

Curly-leaf pondweed Bed Mapping Survey Spider Lake (Big and Little) (WBIC: 2435700) - Sawyer County, WI



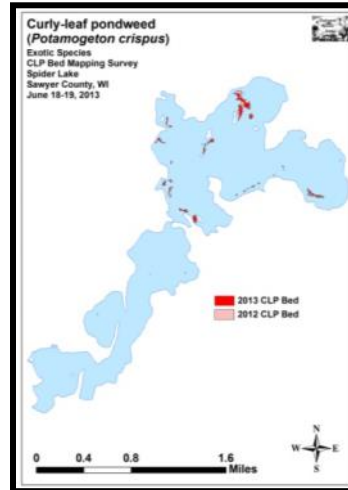
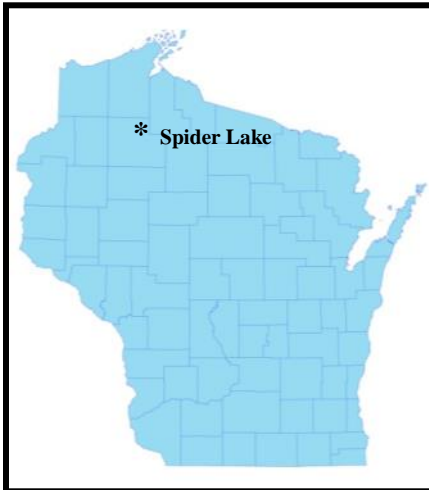
Aerial Photo of the Spider Chain (2010)



Curly-leaf pondweed (M. Berg)

Project Initiated by:

Spider Chain of Lakes Association, Short Elliot Hendrickson Inc., and the Wisconsin Department of Natural Resources (Grant AEPP-354-12)



2013 CLP Beds on Spider Lake

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TABLE OF CONTENTS

	Page
LIST OF FIGURES AND TABLES.....	ii
INTRODUCTION	1
METHODS.....	1
RESULTS AND DISCUSSION.....	2
CONSIDERATIONS FOR MANAGEMENT.....	7
LITERATURE CITED.....	8
APPENDIX.....	9
I: Curly-leaf Pondweed Bed Maps	9

LIST OF FIGURES AND TABLES

	Page #
Figure 1: Spider Chain Aerial Photo.....	1
Figure 2: Rake Fullness Ratings.....	2
Table 1: CLP Bed Summary Spider Lake, Sawyer Co. June 18-19, 2013.....	3
Figure 3: CLP Map of Whole Lake and Beds 1-4B.....	4
Figure 4: CLP Map of Beds 5-11 and 12-14, 26.....	5
Figure 5: CLP Map of Beds 15-20 and 21-25.....	6

INTRODUCTION:

Spider Lake (WBIC 2435700) is a 1,194-acre stratified drainage lake located in the Town of Spider Lake in north-central Sawyer County (T42N R7W). The lake reaches a maximum depth of 64ft in the deep hole in Big Spider just north of the channel to Little Spider and has an average depth of approximately 14ft. The lake is mesotrophic in nature with Secchi readings from 1989-2012 averaging 11.7ft in Big Spider and 10.8ft in Little Spider (WDNR 2012). This good water clarity produced a littoral zone that reached from 18-22ft throughout the 2012 growing season. Bottom substrate was predominantly sandy/marly muck in Little Spider and nutrient rich organic muck in Big Spider. Most sand and gravel areas occurred directly along the shoreline, on midlake bars, and around the lake's numerous islands (Figure 1) (Roth et al. 1969).



Figure 1: Spider Chain Aerial Photo

Prior to developing an Aquatic Plant Management Plan in 2012, the Spider Chain of Lakes Association (SCLA), Short Elliott Hendrickson Inc. (SEH), and the Wisconsin Department of Natural Resources (WDNR) authorized a series of full lake plant surveys on Spider Lake. After the Curly-leaf pondweed (*Potamogeton crispus*) bed mapping survey found 26 different beds totaling 12.06 acres – a total that was higher than expected - the SCLA requested a second CLP bed mapping survey on June 18th and 19th, 2013 to determine if CLP was expanding its coverage on the lake.

METHODS:

Curly-leaf pondweed Bed Mapping Survey:

In addition to revisiting and delineating all beds found in 2012, we again performed a meandering search of the lake's visible littoral zone to look for additional CLP beds. By definition, a bed is defined as a) a location where CLP plants make up greater than 50% of all aquatic plants, and b) CLP has canopied at the surface or is close enough to the surface that it would likely interfere with normal boat traffic.

Upon finding a bed, we circled around the perimeter and used a GPS unit to record waypoints at regular intervals. We then uploaded these points into ArcMap 9.3.1, created bed shapefiles using the WDNR Forestry Tools Extension, and determined the total acreage of the beds to the nearest hundredth of an acre (Table 1). We also visually estimated a rake fullness value of 1-3 as an estimation of CLP's abundance within the bed (Figure 2).




