons Bay channels	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	July 24	22.69 ac	1,2,3,10,11*	Captain XTR + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	October 2	23.57 ac	1,2,3,10,11*	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
2013	SSW	June 28	100.5 ac	1-8, 10,12-24	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	August 12 & 15	54.18 ac	1-3, 15-24	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	September 18-19	59.6 ac	1,2,3, thirty acres of 9, five acres of 11, 15,20,22	Cutrine ultra + Hydrothol (5 acres in area 11 were treated with Komeen Crystal at 20lbs per acre)	2.4 gal/acre foot +Hydrothol***
	EWM	July 1	40 ac		DMA-4	2.0 ppm

2014	SSW	July 9-11	113.4 ac	1-8, 12-13, 15-20, 22-26,30-31	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	August 5-6	113.4 ac	1-8, 12-13, 15-20, 22-26,30-31	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	EWM	June 26	40 ac		DMA-4	2.0 ppm

*Areas in Table 1 refer to Figure 4.
**LARE funded
***Hydrothol rates vary depending on treatment location. In general, Hydrothol was used at a rate of 1 quart per surface acre in all channels and confined water areas. Along open shoreline and main lake areas, Hydrothol was used at a rate of 1 quart per acre foot. These differing rates were used to avoid fish toxicity issues.
All SSW Treatments since 2011 have been funded through the Great Lakes Restoration Initiative.

Table 2: Syracuse Lake Treatment History

Year	Target species	Month	Acres	Areas	Herbicide	Rate
2005	EWM**	July	35 ac		DMA-4	2.0 ppm
2006	EWM**	July	50 ac		DMA-4	2.0 ppm
2007	none	--	--		--	--
2008	EWM**	July	50 ac		DMA-4	2.0 ppm
2009	EWM**	July	50 ac		DMA-4	2.0 ppm
2010	No treatment					
2011	SSW	September 6	4.5 ac	1	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	September 22	4.5 ac	1	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
2012	SSW	May 8	4.5 ac	1	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	June 21	6.5	1,2,3	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	July 24	6.5 ac	1,2,3	Captain XTR	2.4 gal/acre foot +Hydrothol***
	SSW	October 2	7.5 ac	1,2,3,4	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
2013	SSW	July 11	10	1,2,3,4,5	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	August 15	10	1,2,3,4,5	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	September 18	9.5	1,2,4,5(expanded)	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	EWM**	July 1	21 ac		DMA-4	2.0 ppm
2014	SSW	July 10	17.5	1,2,4,5,6*	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	SSW	August 5	17.5	1,2,4,5,6*	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
	EWM	September 3	16.5		DMA-4	2.0 ppm

*Areas in Table 2 refer to Figure 2.

**LARE Funded

***Hydrothol rates vary depending on treatment location. In general, Hydrothol was used at a rate of 1 quart per surface acre in all channels and confined water areas. Along open shoreline and main lake areas, Hydrothol was used at a rate of 1 quart per acre foot. These differing rates were used to avoid fish toxicity issues.

All SSW Treatments since 2011 have been funded through the Great Lakes Restoration Initiative.

2014 Vegetation Treatments

Syracuse Lake 2014 EWM Treatments

In 2014, EWM was not abundant or problematic in spring, which is not uncommon in Syracuse Lake. By the August 15, 2014 tier II survey, 16.5 acres of dense EWM beds were mapped with a GPS. These 16.5 acres of EWM were treated on September 3, 2014 with DMA-4 herbicide at a rate of 2.0 parts per million (ppm). These treatment areas are described in Figure 1. This treatment was later than desired, but EWM growth in Syracuse Lake often becomes problematic in mid to late summer, and spring surveys cannot always accurately describe its abundance. For 2015, a mid-summer visual survey is recommended to help with mapping of EWM and treatment timing.

Permitted EWM treatment acreage has been reduced in Syracuse Lake due to its recent classification as important northern pike habitat which reduces treatment acreage to no more than 5 percent of the lakes surface acreage.

Figure 1: Syracuse Lake 2014 EWM Treatment Areas

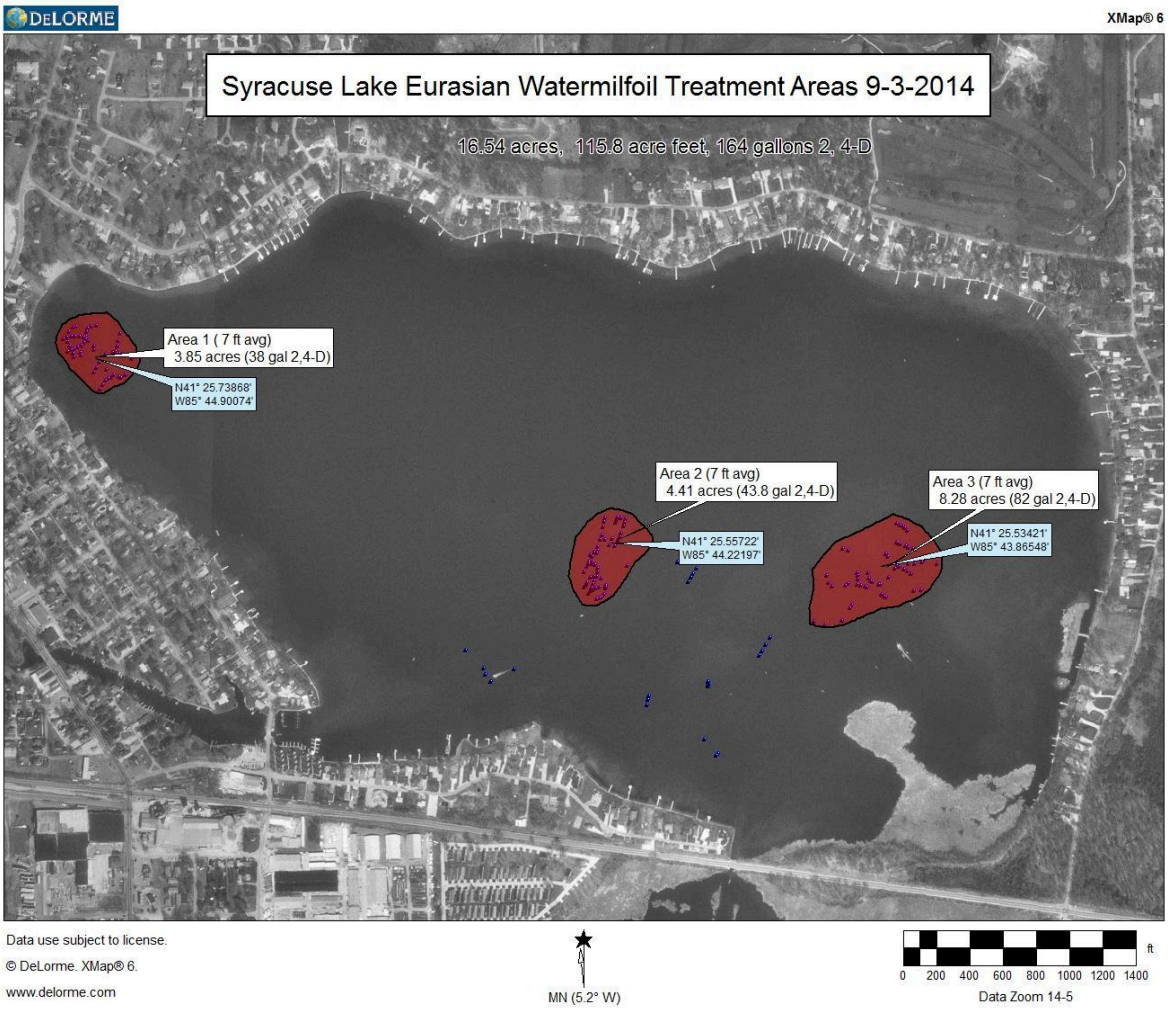


Table 3 summarizes treatment details from the 2014 EWM treatments on Syracuse Lake.

Table 3: Syracuse Lake 2013 EWM Treatment information

Area	Acres	AVG depth	Rate	Amount
1	3.85	7	2.0 ppm	38 gal DMA-4
2	4.41	7	2.0 ppm	43.8 gal DMA-4
3	8.28	7	2.0 ppm	82 gal DMA-4

Syracuse Lake 2014 SSW Treatments

Syracuse Lake was treated for SSW control two different times in 2014. A total of 17.5 acres of SSW infestation were treated on July 10, 2014 including areas 1, 2, 4, 5, and 6 in Figure 2. These same 17.5 acres were treated again on August 5, 2014. All known areas of SSW infestation are shaded in green in Figure 2. All SSW treatments on Syracuse Lake used Cutrine Ultra herbicide at a rate of 2.4 gallons per acre foot along with Hydrothol 191 at varying rates.

Figure 2: Syracuse Lake 2014 SSW Beds

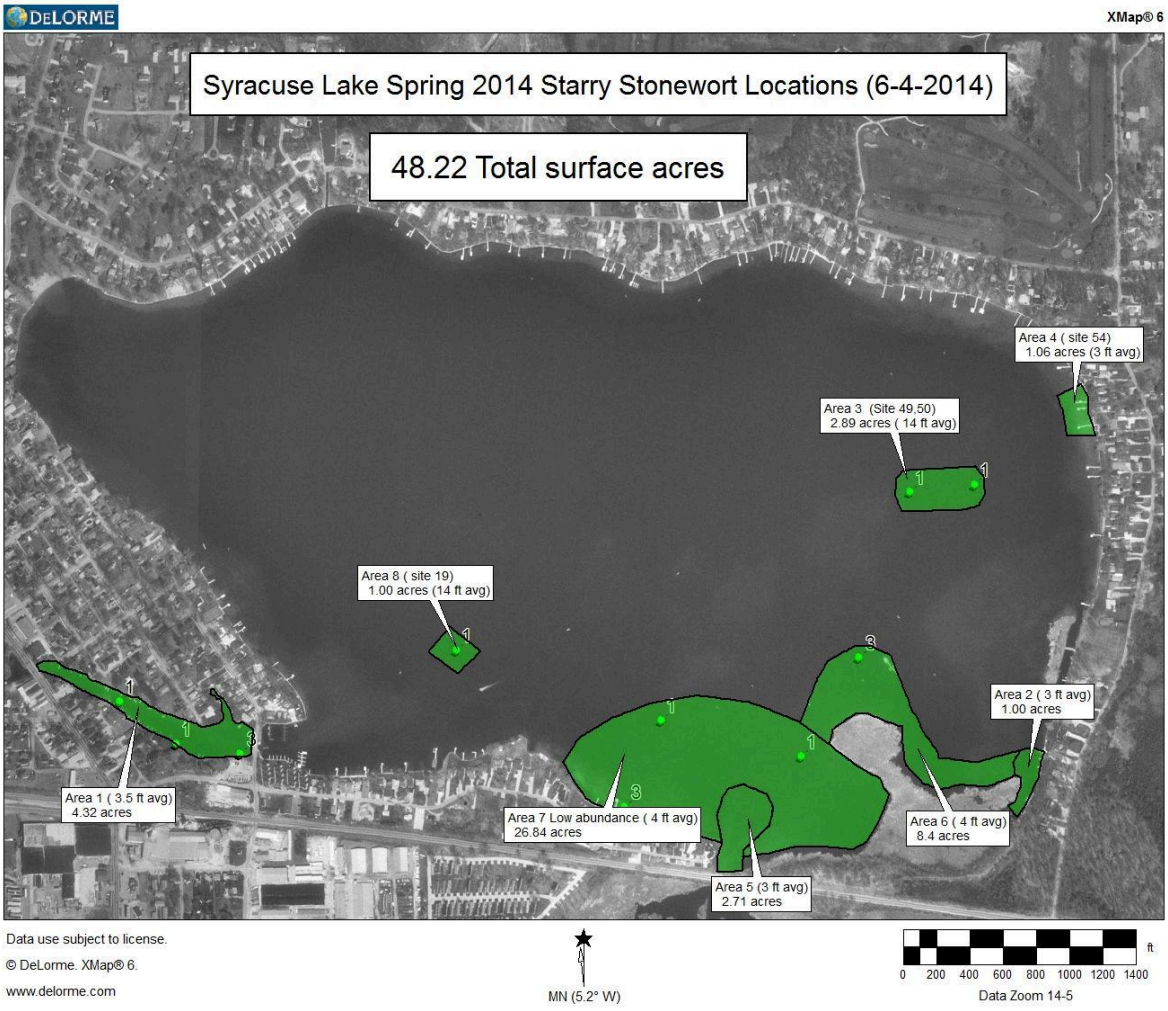


Table 4 gives details of the 2014 Syracuse Lake SSW treatment areas. These areas correspond to Figure 2.

Table 4: Syracuse Lake 2014 SSW Treatment Areas

Area	Dates Treated	Target	Acres	Avg Depth	Acre-feet	Amount
Area 1	July 10 August 5	SSW	4.4	3.5	15.4	36.9 gal Cutrine + Hydrothol
Area 2	July 10 August 5	SSW	1.0	3	3	7.2 gal Cutrine + Hydrothol
Area 4	July 10 August 5	SSW	1.0	3	3	7.2 gal Cutrine + Hydrothol
Area 5	July 10 August 5	SSW	2.7	3	8.1	19.4 gal Cutrine + Hydrothol
Area 6	July 10 August 5	SSW	8.4	4	33.6	80.6 gal Cutrine + Hydrothol
Totals			17.5		63.1	151.3 gal Cutrine + Hydrothol

2014 Lake Wawasee EWM Treatments

On June 26, 2014, a combined 40 acres of EWM in two different areas of Lake Wawasee were treated with liquid 2, 4-D at a rate of 2.0 ppm. These areas are shaded red in Figure 3. These areas represent only a small portion of the total EWM acreage of Wawasee, which is estimated at around 579 acres. These treatments were designed to improve lake use in a few areas of dense infestation, based on conversations with the WACF and IDNR Staff.

Figure 3: Lake Wawasee 2014 EWM Treatment Areas

Table 5 shows detailed information about the 2014 EWM treatment areas on Lake Wawasee. The areas in Table 5 correspond to the labeled treatment areas in Figure 3.

Table 5: Lake Wawasee 2014 EWM Treatment Information

Area	Acres	AVG depth	Acre feet	Rate	Amount
1	32.5	4	130	2.0 ppm	184 gal DMA-4
2	7.5	4	30	2.0 ppm	42.6 gal DMA-4

2013 Lake Wawasee SSW Treatments

On July 9 and July 11, 2014, a total of 113.4 acres of SSW infestation were treated with Cutrine ultra at a rate of 2.4 gallons/acre-foot in combination with hydrothol herbicide. This acreage includes Areas 1-8, 10, 12-13, 15-20, 22-26, and 30-31 in Figure 4. All of these areas were treated again on August 5 and August 6, 2014, using the same herbicides and rates. These treatments were fully funded through the Great Lakes Restoration Initiative (GLRI).

Figure 4 shows all known SSW beds as of August 2014. The numbered SSW areas correspond to the areas listed in the treatment information tables.

Figure 4: Lake Wawasee Total SSW Distribution as of August 2014

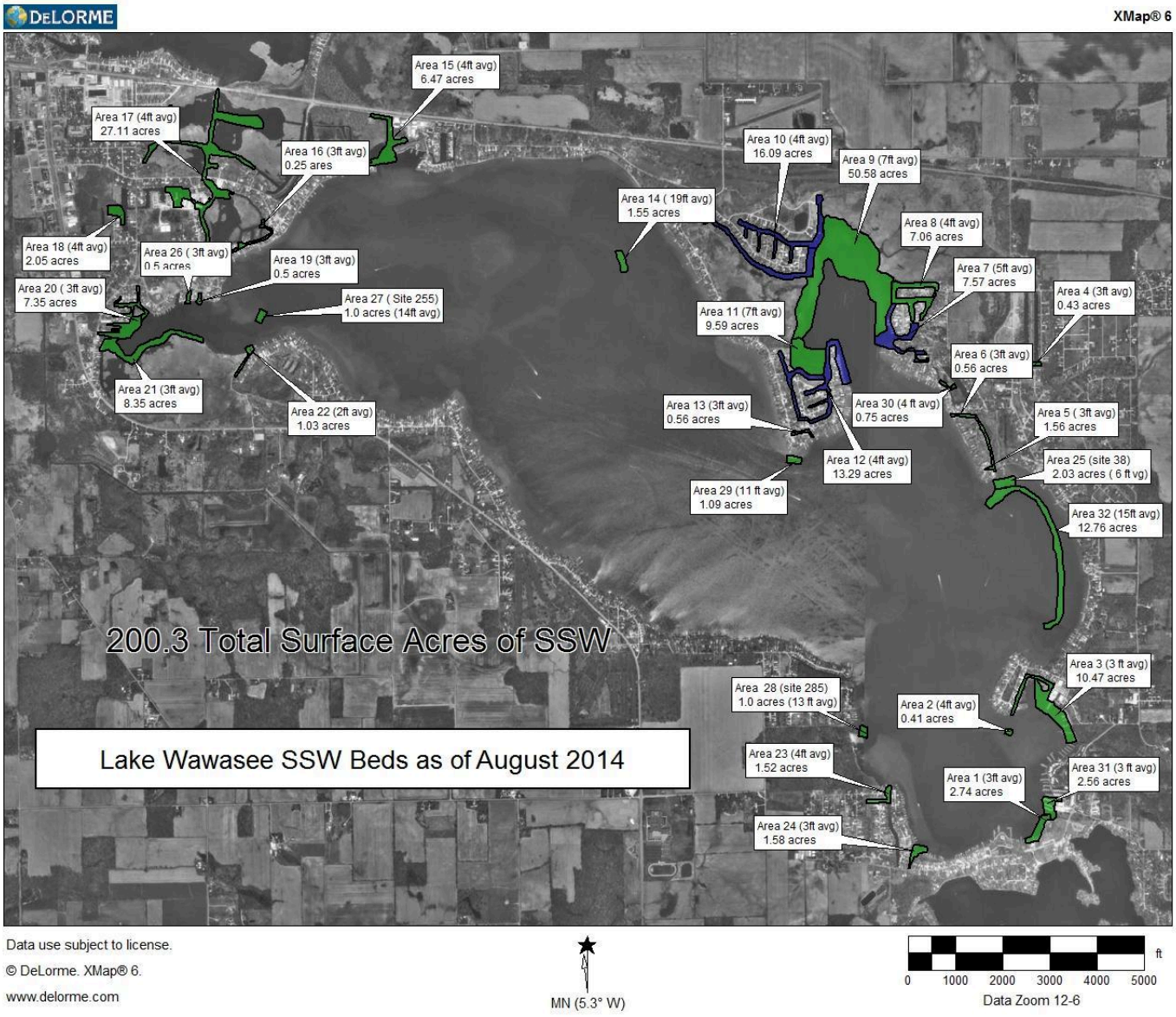


Table 6 shows information on the Lake Wawasee 2014 SSW treatments. The areas referred to in this table correspond to the labeled areas in Figure 4.

Table 6: Lake Wawasee 2014 SSW Treatment Information

Target species	Date Treated	Acres	Areas	Herbicide	Rate
SSW	July 9-11	113.4 ac	1-8, 10, 12-13, 15-20, 22-26, and 30-31	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***
SSW	August 5-6	113.4 ac	1-8, 10, 12-13, 15-20, 22-26, and 30-31	Cutrine ultra + Hydrothol	2.4 gal/acre foot +Hydrothol***

Tier II Survey Results

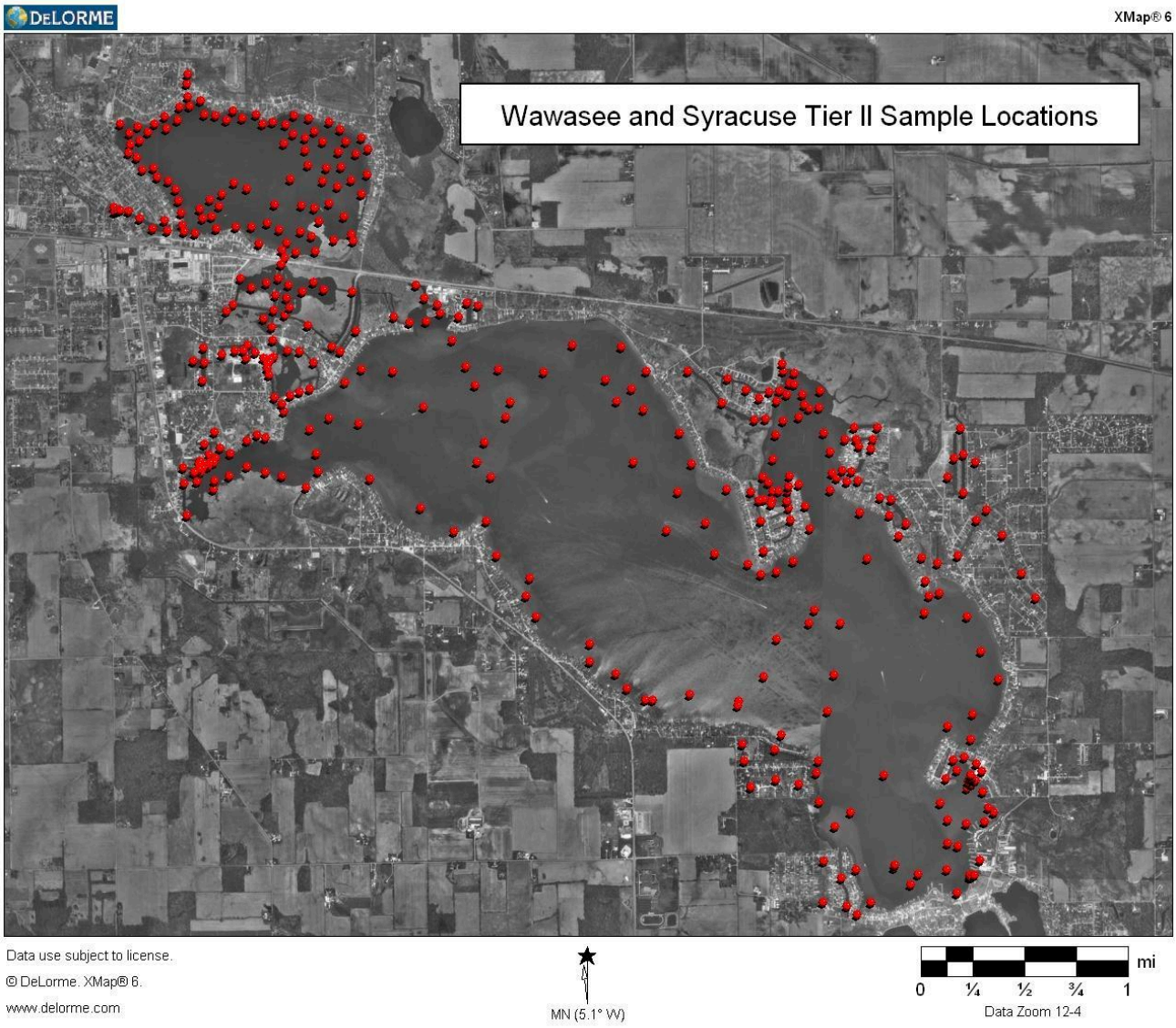
Two tier II vegetation surveys were performed on Lake Wawasee and Syracuse Lake in 2014. The spring survey on Lake Wawasee was conducted on June 5th and 6th, while the summer survey on Lake Wawasee took place on August 26th and 27th.

The spring survey on Syracuse Lake took place on June 4th, while the summer survey took place on August 15th.

Aquatic plant sampling methods used for surveys on Lake Wawasee and Syracuse Lake are outlined in the Tier II Aquatic Vegetation Survey Protocol (IDNR, 2010). In Syracuse Lake, 100 sample sites are distributed randomly throughout the littoral zone. In Lake Wawasee, 300 sample sites are distributed throughout the littoral zone. Channels are typically excluded from vegetation surveys; however channels were included in 2011 through 2014 in an effort to locate starry stonewort.

Data presented below for EWM and SSW excludes any sampling locations within channels and only describes the “main lake” samples. Common and scientific names for aquatic plants are consistent with those listed in the original AVMPs for these lakes and are listed in the appendix to this report. Figure 5 shows the tier II sample locations on Lake Wawasee and Syracuse Lake. These site locations have not changed since 2011.

Figure 5: Wawasee and Syracuse Tier II Sample Locations



Invasive species

In Syracuse Lake, spring 2014 EWM frequency was 11.0 percent and summer frequency was 18.0 percent. Summer EWM frequency in 2014 was very similar to the summer of 2013 (21.0 percent). Spring 2014 EWM distribution in Syracuse Lake is described in Figure 6. It should be noted that EWM frequency can vary greatly each year depending upon weather conditions.

In Lake Wawasee, EWM site frequency was 21.1 percent in the spring of 2014 and 14.2 percent in the summer of 2014. In 2013, spring frequency of EWM was 26.6 percent, and summer frequency was 11.2 percent. This data indicates that EWM abundance seems stable or reduced from 2013 to 2014. Tier II data from multiple tier II surveys, as well as depth contour information was used to estimate total EWM acreage at 579 acres in Lake Wawasee in 2012. Although EWM acreage is high, at approximately 579 acres (Aquatic Weed Control, 2012), the population has remained somewhat constant in recent years. Figure 7 describes EWM distribution in the summer 2014 tier II survey.

