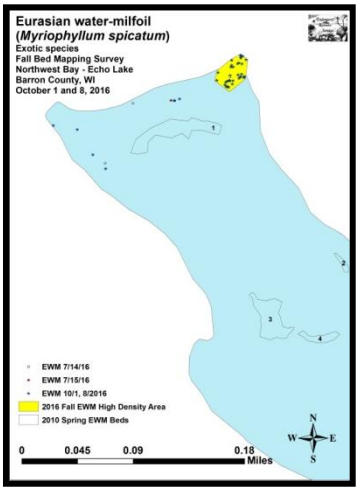
Eurasian Water-milfoil (*Myriophyllum spicatum*) Manual Rake Removal and Fall Bed Mapping Surveys Echo Lake – WBIC: 2630200 Barron County, Wisconsin

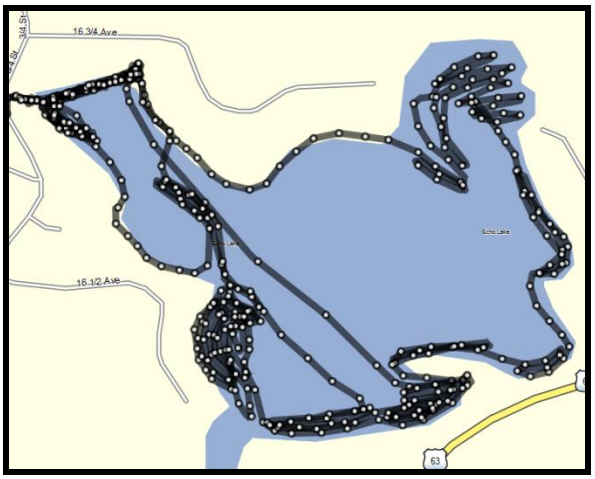
Eurasian water-milfoil (Berg 2007)



EWM in NW Boat Landing Bay 10/1, 8/2016

Project Initiated by:

Echo Lake Association, Lake Education and Planning Services, and the Wisconsin Department of Natural Resources



Search Transects 2016 Fall EWM Bed Mapping Survey

Surveys Conducted by and Report Prepared by:

Endangered Resource Services, LLC
Matthew S. Berg, Research Biologist
St. Croix Falls, Wisconsin
July 15, October 1, and 8, 2016

TABLE OF CONTENTS

	Page
LIST OF FIGURES AND TABLES	ii
INTRODUCTION	1
METHODS	2
RESULTS AND DISCUSSION	2
Summer Meandering Littoral Zone and Rake Removal Surveys	2
Fall Eurasian Water-milfoil Bed Mapping Survey	3
CONSIDERATIONS FOR MANAGEMENT	3
LITERATURE CITED	6
APPENDIX	7
I: 2014, 2015, and 2016 Fall Bed Mapping Surveys	7

LIST OF FIGURES AND TABLES

Page

Figure 1: Echo Lake Aerial Photo……..……..……..…..… 1

Figure 2: July 15, 2016 Survey Tracks……. 2

Figure 3: October 1, 8, 2016 Survey Tracks……. 3

Figure 4: 2016 Northwest Bay High EWM Density Area…… 4

Figure 5: 2015 and 2016 Fall EWM Bed Maps…… 4

Table 1: Fall Eurasian Water-milfoil Bed Mapping Summary –
Echo Lake, Barron County – October 1, 8, 2016..……. 5

INTRODUCTION:

Echo Lake (WBIC 2630200) is a 172 acre stratified seepage lake in west-central Barron County, Wisconsin in the Town of Almena (T34N R14W S07 NE NE) (Figure 1). The lake reaches a maximum depth of 41ft in the southeast corner of the central basin and has an average depth of 20ft (Busch et al. 1967). Echo Lake is mesotrophic bordering on oligotrophic in nature and water clarity is good to very good with summer Secchi readings from 2004-16 averaging 12ft (WDR 2016). Bottom substrate is variable with sandy muck bottoms in most bays and rock/sand bars along most points and around the lake's islands.