<u>Rating</u>	<u>Coverage</u>	<u>Description</u>
1		A few plants on rake head
2		Rake head is about ½ full Can easily see top of rake head
3		Overflowing Cannot see top of rake head

Figure 2: Rake Fullness Ratings (UWEX 2010)

RESULTS AND DISCUSSION:

Curly-leaf Pondweed Bed Mapping Survey:

Compared to 2012, we found 2013's Curly-leaf pondweed beds to be generally lower in both size and density. Beds also tended to be more fragmented as we noted several areas that had continuous plants in 2012 were broken into multiple small beds in 2013 with few or no plants in between. CLP was again focused around the 10ft bathymetric ring, but only on Big Spider over organic muck. Most other environments had only widely scattered CLP plants or, in the case of Little Spider's marly muck, no CLP plants at all. Ultimately, we located and mapped 28 small areas (up from 26 in 2012) that met the bed criteria or were at least close to it (Figure 4). The biggest (Bed 23) was 2.57 acres, but only one other (Bed 21 – 1.59) was over an acre (Table 1). Combined, they covered 9.22 acres and accounted for <1% of the lake's approximately 1,194 surface acres. This total was down 2.84 acres from 2012's total of 12.06 acres – a nearly 25% reduction in coverage (Appendix I).

Descriptions of Beds:

Bed 1 – Really just a high density area, Bed 1 was little more than a 5m² area of a few 10s of plants (Figure 3).

Bed 2 – Bed 2 was much reduced in both density and area. Most of the bed was more of a high density area with highly fragmented borders (Figure 3). We found native species like Large-leaf pondweed (*Potamogeton amplifolius*) and Claspingleaf pondweed (*Potamogeton richardsonii*) mixed in throughout the area. Although some CLP was canopied, we noted most plants were just 2-5ft tall and barely visible from the surface.

**Table 1: CLP Bed Summary
Spider Lake, Sawyer Co. June 18-19, 2013**

Bed Number	2013 Acreage	2012 Acreage	Change in Acres	Est. Mean Rake Fullness	Field Notes
1	0.00	0.01	0.00	<1-1	Tiny 5m ² area dominated by natives – more of a HDA
2	0.65	1.58	-0.93	<<1-2; mostly <1	CLP dense only in center of bed; natives mixed in throughout
3	0.00	0.15	-0.15	0	Area dominated by natives; no evidence of CLP
4	0.05	0.03	0.02	<1-2	Low to moderate density CLP mixed with natives in narrow zone
4B	0.04	0.00	0.04	<1-2; mostly 1	Low density strip in the 10ft contour; mixed with natives
5	0.02	0.02	0.00	<1-2; mostly 1	Low density strip in the 10ft contour; mixed with natives
6	0.13	0.09	0.04	<1-2; mostly 1	Low density strip in the 10ft contour; mixed with natives
7	0.01	0.01	0.01	<1-2; mostly 1	Low density strip in the 10ft contour; mixed with natives
8	0.08	0.02	0.06	<1-2; mostly 1	Low density strip in the 10ft contour; mixed with natives
9	0.05	0.01	0.04	<1-2; mostly 1	Low density strip in the 10ft contour; mixed with natives
9B	0.00	0.00	0.00	<1-2; mostly 1	Low density strip in the 10ft contour; mixed with natives
10	0.77	0.89	-0.12	1-2; mostly 1	Much reduced in density; slightly reduced in area
11	0.51	0.37	0.14	1-3; mostly 2	Moderately dense; mixed with natives
12A and B	0.13	0.75	-0.62	<1-1	Low density; handful of canopied plants
13	0.27	0.43	-0.16	<1-2; mostly 1	Low density/highly variable bed of monotypic canopied plants.
14	0.06	0.21	-0.15	<1-2; mostly 1	Highly variable; few canopied plants; many natives mixed in.
15	0.10	0.01	0.09	1-3; mostly 2	Moderately dense and canopied; mostly monotypic
16	0.06	0.04	0.02	1-3; mostly 2	Moderately dense and canopied; mostly monotypic
17A and B	0.38	0.38	0.00	1-3	Moderately dense and canopied; mostly monotypic
18	0.17	0.00	0.17	1-3	Moderately dense and canopied; mostly monotypic
19 and 20	0.32	0.09	0.23	1-3	Moderately dense and canopied; mostly monotypic
21	1.59	1.37	0.22	<1-3; mostly 2	Nearly canopied bed; high density core, but natives mixed in
22	0.48	0.57	-0.09	<1-3, mostly 1	Highly fragmented east of island; near canopy; but many natives
23	2.57	4.23	-1.66	<1-3, mostly 1	Highly fragmented east of island; near canopy; but many natives
24	0.33	0.41	-0.08	<1-3	Highly fragmented east of island; near canopy
25A and B	0.41	0.39	0.02	<1-3; mostly 1	Canopied, but fragmented - natives mixed in. 25A more of a HDA
26	0.00	0.01	-0.01	0	No CLP found despite extensive searching
Total Acres	9.22	12.06	-2.84		

Bed 3 – We found no evidence of CLP in this former treatment area even though there were regular plants scattered throughout in 2012 (Figure 3).