Figure 6: Syracuse Lake Summer 2014 EWM Tier II Locations

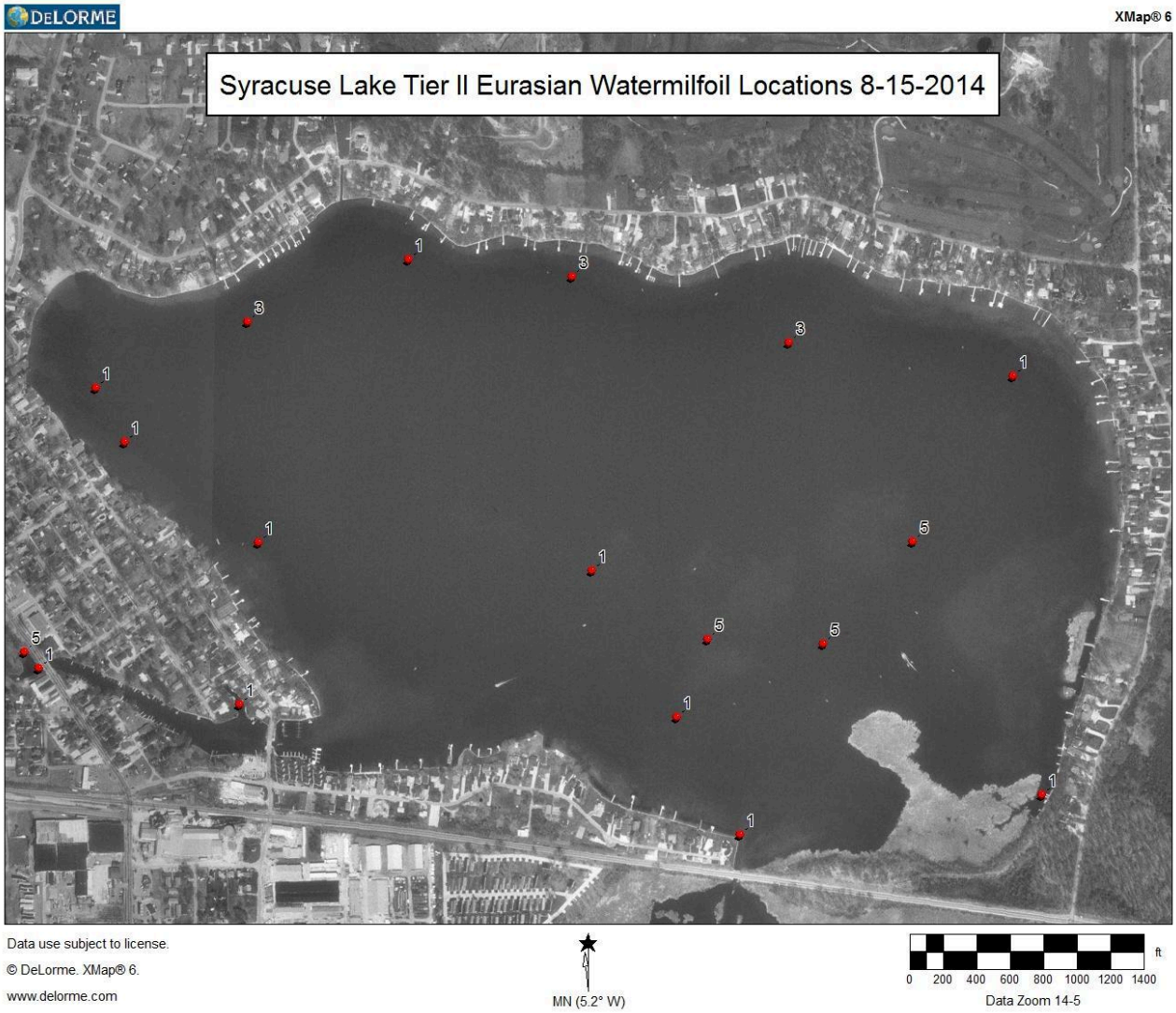
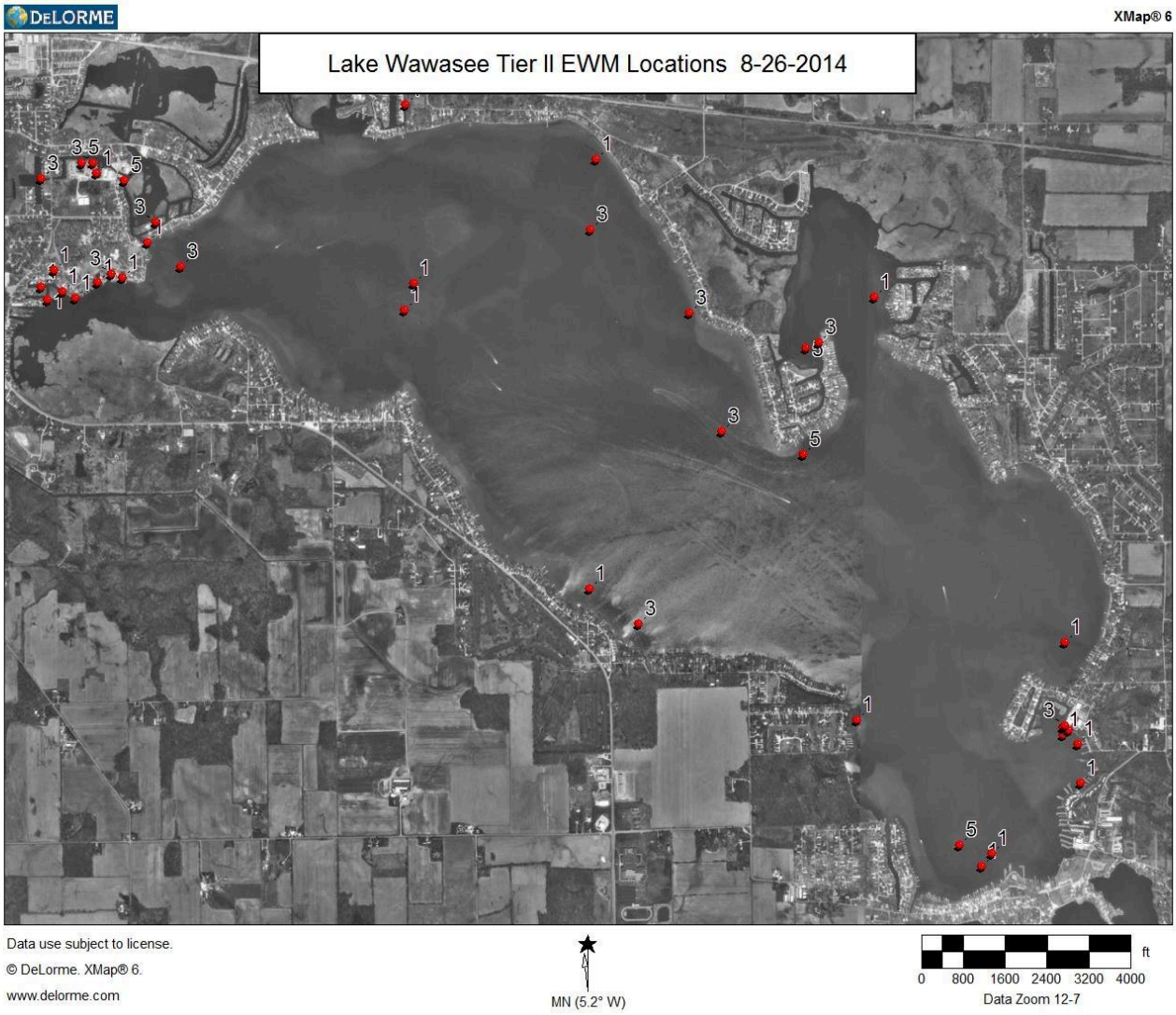


Figure 7: Lake Wawasee Summer 2014 EWM Locations



Starry Stonewort

In Syracuse Lake, SSW frequency was 10.0 percent in the spring and 4.0 percent in the summer of 2014. Although SSW frequency remains low, it appears to be spreading, and the large amount of suitable habitat in Syracuse Lake is of concern. Total SSW distribution in Syracuse Lake is described in Figure 2.

In Lake Wawasee, spring 2014 SSW frequency was 27.2 percent and summer frequency was 18.9 percent. SSW frequency did not increase from 2012 although the amount of identified SSW acreage did increase by about 18 acres. Total SSW acreage in Lake Wawasee is described in Figure 4.

Despite large scale efforts to control SSW, its acreage has increased steadily each year since 2009. In August of 2009, total SSW acreage in Lake Wawasee was estimated at 15 acres. In fall of 2014, total SSW acreage in Wawasee was estimated at 200.3 acres.

SSW in Syracuse Lake is spreading as well. Total SSW acreage in Syracuse Lake was estimated at 7.5 acres in the fall of 2012. In the fall of 2014, that acreage had increased to 48.2 acres.

Curly-leaf Pondweed (CLP)

In Syracuse Lake, CLP does not appear to be problematic. It was not collected in either tier II survey in 2014. CLP site frequency has never been above 3.0 percent since 2011.

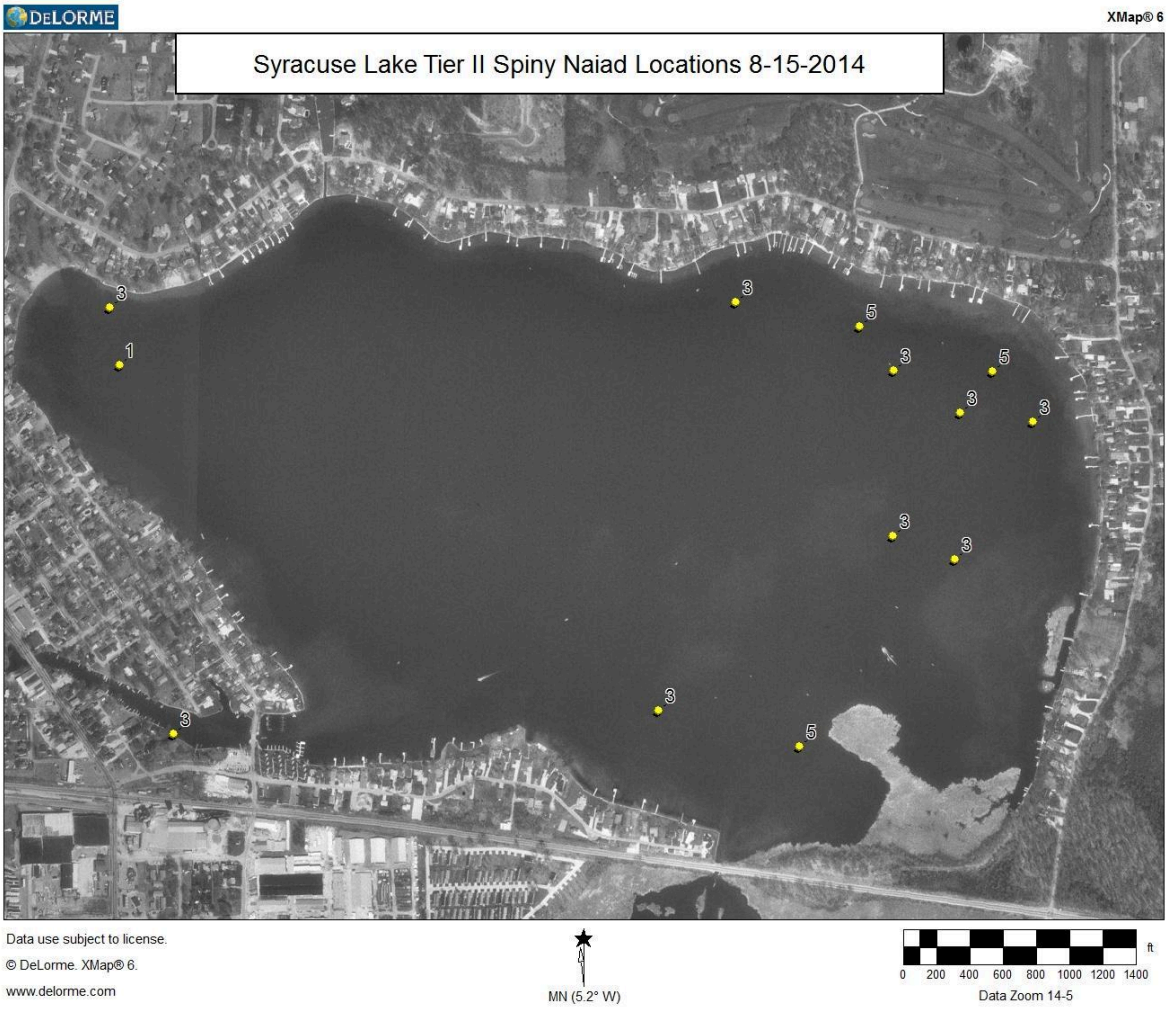
In Lake Wawasee, CLP is somewhat more abundant although it is generally not present in nuisance levels on the main lake. CLP frequency was 8.7 percent in the spring of 2011 and 10.7 percent in the spring of 2012. In the spring of 2013, CLP was found at 4.7 percent of tier II sites, and in the spring of 2014, CLP frequency was 5.3 percent.

Spiny Naiad

Spiny naiad is another exotic species that is present in low abundance in Lake Wawasee and does not seem to be increasing or causing any problems. Spiny naiad frequency in Lake Wawasee was just 0.6 percent in summer of 2014.

In Syracuse Lake, spiny naiad frequency was 13.0 percent in summer of 2014 which is the highest it has ever been in Syracuse Lake. The sites where it was collected are described in Figure 8. Prior to 2014, the highest spiny naiad site frequency recorded was 5.0 percent. Spiny naiad abundance should be monitored closely in future years to make sure that it does not continue to increase in Syracuse Lake.

Figure 8: Syracuse Lake Summer 2014 Spiny Naiad Locations



2014 Tier II Data

***All tier II data tables are for “main lake” sites only in Lake Wawasee, including the multi-year data presentation. Channel sites are excluded from this data.

Results from the spring and summer 2014 tier II surveys are included in the following tables. Table 7 and Table 8 describe data collected on the main lake in the spring and summer tier II surveys conducted on Lake Wawasee in 2014. Site frequency, dominance, diversity, and other metrics are shown for the entire survey (overall) and also for each 5 foot depth contour where plants were present.

Table 9 and Table 10 describe spring and summer 2014 tier II data from Syracuse Lake. Site frequency, dominance, diversity, and other metrics are shown for the entire survey (overall) and also for each 5 foot depth contour where plants were present.

Table 11 and Table 12 are summaries of tier II data collected on these lakes since the beginning of their involvement in the LARE program. Sampling methods changed in 2006 and again in 2010 and should be taken into account when evaluating this data. Every species collected in every survey on these lakes is included in these tables.

Table 7: Lake Wawasee Spring 2014 Tier II Data

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County:	Kosciusko	Secchi (ft):	9.5	Mean species/site:	1.50
Date:	6/5/2014	Sites with plants:	140	SE Mean species/site:	0.08
Littoral Depth (ft):	23.0	Sites with native plants:	110	Mean native species/site:	0.96
Littoral Sites:	169	Number of species:	17	SE Mean natives/site:	0.07
Total Sites:	169	Number of native species:	14	Species diversity:	0.87
		Maximum species/site:	4	Native species diversity:	0.82

All Depths	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	32.0	68.0	20.1	10.7	1.2	11.6
Starry stonewort	27.2	72.8	10.7	11.8	4.7	14.0
Eurasian watermilfoil	21.9	78.1	13.6	4.1	4.1	9.3
Coontail	16.6	83.4	1.8	11.2	3.6	10.7
Sago pondweed	11.8	88.2	3.0	8.9	0.0	5.9
Illinois pondweed	10.7	89.3	8.9	1.8	0.0	2.8
Bladderwort	5.3	94.7	2.4	3.0	0.0	2.2
Curly-leaf pondweed	5.3	94.7	0.6	4.7	0.0	3.0
Nitella	4.1	95.9	2.4	1.8	0.0	1.5
Richardson's pondweed	3.6	96.4	0.6	3.0	0.0	1.9
Slender naiad	3.6	96.4	3.0	0.6	0.0	0.9
Eelgrass	2.4	97.6	1.8	0.6	0.0	0.7
American pondweed	1.8	98.2	0.0	1.8	0.0	1.1
Whorled watermilfoil	1.8	98.2	0.6	0.6	0.6	1.1
Flat-stemmed pondweed	1.2	98.8	1.2	0.0	0.0	0.2
Elodea	0.6	99.4	0.6	0.0	0.0	0.1
Small pondweed	0.6	99.4	0.0	0.6	0.0	0.4
Filamentous Algae	5.9					

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County:	Kosciusko	Secchi (ft):	9.5	Mean species/site:	1.76
Date:	6/5/2014	Sites with plants:	56	SE Mean species/site:	0.13
Littoral Depth (ft):	23.0	Sites with native plants:	46	Mean native species/site:	1.19
Littoral Sites:	62	Number of species:	16	SE Mean natives/site:	0.12
Total Sites:	62	Number of native species:	13	Species diversity:	0.88
		Maximum species/site:	4	Native species diversity:	0.84

Depths: 0 to 5 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	37.1	62.9	27.4	9.7	0.0	11.3
Starry stonewort	30.6	69.4	8.1	16.1	6.5	17.7
Eurasian watermilfoil	22.6	77.4	19.4	3.2	0.0	5.8
Coontail	17.7	82.3	0.0	11.3	6.5	13.2
Illinois pondweed	17.7	82.3	14.5	3.2	0.0	4.8
Sago pondweed	11.3	88.7	3.2	8.1	0.0	5.5
Bladderwort	8.1	91.9	6.5	1.6	0.0	2.3
Slender naiad	6.5	93.5	4.8	1.6	0.0	1.9
Eelgrass	4.8	95.2	3.2	1.6	0.0	1.6
American pondweed	3.2	96.8	0.0	3.2	0.0	1.9
Curly-leaf pondweed	3.2	96.8	0.0	3.2	0.0	1.9
Flat-stemmed pondweed	3.2	96.8	3.2	0.0	0.0	0.6
Richardson's pondweed	3.2	96.8	0.0	3.2	0.0	1.9
Whorled watermilfoil	3.2	96.8	1.6	0.0	1.6	1.9
Elodea	1.6	98.4	1.6	0.0	0.0	0.3
Nitella	1.6	98.4	1.6	0.0	0.0	0.3
Filamentous Algae	12.9					

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County:	Kosciusko	Secchi (ft):	9.5	Mean species/site:	1.51
Date:	6/5/2014	Sites with plants:	40	SE Mean species/site:	0.16
Littoral Depth (ft):	23.0	Sites with native plants:	32	Mean native species/site:	0.94
Littoral Sites:	47	Number of species:	12	SE Mean natives/site:	0.11
Total Sites:	47	Number of native species:	9	Species diversity:	0.82
		Maximum species/site:	4	Native species diversity:	0.68

Depths: 5 to 10 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	48.9	51.1	29.8	17.0	2.1	18.3
Starry stonewort	31.9	68.1	19.1	6.4	6.4	14.0
Eurasian watermilfoil	17.0	83.0	10.6	4.3	2.1	6.8
Sago pondweed	14.9	85.1	6.4	8.5	0.0	6.4
Illinois pondweed	10.6	89.4	8.5	2.1	0.0	3.0
Curly-leaf pondweed	8.5	91.5	2.1	6.4	0.0	4.3
Coontail	6.4	93.6	2.1	4.3	0.0	3.0
Bladderwort	4.3	95.7	0.0	4.3	0.0	2.6
American pondweed	2.1	97.9	0.0	2.1	0.0	1.3
Eelgrass	2.1	97.9	2.1	0.0	0.0	0.4
Nitella	2.1	97.9	2.1	0.0	0.0	0.4
Richardson's pondweed	2.1	97.9	0.0	2.1	0.0	1.3
Filamentous Algae	4.3					

Table 7 continued

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County: Kosciusko	Secchi (ft): 9.5			Mean species/site: 1.75	
Date: 6/5/2014	Sites with plants: 25			SE Mean species/site: 0.20	
Littoral Depth (ft): 23.0	Sites with native plants: 20			Mean native species/site: 1.04	
Littoral Sites: 28	Number of species: 13			SE Mean natives/site: 0.17	
Total Sites: 28	Number of native species: 10			Species diversity: 0.87	
	Maximum species/site: 4			Native species diversity: 0.85	

Depths: 10 to 15 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Eurasian watermilfoil	42.9	57.1	21.4	3.6	17.9	24.3
Chara	21.4	78.6	7.1	10.7	3.6	11.4
Coontail	21.4	78.6	7.1	10.7	3.6	11.4
Sago pondweed	21.4	78.6	0.0	21.4	0.0	12.9
Starry stonewort	21.4	78.6	10.7	7.1	3.6	10.0
Richardson's pondweed	10.7	89.3	3.6	7.1	0.0	5.0
Bladderwort	7.1	92.9	0.0	7.1	0.0	4.3
Curly-leaf pondweed	7.1	92.9	0.0	7.1	0.0	4.3
Nitella	7.1	92.9	0.0	7.1	0.0	4.3
Illinois pondweed	3.6	96.4	3.6	0.0	0.0	0.7
Slender naiad	3.6	96.4	3.6	0.0	0.0	0.7
Small pondweed	3.6	96.4	0.0	3.6	0.0	2.1
Whorled watermilfoil	3.6	96.4	0.0	3.6	0.0	2.1

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County: Kosciusko	Secchi (ft): 9.5			Mean species/site: 0.95	
Date: 6/5/2014	Sites with plants: 15			SE Mean species/site: 0.18	
Littoral Depth (ft): 23.0	Sites with native plants: 8			Mean native species/site: 0.50	
Littoral Sites: 22	Number of species: 8			SE Mean natives/site: 0.16	
Total Sites: 22	Number of native species: 5			Species diversity: 0.82	
	Maximum species/site: 3			Native species diversity: 0.71	

Depths: 15 to 20 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Starry stonewort	27.3	72.7	4.5	22.7	0.0	14.5
Coontail	22.7	77.3	0.0	18.2	4.5	15.5
Eurasian watermilfoil	13.6	86.4	0.0	9.1	4.5	10.0
Chara	9.1	90.9	4.5	4.5	0.0	3.6
Nitella	9.1	90.9	9.1	0.0	0.0	1.8
Curly-leaf pondweed	4.5	95.5	0.0	4.5	0.0	2.7
Illinois pondweed	4.5	95.5	4.5	0.0	0.0	0.9
Slender naiad	4.5	95.5	4.5	0.0	0.0	0.9

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County: Kosciusko	Secchi (ft): 9.5			Mean species/site: 0.40	
Date: 6/5/2014	Sites with plants: 4			SE Mean species/site: 0.16	
Littoral Depth (ft): 23.0	Sites with native plants: 4			Mean native species/site: 0.40	
Littoral Sites: 10	Number of species: 2			SE Mean natives/site: 0.16	
Total Sites: 10	Number of native species: 2			Species diversity: 0.38	
	Maximum species/site: 1			Native species diversity: 0.38	

Depths: 20 to 25 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	30.0	70.0	0.0	30.0	0.0	18.0
Nitella	10.0	90.0	0.0	10.0	0.0	6.0

Table 8: Lake Wawasee Summer 2014 Tier II Data

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County:	Kosciusko	Secchi (ft):	10.7	Mean species/site:	1.37
Date:	8/26/2014	Sites with plants:	125	SE Mean species/site:	0.09
Littoral Depth (ft):	23.0	Sites with native plants:	106	Mean native species/site:	1.03
Littoral Sites:	169	Number of species:	17	SE Mean natives/site:	0.08
Total Sites:	169	Number of native species:	14	Species diversity:	0.87
		Maximum species/site:	6	Native species diversity:	0.82

All Depths	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	34.9	65.1	16.6	16.6	1.8	15.0
Starry stonewort	18.9	81.1	5.9	5.3	7.7	12.1
Eel grass	14.2	85.8	3.6	10.1	0.6	7.3
Eurasian watermilfoil	14.2	85.8	8.3	4.1	1.8	5.9
Illinois pondweed	13.6	86.4	10.7	3.0	0.0	3.9
Sago pondweed	10.1	89.9	2.4	5.9	1.8	5.8
Slender naiad	9.5	90.5	5.9	3.6	0.0	3.3
Coontail	8.9	91.1	1.8	6.5	0.6	4.9
Bladderwort	5.3	94.7	1.8	3.6	0.0	2.5
Elodea	1.2	98.8	0.6	0.6	0.0	0.5
Flat-stemmed pondweed	1.2	98.8	1.2	0.0	0.0	0.2
Richardson's pondweed	1.2	98.8	0.0	1.2	0.0	0.7
Small pondweed	1.2	98.8	0.6	0.6	0.0	0.5
Large-leaved pondweed	0.6	99.4	0.0	0.6	0.0	0.4
Nitella	0.6	99.4	0.6	0.0	0.0	0.1
Spiny naiad	0.6	99.4	0.0	0.6	0.0	0.4
Whorled watermilfoil	0.6	99.4	0.0	0.6	0.0	0.4
Filamentous Algae	3.0					

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County:	Kosciusko	Secchi (ft):	10.7	Mean species/site:	1.56
Date:	8/26/2014	Sites with plants:	49	SE Mean species/site:	0.16
Littoral Depth (ft):	23.0	Sites with native plants:	45	Mean native species/site:	1.27
Littoral Sites:	62	Number of species:	13	SE Mean natives/site:	0.14
Total Sites:	62	Number of native species:	11	Species diversity:	0.86
		Maximum species/site:	6	Native species diversity:	0.82

Depths: 0 to 5 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	37.1	62.9	21.0	16.1	0.0	13.9
Eel grass	24.2	75.8	6.5	16.1	1.6	12.6
Illinois pondweed	22.6	77.4	17.7	4.8	0.0	6.5
Slender naiad	21.0	79.0	11.3	9.7	0.0	8.1
Eurasian watermilfoil	14.5	85.5	11.3	3.2	0.0	4.2
Starry stonewort	14.5	85.5	6.5	4.8	3.2	7.4
Bladderwort	4.8	95.2	1.6	3.2	0.0	2.3
Coontail	4.8	95.2	1.6	3.2	0.0	2.3
Elodea	3.2	96.8	1.6	1.6	0.0	1.3
Flat-stemmed pondweed	3.2	96.8	3.2	0.0	0.0	0.6
Sago pondweed	3.2	96.8	1.6	1.6	0.0	1.3
Small pondweed	1.6	98.4	1.6	0.0	0.0	0.3
Whorled watermilfoil	1.6	98.4	0.0	1.6	0.0	1.0
Filamentous Algae	6.5					

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County:	Kosciusko	Secchi (ft):	10.7	Mean species/site:	1.43
Date:	8/26/2014	Sites with plants:	37	SE Mean species/site:	0.20
Littoral Depth (ft):	23.0	Sites with native plants:	32	Mean native species/site:	1.06
Littoral Sites:	47	Number of species:	10	SE Mean natives/site:	0.14
Total Sites:	47	Number of native species:	8	Species diversity:	0.83
		Maximum species/site:	4	Native species diversity:	0.75

Depths: 5 to 10 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	46.8	53.2	25.5	21.3	0.0	17.9
Starry stonewort	19.1	80.9	10.6	6.4	2.1	8.1
Eurasian watermilfoil	17.0	83.0	6.4	4.3	6.4	10.2
Illinois pondweed	14.9	85.1	12.8	2.1	0.0	3.8
Sago pondweed	14.9	85.1	2.1	8.5	4.3	9.8
Eel grass	10.6	89.4	4.3	6.4	0.0	4.7
Coontail	8.5	91.5	2.1	4.3	2.1	5.1
Bladderwort	6.4	93.6	4.3	2.1	0.0	2.1
Large-leaved pondweed	2.1	97.9	0.0	2.1	0.0	1.3
Richardson's pondweed	2.1	97.9	0.0	2.1	0.0	1.3
Filamentous Algae	2.1					