Figure 1: Echo Lake Aerial Photo

Eurasian water-milfoil (*Myriophyllum spicatum*) (EWM) was discovered in Echo Lake in 2006, and the Echo Lake Association (ELA) has been actively managing this invasive exotic species since 2008. Following the 2015 fall EWM bed mapping survey that found extremely low numbers of EWM plants scattered throughout the lake, the ELA, under the direction of Lake Education and Planning Services, Inc. (LEAPS), proposed to continue with lakewide monitoring and manual rake removal of all EWM found in 2016.

Dave and Logan Blumer and Henry Lahn searched the lake for EWM on July 14th, and we immediately conducted a follow-up survey on July 15th. These initial visits were followed by two intensive bed mapping surveys on October 1st and 8th to determine where EWM control might be considered in 2017. This report is the summary analysis of these four field surveys.

METHODS:

Summer Meandering Littoral Zone and Rake Removal Surveys:

During these surveys, we searched the lake's entire visible littoral zone for EWM. When found, we logged a GPS waypoint and used a rake to remove all EWM plants by the roots. Extra care was also taken to gather any fragments that broke off of the plants.

Fall Eurasian Water-milfoil Bed Mapping Survey:

We again searched the entire visible littoral zone of the lake and mapped all known beds of EWM. A "bed" was determined to be any area where we visually estimated that EWM made up >50% of the area's plants and was generally continuous with clearly defined borders. After we located a bed, we motored around the perimeter of the area, took GPS coordinates at regular intervals, and estimated the average rake fullness rating of EWM within the bed. Using the WDNR's Forestry Tool's Extension to ArcGIS 9.3.1, we used these coordinates to generate bed shapefiles and determine the acreage to the nearest hundredth of an acre. We also GPS marked individual EWM plants outside of the beds.

RESULTS AND DISCUSSION:

Summer Meandering Littoral Zone and Rake Removal Surveys: Due to heavy rain events that brought water levels in the lake up from1-2ft and led to unusually poor water clarity, our first visit to the lake didn't occur until July 15th. Despite searching transects totaling over 10.5km (6.5miles), we only found and removed 4 individual EWM plants (Figure 2). Plant 1 on the east side was a mature individual that was near canopy, but the other three were all young sprouts <2ft tall. In addition to these, Dave and Logan Blumer and Henry Lahn removed at least three plants on July 14th (pers. comm.).

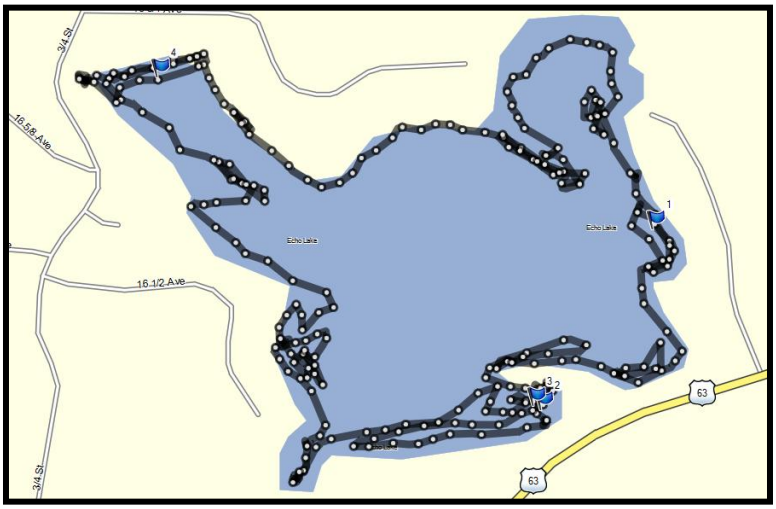


Figure 2: July 15, 2016 Survey Tracks

Fall Eurasian Water-milfoil Bed Mapping Survey:

On October 1 and 8, 2016, we again surveyed the entire visible littoral zone of the lake with nearly 20km (12.4miles) of transects searched (Figure 3). **No true Eurasian water-milfoil beds were present**, but **we did find and remove a total of 51 plants** in the boat landing bay (Figure 4). Almost all of these were in the northeast corner of the bay with most of them being sprouts in water <3ft deep. We found that a small cluster of eight plants that were 7ft tall in 9ft of water had been continuously prop-clipped by residents leaving their docks. Based on additional clipped fragments found in the shallows, this cluster is the most likely explanation of the sudden and unexpected uptick in EWM at this location. Drawing a polygon around the majority of plants produced a 0.32 acre "high density area" (Table 1). No EWM was found anywhere else in the lake. **This brought the total number of EWM plants found outside the northwest bay to just three plants in 2016 despite no treatment occurring**. This was down from 18 plants found outside the bay (19 total) in 2015 (Figure 5) (Appendix 1).