Bed 4 – Bed 4 was canopied and monotypic, but there didn't appear to be more than 100 plants scattered throughout the area (Figure 3). As in 2012, we noted CLP was nearly completely replaced by Fern pondweed (*Potamogeton robbinsii*), Illinois pondweed (*Potamogeton illinoensis*), Claspingleaf pondweed, Large-leaf pondweed, and White-stem pondweed (*Potamogeton praelongus*) outside its preferred 8-12ft ecological window.

Bed 4B – This new “bed” was little more than a ribbon of approximately 50 CLP plants that were near canopy in 10ft of water. The area was dominated by *Nitella* (*Nitella* sp.).

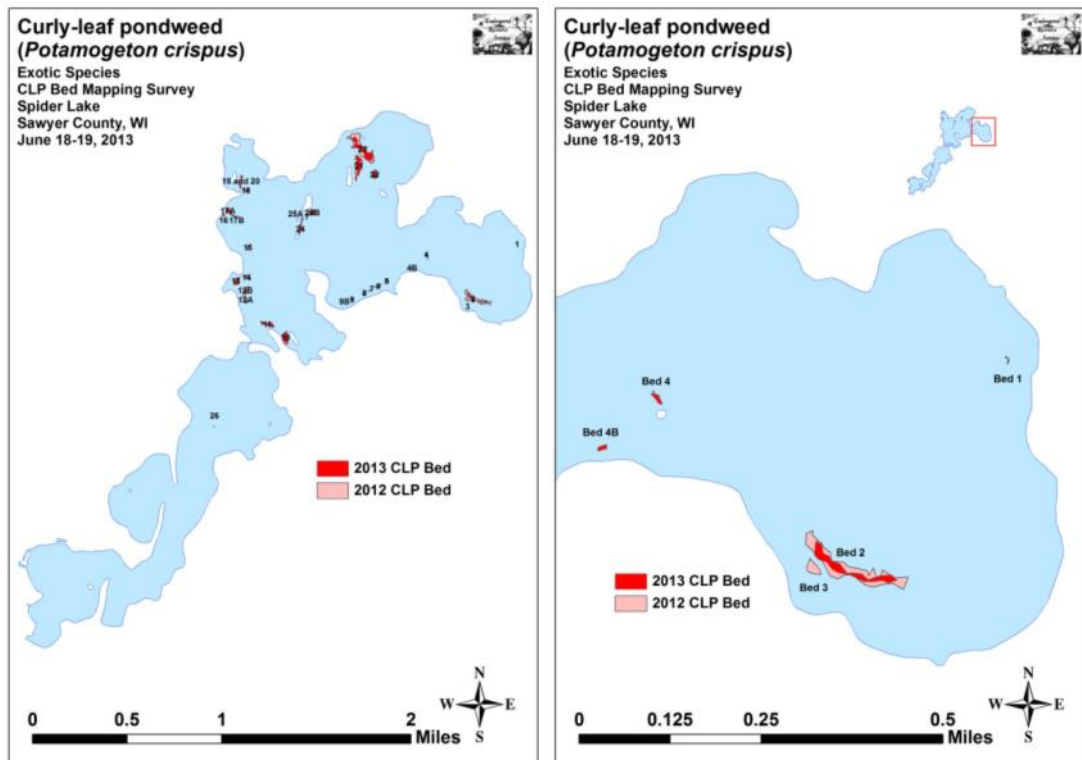


Figure 3: CLP Map of Whole Lake and Beds 1-4B

Beds 5-9B – These narrow beds had continuous, low density CLP in the 10ft range, and followed this depth contour along the bay's shoreline (Figure 4). In from this depth, CLP became very fragmented. Although a few plants were canopied, we found that most were only about 4ft tall. White-stem pondweed was again common in and around the CLP.

Bed 10 – Much less dense than in 2012, we found that Bed 10 was also highly fragmented (Figure 4). Although monotypic in 2012, Variable pondweed (*Potamogeton gramineus*) was now common throughout the area. CLP plants were 5-7ft tall in 10ft of water, and, because they were setting turions, appeared to be done growing. As in 2012, the bed was not an impediment to the channel's frequent boat traffic.

Bed 11 – Nearly identical in area to 2012, Bed 11 broke the trend for 2013 by being denser than in 2012 (Figure 4). Despite this, there were natives throughout the area, and we noted a trophy musky hunting within the CLP.

Beds 12A and 12B – Plants in this area were much reduced in density and area compared to 2012 (Figure 4). Bed 12A was little more than a cluster of canopied plants. Bed 12B had plants canopied in 8ft of water, but the majority of CLP in the area was only 1-2ft tall.

Beds 13-14 – This area was more of a high density area with canopied plants scattered throughout. High value native pondweeds, especially White-stem pondweed and Large-leaf pondweed, were common throughout the area (Figure 4).