Table 8 continued

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County: Kosciusko	Secchi (ft): 10.7	Mean species/site: 1.46	
Date: 8/26/2014	Sites with plants: 22	SE Mean species/site: 0.27	
Littoral Depth (ft): 23.0	Sites with native plants: 18	Mean native species/site: 1.14	
Littoral Sites: 28	Number of species: 10	SE Mean natives/site: 0.24	
Total Sites: 28	Number of native species: 8	Species diversity: 0.82	
	Maximum species/site: 5	Native species diversity: 0.75	

Depths: 10 to 15 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	50.0	50.0	10.7	28.6	10.7	30.0
Sago pondweed	17.9	82.1	0.0	14.3	3.6	12.1
Starry stonewort	17.9	82.1	3.6	7.1	7.1	12.1
Eel grass	14.3	85.7	0.0	14.3	0.0	8.6
Eurasian watermilfoil	14.3	85.7	10.7	3.6	0.0	4.3
Slender naiad	10.7	89.3	10.7	0.0	0.0	2.1
Bladderwort	7.1	92.9	0.0	7.1	0.0	4.3
Illinois pondweed	7.1	92.9	3.6	3.6	0.0	2.9
Coontail	3.6	96.4	0.0	3.6	0.0	2.1
Richardson's pondweed	3.6	96.4	0.0	3.6	0.0	2.1

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County: Kosciusko	Secchi (ft): 10.7	Mean species/site: 1.00	
Date: 8/26/2014	Sites with plants: 14	SE Mean species/site: 0.20	
Littoral Depth (ft): 23.0	Sites with native plants: 9	Mean native species/site: 0.50	
Littoral Sites: 22	Number of species: 6	SE Mean natives/site: 0.14	
Total Sites: 22	Number of native species: 3	Species diversity: 0.76	
	Maximum species/site: 3	Native species diversity: 0.51	

Depths: 15 to 20 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	31.8	68.2	4.5	27.3	0.0	17.3
Starry stonewort	31.8	68.2	0.0	4.5	27.3	30.0
Eurasian watermilfoil	13.6	86.4	4.5	9.1	0.0	6.4
Sago pondweed	13.6	86.4	9.1	4.5	0.0	4.5
Nitella	4.5	95.5	4.5	0.0	0.0	0.9
Spiny naiad	4.5	95.5	0.0	4.5	0.0	2.7

Occurrence and Abundance of Submersed Aquatic Plants in Lake Wawasee

County: Kosciusko	Secchi (ft): 10.7	Mean species/site: 0.40	
Date: 8/26/2014	Sites with plants: 3	SE Mean species/site: 0.22	
Littoral Depth (ft): 23.0	Sites with native plants: 2	Mean native species/site: 0.20	
Littoral Sites: 10	Number of species: 3	SE Mean natives/site: 0.13	
Total Sites: 10	Number of native species: 2	Species diversity: 0.63	
	Maximum species/site: 2	Native species diversity: 0.50	

Depths: 20 to 25 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Starry stonewort	20.0	80.0	0.0	0.0	20.0	20.0
Bladderwort	10.0	90.0	0.0	10.0	0.0	6.0
Small pondweed	10.0	90.0	0.0	10.0	0.0	6.0

Table 9: Syracuse Lake Spring 2014 Tier II Data

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Steuben	Secchi (ft):	9.3	Mean species/site:	1.54
Date:	6/4/2014	Sites with plants:	89	SE Mean species/site:	0.09
Littoral Depth (ft):	20.0	Sites with native plants:	82	Mean native species/site:	1.33
Littoral Sites:	100	Number of species:	15	SE Mean natives/site:	0.09
Total Sites:	100	Number of native species:	13	Species diversity:	0.86
		Maximum species/site:	4	Native species diversity:	0.83

All Depths	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	44.0	56.0	22.0	20.0	2.0	18.4
Sago pondweed	22.0	78.0	14.0	7.0	1.0	8.0
Nitella	14.0	86.0	7.0	6.0	1.0	6.0
Bladderwort	13.0	87.0	4.0	9.0	0.0	6.2
Coontail	13.0	87.0	4.0	9.0	0.0	6.2
Eurasian watermilfoil	11.0	89.0	9.0	2.0	0.0	3.0
Starry stonewort	10.0	90.0	7.0	3.0	0.0	3.2
Illinois pondweed	9.0	91.0	8.0	1.0	0.0	2.2
Flat-stemmed pondweed	4.0	96.0	1.0	3.0	0.0	2.0
American pondweed	3.0	97.0	1.0	2.0	0.0	1.4
Eel grass	3.0	97.0	1.0	2.0	0.0	1.4
Slender naiad	3.0	97.0	3.0	0.0	0.0	0.6
Richardson's pondweed	2.0	98.0	0.0	2.0	0.0	1.2
Whorled watermilfoil	2.0	98.0	1.0	1.0	0.0	0.8
Small pondweed	1.0	99.0	1.0	0.0	0.0	0.2
Filamentous Algae	2.0					

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Steuben	Secchi (ft):	9.3	Mean species/site:	1.57
Date:	6/4/2014	Sites with plants:	39	SE Mean species/site:	0.14
Littoral Depth (ft):	20.0	Sites with native plants:	39	Mean native species/site:	1.43
Littoral Sites:	44	Number of species:	13	SE Mean natives/site:	0.13
Total Sites:	44	Number of native species:	11	Species diversity:	0.79
		Maximum species/site:	4	Native species diversity:	0.75

Depths: 0 to 5 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	63.6	36.4	29.5	29.5	4.5	28.2
Sago pondweed	22.7	77.3	15.9	4.5	2.3	8.2
Bladderwort	18.2	81.8	4.5	13.6	0.0	9.1
Illinois pondweed	9.1	90.9	6.8	2.3	0.0	2.7
Starry stonewort	9.1	90.9	4.5	4.5	0.0	3.6
American pondweed	6.8	93.2	2.3	4.5	0.0	3.2
Coontail	6.8	93.2	0.0	6.8	0.0	4.1
Eel grass	4.5	95.5	2.3	2.3	0.0	1.8
Eurasian watermilfoil	4.5	95.5	4.5	0.0	0.0	0.9
Whorled watermilfoil	4.5	95.5	2.3	2.3	0.0	1.8
Flat-stemmed pondweed	2.3	97.7	0.0	2.3	0.0	1.4
Slender naiad	2.3	97.7	2.3	0.0	0.0	0.5
Richardson's pondweed	2.3	97.7	0.0	2.3	0.0	1.4
Filamentous Algae	4.5					

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Steuben	Secchi (ft):	9.3	Mean species/site:	1.80
Date:	6/4/2014	Sites with plants:	24	SE Mean species/site:	0.19
Littoral Depth (ft):	20.0	Sites with native plants:	22	Mean native species/site:	1.56
Littoral Sites:	25	Number of species:	12	SE Mean natives/site:	0.20
Total Sites:	25	Number of native species:	10	Species diversity:	0.86
		Maximum species/site:	4	Native species diversity:	0.82

Depths: 5 to 10 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	48.0	52.0	28.0	20.0	0.0	17.6
Sago pondweed	32.0	68.0	24.0	8.0	0.0	9.6
Eurasian watermilfoil	20.0	80.0	16.0	4.0	0.0	5.6
Illinois pondweed	20.0	80.0	20.0	0.0	0.0	4.0
Coontail	16.0	84.0	4.0	12.0	0.0	8.0
Bladderwort	8.0	92.0	0.0	8.0	0.0	4.8
Flat-stemmed pondweed	8.0	92.0	0.0	8.0	0.0	4.8
Slender naiad	8.0	92.0	8.0	0.0	0.0	1.6
Nitella	8.0	92.0	4.0	4.0	0.0	3.2
Eel grass	4.0	96.0	0.0	4.0	0.0	2.4
Richardson's pondweed	4.0	96.0	0.0	4.0	0.0	2.4
Starry stonewort	4.0	96.0	4.0	0.0	0.0	0.8

Table 9 continued

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Steuben	Secchi (ft):	9.3	Mean species/site:	1.57
Date:	6/4/2014	Sites with plants:	20	SE Mean species/site:	0.18
Littoral Depth (ft):	20.0	Sites with native plants:	16	Mean native species/site:	1.24
Littoral Sites:	21	Number of species:	9	SE Mean natives/site:	0.21
Total Sites:	21	Number of native species:	7	Species diversity:	0.86
		Maximum species/site:	3	Native species diversity:	0.81

Depths: 10 to 15 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Nitella	33.3	66.7	19.0	14.3	0.0	12.4
Coontail	28.6	71.4	14.3	14.3	0.0	11.4
Chara	19.0	81.0	9.5	9.5	0.0	7.6
Sago pondweed	19.0	81.0	4.8	14.3	0.0	9.5
Starry stonewort	19.0	81.0	14.3	4.8	0.0	5.7
Bladderwort	14.3	85.7	9.5	4.8	0.0	4.8
Eurasian watermilfoil	14.3	85.7	9.5	4.8	0.0	4.8
Flat-stemmed pondweed	4.8	95.2	4.8	0.0	0.0	1.0
Small pondweed	4.8	95.2	4.8	0.0	0.0	1.0

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Steuben	Secchi (ft):	9.3	Mean species/site:	0.70
Date:	6/4/2014	Sites with plants:	6	SE Mean species/site:	0.21
Littoral Depth (ft):	20.0	Sites with native plants:	5	Mean native species/site:	0.50
Littoral Sites:	10	Number of species:	3	SE Mean natives/site:	0.17
Total Sites:	10	Number of native species:	1	Species diversity:	0.45
		Maximum species/site:	2	Native species diversity:	0.00

Depths: 15 to 20 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Nitella	50.0	50.0	20.0	20.0	10.0	26.0
Eurasian watermilfoil	10.0	90.0	10.0	0.0	0.0	2.0
Starry stonewort	10.0	90.0	10.0	0.0	0.0	2.0

Table 10: Syracuse Lake Summer 2014 Tier II Data

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Kosciusko	Secchi (ft):	17.5	Mean species/site:	1.73
Date:	8/15/2014	Sites with plants:	90	SE Mean species/site:	0.10
Littoral Depth (ft):	20.0	Sites with native plants:	85	Mean native species/site:	1.38
Littoral Sites:	100	Number of species:	16	SE Mean natives/site:	0.09
Total Sites:	100	Number of native species:	13	Species diversity:	0.88
		Maximum species/site:	4	Native species diversity:	0.83

All Depths	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	36.0	64.0	11.0	23.0	2.0	18.0
Sago pondweed	33.0	67.0	6.0	23.0	4.0	19.0
Bladderwort	19.0	81.0	2.0	16.0	1.0	11.0
Eurasian watermilfoil	18.0	82.0	11.0	3.0	4.0	8.0
Eel grass	13.0	87.0	4.0	9.0	0.0	6.2
Spiny naiad	13.0	87.0	1.0	9.0	3.0	8.6
Illinois pondweed	10.0	90.0	7.0	3.0	0.0	3.2
Coontail	7.0	93.0	0.0	5.0	2.0	5.0
Slender naiad	7.0	93.0	3.0	3.0	1.0	3.4
Small pondweed	4.0	96.0	3.0	1.0	0.0	1.2
Starry stonewort	4.0	96.0	2.0	2.0	0.0	1.6
Nitella	3.0	97.0	1.0	2.0	0.0	1.4
Flat-stemmed pondweed	2.0	98.0	1.0	1.0	0.0	0.8
Richardson's pondweed	2.0	98.0	0.0	2.0	0.0	1.2
American pondweed	1.0	99.0	0.0	1.0	0.0	0.6
Whorled watermilfoil	1.0	99.0	1.0	0.0	0.0	0.2
Filamentous Algae	2.0					

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Kosciusko	Secchi (ft):	17.5	Mean species/site:	1.75
Date:	8/15/2014	Sites with plants:	40	SE Mean species/site:	0.15
Littoral Depth (ft):	20.0	Sites with native plants:	39	Mean native species/site:	1.59
Littoral Sites:	44	Number of species:	13	SE Mean natives/site:	0.14
Total Sites:	44	Number of native species:	10	Species diversity:	0.80
		Maximum species/site:	4	Native species diversity:	0.77

Depths: 0 to 5 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Chara	61.4	38.6	18.2	40.9	2.3	30.5
Bladderwort	34.1	65.9	2.3	31.8	0.0	19.5
Sago pondweed	27.3	72.7	2.3	22.7	2.3	16.4
Eurasian watermilfoil	11.4	88.6	9.1	0.0	2.3	4.1
Illinois pondweed	11.4	88.6	9.1	2.3	0.0	3.2
Eel grass	9.1	90.9	0.0	9.1	0.0	5.5
Slender naiad	4.5	95.5	4.5	0.0	0.0	0.9
Small pondweed	4.5	95.5	2.3	2.3	0.0	1.8
American pondweed	2.3	97.7	0.0	2.3	0.0	1.4
Coontail	2.3	97.7	0.0	2.3	0.0	1.4
Flat-stemmed pondweed	2.3	97.7	0.0	2.3	0.0	1.4
Spiny naiad	2.3	97.7	0.0	2.3	0.0	1.4
Starry stonewort	2.3	97.7	2.3	0.0	0.0	0.5
Filamentous Algae	4.5					

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Kosciusko	Secchi (ft):	17.5	Mean species/site:	2.08
Date:	8/15/2014	Sites with plants:	24	SE Mean species/site:	0.19
Littoral Depth (ft):	20.0	Sites with native plants:	24	Mean native species/site:	1.64
Littoral Sites:	25	Number of species:	13	SE Mean natives/site:	0.18
Total Sites:	25	Number of native species:	11	Species diversity:	0.85
		Maximum species/site:	4	Native species diversity:	0.80

Depths: 5 to 10 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Sago pondweed	60.0	40.0	20.0	32.0	8.0	31.2
Chara	28.0	72.0	12.0	12.0	4.0	13.6
Spiny naiad	24.0	76.0	4.0	8.0	12.0	17.6
Eel grass	20.0	80.0	4.0	16.0	0.0	10.4
Eurasian watermilfoil	20.0	80.0	8.0	4.0	8.0	12.0
Bladderwort	16.0	84.0	4.0	8.0	4.0	9.6
Illinois pondweed	16.0	84.0	12.0	4.0	0.0	4.8
Coontail	4.0	96.0	0.0	4.0	0.0	2.4
Flat-stemmed pondweed	4.0	96.0	4.0	0.0	0.0	0.8
Richardson's pondweed	4.0	96.0	0.0	4.0	0.0	2.4
Slender naiad	4.0	96.0	0.0	4.0	0.0	2.4
Small pondweed	4.0	96.0	4.0	0.0	0.0	0.8
Whorled watermilfoil	4.0	96.0	4.0	0.0	0.0	0.8

Table 10 continued

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Kosciusko	Secchi (ft):	17.5	Mean species/site:	1.71
Date:	8/15/2014	Sites with plants:	19	SE Mean species/site:	0.20
Littoral Depth (ft):	20.0	Sites with native plants:	16	Mean native species/site:	1.00
Littoral Sites:	21	Number of species:	12	SE Mean natives/site:	0.15
Total Sites:	21	Number of native species:	9	Species diversity:	0.87
		Maximum species/site:	3	Native species diversity:	0.83

Depths: 10 to 15 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Eurasian watermilfoil	33.3	66.7	23.8	4.8	4.8	12.4
Sago pondweed	28.6	71.4	0.0	23.8	4.8	19.0
Spiny naiad	28.6	71.4	0.0	28.6	0.0	17.1
Eel grass	19.0	81.0	14.3	4.8	0.0	5.7
Coontail	14.3	85.7	0.0	4.8	9.5	12.4
Slender naiad	14.3	85.7	0.0	9.5	4.8	10.5
Starry stonewort	9.5	90.5	0.0	9.5	0.0	5.7
Chara	4.8	95.2	0.0	4.8	0.0	2.9
Illinois pondweed	4.8	95.2	0.0	4.8	0.0	2.9
Nitella	4.8	95.2	4.8	0.0	0.0	1.0
Richardson's pondweed	4.8	95.2	0.0	4.8	0.0	2.9
Small pondweed	4.8	95.2	4.8	0.0	0.0	1.0

Occurrence and Abundance of Submersed Aquatic Plants in Syracuse Lake

County:	Kosciusko	Secchi (ft):	17.5	Mean species/site:	0.80
Date:	8/15/2014	Sites with plants:	7	SE Mean species/site:	0.20
Littoral Depth (ft):	20.0	Sites with native plants:	6	Mean native species/site:	0.60
Littoral Sites:	10	Number of species:	6	SE Mean natives/site:	0.16
Total Sites:	10	Number of native species:	4	Species diversity:	0.81
		Maximum species/site:	2	Native species diversity:	0.72

Depths: 15 to 20 ft	Frequency of	Rake score frequency per species				Plant
Species	Occurrence	0	1	3	5	Dominance
Coontail	20.0	80.0	0.0	20.0	0.0	12.0
Nitella	20.0	80.0	0.0	20.0	0.0	12.0
Chara	10.0	90.0	0.0	10.0	0.0	6.0
Eurasian watermilfoil	10.0	90.0	0.0	10.0	0.0	6.0
Slender naiad	10.0	90.0	10.0	0.0	0.0	2.0
Starry stonewort	10.0	90.0	10.0	0.0	0.0	2.0

Table 11: Lake Wawasee Multi-Year Tier II Data Presentation

Lake Wawasee Multi-year Data Presentation												
Date:	5/26/2005	8/10/2005	7/26/2006	8/12/2009	6/22/2011	9/8/2011	5/30/2012	8/22/2012	6/7/2013	8/16/2013	6/5/2014	8/26/2014
Total Sites:	360	360	100.0	100	169	169	169	169	169	169	169	169
Secchi (ft):	10.0	10.0	8.0	8.5	8.0	7.8	15.5	11.2	17.0	16	9.5	10.7
Number of Species:	16	20	18	16	19	18	18	17	16	17	17	17
Number of Native Species:	14	18	16	14	16	16	15	14	13	15	14	14
Sites with plants	323	323	90	78	136	129	142	142	138	143	140	125
Sites with Native Plants	322	320	88	71	116	113	113	116	102	121	110	106
Maximum Plant Depth (ft)	22	23	19	24	23	22	23	23	23	23	23	23
Species Diversity:	0.81	0.88	1.00	0.85	0.90	0.90	0.89	0.90	0.87	0.87	0.87	0.87
Native Species Diversity:	0.75	0.86	0.99	0.83	0.88	0.88	0.88	0.87	0.83	0.84	0.82	0.82
Mean Native Species/Site:	1.33	1.93	2	1.15	1.18	1.33	0.89	1.36	0.85	1.19	0.96	1.03
Surveying organization	AWC	AWC	V3	V3	AWC	AWC	AWC	AWC	AWC	AWC	AWC	AWC
Species Frequency of Occurrence - All Depths												
Eurasian watermilfoil	12.8	11.1	28.0	33.0	29.6	23.7	33.7	23.7	26.6	11.2	21.9	14.2
Coontail	10.6	15.3	31.0	18.0	23.1	21.3	16.0	17.8	15.4	17.2	16.6	8.9
Chara	59.7	55.3	49.0	39.0	23.1	24.3	18.3	29.6	26.0	34.9	32.0	34.9
Starry stonewort	0.0	0.0	0.0	0.0	17.8	14.2	17.2	23.1	23.7	27.2	27.2	18.9
Eelgrass	2.5	14.7	12.0	14.0	13.6	16.0	4.1	19.5	3.6	16.0	2.4	14.2
Illinois pondweed	0.0	2.2	7.0	3.0	11.2	17.8	11.8	17.8	12.4	18.9	10.7	13.6
Curly-leaf pondweed	10.3	0.6	2.0	1.0	8.9	0.0	10.7	0.6	4.7	0.0	5.3	0.0
Bladderwort	4.7	18.3	9.0	4.0	7.7	7.7	5.3	4.7	1.8	2.4	5.3	5.3
Sago pondweed	1.9	9.7	8.0	6.0	6.5	16.0	8.9	15.4	8.3	8.9	11.8	10.1
Flat-stemmed pondweed	5.0	2.5	4.0	0.0	6.5	0.0	0.6	0.0	1.8	1.2	1.2	1.2
Richardson's pondweed	10.3	4.7	2.0	7.0	5.9	7.1	3.0	4.1	3.6	4.7	3.6	1.2
Whorled watermilfoil	3.9	7.2	4.0	4.0	5.3	1.8	8.9	5.3	3.0	5.3	1.8	0.6
Small pondweed	0.0	0.0	2.0	1.0	4.1	1.2	3.6	1.8	0.0	1.2	0.6	1.2
Nitella	1.7	0.3	8.0	5.0	4.1	1.2	2.4	1.8	4.1	0.6	4.1	0.6
Saggitaria sp.	0.0	2.5	0.0	0.0	3.0	1.8	0.0	0.6	0.0	0.0	0.0	0.0
American pondweed	0.0	0.0	0.0	1.0	2.4	0.6	1.2	1.2	1.8	0.6	1.8	0.0
Elodea	0.8	0.6	2.0	0.0	0.6	0.0	2.4	1.2	1.2	1.2	0.6	1.2
Large-leaved pondweed	2.2	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Slender naiad	3.3	18.9	10.0	7.0	0.6	11.8	2.4	15.4	1.8	5.3	3.6	9.5
Southern naiad	0.0	2.5	2.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0
Spiny naiad	0.0	0.8	0.0	1.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Variable pondweed	0.0	18.6	9.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Water stargrass	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Northern watermilfoil	22.2	0.0	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horned pondweed	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White-stemmed pondweed	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Species Frequency of Occurrence - 0 to 5 ft												
Eelgrass	NA	NA	NA	6.9	30.6	27.0	9.7	37.1	9.7	24.2	4.8	24.2
Coontail	NA	NA	NA	3.4	25.8	20.6	19.4	16.1	12.9	12.9	17.7	4.8
Eurasian watermilfoil	NA	NA	NA	3.4	24.2	20.6	21.0	21.0	24.2	9.7	22.6	14.5
Chara	NA	NA	NA	62.1	22.6	22.2	17.7	32.3	27.4	41.9	37.1	37.1
Starry stonewort	NA	NA	NA	0.0	19.4	17.5	21.0	19.4	29.0	32.3	30.6	14.5
Illinois pondweed	NA	NA	NA	10.3	16.1	19.0	16.1	25.8	14.5	27.4	17.7	22.6
Bladderwort	NA	NA	NA	0.0	12.9	7.9	8.1	11.3	1.6	1.6	8.1	4.8
Flat-stemmed pondweed	NA	NA	NA	0.0	11.3	1.6	0.0	0.0	1.6	3.2	3.2	3.2
Sago pondweed	NA	NA	NA	0.0	9.7	15.9	8.1	17.7	9.7	9.7	11.3	3.2
Small pondweed	NA	NA	NA	3.4	9.7	0.0	1.6	0.0	0.0	1.6	0.0	1.6
Whorled watermilfoil	NA	NA	NA	0.0	9.7	3.2	11.3	4.8	4.8	8.1	3.2	1.6
Richardson's pondweed	NA	NA	NA	10.3	8.1	9.5	4.8	6.5	6.5	6.5	3.2	0.0
Saggitaria sp.	NA	NA	NA	0.0	6.5	4.8	0.0	1.6	0.0	0.0	0.0	0.0
American pondweed	NA	NA	NA	3.4	4.8	1.6	3.2	1.6	4.8	1.6	3.2	0.0
Curly-leaf pondweed	NA	NA	NA	0.0	4.8	0.0	8.1	0.0	4.8	0.0	3.2	0.0
Elodea	NA	NA	NA	0.0	1.6	0.0	4.8	3.2	3.2	0.0	1.6	3.2
Large-leaved pondweed	NA	NA	NA	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slender naiad	NA	NA	NA	10.3	0.0	19.0	4.8	21.0	3.2	8.1	6.5	21.0
Southern naiad	NA	NA	NA	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0
Water stargrass	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
Spiny naiad	NA	NA	NA	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nitella	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0