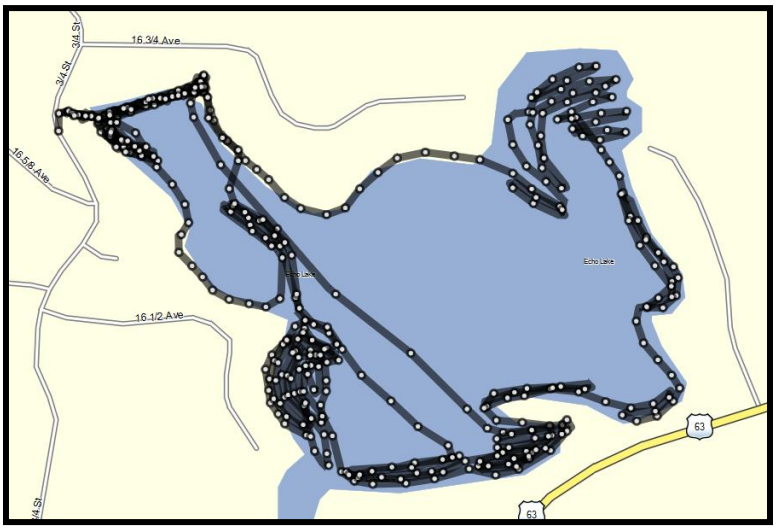


Figure 3: October 1, 8, 2016 Survey Tracks

CONSIDERATIONS FOR MANAGEMENT:

The uptick in EWM in the boat landing bay is unfortunate, but the continued low levels throughout the rest of the lake is encouraging. Because there were so many plants in such a small area, a limited chemical treatment might be justified; however, a "wait and see" approach with continued rake removal throughout the lake might also be considered. Regardless of what management is decided on for the northwest bay, we continue to recommend regular monitoring and rake removal for the rest of the lake as this method has proved effective at keeping the infestation in check.