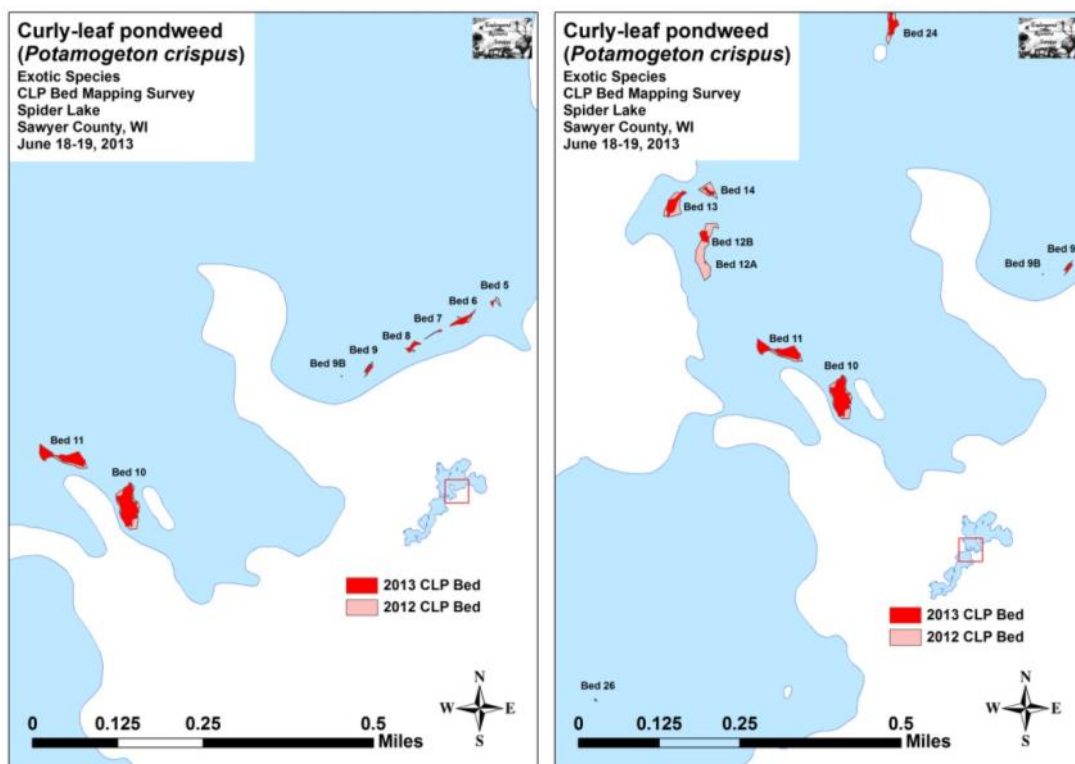


Figure 4: CLP Map of Beds 5-11 and 12-14, and 26

Bed 15 – A small area with large amounts of Large-leaf pondweed mixed in, Bed 15 was established on top of a small hump with sharp drop-offs into 20ft+ (Figure 5). Although its density appeared to be somewhat reduced, this was one of the few areas on the lake that showed significant expansion in area compared to 2012.

Beds 16, 17A, and 17B – Although nearly monotypic and canopied in up to 10ft of water, CLP was much more fragmented than in 2012 (Figure 5). Bed 17 split into two with nothing but high value natives in between. White-stem pondweed was common on the outer border of all the beds while Large-leaf pondweed dominated the inner border of each.

Beds 18 and 19/20 – These beds were nearly monotypic and fairly dense (Figure 5). All three were canopied in up to 10ft of water. As in Beds, 16, 17A, and 17B, White-stem pondweed/Large-leaf pondweed were abundant on the outer and inner borders.

Beds 21-23 – We again found these beds contained the densest CLP in the lake as they occurred over mucky flat in the 8-12ft range that CLP favors (Figure 5). All three beds were fragmented on the exterior with high value natives like Large-leaf pondweed, White-stem pondweed, and Fern pondweed scattered among the CLP. Nearer the core, CLP was nearly monotypic. Each area had some canopied plants in up to 9ft of water.

Beds 24, 25A, and 25B – These three small beds were established over muck in 8-10ft of water east of the midlake islands (Figure 5). Although monotypic on the outer edge and canopied in places, they were quite fragmented with 25A being more of a high density area than a true bed. The inner edge tended to be dominated by White-stem pondweed.

Bed 26 – Despite extensive searching, we found no trace of the small CLP bed we documented here in 2012 (Figure 4). We also found no sign of CLP anywhere else in Little Spider. Initially, we thought SCUBA divers may have removed the plants, but we were informed they had not been able to locate any plants either (John Kuntz, pers. com.). The surrounding area continues to be dominated by dense beds of high value native pondweed species that are much more adapted to Little Spider's bottom type. It's possible the CLP died out at this location, but we encourage volunteers to return to the area for the next several years to look for and rake or dive remove any plants that appear.