Table 11 continued

Species Frequency of Occurrence - 5 to 10 ft												
Chara	NA	NA	NA	59.1	35.6	37.8	25.5	31.1	36.2	44.7	48.9	46.8
Eurasian watermilfoil	NA	NA	NA	27.3	33.3	20.0	44.7	26.7	27.7	12.8	17.0	17.0
Starry stonewort	NA	NA	NA	0.0	26.7	11.1	21.3	35.6	29.8	27.7	31.9	19.1
Illinois pondweed	NA	NA	NA	0.0	13.3	22.2	17.0	24.4	21.3	21.3	10.6	14.9
Bladderwort	NA	NA	NA	18.2	8.9	13.3	6.4	2.2	2.1	4.3	4.3	6.4
Curly-leaf pondweed	NA	NA	NA	0.0	8.9	0.0	12.8	0.0	6.4	0.0	8.5	0.0
Eel grass	NA	NA	NA	31.8	8.9	13.3	2.1	13.3	0.0	14.9	2.1	10.6
Coontail	NA	NA	NA	0.0	6.7	11.1	4.3	15.6	8.5	6.4	6.4	8.5
Richardson's pondweed	NA	NA	NA	18.2	6.7	4.4	2.1	6.7	4.3	2.1	2.1	2.1
Sago pondweed	NA	NA	NA	13.6	6.7	11.1	17.0	20.0	8.5	10.6	14.9	14.9
Flat-stemmed pondweed	NA	NA	NA	0.0	6.7	0.0	2.1	0.0	2.1	0.0	0.0	0.0
Nitella	NA	NA	NA	0.0	4.4	0.0	0.0	0.0	4.3	0.0	2.1	0.0
American pondweed	NA	NA	NA	0.0	2.2	0.0	0.0	2.2	0.0	0.0	2.1	0.0
Saggitaria sp.	NA	NA	NA	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Whorled watermilfoil	NA	NA	NA	9.1	2.2	2.2	12.8	8.9	2.1	8.5	0.0	0.0
Slender naiad	NA	NA	NA	0.0	0.0	13.3	2.1	20.0	2.1	8.5	0.0	0.0
Small pondweed	NA	NA	NA	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0
Variable pondweed	NA	NA	NA	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0
Elodea	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0
Large-leaved pondweed	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1
White-stemmed pondweed	NA	NA	NA	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Species Frequency of Occurrence - 10 to 15 ft												
Eurasian watermilfoil	NA	NA	NA	60.0	50.0	40.7	57.1	35.7	42.9	14.3	42.9	14.3
Coontail	NA	NA	NA	24.0	35.7	22.2	32.1	25.0	17.9	14.3	21.4	3.6
Chara	NA	NA	NA	28.0	25.0	29.6	25.0	53.6	35.7	35.7	21.4	50.0
Curly-leaf pondweed	NA	NA	NA	0.0	21.4	0.0	21.4	0.0	3.6	0.0	7.1	0.0
Starry stonewort	NA	NA	NA	0.0	7.1	7.4	3.6	10.7	7.1	21.4	21.4	17.9
Whorled watermilfoil	NA	NA	NA	4.0	7.1	0.0	7.1	0.0	3.6	0.0	3.6	0.0
Richardson's pondweed	NA	NA	NA	4.0	7.1	7.4	3.6	0.0	0.0	7.1	10.7	3.6
Sago pondweed	NA	NA	NA	12.0	7.1	18.5	7.1	17.9	3.6	10.7	21.4	17.9
Small pondweed	NA	NA	NA	0.0	3.6	0.0	14.3	3.6	0.0	0.0	3.6	0.0
Bladderwort	NA	NA	NA	0.0	3.6	3.7	3.6	0.0	3.6	3.6	7.1	7.1
Flat-stemmed pondweed	NA	NA	NA	0.0	3.6	0.0	0.0	0.0	3.6	0.0	0.0	0.0
Illinois pondweed	NA	NA	NA	0.0	3.6	18.5	7.1	7.1	7.1	17.9	3.6	7.1
Slender naiad	NA	NA	NA	12.0	3.6	3.7	0.0	10.7	0.0	0.0	3.6	10.7
Eel grass	NA	NA	NA	20.0	0.0	14.8	0.0	10.7	0.0	14.3	0.0	14.3
Southern naiad	NA	NA	NA	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0
Nitella	NA	NA	NA	4.0	0.0	0.0	7.1	0.0	3.6	0.0	7.1	0.0
White-stemmed pondweed	NA	NA	NA	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spiny naiad	NA	NA	NA	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Species Frequency of Occurrence - 15 to 20 ft												
Coontail	NA	NA	NA	43.8	37.5	33.3	13.6	25.0	31.8	45.5	22.7	31.8
Eurasian watermilfoil	NA	NA	NA	50.0	25.0	20.8	31.8	16.7	13.6	9.1	13.6	13.6
Starry stonewort	NA	NA	NA	0.0	16.7	20.8	22.7	33.3	22.7	27.3	27.3	31.8
Nitella	NA	NA	NA	18.8	12.5	8.3	4.5	8.3	13.6	4.5	9.1	4.5
Chara	NA	NA	NA	6.3	8.3	8.3	4.5	4.2	0.0	9.1	9.1	0.0
Illinois pondweed	NA	NA	NA	0.0	8.3	12.5	0.0	4.2	0.0	0.0	4.5	0.0
Curly-leaf pondweed	NA	NA	NA	6.3	4.2	0.0	0.0	4.2	4.5	0.0	4.5	0.0
Sago pondweed	NA	NA	NA	0.0	0.0	29.2	0.0	4.2	13.6	4.5	0.0	0.0
Richardson's pondweed	NA	NA	NA	0.0	0.0	8.3	0.0	0.0	0.0	4.5	0.0	0.0
Chara	NA	NA	NA	0.0	0.0	8.3	0.0	4.2	0.0	0.0	0.0	0.0
Bladderwort	NA	NA	NA	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0
Slender naiad	NA	NA	NA	0.0	0.0	4.2	0.0	4.2	0.0	0.0	4.5	0.0
Spiny naiad	NA	NA	NA	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	4.5
Elodea	NA	NA	NA	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0
Small pondweed	NA	NA	NA	0.0	0.0	0.0	4.5	4.2	0.0	0.0	0.0	0.0
Whorled watermilfoil	NA	NA	NA	6.3	0.0	0.0	0.0	8.3	0.0	0.0	0.0	0.0
Eelgrass	NA	NA	NA	0.0	0.0	0.0	0.0	4.2	0.0	4.5	0.0	0.0
Species Frequency of Occurrence 20 to 25 ft												
Nitella	NA	NA	NA	12.5	20.0	40.0	10.0	10.0	10.0	0.0	10.0	0.0
Coontail	NA	NA	NA	50.0	10.0	0.0	10.0	0.0	20.0	40.0	30.0	0.0
Curly-leaf pondweed	NA	NA	NA	0.0	10.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0
Eurasian watermilfoil	NA	NA	NA	37.5	0.0	20.0	0.0	10.0	20.0	10.0	0.0	0.0
Starry stonewort	NA	NA	NA	0.0	0.0	10.0	0.0	0.0	10.0	10.0	0.0	20.0
Small pondweed	NA	NA	NA	0.0	0.0	0.0	0.0	10.0	0.0	10.0	0.0	10.0
Bladderwort	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0

Table 12: Syracuse Lake Multi-Year Tier II Data Presentation

Syracuse Lake Multi-Year Data Presentation												
Date:	8/19/2004	8/5/2005	8/9/2006	8/12/2009	6/29/2011	8/25/2011	6/1/2012	8/16/2012	6/11/2013	8/9/2013	6/4/2014	8/15/2014
Total Sites:	80	80	80	80	100	100	100	100	100	100	100	100
Secchi (ft):	10.0	12.0	9.0	15.3	13.0	9.5	14.0	13.7	16.5	12	9.3	17.5
Number of Species:	11	14	16	17	13	17	15	18	16	13	15	16
Number of Native Species:	10	12	14	15	12	16	12	16	13	10	13	13
Sites with Plants	NA	75	66	75	96	92	87	96	90	88	89	90
Sites with Native Plants	NA	73	63	74	92	89	78	92	85	82	82	85
Maximum Plant Depth (ft)	NA	17	17	20	20	18	20	20	18	20	20	20
Species Diversity:	0.84	0.84	0.89	0.86	0.86	0.84	0.84	0.87	0.83	0.85	0.86	0.88
Native Species Diversity:	0.76	0.82	0.88	0.84	0.83	0.82	0.79	0.85	0.77	0.8	0.83	0.88
Mean Native Species/Site:	1.92	2.16	1.83	2.36	1.82	1.58	1.32	2.09	1.36	1.42	1.33	1.38
Surveying Organization	AWC	AWC	AWC	AWC	AWC	AWC	AWC	AWC	AWC	AWC	AWC	AWC
Species Frequency of Occurrence - All Depths												
Chara	77.3	66.3	43.8	66.3	59.0	58.0	53.0	59.0	57.0	51.0	44.0	36.0
Eurasian watermilfoil	33.3	12.5	21.3	25.0	31.0	26.0	30.0	46.0	26.0	21.0	11.0	18.0
Illinois pondweed	30.7	23.8	18.8	12.5	25.0	15.0	9.0	30.0	21.0	25.0	9.0	10.0
Sago pondweed	12.0	17.5	20.0	16.3	14.0	10.0	18.0	27.0	15.0	16.0	22.0	33.0
Eel grass	9.3	10.0	15.0	27.5	16.0	21.0	5.0	22.0	5.0	8.0	3.0	13.0
Coontail	5.3	22.5	16.3	28.8	18.0	15.0	14.0	17.0	12.0	19.0	13.0	7.0
Slender naiad	9.3	3.8	13.8	8.8	4.0	6.0	3.0	17.0	1.0	6.0	3.0	7.0
Nitella	0.0	0.0	0.0	10.0	15.0	7.0	12.0	10.0	8.0	5.0	14.0	3.0
Bladderwort	0.0	48.8	22.5	17.5	17.0	12.0	7.0	6.0	6.0	6.0	13.0	19.0
Spiny naiad	0.0	0.0	5.0	1.3	0.0	2.0	0.0	5.0	0.0	1.0	0.0	13.0
American pondweed	14.7	6.3	1.3	1.3	0.0	4.0	2.0	4.0	5.0	4.0	3.0	1.0
Richardson's pondweed	0.0	0.0	12.5	2.5	5.0	2.0	2.0	3.0	1.0	0.0	2.0	2.0
Whorled watermilfoil	0.0	0.0	3.8	6.3	2.0	1.0	2.0	3.0	2.0	2.0	2.0	1.0
Flat-stemmed pondweed	0.0	11.3	1.3	1.3	3.0	1.0	3.0	3.0	1.0	0.0	4.0	2.0
Starry stonewort	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	3.0	7.0	10.0	4.0
Small pondweed	0.0	0.0	6.3	3.8	4.0	1.0	2.0	1.0	2.0	0.0	1.0	4.0
Elodea	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Saggitaria sp.	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0
Curly-leaf pondweed	42.7	3.8	1.3	0.0	0.0	0.0	2.0	0.0	3.0	0.0	0.0	0.0
Southern naiad	0.0	0.0	0.0	6.3	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Northern watermilfoil	13.3	3.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water stargrass	9.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Large-leaved pondweed	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Species Frequency of Occurrence - 0 to 5 ft												
Chara	NA	NA	84.0	92.0	84.1	70.5	54.5	61.4	65.9	63.6	63.6	61.4
Illinois pondweed	NA	NA	36.0	24.0	38.6	25.0	15.9	43.2	34.1	31.8	9.1	11.4
Eurasian watermilfoil	NA	NA	0.0	8.0	18.2	9.1	18.2	38.6	13.6	11.4	4.5	11.4
Sago pondweed	NA	NA	12.0	24.0	11.4	11.4	20.5	29.5	11.4	9.1	22.7	27.3
Slender naiad	NA	NA	16.0	16.0	6.8	6.8	4.5	22.7	0.0	11.4	2.3	4.5
Eel grass	NA	NA	8.0	24.0	18.2	9.1	4.5	22.7	6.8	4.5	4.5	9.1
Bladderwort	NA	NA	36.0	12.0	20.5	11.4	13.6	9.1	11.4	9.1	18.2	34.1
American pondweed	NA	NA	4.0	4.0	0	9.1	4.5	6.8	6.8	9.1	6.8	2.3
Whorled watermilfoil	NA	NA	4.0	12.0	2.3	2.3	4.5	6.8	4.5	4.5	4.5	0.0
Flat-stemmed pondweed	NA	NA	0.0	0.0	2.3	0.0	2.3	4.5	0.0	0.0	2.3	2.3
Spiny naiad	NA	NA	0.0	0.0	0	0.0	0.0	2.3	0.0	2.3	0.0	2.3
Richardson's pondweed	NA	NA	0.0	8.0	2.3	2.3	0.0	2.3	0.0	0.0	2.3	0.0
Starry stonewort	NA	NA	0.0	0.0	0	0.0	4.5	2.3	2.3	9.1	9.1	2.3
Coontail	NA	NA	4.0	8.0	4.5	6.8	6.8	2.3	6.8	11.4	6.8	2.3
Elodea	NA	NA	0.0	0.0	0	0.0	0.0	2.3	0.0	0.0	0.0	0.0
Saggitaria sp.	NA	NA	0.0	0.0	0	2.3	0.0	2.3	0.0	0.0	0.0	0.0
Curly-leaf pondweed	NA	NA	0.0	0.0	0	0.0	4.5	0.0	2.3	0.0	0.0	0.0
Small pondweed	NA	NA	4.0	0.0	6.8	0.0	2.3	0.0	4.5	0.0	0.0	4.5
Southern naiad	NA	NA	0.0	8.0	0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Northern watermilfoil	NA	NA	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nitella	NA	NA	0.0	0.0	0	0.0	0.0	0.0	2.3	0.0	0.0	0.0

Table 12 continued

Species Frequency of Occurrence - 5 to 10 ft											
Chara	NA	NA	52.2	70.8	52.0	80.0	56.0	68.0	64.0	52.0	48.0	28.0
Eurasian watermilfoil	NA	NA	26.1	33.3	52.0	36.0	40.0	56.0	40.0	44.0	20.0	20.0
Sago pondweed	NA	NA	30.4	16.7	16.0	12.0	20.0	40.0	28.0	32.0	32.0	60.0
Eel grass	NA	NA	26.1	41.7	16.0	40.0	8.0	32.0	4.0	16.0	4.0	20.0
Illinois pondweed	NA	NA	17.4	16.7	16.0	16.0	8.0	32.0	24.0	24.0	20.0	16.0
Coontail	NA	NA	21.7	33.3	20.0	8.0	8.0	20.0	16.0	16.0	16.0	4.0
Slender naiad	NA	NA	8.7	4.2	4.0	8.0	4.0	12.0	0.0	0.0	8.0	4.0
Richardson's pondweed	NA	NA	13.0	0.0	8.0	0.0	0.0	4.0	0.0	0.0	4.0	4.0
Small pondweed	NA	NA	8.7	8.3	4.0	0.0	4.0	4.0	0.0	0.0	0.0	4.0
Bladderwort	NA	NA	30.4	12.5	20.0	12.0	4.0	4.0	4.0	4.0	8.0	16.0
Spiny naiad	NA	NA	13.0	4.2	0.0	0.0	0.0	4.0	0.0	0.0	0.0	24.0
Flat-stemmed pondweed	NA	NA	4.3	4.2	8.0	4.0	4.0	4.0	0.0	0.0	8.0	4.0
Nitella	NA	NA	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	8.0	0.0
Southern naiad	NA	NA	0.0	12.5	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0
Whorled watermilfoil	NA	NA	4.3	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
Curly-leaf pondweed	NA	NA	4.3	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0
Starry stonewort	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	4.0	0.0
Species Frequency of Occurrence - 10 to 15 ft											
Eurasian watermilfoil	NA	NA	45.5	47.6	47.6	57.1	52.4	71.4	38.1	23.8	14.3	33.3
Chara	NA	NA	9.1	52.4	38.1	33.3	66.7	66.7	47.6	42.9	19.0	4.8
Coontail	NA	NA	27.3	42.9	38.1	38.1	19.0	42.9	19.0	47.6	28.6	14.3
Eel grass	NA	NA	18.2	28.6	14.3	28.6	4.8	19.0	4.8	9.5	0.0	19.0
Sago pondweed	NA	NA	22.7	14.3	23.8	9.5	14.3	19.0	14.3	19.0	19.0	28.6
Spiny naiad	NA	NA	4.5	0.0	0.0	9.5	0.0	14.3	0.0	0.0	0.0	28.6
Illinois pondweed	NA	NA	9.1	0.0	19.0	0.0	0.0	14.3	0.0	23.8	0.0	4.8
Slender naiad	NA	NA	22.7	9.5	0.0	4.8	0.0	14.3	0.0	4.8	0.0	14.3
Nitella	NA	NA	0.0	9.5	33.3	19.0	19.0	9.5	4.8	4.8	33.3	4.8
Bladderwort	NA	NA	9.1	0.0	9.5	19.0	0.0	4.8	0.0	4.8	14.3	0.0
Richardson's pondweed	NA	NA	9.1	0.0	9.5	4.8	9.5	4.8	4.8	0.0	0.0	4.8
Starry stonewort	NA	NA	0.0	0.0	0.0	0.0	4.8	4.8	4.8	9.5	19.0	9.5
American pondweed	NA	NA	0.0	0.0	0.0	0.0	0.0	4.8	9.5	0.0	0.0	0.0
Flat-stemmed pondweed	NA	NA	0.0	0.0	0.0	0.0	4.8	0.0	4.8	0.0	4.8	0.0
Small pondweed	NA	NA	9.1	4.8	0.0	4.8	0.0	0.0	0.0	0.0	4.8	4.8
Curly-leaf pondweed	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0
Whorled watermilfoil	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Species Frequency of Occurrence - 15 to 20 ft											
Nitella	NA	NA	0.0	60.0	80.0	30.0	70.0	80.0	60.0	40.0	50.0	20.0
Coontail	NA	NA	10.0	40.0	30.0	20.0	50.0	20.0	10.0	0.0	0.0	20.0
Chara	NA	NA	0.0	20.0	10.0	0.0	10.0	10.0	20.0	10.0	0.0	10.0
Slender naiad	NA	NA	0.0	0.0	0.0	0.0	0.0	10.0	10.0	0.0	0.0	10.0
Sago pondweed	NA	NA	10.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0
Eurasian watermilfoil	NA	NA	10.0	0.0	0.0	10.0	0.0	0.0	20.0	0.0	10.0	10.0
Eel grass	NA	NA	10.0	0.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Bladderwort	NA	NA	10.0	20.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Whorled watermilfoil	NA	NA	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Starry stonewort	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	100.0

Secchi depth and water quality history

Water clarity was good in the summer of 2014 in both Lake Wawasee and Syracuse Lake. Secchi depth (a measure of water clarity) in Syracuse Lake was 9.3 feet in June and 17.5 feet in August. In Lake Wawasee, Secchi depth was 9.5 feet in June and 10.7 feet in August.

Water quality in both of these lakes has historically been good, and the Syracuse Lake Association and the Wawasee Area Conservancy Foundation have been proactive in improving the watershed of these lakes through establishing protected wetland areas as well as purchasing tracts of land that are important to the ecology of these lakes (V3 Companies, 2010). Data from the past 9 years indicates that water clarity in these lakes has remained stable or has even risen slightly over this time period. Secchi depths for each survey on these lakes can be found in Table 11 and Table 12.

Dissolved oxygen and temperature profiles for 2014 on Lake Wawasee and Syracuse Lake are described in Figure 9 through Figure 12. Adequate dissolved oxygen to support fish life was present down to about 22 feet in both lakes in August of 2014. Both lakes showed only very weak thermal stratification which is likely due to cool and unstable weather patterns in 2014.

Figure 9: Syracuse Lake 2014 Dissolved Oxygen Profile

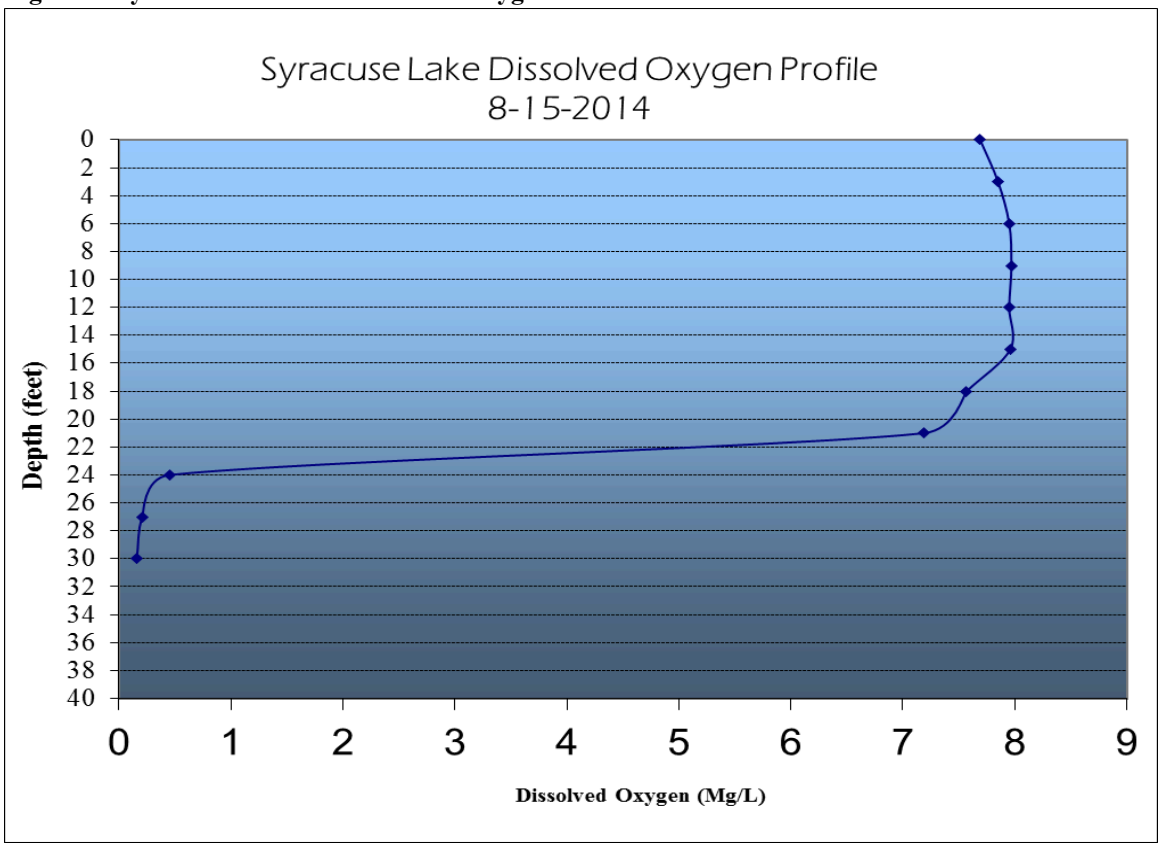


Figure 10: Syracuse Lake 2014 Temperature Profile

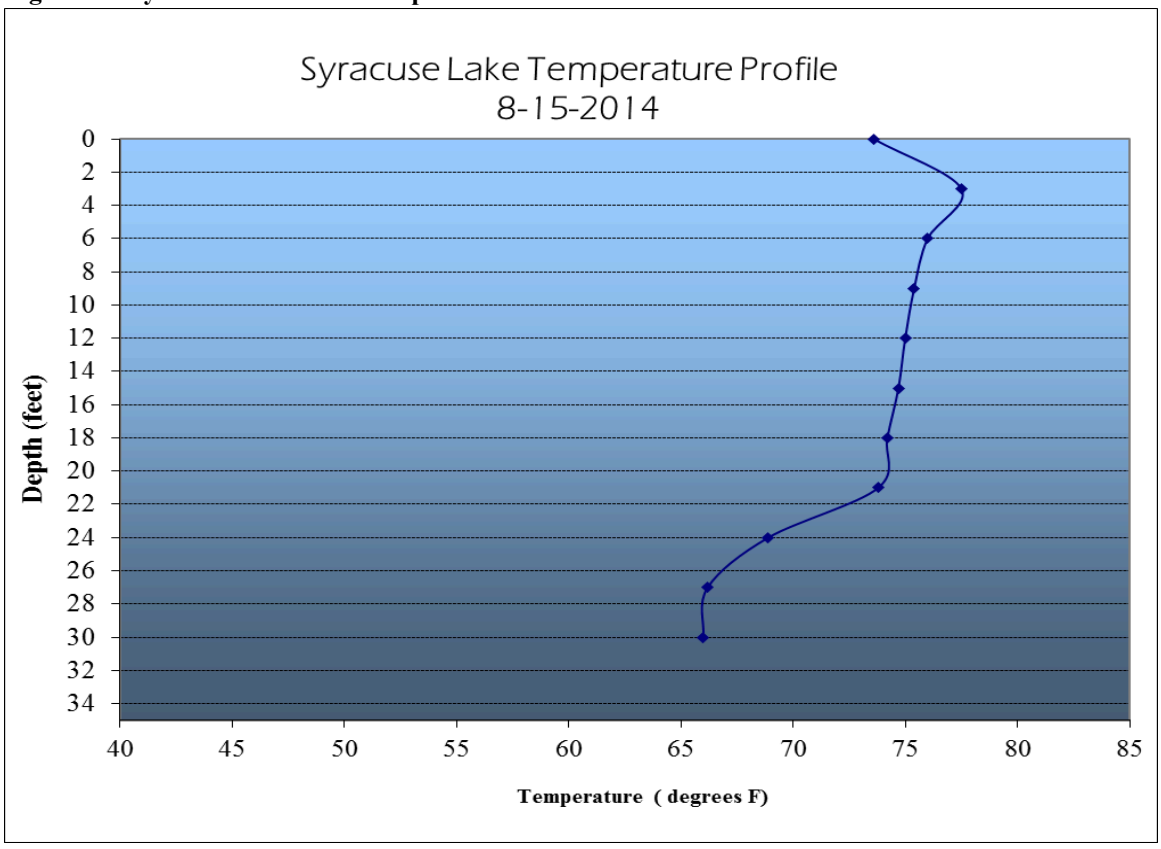


Figure 11: Lake Wawasee 2014 Dissolved Oxygen Profile

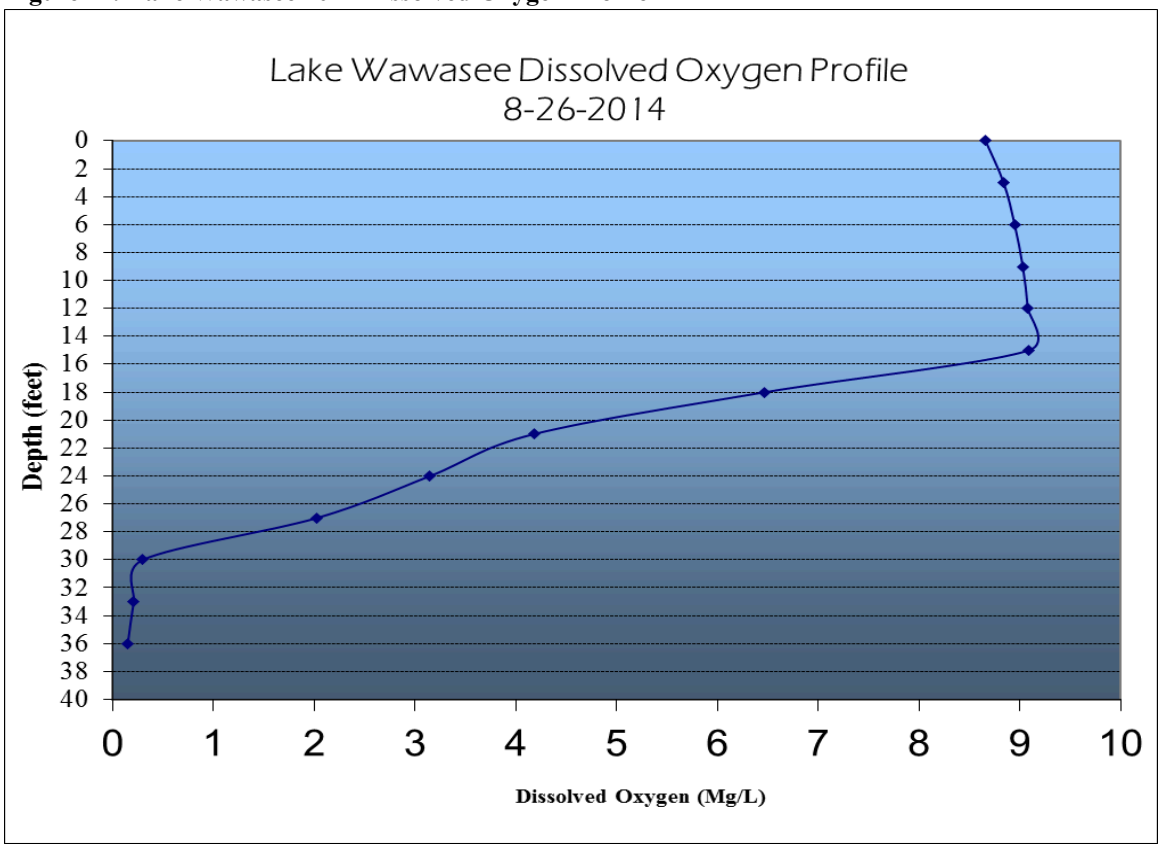
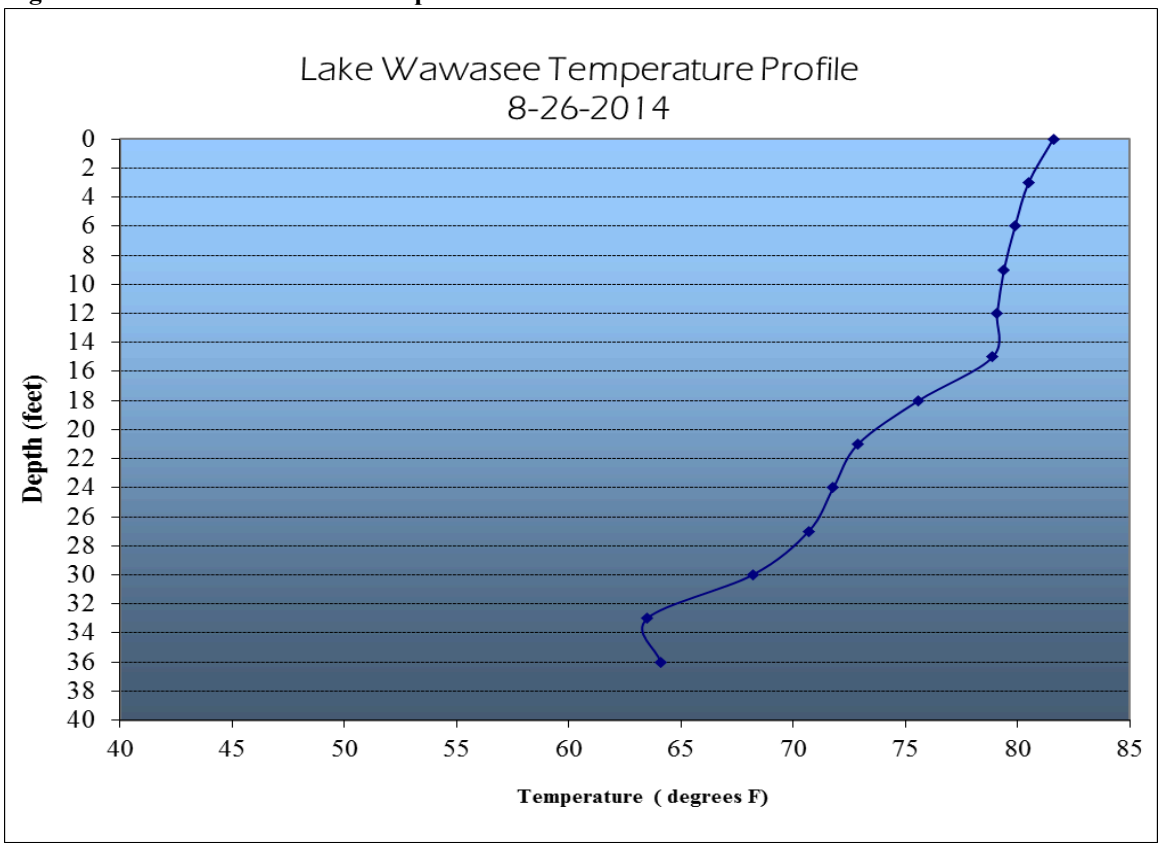


Figure 12: Lake Wawasee 2014 Temperature Profile



Tier II Discussion

Overall plant diversity and species richness in Lake Wawasee and Syracuse Lakes are greater than those seen in many area lakes. In the summer of 2014 surveys, 13 native plant species were collected in Syracuse Lake and 14 native plant species were collected in Lake Wawasee. Native species richness in Syracuse Lake and Lake Wawasee each met the native species richness objectives of 11 and 13 species respectively.