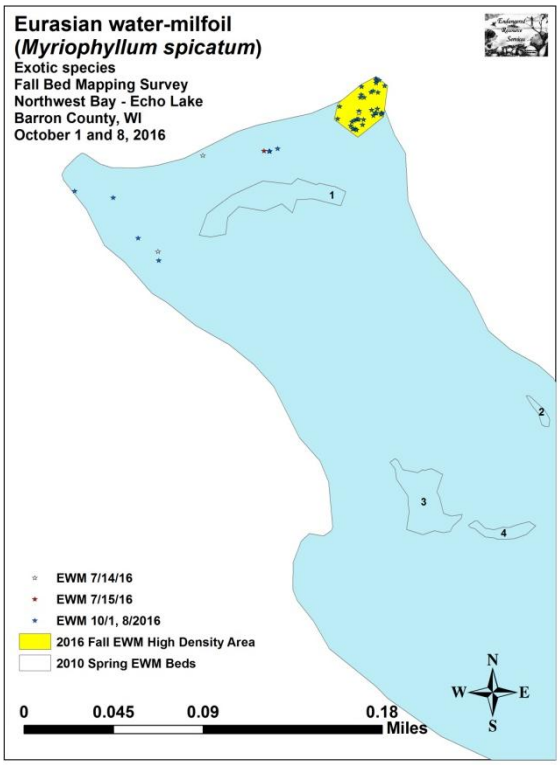


Figure 4: 2016 Northwest Bay High EWM Density Area

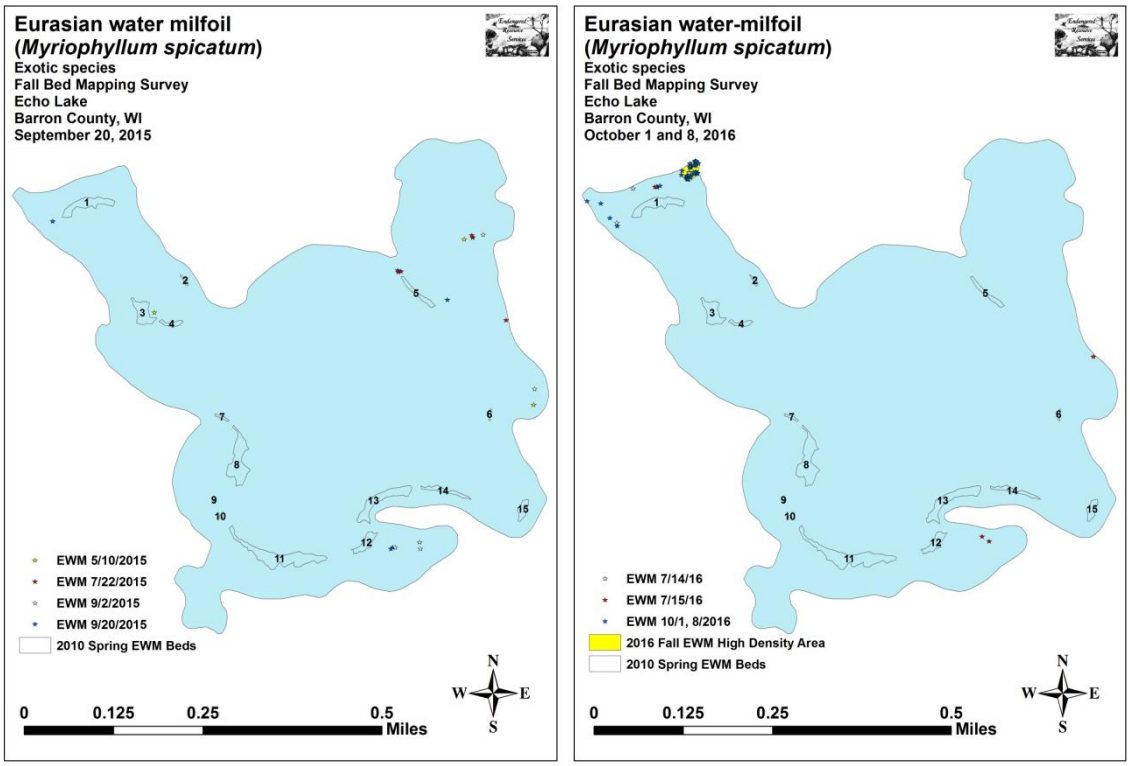


Figure 5: 2015 and 2016 Fall EWM Bed Maps

Table 1: Fall Eurasian Water-milfoil Bed Mapping Summary
Echo Lake, Barron County
October 1, 8, 2016