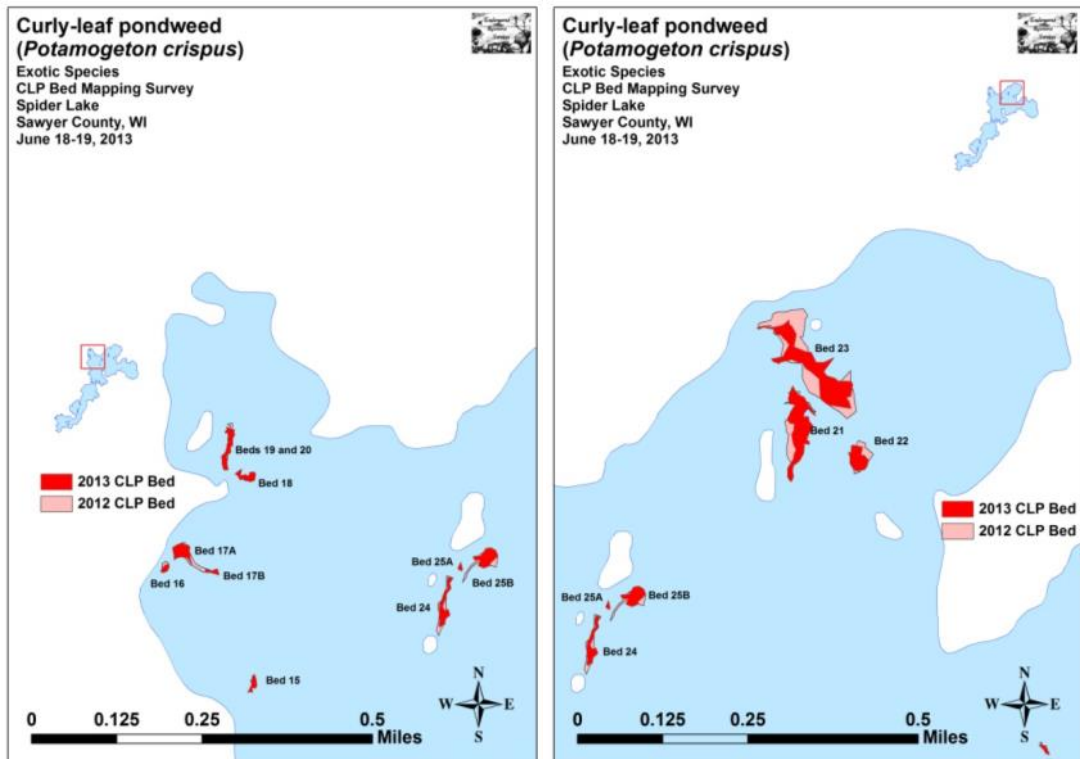


Figure 5: CLP Map of Beds 15-20 and 21-25

CONSIDERATIONS FOR MANAGEMENT:

Spider Lake has a rich and diverse native plant community that is the foundation of the entire lake ecosystem. Although CLP is an exotic species, it is seldom invasive to the point that it significantly impeded navigation or excludes native vegetation. For the most part, CLP occupies a distinct ecological niche and acts like “just another plant” interspersed among the lake’s native species.

Although chemical control of CLP beds could reduce the plant’s presence in the lake, incidental kill of the high value native pondweeds that share habitat with CLP could create a void that may favor CLP. In other words, there is a definite possibility that widespread treatment could ultimately make the infestation worse rather than better. Because of this, and with no evidence of expansion at this time, we feel a very cautious and limited approach to any active management is warranted.

LITERATURE CITED

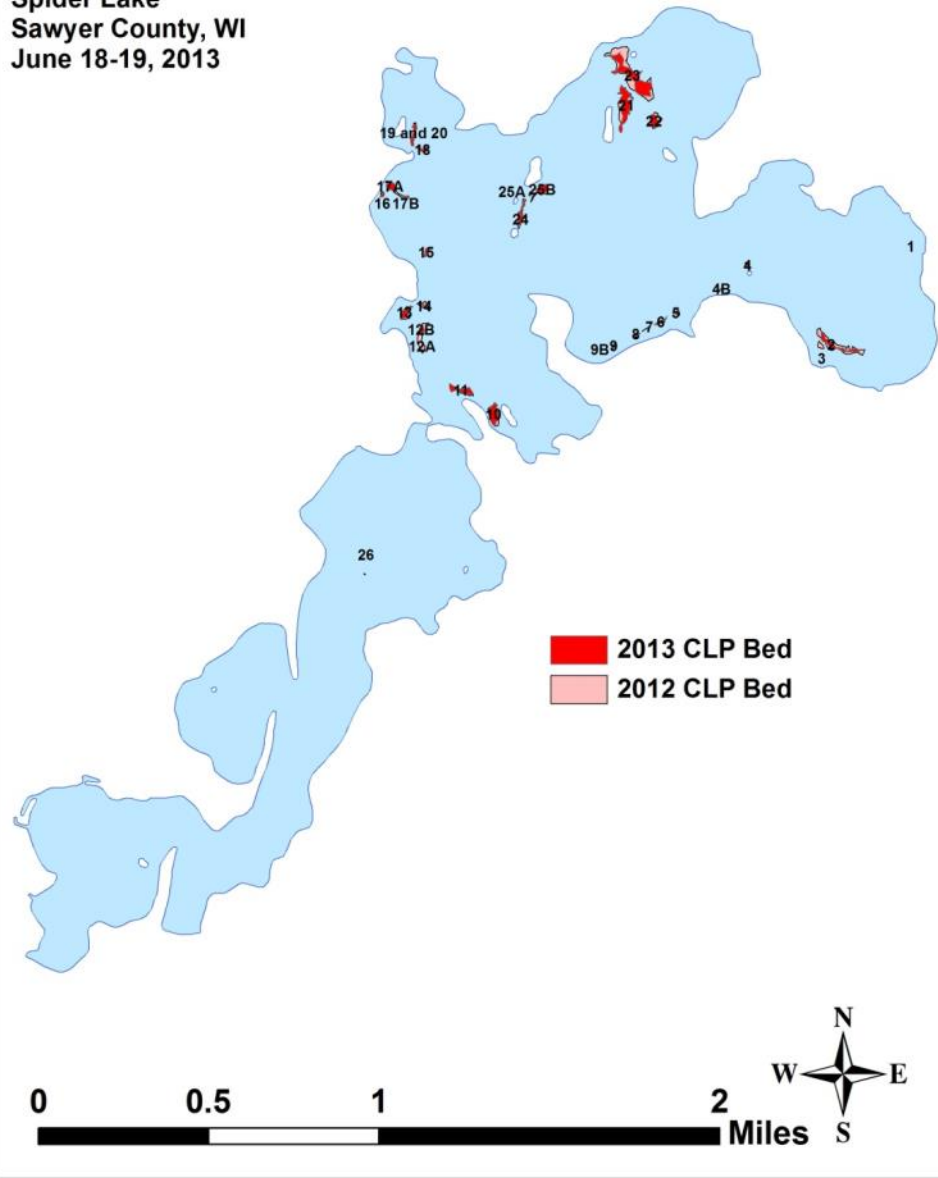
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WDNR. [online]. 2012. Wisconsin Lake Citizen Monitoring Data for Sawyer County. Available from <http://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=2435700&page=waterquality> (2012, November).