Native species diversity in Lake Wawasee and Syracuse Lake was good in 2014. Native species diversity in Lake Wawasee was 0.82 in the summer of 2014, and the species diversity in Syracuse Lake was 0.83. While native plant populations appear healthy, exotic plant species (mainly SSW) have been expanding in these lakes and should be monitored closely.

The continued increase in SSW site frequency is still likely the biggest cause for concern in Lake Wawasee and Syracuse Lake. Despite large scale efforts to control SSW, its acreage has increased steadily each year since 2009. In August of 2009, total SSW acreage in Lake Wawasee was estimated at 15 acres. In the summer of 2014, total SSW acreage in Wawasee was estimated at 200.3 acres. Total SSW acreage in Syracuse Lake was estimated at 7.5 acres in the summer of 2012 and had risen to 48.2 acres in the summer of 2014. Chemical applications temporarily control SSW, but no long term control of the plant has been observed. Multiple applications are needed in the same treatment area throughout the course of the season to keep SSW suppressed.

EWM is present throughout the littoral zone in both Lake Wawasee and Syracuse Lake. In Lake Wawasee, EWM total acreage was estimated at 579 acres in 2012. The EWM population appears to be stable in Lake Wawasee. EWM has been in the lake for decades and may currently be growing in most if not all areas of suitable habitat. Its total acreage would not be expected to increase dramatically although its overall percentage of the plant community could become greater, especially if a decrease in water quality would occur.

EWM frequency on Syracuse Lake seems highly variable. EWM frequency on Syracuse Lake in the summer of 2014 was 18.0 percent, which is down from 21.0 percent in 2013. This also represents the lowest summer EWM frequency since 2006. This is encouraging, as the EWM frequency in 2012 was 46.0, which was the highest frequency AWC has found on Syracuse Lake in the past 8 years (Aquatic Weed Control, 2005 and 2012). The summers of 2013 and 2014 have been relatively cool and wet and may have contributed to the EWM decline in addition to herbicide treatments. It is interesting to note that the 13.1 acre area in the east end of Syracuse Lake that was treated in 2013 showed very little re-growth at all in 2014. EWM populations should continue to be monitored closely in future years.

Permitting restrictions on treatment acreage for EWM in both of these lakes make it unlikely that the frequency goals for EWM set forth in this plan will be met. However, treatments should eliminate nuisance conditions in some areas of the lakes, which is the goal of maintenance treatments.

SSW treatment funding is becoming increasingly limited as more lakes are requiring SSW treatment. This may further reduce the ability to slow the spread of SSW. Thus far, treatments have provided good short term control in treatment areas and may have slowed its spread, but they have certainly not stopped the spread of SSW.

Action Plan

SSW Treatments

The treatment of starry stonewort (SSW) should be the highest management priority for Lake Wawasee and Syracuse Lake in 2015. SSW treatments help to reduce biomass, although control is not usually complete, and multiple applications must be made to the same area each year to keep it in check. At this point, herbicide options for the control of SSW are very limited. Cutrine ultra applied at a rate of 2.4 gallons per acre-foot in combination with Hydrothol 191 herbicide at varying rates is currently being used to provide temporary control of SSW. It is recommended that this treatment strategy be continued. Some funding for SSW treatments will again be available from the IDNR in 2015 through a grant from the Great Lakes Restoration Initiative. All available funding in 2015 will need to be prioritized between a rising number of lakes with increasing populations of SSW. This means that fewer state sponsored treatments may be conducted on these lakes. Private homeowners should be making preparations to privately fund SSW treatments in areas where it impairs lake use.

Developing SSW treatment priorities and tracking SSW treatments on these lakes is challenging due to the high number of SSW beds and their ever-changing acreages as SSW continues to spread. Table 13 attempts to consolidate information from every SSW bed in Lake Wawasee as of the fall of 2014. This table includes acreage, estimated average depth, acre-feet, rates, and amounts of herbicide needed for each area and a very brief description of each bed. Each area in Table 13 corresponds to a labeled area in Figure 4. These items may provide a good baseline for the SSW treatments in 2015 and beyond.

Table 13: Lake Wawasee SSW Bed Details

Descritpion (Lake Wawasee)	Area	Acres	Avg Depth	Total Acre-feet	Amount of 25 ac-ft Pricing units	Recommended Hydrothol Rate	Open water or confined	Quarts of Hydrothol	Gallons Cutrine @ 2.4 gal/ac-ft
IDNR access site	Area 1	2.74	3	8.22	0.3288	1 qt per acre-foot	Open water	8.2	19.728
open water near IDNR access	Area 2	0.41	4	1.64	0.0656	1 qt per acre-foot	Open Water	1.64	3.936
Griffith's marina and bay area	Area 3	10.47	3	31.41	1.2564	1 qt per acre	Confined	10.4	75.384
channel area-enchanted hills	Area 4	0.43	3	1.29	0.0516	1 qt per acre	Confined	0.43	3.096
channel by cedar point	Area 5	1.56	3	4.68	0.1872	1 qt per acre	Confined	1.56	11.232
channel by strawberry island	Area 6	0.56	3	1.68	0.0672	1 qt per acre	Confined	0.56	4.032
black point channels and frontage	Area 7	7.57	5	37.85	1.514	1 qt per acre	Confined	7.57	90.84
NE Johnson bay channels/frontage	Area 8	7.06	4	28.24	1.1296	1 qt per acre	Confined	7.06	67.776
large Johnson bay open water area	Area 9	50.58	7	354.06	14.1624	1 qt per acre-foot	Open Water	354.06	849.744
Kenata Manayunk channels/frontage	Area 10	16.09	4	64.36	2.5744	1 qt per acre	Confined	16.09	154.464
Bay outside venetian isles-open water	Area 11	9.59	7	67.13	2.6852	1 qt per acre-foot	Confined	9.59	161.112
Venetian isles channel system/frontage	Area 12	13.29	4	53.16	2.1264	1 qt per acre	Confined	13.2	127.584
channel- ogden island	Area 13	0.56	3	1.68	0.0672	1 qt per acre	Confined	0.56	4.032
open water - near Spinks	Area 14	1.55	19	29.45	1.178	1 qt per acre-foot	Open Water	29.45	70.68
channels by wawassee boat company	Area 15	6.47	4	25.88	1.0352	1 qt per acre	Confined	6.47	62.112
small channel area in mud lake	Area 16	0.25	3	0.75	0.03	1 qt per acre	Confined	0.25	1.8
Channel between syr/waw and marina	Area 17	27.11	4	108.44	4.3376	1 qt per acre	Confined	25	260.256
in channel west of main channel marina	Area 18	2.05	4	8.2	0.328	1 qt per acre	Confined	1.26	19.68
small channel near oakwood hotel	Area 19	0.5	3	1.5	0.06	1 qt per acre	Confined	0.5	3.6
wawasee slip and conlkin channels	Area 20	7.35	3	22.05	0.882	1 qt per acre	Confined	7.35	52.92
south side of conklin bay	Area 21	8.35	3	25.05	1.002	1 qt per acre-foot	Open Water	25.05	60.12
small channel on south shore- conlkin	Area 22	1.03	2	2.06	0.0824	1 qt per acre	Confined	1.03	4.944
mouth of Marineland gardens	Area 23	1.52	4	6.08	0.2432	1 qt per acre	Confined	1.52	14.592
channel off of hatchery road	Area 24	1.58	3	4.74	0.1896	1 qt per acre	Confined	1.5	11.376
open water outside of enchanted hills entrance	Area 25	2.03	6	12.18	0.4872	1 qt per acre-foot	Open Water	6	29.232
2nd channel west of oakwood hotel	Area 26	0.5	3	1.5	0.06	1 qt per acre	Confined	0.5	3.6
Open water near mouth of conklin bay	Area 27	1	14	14	0.56	1 qt per acre-foot	Open Water	14	33.6
Open water near leeland	Area 28	1	13	13	0.52	1 qt per acre-foot	Open Water	13	31.2
Open water near ogden point	Area 29	1	11	11	0.44	1 qt per acre-foot	Open Water	11	26.4
channel-johnson bay	Area 30	0.75	4	3	0.12	1 qt per acre	Confined	0.75	7.2
Condo by public acess	Area 31	2.56	3	7.68	0.3072	1 qt per acre	Confined	2.56	18.432
Dropoff - east shore	Area 32	12.76	12	153.12	6.1248	1 qt per acre-foot	Open Water	153.12	367.488
Wawasee Totals		**200.3**		**1105.08**	**44.2032**			**731.23**	**2652.192**

Table 14 and Figure 2 provide detailed treatment information on total SSW abundance in Syracuse Lake and are up to date as of the fall of 2014.

Table 14: Syracuse 2014 SSW Bed Details

Description (Syracuse Lake)	Area	Acres	Avg Depth	Total Acre-feet	Amount of 25 ac-ft Pricing units	Recommended Hydrothol Rate	Open water or confined	Quarts of Hydrothol	Gallons Cutrine @ 2.4 gal/ac-ft
Access channel	Area 1	4.5	3.5	15.75	0.63	1 qt per acre	Confined	4.5	37.8
channel- SE corner	Area 2	1	3	3	0.12	1 qt per acre	Confined	1	7.2
open water - point 49	Area 3	2.89	14	40.46	1.6184	1 qt per acre-foot	Open Water	40.4	97.104
open water- point 54	Area 4	1	3	3	0.12	1 qt per acre-foot	Open Water	3	7.2
open water near wawasee channel	Area 5	2.71	3	8.13	0.3252	1 qt per acre-foot	Open Water	8.13	19.512
wetland on south shore	Area 6	8.4	4	33.6	1.344	1 qt per acre	Confined	8.4	80.64
open water-point 27	Area 7	26.84	4	107.36	4.2944	1 qt per acre-foot	Open Water	107.36	257.664
open water - point 19	Area 8	1	14	14	0.56	1 qt per acre-foot	Open Water	14	33.6
Syracuse Totals		**48.34**		**225.3**	**9.012**			**186.79**	**540.72**

2014 EWM treatments

It is recommended that funding be set aside to treat 25 acres of EWM infestation in Syracuse Lake and 40 acres of EWM infestation in Lake Wawasee in 2015. These acreages do not represent total EWM abundance in these lakes and are not expected to reduce EWM frequency significantly in these lakes. These acreages are based upon permitting guidelines from fisheries staff. The goal of any EWM treatments in 2015 would primarily be to improve lake use and access in areas of dense EWM growth. Any EWM treatment recommendations must be balanced with the fact that many EWM treatment areas are also likely to be suitable habitats for SSW infestation.

Exact EWM treatment areas in these lakes in 2015 will depend upon the results of the spring surveys. However, the most likely potential treatment areas would be the same areas that were treated in 2014. These areas are described in Figure 1 and Figure 3.

EWM Treatment Specifications

In the past, all areas of EWM infestation in Syracuse Lake and Lake Wawasee have been treated with DMA-4 herbicide at 2.0 ppm. Treatments have been successful in the past at reducing EWM on a yearly basis in treatment areas, and this strategy is recommended for 2015. Average depth of past EWM treatment areas on these lakes has been 4 to 7 feet.

Surveys and Planning

Two tier II surveys for each lake are proposed for 2015. These surveys will be fully funded by the IDNR through a grant from the Great Lakes Restoration Initiative (GLRI). For this reason, there are no cost figures in the project budget for survey and planning costs.

In addition to the tier II surveys an extra visual survey should be scheduled for the second week of July to document EWM growth. EWM in Syracuse Lake often appears late in spring after the normal tier II survey window. This survey should help to identify potential EWM treatment areas and help time treatments to provide the most good for the lake association and other lake users.

2015 Project Budget

The following budget estimates are based on a 50/50 cost share between the IDNR and the lake associations.

EWM treatments on these lakes may be funded as "maintenance treatments" by the LARE program, in which case a 50/50 cost share would take place for EWM treatments with the DNR paying a maximum of $5,000 per lake.

2014 Budget	**Cost Estimates**
Treat 25 acres of EWM on Syracuse Lake with DMA-4 herbicide at 2ppm. (up to 7 foot avg. depth)	$ 8,750
Treat 40 acres of EWM on Lake Wawasee with DMA-4 herbicide at 2ppm. (4 foot avg. depth)	$ 14,000
Total cost estimate and grant request	$ 22,750
LARE share (subject to availability)	$ 10,000 max
Association's cost-share	$ 12,750

Starry Stonewort Budget

At this time it is believed that continued funding from the Great Lakes Restoration Initiative will be available to treat SSW in 2015 as it has in the past. Cutrine Ultra was used in combination with Hydrothol 191 to control SSW in 2014. The cost for SSW treatments at Lake Wawasee and Syracuse Lake in 2014 was $787.47 per 10 acre-feet treated with Cutrine Ultra. The additional cost for Hydrothol was $21.08 per quart used.

Priority Starry Stonewort Areas

If all areas of SSW infestation in Lake Wawasee cannot be treated in 2015 the highest priority SSW treatment areas are listed below. All of these areas correspond to Figure 4 which is recommended as the basis for future SSW Treatments on Lake Wawasee. These are all areas of high use or with very dense SSW infestations.

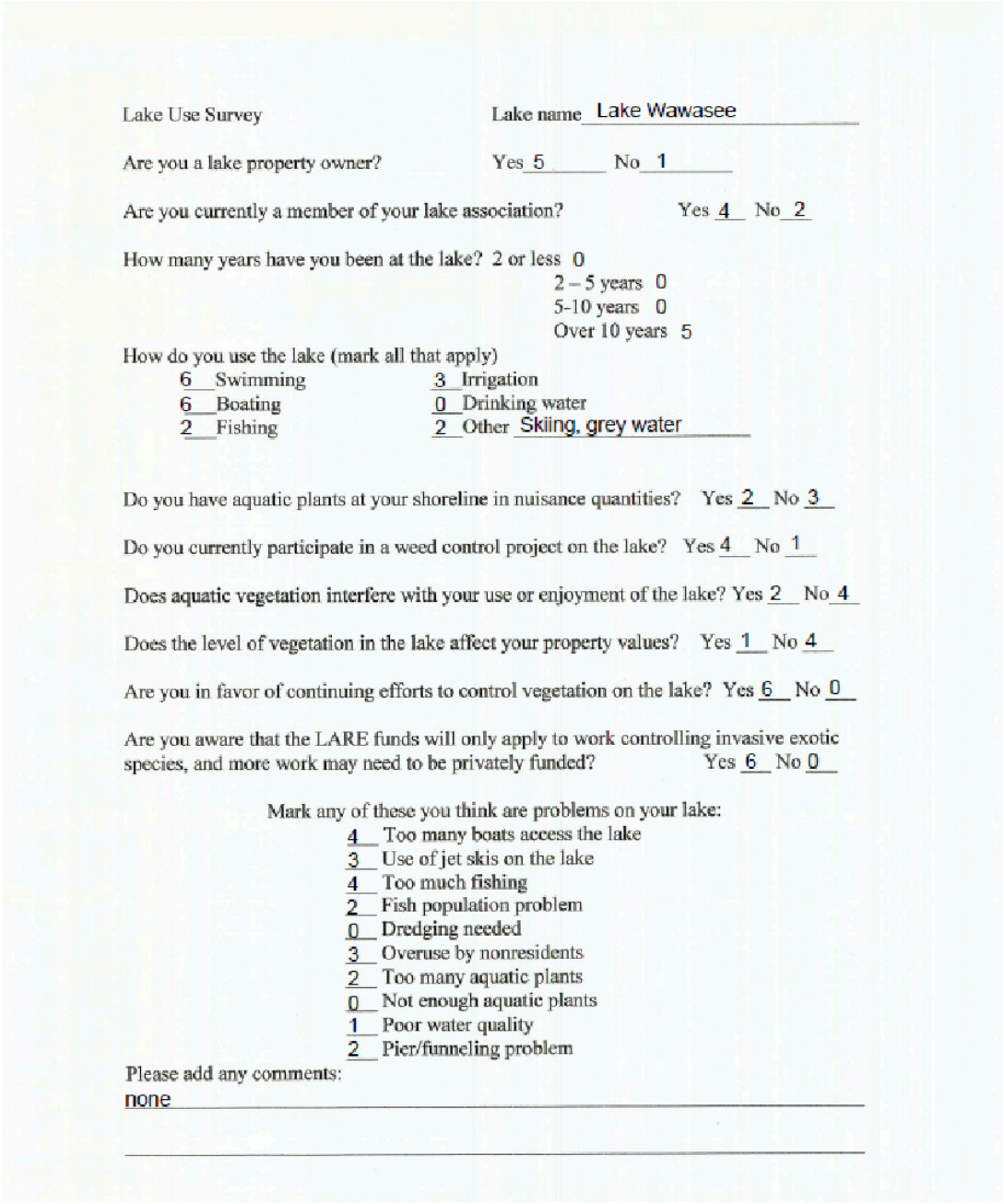
1. Area 1: 2.74 acres
2. Area 3: 10.47 acres
3. Area 17: 27.11 acres
4. Area 20: 7.35 acres
5. Area 10: 16.09 acres

Public Involvement

Parties interested in the improvement of Lake Wawasee and Syracuse Lake include members of the WACF and the Syracuse Lake Association as well as others who access the lake at the IDNR public access sites. The most common and most effective methods for keeping the public informed about aquatic vegetation management practices are lake association meetings as well as periodical newsletters sent out by the associations. It is recommended that association members encourage neighbors and other lake users to attend lake association meetings so that interested parties are well informed about the LARE program. Making sure that meetings are well advertised and planned well in advance of the meeting dates are ways to help ensure good attendance. Carry-in dinners, door prizes, contests, guest speakers, and discussion panels are all excellent ways to boost attendance, encourage involvement, and keep association members informed about lake management activities.

The WACF held a public meeting on August 4, 2014 to discuss issues related to the LARE program and SSW control. Jim Donahoe of Aquatic Weed Control attended this meeting to summarize LARE activities on the lake. Attendance was low with 6 public surveys being returned. The lake residents continue to be in favor of controlling invasive species in these lakes and were supportive of continued involvement in the LARE program. Figure 13 summarizes responses to the 2014 public questionnaire.

Figure 13: Lake Wawasee and Syracuse 2014 Public Survey



Lake Use Survey Lake name Lake Wawasee

Are you a lake property owner? Yes 5 No 1

Are you currently a member of your lake association? Yes 4 No 2

How many years have you been at the lake? 2 or less 0
2 – 5 years 0
5-10 years 0
Over 10 years 5

How do you use the lake (mark all that apply)

6 Swimming
6 Boating
2 Fishing
3 Irrigation
0 Drinking water
2 Other Skiing, grey water

Do you have aquatic plants at your shoreline in nuisance quantities? Yes 2 No 3

Do you currently participate in a weed control project on the lake? Yes 4 No 1

Does aquatic vegetation interfere with your use or enjoyment of the lake? Yes 2 No 4

Does the level of vegetation in the lake affect your property values? Yes 1 No 4

Are you in favor of continuing efforts to control vegetation on the lake? Yes 6 No 0

Are you aware that the LARE funds will only apply to work controlling invasive exotic species, and more work may need to be privately funded? Yes 6 No 0

Mark any of these you think are problems on your lake:

4 Too many boats access the lake
3 Use of jet skis on the lake
4 Too much fishing
2 Fish population problem
0 Dredging needed
3 Overuse by nonresidents
2 Too many aquatic plants
0 Not enough aquatic plants
1 Poor water quality
2 Pier/funneling problem

Please add any comments:
none

References Cited

Aquatic Weed Control. 2012. Lake Wawasee and Syracuse Lake Aquatic Vegetation Management Plan Update. P.O. Box 325 Syracuse, IN 46567.

Aquatic Weed Control. 2006. Lake Wawasee Aquatic Vegetation Management Plan. P.O. Box 325 Syracuse, IN 46567.

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IDNR. 2010. Procedure Manual for Surveying Aquatic Vegetation: Tier II Reconnaissance Surveys. IN Department of Natural Resources. Indianapolis, Indiana.