Appendix I: Curly-leaf Pondweed Bed Maps

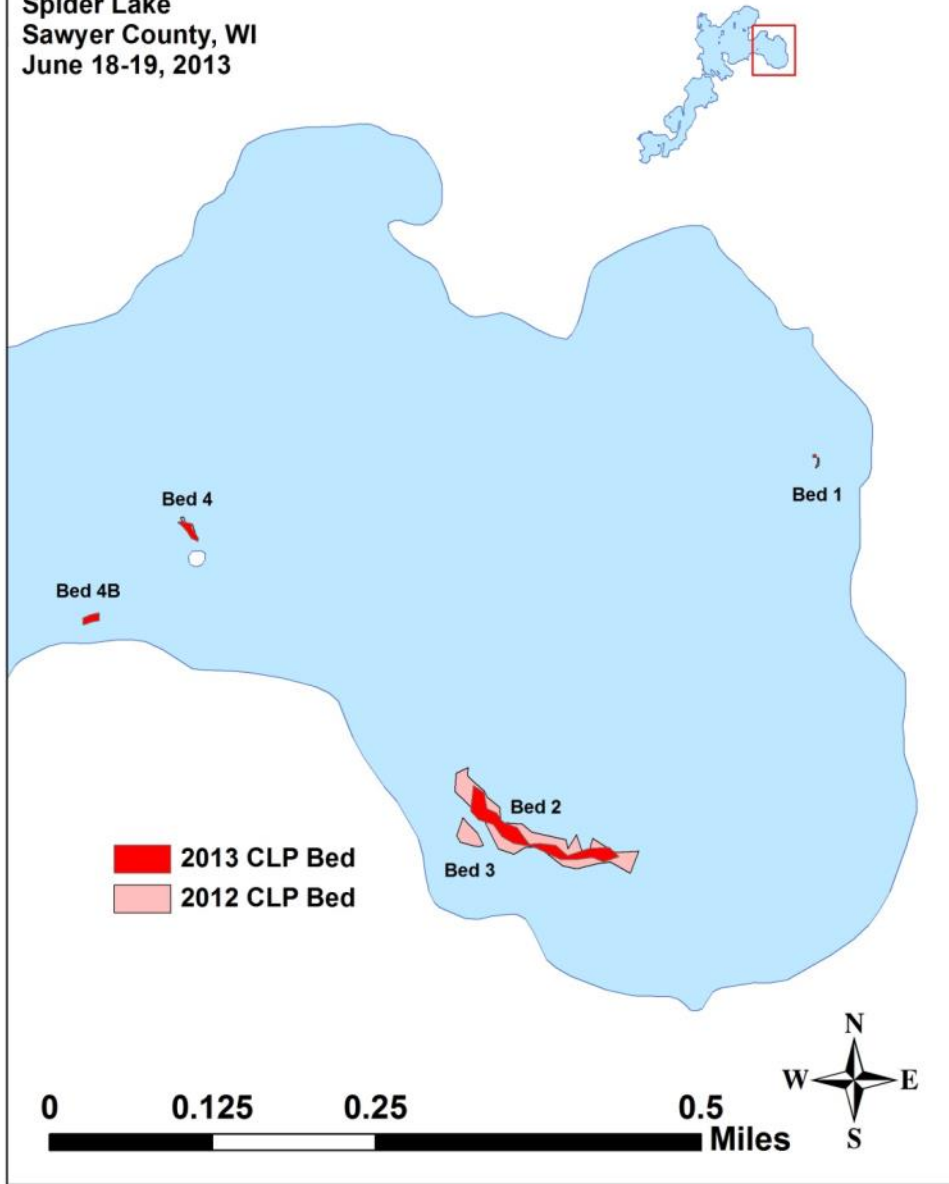
Curly-leaf pondweed (*Potamogeton crispus*)

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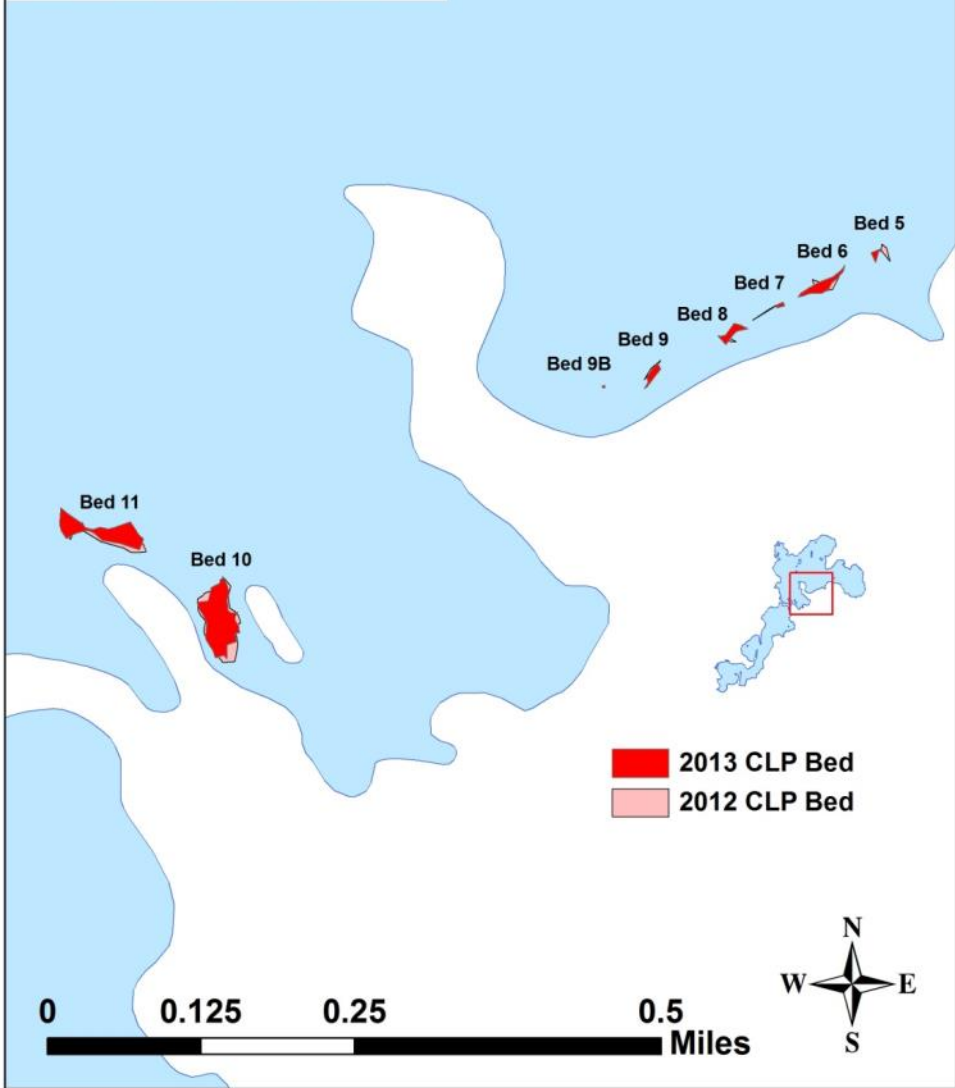
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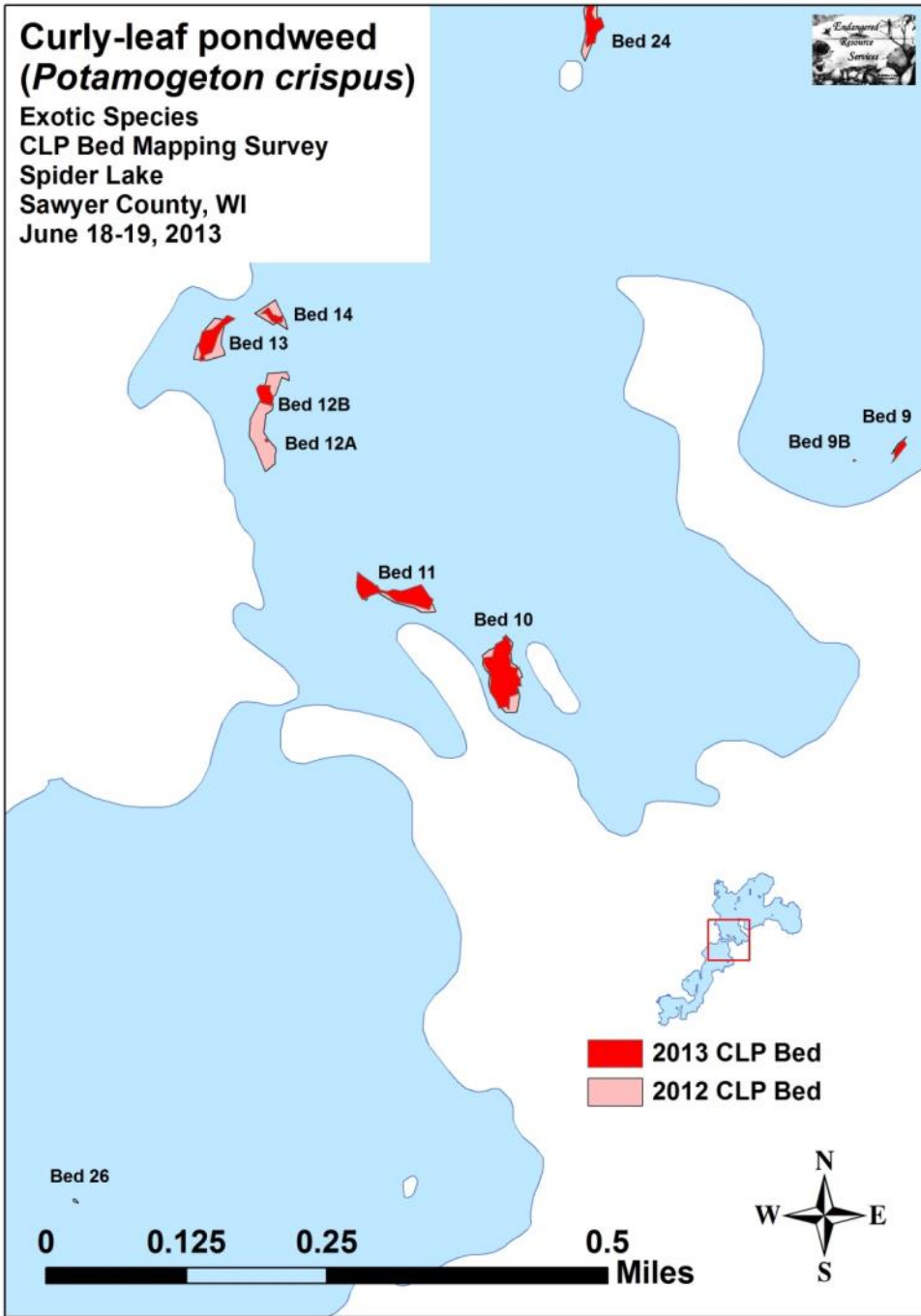