V3 Companies. 2010. Lake Wawasee Aquatic Vegetation Management Plan Update – 2009 and Vegetation Surveys in Eco-zone Areas of Conklin. 7325 Janes Avenue, Woodbridge, Illinois 60517

Appendix

Common and Scientific Plant Names of species in Lake Wawasee and Syracuse Lake

Common Name	Scientific Name
American pondweed	*Potamogeton nodosus*
arrowhead	*Saggitaria sp.*
bladderwort	*Utricularia sp.*
brittle naiad	*Najas minor*
Chara	*Chara sp.*
coontail	*Ceratophyllum demersum*
curly-leaf pondweed	*Potamogeton crispus*
eelgrass	*Vallisneria americana*
elodea	*Elodea canadensis*
Eurasian watermilfoil	*Myriophyllum spicatum*
flat -stem pondweed	*Potamogeton zosteriformis*
floating-leaf pondweed	*Potamogeton natans*
Illinois pondweed	*Potamogeton illinoensis*
large-leaf pondweed	*Potamogeton amplifolius*
leafy pondweed	*Potamogeton foliosus*
nitella	*Nitella sp.*
Northern watermilfoil	*Myriophyllum sibiricum*
Richardson's pondweed	*Potamogeton richardsonii*
sago pondweed	*Potamogeton pectinatus*
slender naiad	*Najas flexilis*
small pondweed	*Potamogeton pusillus*
variable pondweed	*Potamogeton diversifolius*
water stargrass	*Heteranthera dubia*
white-stem pondweed	*Potamogeton praelongus*
whorled watermilfoil	*Myriophyllum verticillatum*

Data Sheets and GPS Coordinates- Syracuse Lake

Syracuse 6-4-2014

Syracuse Lake																				
Latitude	Longitude	Depth	Site	EWM	CLP	Starry	Chara	Sago	Richardsons	Naiad	Bladderwort	small	Illinois	Eel grass	Coontail	whorled	Flatstem	American	Nitella
41.424312	-85.749884	5	1	1			1		3							1			
41.423983	-85.749814	5	2				3									3			
41.424055	-85.749567	5	3	1			3												
41.424136	-85.749270	3	4				3	3											
41.424041	-85.748523	3	5				3												
41.423561	-85.747522	3	6			1		1											
41.422871	-85.746280	2	7			1	3								3				
41.423453	-85.745186	2	8				3	5											
41.422700	-85.744881	4	9			3		1											
41.423098	-85.743490	5	10				1				1								
41.422679	-85.743364	3	11				3				1								
41.422531	-85.742336	3	12				3				3								
41.423581	-85.741657	6	13				3						1						
41.424191	-85.741880	6	14				1								1				
41.424870	-85.740935	18	15																3
41.425221	-85.739882	14	16												1				3
41.426022	-85.738747	13	17												1				3
41.425643	-85.737497	12	18												3				
41.424400	-85.740133	14	19			1													
41.423672	-85.740768	5	20				3										3		
41.422841	-85.740373	3	21				5												
41.422957	-85.738561	3	22				5				3								
41.422959	-85.737112	6	23				3			1									
41.421829	-85.736451	3	24			3					3								
41.423250	-85.735642	11	25			1													
41.424518	-85.734990	8	26	3				1									3		
41.422785	-85.734484	16	27	—															
41.421867	-85.733861	6	28	1															
41.421334	-85.734269	3	29	—															
41.420849	-85.734031	2	30					1					3	3					
41.421208	-85.732989	2	31				1				3								
41.421289	-85.731209	3	A 32								3		1						
41.422322	-85.731502	3	33				1											3	
41.422658	-85.732557	8	34	1		1													
41.424445	-85.732452	9	35			1	1				3								
41.424283	-85.731297	11	36			3	1				1								
41.423350	-85.730825	2	37				1												
41.422081	-85.729424	3	A 38					1		1				1				3	
41.422489	-85.727798	2	39					1										1	
41.421986	-85.727684	3	40				3								3				
41.423689	-85.728488	4	41				3						1						
41.424564	-85.729873	8	42					3											
41.425248	-85.726876	3	43	—															
41.426169	-85.727798	11	44				3	1				1							
41.425740	-85.729138	6	45				3												
41.426125	-85.730501	11	46	1															
41.426268	-85.733509	17	47	—															
41.427232	-85.731884	16	48																1
41.427004	-85.730169	14	49			1													
41.427124	-85.728758	17	50			1													

41.428927	-85.747459	8	90																1
41.428623	-85.748328	11	91												1				1
41.428055	-85.748533	6	92				3												
41.427750	-85.747697	13	93																1
41.426880	-85.747227	3	94				1												
41.427020	-85.746157	13	95				1				1								3
41.426367	-85.745817	7	96				1												
41.426102	-85.744781	8	97																2
41.425570	-85.744096	18	98																1
41.424753	-85.743881	6	99				1	1											
41.423957	-85.743585	2	100				1												

Syracuse 8-15-2014 Secchi: 17.5 Water Temp 73.6

Syracuse Lake																				
Latitude	Longitude	Depth	Site	EWM	CLP	Starry	Chara	Sago	~~Richardsons~~	Naiad	Bladderwort	small	Illinois	Eel grass	Coontail	whorled	Flatstem	American	Nitella
41.424312	-85.749884	5	1	5															
41.423983	-85.749814	5	2				3	3											
41.424055	-85.749567	5	3	1			3	3					1						
41.424136	-85.749270	3	4				3	1											
41.424041	-85.748523	3	5				3												
41.423561	-85.747522	3	6																
41.422871	-85.746280	2	7					3	3		3								
41.423453	-85.745186	2	8	1		1	1				3								
41.422700	-85.744881	4	9	—															
41.423098	-85.743490	5	10				3				3								
41.422679	-85.743364	3	11				3				3								
41.422531	-85.742336	3	12				3				1		3						
41.423581	-85.741657	6	13				3												
41.424191	-85.741880	6	14					5						3					
41.424870	-85.740935	18	15																3
41.425221	-85.739882	14	16																1
41.426022	-85.738747	13	17												5				
41.425643	-85.737497	12	18	1				3											
41.424400	-85.740133	14	19			3													
41.423672	-85.740768	5	20					5		1				5					
41.422841	-85.740373	3	21				3	3			3								
41.422957	-85.738561	3	22				5												
41.422959	-85.737112	6	23				5	1											
41.421829	-85.736451	3	24				1						1						
41.423250	-85.735642	11	25	1				3	3										
41.424518	-85.734990	8	26	5				1											
41.422785	-85.734484	16	27			1													
41.421867	-85.733861	6	28	—															
41.421334	-85.734269	3	29	1				3											
41.420849	-85.734031	2	30									3							
41.421208	-85.732989	2	31					3											
41.421289	-85.731209	3	32				3	3			3								
41.422322	-85.731502	3	33				3	3			3								
41.422658	-85.732557	8	34						5			1							
41.424445	-85.732452	9	35	5				3						3					
41.424283	-85.731297	11	36							5									
41.423350	-85.730825	2	37												3		3		
41.422081	-85.729424	3	38															3	
41.422489	-85.727798	2	39																
41.421986	-85.727684	3	40	1				3											
41.423689	-85.728488	4	41				1	3											
41.424564	-85.729873	8	42					3			3								
41.425248	-85.726876	3	43	—															
41.426169	-85.727798	11	44										3	1					
41.425740	-85.729138	6	45					1	3										
41.426125	-85.730501	11	46	5					3										
41.426268	-85.733509	17	47							1									
41.427232	-85.731884	16	48												3				
41.427004	-85.730169	14	49			3													
41.427124	-85.728758	17	50	—															

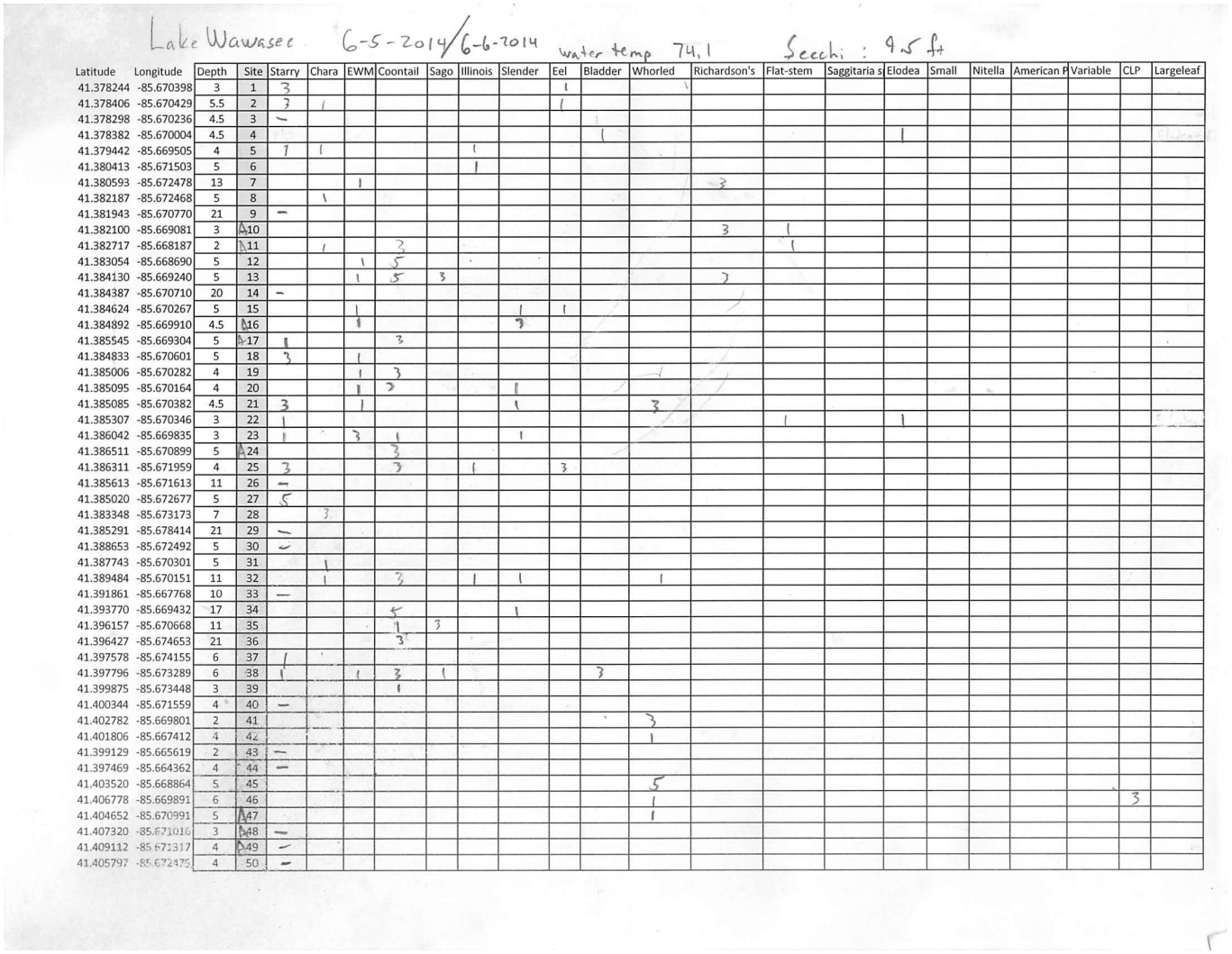
Secchi: 17.5

Latitude	Longitude	Depth	Site	EWM	CLP	Starry	Chara	Sago	~~Richardson's~~ spiny naiad	Naiad	Bladderwort	small	Illinois	Eel grass	Coontail	~~whorled~~ Richardson's P.W.	Flatstem	American	Nitella
41.428135	-85.729013	11	51					3	3										
41.426583	-85.726387	5	52				3				3								
41.427992	-85.727427	11	53					3	3							3			
41.428326	-85.726260	2	54				3						1						
41.429079	-85.726910	3	55							1									
41.428815	-85.728316	9	56	1					5						3				
41.429654	-85.728899	6	57																
41.428832	-85.730474	12	58						3			1							
41.428267	-85.732135	14	59												5				
41.428687	-85.734089	18	60												3				
41.429375	-85.733202	8	61	3				3											
41.429088	-85.732100	9	62					5											
41.429562	-85.731234	8	63					3	5										
41.430207	-85.729913	3	64				3				3								
41.430450	-85.731786	3	65				3												
41.430639	-85.733168	6	66				3												
41.429962	-85.733941	11	67						3	3									
41.430197	-85.735139	6	68					3		3				3					
41.430026	-85.736043	17	69	—															
41.430698	-85.736633	2	70				3												
41.430447	-85.737930	11	71	3						3					3				
41.430966	-85.738797	2	72				1				3								
41.430317	-85.739433	20	73																3
41.430631	-85.740412	6	74					3					1						
41.430729	-85.741506	12	75	1				3						1					
41.431645	-85.741790	1	76				3	3						3					
41.431306	-85.742828	9	77					1											
41.431946	-85.742978	2	78											3					
41.432827	-85.743068	5	79											3					
41.433501	-85.742999	3	80									1							
41.431188	-85.743824	2	81				3												
41.430283	-85.743964	12	82				3							3					
41.429715	-85.745008	17	83	3			3												
41.430581	-85.745194	1	84				3				3		1						
41.430060	-85.746096	2	85				1				3								
41.429449	-85.746682	15	86	—															
41.429878	-85.747684	6	87				3		3		1		3						
41.430028	-85.749299	3	88				1												
41.429399	-85.748397	10	89					3			3			3		3			
41.428927	-85.747459	8	90						1				1						
41.428623	-85.748328	11	91	1				5											
41.428055	-85.748533	6	92				1	1					1						
41.427750	-85.747697	13	93	1										1					
41.426880	-85.747227	3	94				1				3								
41.427020	-85.746157	13	95	—															
41.426367	-85.745817	7	96				1				5								
41.426102	-85.744781	8	97	1			1	3											
41.425570	-85.744096	18	98	—															
41.424753	-85.743881	6	99											1			1		
41.423957	-85.743585	2	100				1				3								

Do/Temp

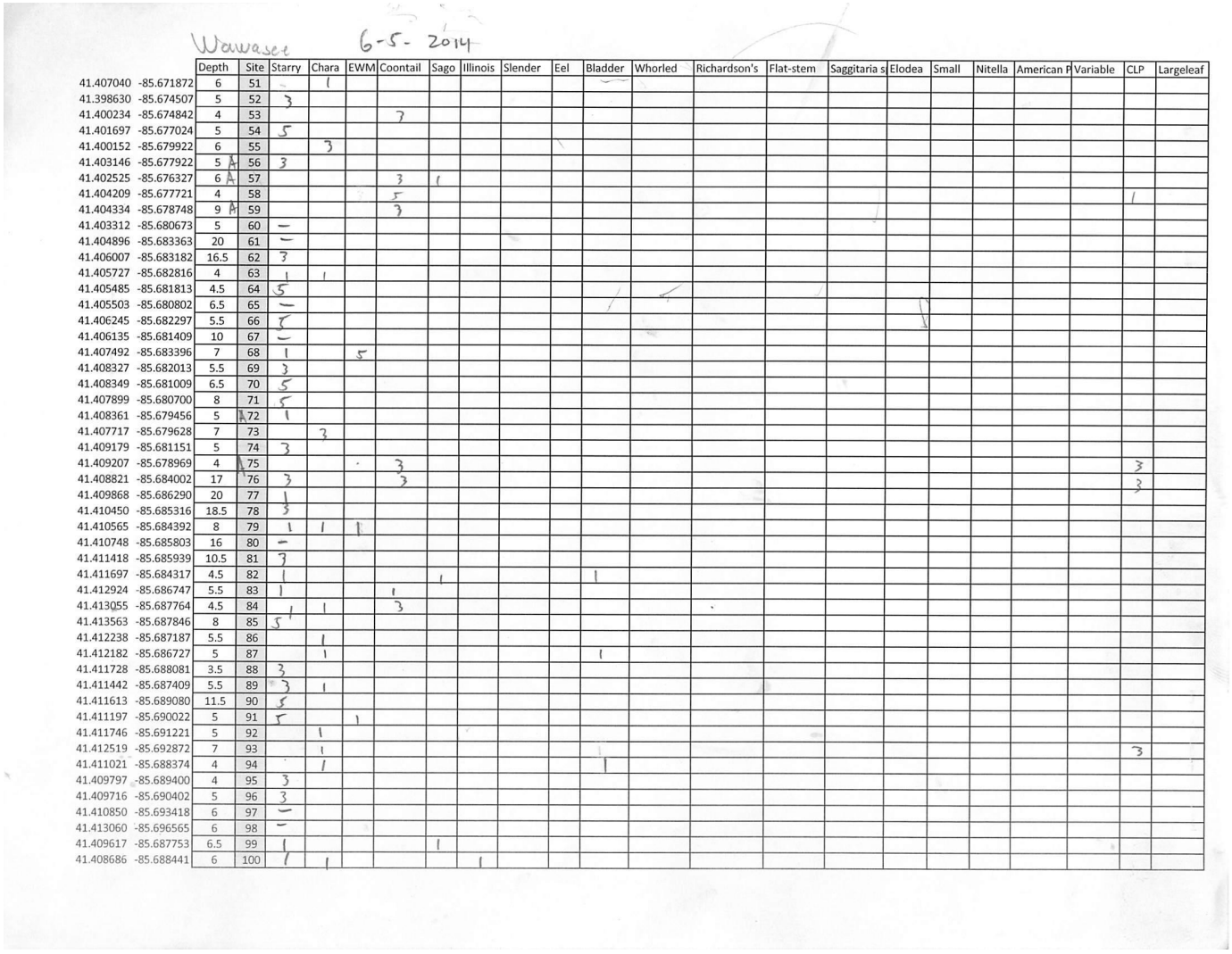
Thermocline	Do	Temp
0	7.69	73.6
1	7.85	77.5
2	7.95	76.0
3	7.97	75.4
4	7.95	75.0
5	7.96	74.7
6	7.57	74.2
7	7.19	73.8
8	0.45	68.9
9	0.21	66.2
10	0.16	66.8

Data Sheets and GPS Coordinates- Lake Wawasee



Lake Wawasee 6-5-2014/6-6-2014 water temp 74.1 Secchi: 9.5 ft

Latitude	Longitude	Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.378244	-85.670398	3	1	3							1												
41.378406	-85.670429	5.5	2	3	1						1												
41.378298	-85.670236	4.5	3	–								1											
41.378382	-85.670004	4.5	4									1					1						
41.379442	-85.669505	4	5	1	1				1														
41.380413	-85.671503	5	6						1														
41.380593	-85.672478	13	7			1								3									
41.382187	-85.672468	5	8		1																		
41.381943	-85.670770	21	9	–																			
41.382100	-85.669081	3	A10											3	1								
41.382717	-85.668187	2	A11		1		3								1								
41.383054	-85.668690	5	12			1	5																
41.384130	-85.669240	5	13			1	5	3						3									
41.384387	-85.670710	20	14	–																			
41.384624	-85.670267	5	15			1				1	1												
41.384892	-85.669910	4.5	A16			1				1													
41.385545	-85.669304	5	A17	1			3																
41.384833	-85.670601	5	18	3		1																	
41.385006	-85.670282	4	19			1	3																
41.385095	-85.670164	4	20			1	3			1													
41.385085	-85.670382	4.5	21	3		1				1			3										
41.385307	-85.670346	3	22	1											1		1						
41.386042	-85.669835	3	23	1		3	1			1													
41.386511	-85.670899	5	A24				3																
41.386311	-85.671959	4	25	3			3		1		3												
41.385613	-85.671613	11	26	–																			
41.385020	-85.672677	5	27	5																			
41.383348	-85.673173	7	28		3																		
41.385291	-85.678414	21	29	–																			
41.388653	-85.672492	5	30	–																			
41.387743	-85.670301	5	31		1																		
41.389484	-85.670151	11	32		1		3		1	1			1										
41.391861	-85.667768	10	33	–																			
41.393770	-85.669432	17	34				5			1													
41.396157	-85.670668	11	35				1	3															
41.396427	-85.674653	21	36				3																
41.397578	-85.674155	6	37	1																			
41.397796	-85.673289	6	38	1		1	3	1				3											
41.399875	-85.673448	3	39				1																
41.400344	-85.671559	4	40	–																			
41.402782	-85.669801	2	41										3										
41.401806	-85.667412	4	42										1										
41.399129	-85.665619	2	43	–																			
41.397469	-85.664362	4	44	–																			
41.403520	-85.668864	5	45										5										
41.406778	-85.669891	6	46										1									3	
41.404652	-85.670991	5	A47										1										
41.407320	-85.671016	3	A48	–																			
41.409112	-85.671317	4	A49	–																			
41.405797	-85.672475	4	50	–																			



Wawaset 6-5-2014

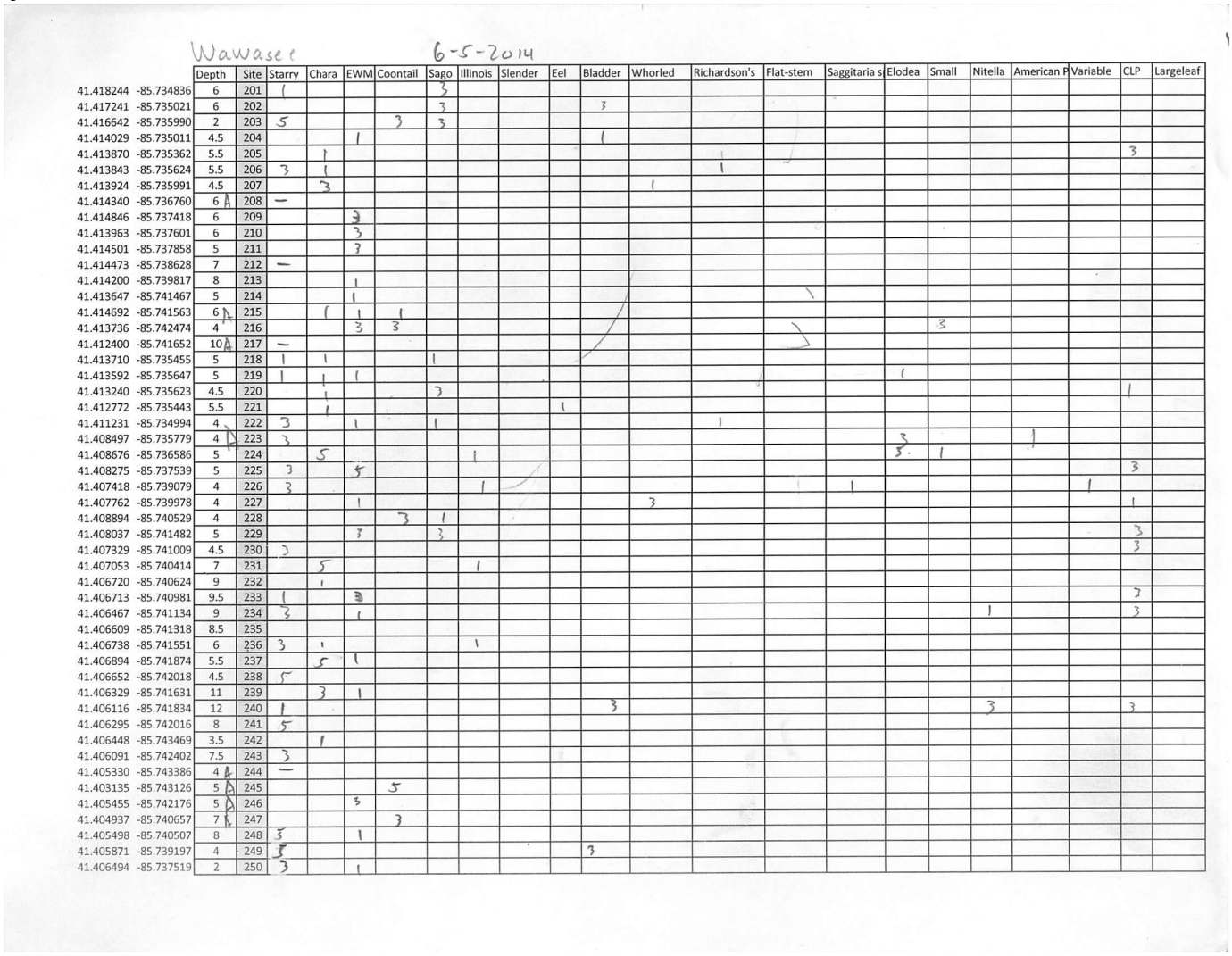
		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.407040	-85.671872	6	51		1																		
41.398630	-85.674507	5	52	3																			
41.400234	-85.674842	4	53				7																
41.401697	-85.677024	5	54	5																			
41.400152	-85.679922	6	55		3																		
41.403146	-85.677922	5 A	56	3																			
41.402525	-85.676327	6 A	57				3	1															
41.404209	-85.677721	4	58				5															1	
41.404334	-85.678748	9 A	59				3																
41.403312	-85.680673	5	60	—																			
41.404896	-85.683363	20	61	—																			
41.406007	-85.683182	16.5	62	3																			
41.405727	-85.682816	4	63	1	1																		
41.405485	-85.681813	4.5	64	5									5										
41.405503	-85.680802	6.5	65	—																			
41.406245	-85.682297	5.5	66	5																			
41.406135	-85.681409	10	67	—																			
41.407492	-85.683396	7	68	1		5																	
41.408327	-85.682013	5.5	69	3																			
41.408349	-85.681009	6.5	70	5																			
41.407899	-85.680700	8	71	5																			
41.408361	-85.679456	5	72	1																			
41.407717	-85.679628	7	73		3																		
41.409179	-85.681151	5	74	3																			
41.409207	-85.678969	4	75				3															3	
41.408821	-85.684002	17	76	3			3															3	
41.409868	-85.686290	20	77	1																			
41.410450	-85.685316	18.5	78	3																			
41.410565	-85.684392	8	79	1	1	1																	
41.410748	-85.685803	16	80	—																			
41.411418	-85.685939	10.5	81	3																			
41.411697	-85.684317	4.5	82	1				1				1											
41.412924	-85.686747	5.5	83	1			1																
41.413055	-85.687764	4.5	84	1	1		3																
41.413563	-85.687846	8	85	5																			
41.412238	-85.687187	5.5	86		1																		
41.412182	-85.686727	5	87		1							1											
41.411728	-85.688081	3.5	88	3																			
41.411442	-85.687409	5.5	89	3	1																		
41.411613	-85.689080	11.5	90	5																			
41.411197	-85.690022	5	91	5		1																	
41.411746	-85.691221	5	92		1																		
41.412519	-85.692872	7	93		1																	3	
41.411021	-85.688374	4	94		1							1											
41.409797	-85.689400	4	95	3																			
41.409716	-85.690402	5	96	3																			
41.410850	-85.693418	6	97	—																			
41.413060	-85.696565	6	98	—																			
41.409617	-85.687753	6.5	99	1				1															
41.408686	-85.688441	6	100	1	1				1														

Wawasee 6-5-2014

		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.406999	-85.688732	17	101	3																			
41.405778	-85.689676	4	102	1		1						1											
41.405410	-85.689098	15.5	103	3																			
41.404804	-85.688693	8	104	1																		1	
41.404803	-85.688198	10	105	3		3																	
41.404138	-85.688797	3.5	106		1				1														
41.403920	-85.688839	1.5	107	1	1			3															
41.404256	-85.689547	3.5	108	3								1											
41.404177	-85.689985	4.5	109	5																			
41.404765	-85.690732	5.5	110		1																		
41.402718	-85.689817	6.5	111	—																			
41.402805	-85.687075	8.5	112		3														3				
41.403677	-85.687258	3	113		3			3					1										
41.404114	-85.687414	3.5	114	3																			
41.404781	-85.687345	5	115		3																		
41.405114	-85.687267	5	116	3	1			3															
41.405823	-85.687130	21	117	—																			
41.405289	-85.686276	6	118	1	1			3															
41.403772	-85.685728	15	119	1																			
41.402234	-85.685243	5	120	—																			
41.399980	-85.686783	19	121	—																			
41.396623	-85.684857	10	122		3																		
41.395727	-85.685384	21	123				3																
41.395749	-85.682462	17	124		3				1														
41.392172	-85.683025	11	125			5	3																
41.389694	-85.683622	5	126						3														
41.392081	-85.689568	12	127		1	1								3									
41.394628	-85.688329	12	128		5																		
41.399273	-85.688387	10	129			1		3	1														
41.400687	-85.689565	11	130	3		1																	
41.399068	-85.689817	11	131	1		1		3															
41.399773	-85.691022	5	132	—																			
41.400476	-85.694067	15	133			1		3															
41.402086	-85.698529	21	134	—																			
41.402639	-85.694984	8	135	—	1																		
41.404949	-85.692977	4	136	—																			
41.404725	-85.697527	12	137		3																		
41.406676	-85.696283	8	138	—																			
41.406798	-85.701615	13	139			5																	
41.408801	-85.697334	6	140		1																		
41.410425	-85.700719	8	141		1				3														
41.410990	-85.703201	19	142		1		3																
41.411811	-85.701816	11	143	—																			
41.412452	-85.704212	18	144																1				
41.413082	-85.700442	6	145	—																			
41.414702	-85.702782	7	146		1																		
41.414881	-85.707302	7	147		1							3											
41.412966	-85.709979	14	148			5	1																
41.410931	-85.713027	37	149		3			1															
41.409910	-85.713513	8	150						1														