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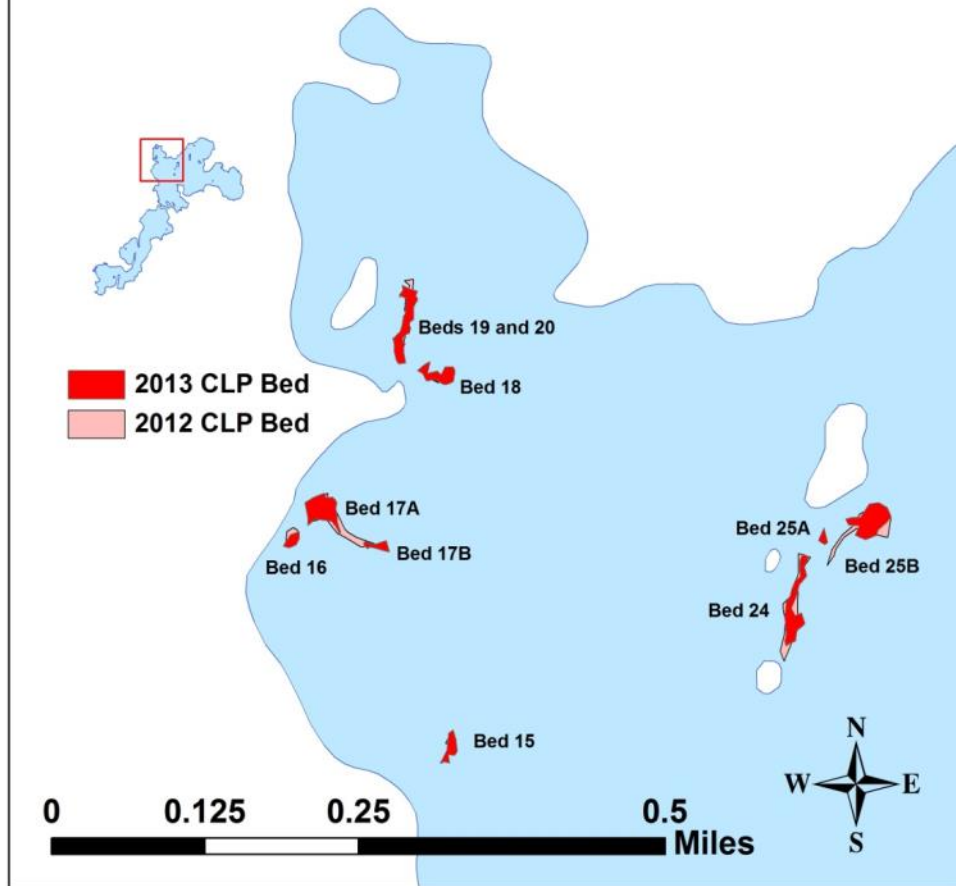




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