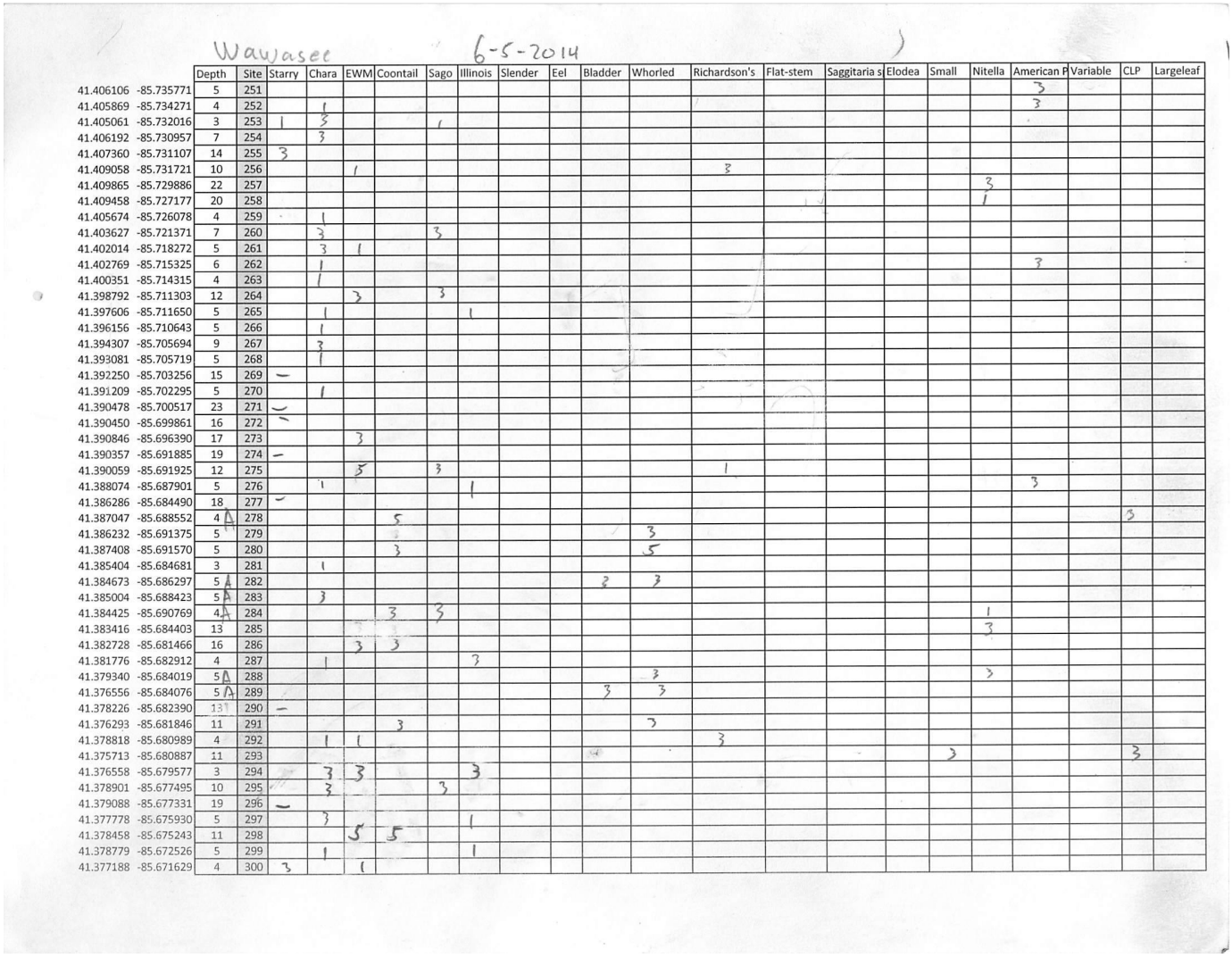
Wawasee Secchi disk 9.5 ft 6-5-2014

		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.408191	-85.715511	16	151			5																	
41.406792	-85.716151	16	152					1															
41.405784	-85.714883	23	153				3																
41.410590	-85.721112	11	154		3							3											
41.412107	-85.716289	11	155	—																			
41.413190	-85.714227	18	156				3																
41.413370	-85.717185	23	157	—																			
41.415187	-85.718464	4	158	—					1														
41.416446	-85.720861	6	159		3																		
41.417051	-85.719575	4	160		1				1	1		1											
41.416773	-85.717838	4	161				5																
41.417770	-85.717082	8	162	—																			
41.417536	-85.716055	3	163				3																
41.417617	-85.719869	3	164										3										
41.418054	-85.721022	10	165				3																
41.418993	-85.721816	5	166				3															3	
41.416373	-85.722418	5	167	3																			
41.416787	-85.723894	4	168		1	5																	
41.415841	-85.727439	3	169				5																
41.414382	-85.728835	3	170				5																
41.413029	-85.723943	14	171					3															
41.413195	-85.726925	7	172		1							3											
41.412269	-85.728458	5	173	—																			
41.410315	-85.734066	4	174	—																			
41.410829	-85.734233	6	175		3			3															
41.411397	-85.733456	5	176					1														3	
41.411633	-85.732645	7	177	1								1											
41.411835	-85.731653	6	178		3			1				3											
41.413649	-85.731328	5	179		1																		
41.414421	-85.732649	5	180	—																			
41.414480	-85.733735	5	181					1															
41.415193	-85.735141	6	182	3		1		1										1					
41.416113	-85.735173	5	183		1													3					
41.416892	-85.734027	7	184				1																
41.416203	-85.731863	6	185				5																
41.414759	-85.729608	4	186				5																
41.418524	-85.727757	4	187				3																
41.417458	-85.733588	3	188																				
41.418093	-85.733827	3	189																				
41.418522	-85.732342	3	190				5					3											
41.418670	-85.730407	3	191									3											
41.419143	-85.731389	4	192	—																			
41.418990	-85.733678	3	193	3			5					3											
41.419418	-85.734580	4	194	3								3											
41.420370	-85.734383	4	195	—																			
41.419104	-85.735726	0	196	—																			
41.418809	-85.737111	0	197	—																			
41.419416	-85.738102	4	198				3																
41.417648	-85.738833	5	199	—																			
41.417192	-85.739453	4	200	1			3																



Wawasee 6-5-2014

		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.418244	-85.734836	6	201	1				3															
41.417241	-85.735021	6	202					3				3											
41.416642	-85.735990	2	203	5			3	3															
41.414029	-85.735011	4.5	204			1						1											
41.413870	-85.735362	5.5	205		1																	3	
41.413843	-85.735624	5.5	206	3	1									1									
41.413924	-85.735991	4.5	207		3								1										
41.414340	-85.736760	6	208	—																			
41.414846	-85.737418	6	209			3																	
41.413963	-85.737601	6	210			3																	
41.414501	-85.737858	5	211			3																	
41.414473	-85.738628	7	212	—																			
41.414200	-85.739817	8	213			1																	
41.413647	-85.741467	5	214			1																	
41.414692	-85.741563	6	215		1	1	1																
41.413736	-85.742474	4	216			3	3											3					
41.412400	-85.741652	10	217	—																			
41.413710	-85.735455	5	218	1	1			1															
41.413592	-85.735647	5	219	1	1	1											1						
41.413240	-85.735623	4.5	220		1			3														1	
41.412772	-85.735443	5.5	221		1						1												
41.411231	-85.734994	4	222	3		1		1						1									
41.408497	-85.735779	4	223	3													3			1			
41.408676	-85.736586	5	224		5				1								5	1				3	
41.408275	-85.737539	5	225	3		5																	
41.407418	-85.739079	4	226	3					1							1					1		
41.407762	-85.739978	4	227			1							3									1	
41.408894	-85.740529	4	228				3	1															
41.408037	-85.741482	5	229			3		3														3	
41.407329	-85.741009	4.5	230	3																		3	
41.407053	-85.740414	7	231		5				1														
41.406720	-85.740624	9	232		1																		
41.406713	-85.740981	9.5	233	1		3																3	
41.406467	-85.741134	9	234	3		1													1			3	
41.406609	-85.741318	8.5	235																				
41.406738	-85.741551	6	236	3	1				1														
41.406894	-85.741874	5.5	237		5	1																	
41.406652	-85.742018	4.5	238	5																			
41.406329	-85.741631	11	239		3	1																	
41.406116	-85.741834	12	240	1								3							3			3	
41.406295	-85.742016	8	241	5																			
41.406448	-85.743469	3.5	242		1																		
41.406091	-85.742402	7.5	243	3																			
41.405330	-85.743386	4	244	—																			
41.403135	-85.743126	5	245				5																
41.405455	-85.742176	5	246			3																	
41.404937	-85.740657	7	247				3																
41.405498	-85.740507	8	248	3		1																	
41.405871	-85.739197	4	249	3								3											
41.406494	-85.737519	2	250	3		1																	



Wawasee 6-5-2014

		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.406106	-85.735771	5	251																	3			
41.405869	-85.734271	4	252		1															3			
41.405061	-85.732016	3	253	1	3			1															
41.406192	-85.730957	7	254		3																		
41.407360	-85.731107	14	255	3																			
41.409058	-85.731721	10	256			1								3									
41.409865	-85.729886	22	257																3				
41.409458	-85.727177	20	258																1				
41.405674	-85.726078	4	259		1																		
41.403627	-85.721371	7	260		3			3															
41.402014	-85.718272	5	261		3	1																	
41.402769	-85.715325	6	262		1															3			
41.400351	-85.714315	4	263		1																		
41.398792	-85.711303	12	264			3		3															
41.397606	-85.711650	5	265		1				1														
41.396156	-85.710643	5	266		1																		
41.394307	-85.705694	9	267		3																		
41.393081	-85.705719	5	268		1																		
41.392250	-85.703256	15	269	–																			
41.391209	-85.702295	5	270		1																		
41.390478	-85.700517	23	271	–																			
41.390450	-85.699861	16	272	–																			
41.390846	-85.696390	17	273			3																	
41.390357	-85.691885	19	274	–																			
41.390059	-85.691925	12	275			3		3						1									
41.388074	-85.687901	5	276		1				1											3			
41.386286	-85.684490	18	277	–																			
41.387047	-85.688552	4	278				5															3	
41.386232	-85.691375	5	279										3										
41.387408	-85.691570	5	280				3						5										
41.385404	-85.684681	3	281		1																		
41.384673	-85.686297	5	282									3	3										
41.385004	-85.688423	5	283		3																		
41.384425	-85.690769	4	284				3	3											1				
41.383416	-85.684403	13	285																3				
41.382728	-85.681466	16	286			3	3																
41.381776	-85.682912	4	287		1				3														
41.379340	-85.684019	5	288										3						3				
41.376556	-85.684076	5	289									3	3										
41.378226	-85.682390	13	290	–																			
41.376293	-85.681846	11	291				3						3										
41.378818	-85.680989	4	292		1	1								3									
41.375713	-85.680887	11	293															3				3	
41.376558	-85.679577	3	294		3	3			3														
41.378901	-85.677495	10	295		3			3															
41.379088	-85.677331	19	296	–																			
41.377778	-85.675930	5	297		3				1														
41.378458	-85.675243	11	298			5	5																
41.378779	-85.672526	5	299		1				1														
41.377188	-85.671629	4	300	3		1																	

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Latitude	Longitude	Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.378244	-85.670398	3	1	1						1	3												
41.378406	-85.670429	5.5	2	3	7																		
41.378298	-85.670236	4.5	3	—																			
41.378382	-85.670004	4.5	4							1	3												
41.379442	-85.669505	4	5		3																		
41.380413	-85.671503	5	6		1				1														
41.380593	-85.672478	13	7	—																			
41.382187	-85.672468	5	8		3				1	3													
41.381943	-85.670770	21	9	—																			
41.382100	-85.669081	3	10			1	3		1	3	5				1								
41.382717	-85.668187	2	11						1	3	3												
41.383054	-85.668690	5	12							1	3				1								
41.384130	-85.669240	5	13			1				1	3												
41.384387	-85.670710	20	14				3																
41.384624	-85.670267	5	15			1				1	3							1					
41.384892	-85.669910	4.5	16			1																	
41.385545	-85.669304	5	17	1							3												
41.384833	-85.670601	5	18	3																			
41.385006	-85.670282	4	19			1			1		1						1						
41.385095	-85.670164	4	20			3					1						3						
41.385085	-85.670382	4.5	21								3												
41.385307	-85.670346	3	22	1							1												
41.386042	-85.669835	3	23							3													
41.386511	-85.670899	5	24				3			1													
41.386311	-85.671959	4	25	5			3																
41.385613	-85.671613	11	26								1												
41.385020	-85.672677	5	27	3																			
41.383348	-85.673173	7	28								3			3									
41.385291	-85.678414	21	29	—																			
41.388653	-85.672492	5	30	—																			
41.387743	-85.670301	5	31	—																			
41.389484	-85.670151	11	32	5	3	1		3			3												
41.391861	-85.667768	10	33					3															
41.393770	-85.669432	17	34	5			3																
41.396157	-85.670668	11	35					5		1	3												
41.396427	-85.674653	21	36	5								3											
41.397578	-85.674155	6	37	—																			
41.397796	-85.673289	6	38	—																			
41.399875	-85.673448	3	39	—																			
41.400344	-85.671559	4	40							3													
41.402782	-85.669801	2	41	—																			
41.401806	-85.667412	4	42	—																			
41.399129	-85.665619	2	43	1					1				3										
41.397469	-85.664362	4	44										1										
41.403520	-85.668864	5	45										1										
41.406778	-85.669891	6	46	—																			
41.404652	-85.670991	5	47	—																			
41.407320	-85.671016	3	48	—																			
41.409112	-85.671317	4	49	—																			
41.405797	-85.672475	4	50	—																			

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		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	~~ELF~~	Largeleaf
41.407040	-85.671872	6	51	–																			
41.398630	-85.674507	5	52							3	3												
41.400234	-85.674842	4	53						1		3												
41.401697	-85.677024	5	54								1												
41.400152	-85.679922	6	55		5																		
41.403146	-85.677922	5 A	56											1									
41.402525	-85.676327	6	57				5																
41.404209	-85.677721	4	58				5																
41.404334	-85.678748	9	59				5					1											
41.403312	-85.680673	5	60	–																			
41.404896	-85.683363	20	61	–																			
41.406007	-85.683182	16.5	62	5																			
41.405727	-85.682816	4	63	–																			
41.405485	-85.681813	4.5	64	1																			
41.405503	-85.680802	6.5	65	–																			
41.406245	-85.682297	5.5	66	1																			
41.406135	-85.681409	10	67	–																			
41.407492	-85.683396	7	68		3	1			1														
41.408327	-85.682013	5.5	69		3							1											
41.408349	-85.681009	6.5	70	3																			
41.407899	-85.680700	8	71	–																			
41.408361	-85.679456	5	72	1																			
41.407717	-85.679628	7	73															3					
41.409179	-85.681151	5 A	74	–																			
41.409207	-85.678969	4 A	75	–																			
41.408821	-85.684002	17	76	5			1																
41.409868	-85.686290	20	77	–																			
41.410450	-85.685316	18.5	78	5																			
41.410565	-85.684392	8	79		1																	3	
41.410748	-85.685803	16	80	3																			
41.411418	-85.685939	10.5	81		5																	1	
41.411697	-85.684317	4.5	82		1																	1	
41.412924	-85.686747	5.5	83	3	3			1															
41.413055	-85.687764	4.5 A	84							1													
41.413563	-85.687846	8	85	1																			
41.412238	-85.687187	5.5	86		3																		
41.412182	-85.686727	5	87		1					3													
41.411728	-85.688081	3.5	88		1																		
41.411442	-85.687409	5.5	89	1							1												
41.411613	-85.689080	11.5	90	–																			
41.411197	-85.690022	5	91	–						1	3												
41.411746	-85.691221	5	92	–																			
41.412519	-85.692872	7	93	–																			
41.411021	-85.688374	4	94		3																	3	
41.409797	-85.689400	4	95	–																			
41.409716	-85.690402	5	96	1																			
41.410850	-85.693418	6	97	–																			
41.413060	-85.696565	6	98	–																			
41.409617	-85.687753	6.5	99		3																		
41.408686	-85.688441	6	100	–																			

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		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.406999	-85.688732	17	101	5																			
41.405778	-85.689676	4	102		1				3														
41.405410	-85.689098	15.5	103	5																			
41.404804	-85.688693	8	104	1	3																		
41.404803	-85.688198	10	105			5																	
41.404138	-85.688797	3.5	106	1																			
41.403920	-85.688839	1.5	107		3					1	3												
41.404256	-85.689547	3.5	108	1																			
41.404177	-85.689985	4.5	109							1													
41.404765	-85.690732	5.5	110	1																			
41.402718	-85.689817	6.5	111	—																			
41.402805	-85.687075	8.5	112	1																			
41.403677	-85.687258	3	113	—																			
41.404114	-85.687414	3.5	114						3	1		1											
41.404781	-85.687345	5	115		3																		
41.405114	-85.687267	5	116		3	3		3															
41.405823	-85.687130	21	117	5																			
41.405289	-85.686276	6	118					5															
41.403772	-85.685728	15	119	5																			
41.402234	-85.685243	5	120						3		3												
41.399980	-85.686783	19	121	—																			
41.396623	-85.684857	10	122		3			3															
41.395727	-85.685384	21	123	—																			
41.395749	-85.682462	17	124	—																			
41.392172	-85.683025	11	125		3				3														
41.389694	-85.683622	5	126		3																		
41.392081	-85.689568	12	127		3																		
41.394628	-85.688329	12	128		5																		
41.399273	-85.688387	10	129			5	3	3															
41.400687	-85.689565	11	130	1																			
41.399068	-85.689817	11	131		3			3		1	3			3									
41.399773	-85.691022	5	132	—																			
41.400476	-85.694067	15	133			3	3																
41.402086	-85.698529	21	134	—																			
41.402639	-85.694984	8	135		3	3																	
41.404949	-85.692977	4	136	—	3																		
41.404725	-85.697527	12	137		5																		
41.406676	-85.696283	8	138		1		3	3															
41.406798	-85.701615	13	139	—																			
41.408801	-85.697334	6	140		1							1											
41.410425	-85.700719	8	141		1																		
41.410990	-85.703201	19	142				3	1															
41.411811	-85.701816	11	143		3																		
41.412452	-85.704212	18	144					1															Spiny - 3
41.413082	-85.700442	6	145		1																		
41.414702	-85.702782	7	146		1		1		1														
41.414881	-85.707302	7	147		1				1														
41.412966	-85.709979	14	148			5		3															
41.410931	-85.713027	~~17~~ 7	149						1														
41.409910	-85.713513	8	150	—																			

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		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.408191	-85.715511	16	151			1	3																
41.406792	-85.716151	16	152		1	1					3												
41.405784	-85.714883	23	153	—																			
41.410590	-85.721112	11	154		3			3				3											
41.412107	-85.716289	11	155		1																		
41.413190	-85.714227	18	156				3												1				
41.413370	-85.717185	23	157	—														3					
41.415187	-85.718464	4	158	—																			
41.416446	-85.720861	6	159		1						3												
41.417051	-85.719575	4	160		1				3	1													
41.416773	-85.717838	4	161				3				1												
41.417770	-85.717082	8	162				3																
41.417536	-85.716055	3	163			1	3	3						1									spiny-1
41.417617	-85.719869	3	164	—																			
41.418054	-85.721022	10	165	—																			
41.418993	-85.721816	5	166	—								—											
41.416373	-85.722418	5	167		1				1			1											
41.416787	-85.723894	4	168	—																			
41.415841	-85.727439	3	169				5																
41.414382	-85.728835	3	170				3																
41.413029	-85.723943	14	171		1																		
41.413195	-85.726925	7	172		1																		
41.412269	-85.728458	5	173	—																			
41.410315	-85.734066	4	174		3	1			1	1													
41.410829	-85.734233	6	175	1	1						3	1											
41.411397	-85.733456	5	176			3	3					1											
41.411633	-85.732645	7	177	1					3		1	1											
41.411835	-85.731653	6	178	3								3											
41.413649	-85.731328	5	179	—								3											
41.414421	-85.732649	5	180				3																
41.414480	-85.733735	5	181	1																	1		
41.415193	-85.735141	6	182	—																			
41.416113	-85.735173	5	183					3															
41.416892	-85.734027	7	184				1																
41.416203	-85.731863	6	185				5	3				3											
41.414759	-85.729608	4	186				5																
41.418524	-85.727757	4	187				3					5											
41.417458	-85.733588	3	188	—																			
41.418093	-85.733827	3	189	—																			
41.418522	-85.732342	3	190									5											
41.418670	-85.730407	3	191	—																			
41.419143	-85.731389	4	192									5											
41.418990	-85.733678	3	193	3								3											
41.419418	-85.734580	4	194	3								3											
41.420370	-85.734383	4	195						1														spiny-1
41.419104	-85.735726	0	196	—																			
41.418809	-85.737111	0	197	—																			
41.419416	-85.738102	4	198	3			1																
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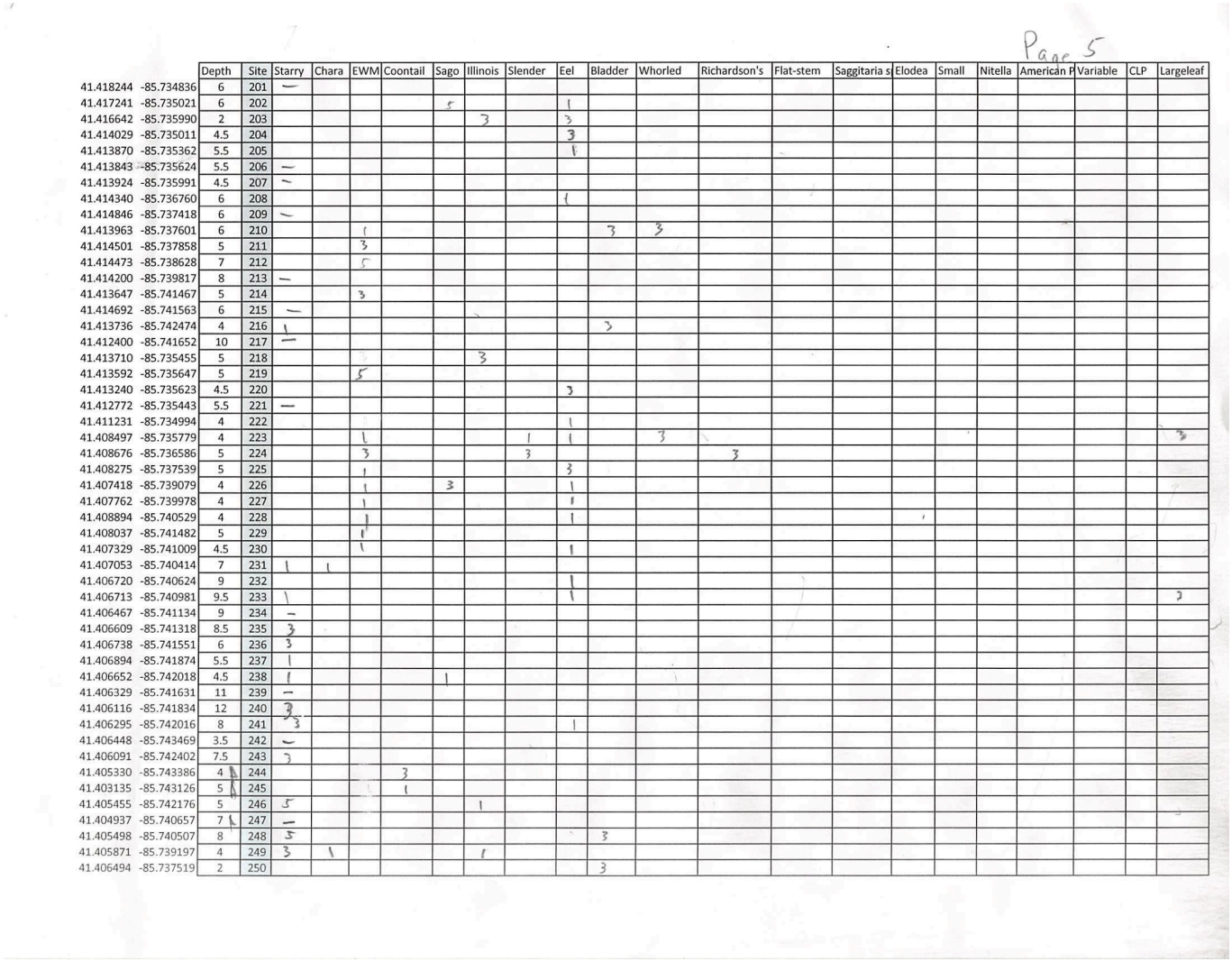
41.417192	-85.739453	4	200	3																			



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		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.418244	-85.734836	6	201	—																			
41.417241	-85.735021	6	202					5			1												
41.416642	-85.735990	2	203						3		3												
41.414029	-85.735011	4.5	204								3												
41.413870	-85.735362	5.5	205								1												
41.413843	-85.735624	5.5	206	—																			
41.413924	-85.735991	4.5	207	—																			
41.414340	-85.736760	6	208								1												
41.414846	-85.737418	6	209	—																			
41.413963	-85.737601	6	210			1						3	3										
41.414501	-85.737858	5	211			3																	
41.414473	-85.738628	7	212			5																	
41.414200	-85.739817	8	213	—																			
41.413647	-85.741467	5	214			3																	
41.414692	-85.741563	6	215	—																			
41.413736	-85.742474	4	216	1								2											
41.412400	-85.741652	10	217	—																			
41.413710	-85.735455	5	218						3														
41.413592	-85.735647	5	219			5																	
41.413240	-85.735623	4.5	220								3												
41.412772	-85.735443	5.5	221	—																			
41.411231	-85.734994	4	222								1												
41.408497	-85.735779	4	223			1				1	1		3										3
41.408676	-85.736586	5	224			3				3				3									
41.408275	-85.737539	5	225			1					3												
41.407418	-85.739079	4	226			1		3			1												
41.407762	-85.739978	4	227			1					1												
41.408894	-85.740529	4	228			1					1												
41.408037	-85.741482	5	229			1																	
41.407329	-85.741009	4.5	230			1					1												
41.407053	-85.740414	7	231	1	1																		
41.406720	-85.740624	9	232								1												
41.406713	-85.740981	9.5	233	1							1												3
41.406467	-85.741134	9	234	—																			
41.406609	-85.741318	8.5	235	3																			
41.406738	-85.741551	6	236	3																			
41.406894	-85.741874	5.5	237	1																			
41.406652	-85.742018	4.5	238	1				1															
41.406329	-85.741631	11	239	—																			
41.406116	-85.741834	12	240	3																			
41.406295	-85.742016	8	241	3							1												
41.406448	-85.743469	3.5	242	—																			
41.406091	-85.742402	7.5	243	3																			
41.405330	-85.743386	4	244				3																
41.403135	-85.743126	5	245				1																
41.405455	-85.742176	5	246	5					1														
41.404937	-85.740657	7	247	—																			
41.405498	-85.740507	8	248	5								3											
41.405871	-85.739197	4	249	3	1				1														
41.406494	-85.737519	2	250									3											

Secchi: 10.7 Page 6

		Depth	Site	Starry	Chara	EWM	Coontail	Sago	Illinois	Slender	Eel	Bladder	Whorled	Richardson's	Flat-stem	Saggitaria s	Elodea	Small	Nitella	American P	Variable	CLP	Largeleaf
41.406106	-85.735771	5	251		1				1														
41.405869	-85.734271	4	252		1															1	1		
41.405061	-85.732016	3	253								3												
41.406192	-85.730957	7	254		1																		
41.407360	-85.731107	14	255	3																			
41.409058	-85.731721	10	256			3		5	3														
41.409865	-85.729886	22	257	–																			
41.409458	-85.727177	20	258	–																			
41.405674	-85.726078	4	259	–																			
41.403627	-85.721371	7	260	–																			
41.402014	-85.718272	5	261		1																		
41.402769	-85.715325	6	262		3				1														
41.400351	-85.714315	4	263		3																		
41.398792	-85.711303	12	264	–																			
41.397606	-85.711650	5	265		1																		
41.396156	-85.710643	5	266		1				1														
41.394307	-85.705694	9	267		3				1														
41.393081	-85.705719	5	268		1																		
41.392250	-85.703256	15	269		1	1					3												
41.391209	-85.702295	5	270																				
41.390478	-85.700517	23	271	–																			
41.390450	-85.699861	16	272			3		3															
41.390846	-85.696390	17	273	~																			
41.390357	-85.691885	19	274				3																
41.390059	-85.691925	12	275		3																		
41.388074	-85.687901	5	276		3																		
41.386286	-85.684490	18	277	–																			
41.387047	-85.688552	4	278				5																
41.386232	-85.691375	5	279								3		3										
41.387408	-85.691570	5	280	–																			
41.385404	-85.684681	3	281		5	1			1														
41.384673	-85.686297	5	282									5											
41.385004	-85.688423	5	283									1	3										
41.384425	-85.690769	4	284									3	3										
41.383416	-85.684403	13	285									7											
41.382728	-85.681466	16	286	–																			
41.381776	-85.682912	4	287		3					1													
41.379340	-85.684019	5	288								3												
41.376556	-85.684076	5	289										3										
41.378226	-85.682390	13	290	–																			
41.376293	-85.681846	11	291	–																			
41.378818	-85.680989	4	292		3																		
41.375713	-85.680887	11	293	–																			
41.376558	-85.679577	3	294	1	3				1														
41.378901	-85.677495	10	295			5																	
41.379088	-85.677331	19	296	–																			
41.377778	-85.675930	5	297		3	1				3													
41.378458	-85.675243	11	298		3	1			1	1													
41.378779	-85.672526	5	299		1					3													
41.377188	-85.671629	4	300						1														

DO	Temp
0	8.66 81.6
1	8.84 80.5
2	8.93 79.9
3	9.03 79.4
4	9.08 79.1
5	9.09 78.9
6	6.47 75.6
7	4.18 72.9
8	3.15 71.8
9	2.03 70.7
10	0.30 68.2
11	0.21 63.5
12	0.15 64.1

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Aquatic Vegetation Control Permits
Lake Wawasee EWM LARE Permit

APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT	FOR OFFICE USE ONLY	Return to: Page 1 of
State Form 26727 (R4 / 2-04)	License No.	DEPARTMENT OF NATURAL RESOURCES
Approved State Board of Accounts 2004	Date Issued	Division of Fish and Wildlife
☐ Whole Lake ☒ Multiple Treatment Areas	Lake County	Commercial License Clerk
Check type of permit		402 West Washington Street, Room W273
INSTRUCTIONS: Please print or type information		Indianapolis, IN 46204
		FEE $5.00

Applicant's Name	Lake Assoc. Name	
Aquatic Weed Control	Wawasee Area Conservancy Foundation	
Rural Route or Street		Phone Number
P. O. Box 325		574-533-2597
City and State		ZIP Code
Syracuse IN		46567
Certified Applicator (if applicable)	Company or Inc. Name	Certification Number
Jim Donahoe	Above	F-19215
Rural Route or Street		Phone Number
P. O. Box 325		574-533-2597
City and State		ZIP Code
Syracuse IN		46567

Lake (One application per lake)	Nearest Town	County		
Lake Wawasee	Syracuse	Kosciusko		
Does water flow into a water supply			☐ Yes	☒ No

Please complete one section for *EACH* treatment area. Attach lake map showing treatment area and denote location of any water supply intake.

Treatment Area #	1	LAT/LONG or UTM's	on map		
Total acres to be controlled	32.5 ac	Proposed shoreline treatment length (ft)	4347	Perpendicular distance from shoreline (ft)	100
Maximum Depth of Treatment (ft)	12	Expected date(s) of treatment(s)	Mid June		

Treatment method: ☒ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2, 4-D (DMA-4 or Navigate)

Plant survey method: ☐ Rake ☒ Visual ☐ Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	50
Curley Leaf		20
Sago		10
Coontail		20

Page 2 of

Treatment Area	2	LAT/LONG or UTM's	on map		
Total acres to be controlled	7.5	Proposed shoreline treatment length (ft)	2025	Perpendicular distance from shoreline (ft)	250
Maximum Depth of Treatment	12	Expected date(s) of treatment(s)	Mid June		

Treatment method: [X] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological contr 2, 4-D (DMA-4 or Navigate)

Plant survey metho [ ] Rake [X] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	50
Curley Leaf		20
Sago		10
Coontail		20

Treatment Area	3	LAT/LONG or UTM's	on map		
Total acres to be controlled	52.4	Proposed shoreline treatment length (ft)	3938	Perpendicular distance from shoreline (ft)	1497
Maximum Depth of Treatment	12	Expected date(s) of treatment(s)	Mid June		

Treatment method: [X] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological contr 2, 4-D (DMA-4 or Navigate)

Plant survey metho [ ] Rake [X] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	50
Curley Leaf		20
Sago		10
Coontail		20

Treatment Area #		LAT/LONG or UTM's	
Total acres to be controlled		Proposed shoreline treatment length (ft)	Perpendicular distance from shoreline (ft)
Maximum Depth of Treatment (ft)		Expected date(s) of treatment(s)	

Treatment method: ☐ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. Reward, Aquathal K, Copper sulfate, 2-4D, renovate, Nautique

Plant survey method: ☐ Rake ☐ Visual ☐ Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community

INSTRUCTIONS: Whoever treats the lake fills in "Applicant's Signature" unless they are a professional. If they are a professional company who specializes in lake treatment, they should sign on the "Certified Applicant" line.

Applicant Signature	Date
Certified Applicant's Signature	Date

FOR OFFICE ONLY

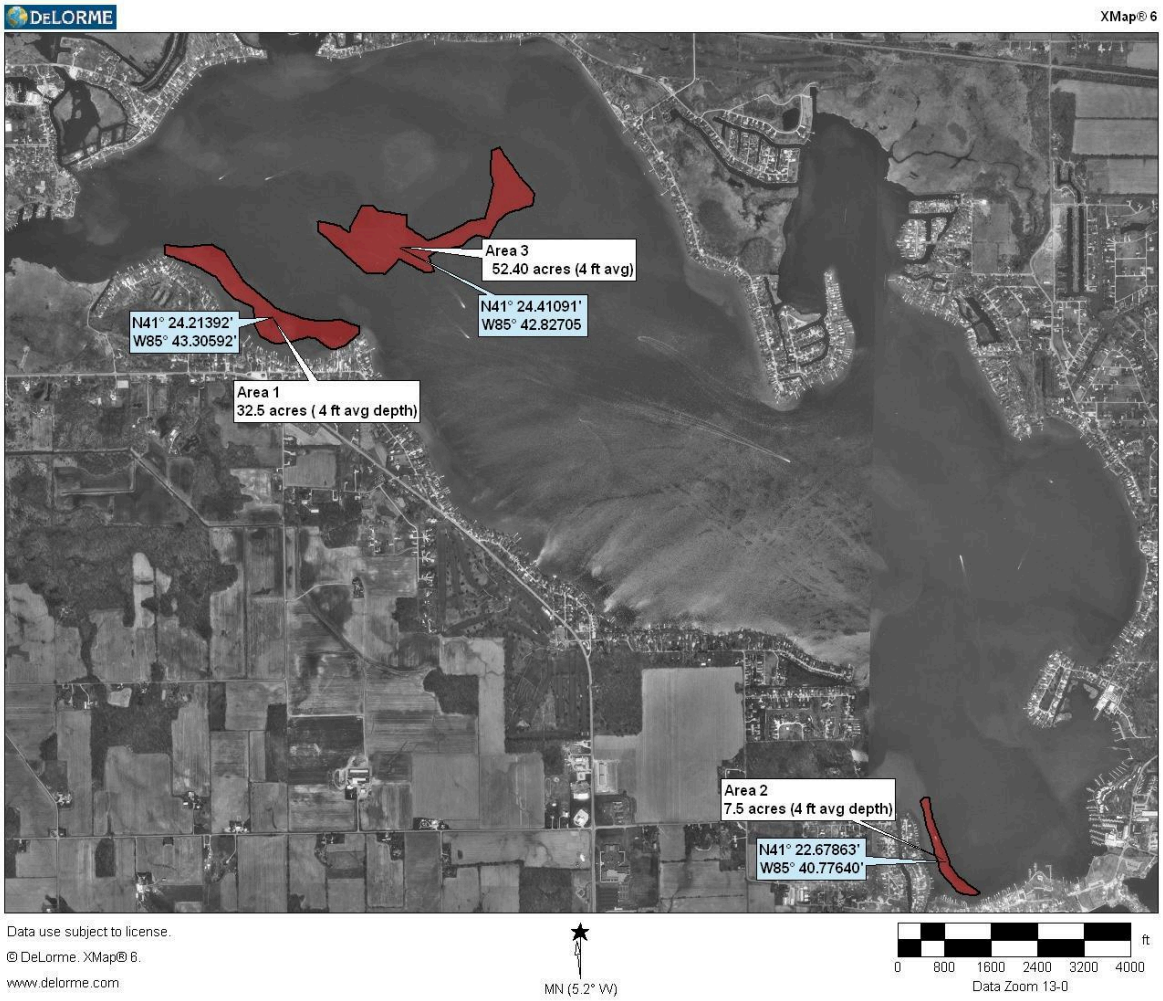
	Fisheries Staff Specialist
☐ Approved ☐ Disapproved	
	Environmental Staff Specialist
☐ Approved ☐ Disapproved	

Mail check or money order in the amount of $5.00 to:

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
COMMERCIAL LICENSE CLERK
402 WEST WASHINGTON STREET ROOM W273
INDIANAPOLIS, IN 46204

*****Wawasee EWM LARE Permit Map

These areas will not all be treated for EWM. They are simply high priority areas that could potentially be treated. Area 1 will be the highest priority, with the other two areas prioritized based on EWM severity in spring of 2015.



Syracuse Lake 2014 EWM LARE Permit

AWC was instructed to apply for up to 20 acres of EWM treatment on Syracuse Lake for the 2015 IDNR permit. The treatment areas on the following permit are potential areas based on 2014 EWM density. However, a final map will submitted following the visual survey in July of 2015.

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APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT

State Form 26727 (R4 / 2-04)
Approved State Board of Accounts 2004
☐ Whole Lake ☒ Multiple Treatment Areas
Check type of permit

INSTRUCTIONS: Please print or type information

FOR OFFICE USE ONLY
License No.
Date Issued
Lake County

DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife
Commercial License Clerk
402 West Washington Street, Room W273
Indianapolis, IN 46204

FEE: $5.00

Applicant's Name	Lake Assoc. Name	
Aquatic Weed Control	Wawasee Area Conservance Foundation	
Rural Route or Street		Phone Number
P. O. Box 325		574-533-2597
City and State		ZIP Code
Syracuse IN		46567
Certified Applicator (if applicable)	Company or Inc. Name	Certification Number
Jim Donahoe	Above	F-19215
Rural Route or Street		Phone Number
P. O. Box 325		574-533-2597
City and State		ZIP Code
Syracuse IN		46567

Lake (One application per lake)	Nearest Town	County
Syracuse Lake	Syracuse	Kosciusko
Does water flow into a water supply	☐ Yes	☒ No

Please complete one section for *EACH* treatment area. Attach lake map showing treatment area and denote location of any water supply intake.

Treatment Area #	1	LAT/LONG or UTM's	on map		
Total acres to be controlled	3.85 ac	Proposed shoreline treatment length (ft)	NA	Perpendicular distance from shoreline (ft)	NA
Maximum Depth of Treatment (ft)	12	Expected date(s) of treatment(s)	July		

Treatment method: ☒ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2, 4-D

Plant survey method: ☐ Rake ☒ Visual ☐ Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	50
Curly-leaf		20
Sago		10
Coontail		20

Page 2 of

Treatment Area #	2	LAT/LONG or UTM's	on map		
Total acres to be controlled	4.41	Proposed shoreline treatment length (ft)	NA	Perpendicular distance from shoreline (ft)	NA
Maximum Depth of Treatment (ft)	12	Expected date(s) of treatment(s)	Mid June		

Treatment method: [x] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2, 4-D

Plant survey method: [ ] Rake [x] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	50
Curly-leaf		20
Sago		10
Coontail		20

Treatment Area #	3	LAT/LONG or UTM's	on map		
Total acres to be controlled	8.28	Proposed shoreline treatment length (ft)	NA	Perpendicular distance from shoreline (ft)	NA
Maximum Depth of Treatment (ft)	12	Expected date(s) of treatment(s)	July		

Treatment method: [x] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. 2, 4-D

Plant survey method: [ ] Rake [x] Visual [ ] Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian Milfoil	x	50
Curly-leaf		20
Sago		10
Coontail		20

Page 3 of

Treatment Area #		LAT/LONG or UTM's	
Total acres to be controlled		Proposed shoreline treatment length (ft)	Perpendicular distance from shoreline (ft)
Maximum Depth of Treatment (ft)		Expected date(s) of treatment(s)	

Treatment method: ☐ Chemical ☐ Physical ☐ Biological Control ☐ Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control.

Plant survey method: ☐ Rake ☐ Visual ☐ Other (specify)

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community

INSTRUCTIONS: Whoever treats the lake fills in "Applicant's Signature" unless they are a professional. If they are a professional company who specializes in lake treatment, they should sign on the "Certified Applicant" line.

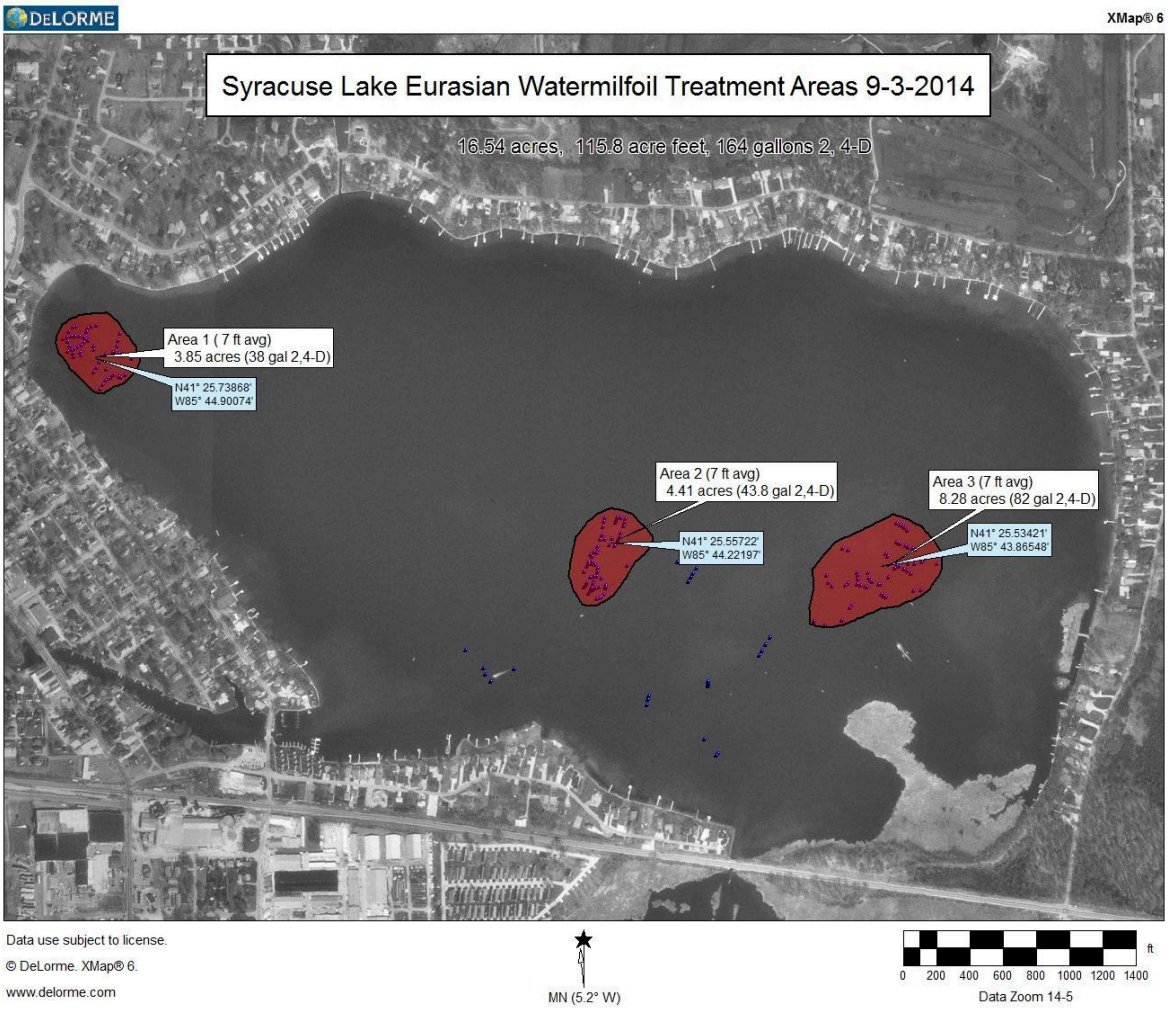
Applicant Signature	Date
Certified Applicant's Signature	Date

FOR OFFICE ONLY

	Fisheries Staff Specialist
☐ Approved ☐ Disapproved	
	Environmental Staff Specialist
☐ Approved ☐ Disapproved	

Mail check or money order in the amount of $5.00 to:

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
COMMERCIAL LICENSE CLERK
402 WEST WASHINGTON STREET ROOM W273
INDIANAPOLIS, IN 46204



*****Starry stonewort treatments have not needed a vegetation control permit in the past since they have been funded and controlled by the IDNR. It is likely that they will not need a permit in 2015.

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AQUATIC VEGETATION MANAGEMENT PROJECT APPLICATION
LAKE AND RIVER ENHANCEMENT (LARE) PROGRAM
State Form 54522 (R2 / 10-13)
INDIANA DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH & WILDLIFE

Application deadline is January 31st of the year for which grant is applied.

ACTIVITIES RELATED TO AQUATIC VEGETATION MANAGEMENT FOR LAKES	
I. APPLICANT INFORMATION	
A. Project sponsor *(applicant)*:	
Name: Wawasee Area Conservancy Foundation	
Address *(number and street)*: PO Box 548	
City, State, and ZIP Code: Syracuse, IN 46567	
Is the project sponsor already listed as a vendor with the state of Indiana? ☒ Yes ☐ No *If the answer is no, a Vendor Information Form (State Form 53788) must be submitted to the Indiana State Auditor before the sponsor can receive funds from the State of Indiana.*	
B. Contact person for the sponsor organization	
Name: Heather Harwood	Title: Executive Director
Address *(number and street)*: PO Box 548	
City, State, and ZIP Code: Syracuse IN 46567	
Telephone number *(Day)*: 574-457-549	Telephone number *(Evening)*: 574-457-549
FAX number: 574-457-4432	E-mail address: info@wacf.com
C. Briefly describe the past and present activities of the sponsor organization. WACF was formed in 1991 to anticipate, search out and solve threats to the Wawasee Area Watershed and it's water quality. The Foundation is dedicated to the enhancement of the area and will work with property owner groups in carrying out it's mission. It will also work with the IDNR and other government and civic organizations that share it's concerns. Initial funding was from the Wawasee Property Owners Association. With the help of the IDNR personnel, five key wetland areas were identified. Efforts were made to acquire all or parts of these wetlands to reduce water velocity and absorb polluting nutrients. To date these efforts have resulted in acquisitions of forty six wetland areas totalling over 820 acres including approximately 50 acres in Conservation Easements.	
D. Describe the legal status of the sponsor organization, i.e., indicate what the sponsor has done to acquire official standing. State when the organization was established. List current officers' / officials' names. 501 C (3) - Status granted due to programs offered by WACF with focus on Community education. Indiana 1991. Chairman - Sam Leman, Vice Chair - Joan Szynal, Treasurer - Donn Baird, Executive Director - Heather Harwood	
E. If the sponsor organization is a property owners or lake association, what percentage of the affected lake's residents are members of the group? The Wawasee Area Conservancy Foundation (WACF) includes any individuals or organizations interested in supporting the mission of the Conservancy and may make a monetary donation, conservaiton easement, lands, buildings, or interests therein. A public annual meeting is held each summer. The watershed includes approximately 20 lakes with the two largest being Wawasee (35% of property owners have supported WACF) and Syracuse Lake (40% of property owners have supported WACF)	

F. Are there other organizations also representing residents of the affected lake? What relationship do those organizations have with the sponsor/applicant on matters related to this proposed project? Yes - Wawasee has a property owners association (lake association) and considered a 'sister' organization to WACF - and was responsible for the formation of WACF. The property owners association (WPOA) has goals including buoys, safety, lake rules, fireworks and dry hydrants.
G. Briefly describe the financial resources available to the sponsor organization *(e.g. dues, contributions, fund drives, taxes, etc.)*. Contributions fund the annual operating budget. Fund drives would finance capital purchases and Endowment Funds.

II. LAKE/WATERSHED INFORMATION	
A. Lake(s) or River name(s): Wawasee	B. County(ies): Kosciusko
C. Lake size (acres): 3,410	D. Watershed (drainage basin) size (acres), *(if known)*: 23,618
E. 12 digit Hydrologic Unit Code (HUC) 040500011702	

F. Describe how the general public can gain access to the lake(s) *(i.e., the number and types of access sites, their location, ownership, and any fees charged).*

As well as the DNR Public Access site on Hatchery Road on the southeast end of Lake Wawasee, and one accessible through Syracuse Lake, there are at least two other free public easements and three public marinas.

III. PROJECT INFORMATION

A. For what specific purpose or need is funding being sought?

Aquatic Plant Survey and Treatment

Development of a new or updated aquatic vegetation management plan?

Updated

Management of aquatic vegetation?

Yes

Other? *(Explain)*

B. Describe any studies or restoration measures that have been completed for the lake/watershed.

Aquatic Plant Management Plan Update (2013), Design Build on Ritter Branch (2012), Planted 15,000 trees thru the CRP program in both Kosciusko and Noble Counties (2012), Aquatic Plant Management Plan Update (2012), Village Lake Stream Restoration (2011), Partnered with the ERRA for a GLC grant (2011), Constructed wetland and stream restoration at Dillon Creek (2011), Wetland Enhancement at WACF Education Center (2011), Aquatic Plant Management Plan Update (2011), Aquatic Plant Management Plan Update (2010), Aquatic Plant Management Plan Update (2008), Aquatic Plant Management Plan Update (2006), Aquatic Weed Survey (2005), Watershed Management Plan (2007), Design/Build Dillon Creek (2006) and Dillon Creek shoreline stabilization (2007), Littoral Zone Planting Study (2006), Bayshore Design/Build Wetlands and Sediment Ponds (2005), Martin Creek Sediment Basin (2004), Griffith Island Bank Stabilization (2005), Ten Grade Control Structures, Dillon Creek (2002), Wawasee Engineering Feasibility Study (2001), Wawasee Design Study (2002), Diagnostic Feasibility Study (1996), Glacial Stone Demonstration Project (2000), Largemouth Bass Population Characteristics and Movement (1998), Enchanted Hills Shoreline Stabilization Demonstration Project (1996) and Watershed Evaluation (1994

C. Complete the table below as well as describe here or on an attached sheet the activities for which funding is requested *(include maps of treatment areas, include average depth of treatment areas, indicate whole-lake or spot treatment, indicate priority species if only one can be funded; as well as other support materials, as applicable).*

Species	Total Acreage Including Channels	Channel Only Acreage	Chemical Name	Treatment Cost
EWM	40 acres- Lake Wawasee	0	2,4-D	$14,000
EWM	25 acres- Syracuse Lake	0	2,4-D	$ 8,750

D. What is the total estimated cost of the project? $ 22,750

Itemized by specific expenses:

Planning and Surveys *(AVMP or update):* $ 0- All survey and planning costs will be covered through the Great Lakes Restoration Initiative (GLRI) in 2015.

Herbicide treatment costs: $ 22,750

Other *(revegetation, ecozones, etc):* $ none

Anticipated cost-share to be contributed by sponsor ($ or %): 50/50 for maintenance treatments

What was the basis for the estimate *(e.g., diagnostic or feasibility study, preliminary estimate by consultant, formal bidding, etc.)*? Cost estimates are provided by Aquatic Weed Control and are based on past application costs as well as projected herbicide costs in 2015.
E. If a LARE grant were awarded for herbicide treatment, when would the effort realistically be expected to begin *(e.g., early-season treatment, prior to June 1st, etc.)*? June 2015
F. Indicate how the sponsor will oversee the contractor's work and participate in the effort. Weekly communication on project approach, development and succes
This application for Lake and River Enhancement program assistance is hereby submitted as authorized by the sponsoring organization.
Sponsor organization: Wawasee Area Conservancy Foundation, Inc.
Printed name of representative: Heather Harwood
Signature of representative: ***(Note: Please insert the initials of the representative in this box to constitute the electronic signature on your organization's application.)*** HHH
Date *(month, day, year)*: 10-29-14

INSTRUCTIONS: This application can be completed electronically, but to submit it, you must save a copy of the completed form, assign it a file name, and e-mail it to: lare@dnr.IN.gov
or print the completed form and mail to:

Lake and River Enhancement Program
Division of Fish and Wildlife
Indiana Department of Natural Resources
402 W. Washington Street, Room W273
Indianapolis, IN 46204
Telephone 317-233-1484

Application deadline is January 31st