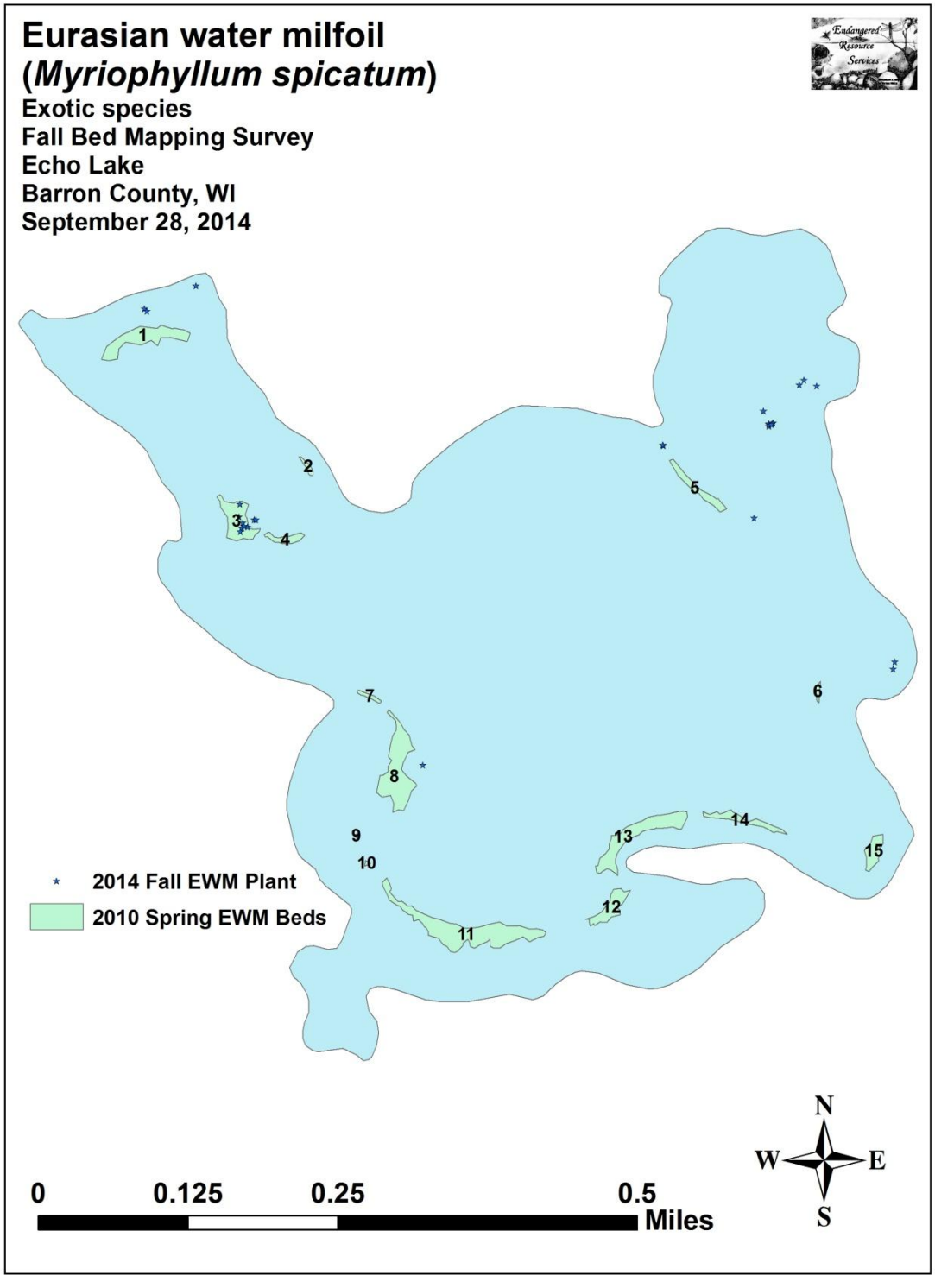
Bed Number	2016 Fall HDA Acreage	2015 Fall Bed Acreage	2014 Fall Bed Acreage	2013 Fall Bed Acreage	2012 Fall Bed Acreage	2011 Fall Bed Acreage	Years Treated	2016 Former Bed Characteristics And Field Notes
1	0.32	0	0	0	0	0	2010, 2014	51 EWM plants removed
2	0	0	0	0	0	0	2010	No EWM found
3	0	0	0	0	0	0	2010	No EWM found
4	0	0	0	0	0	0	2010	No EWM found
4B	0	0	0	0	0	0	2014	No EWM found
5	0	0	0	0	0	0	2010	No EWM found
NE Bay	0	0	0	0	0	0	None	No EWM found
6	0	0	0	0	0	0	2010, 2013	No EWM found
7	0	0	0	0	0	0	2010	No EWM found
8	0	0	0	0.02	0.09	0	’10, ’11, ’13, ’14	No EWM found
8A	0	0	0	0	<0.01	0	2013	No EWM found
8B	0	0	0	0	0	0	2012, 2013	No EWM found
8C	0	0	0	0	0.05	0	2013	No EWM found
8D	0	0	0	0.02	0	0	2014	No EWM found
9	0	0	0	0	0	0	2010, 2011	No EWM found
10	0	0	0	0	0	0	2010	No EWM found
11	0	0	0	0	0	0	’10, ’11, ’12, ’14	No EWM found
12	0	0	0	0	0	0	2010, 2014	No EWM found
12A	0	0	0	0	0.03	0	None	No EWM found
12B	0	0	0	0	0.04	0	None	No EWM found
13	0	0	0	0	0	0	2010, 2014	No EWM found
14	0	0	0	0	0	0	2010	No EWM found
15	0	0	0	0	0	0	2010, 2014	No EWM found
Total	**0.32**	**0.00**	**0.00**	**0.04**	**0.21**	**0.00**		

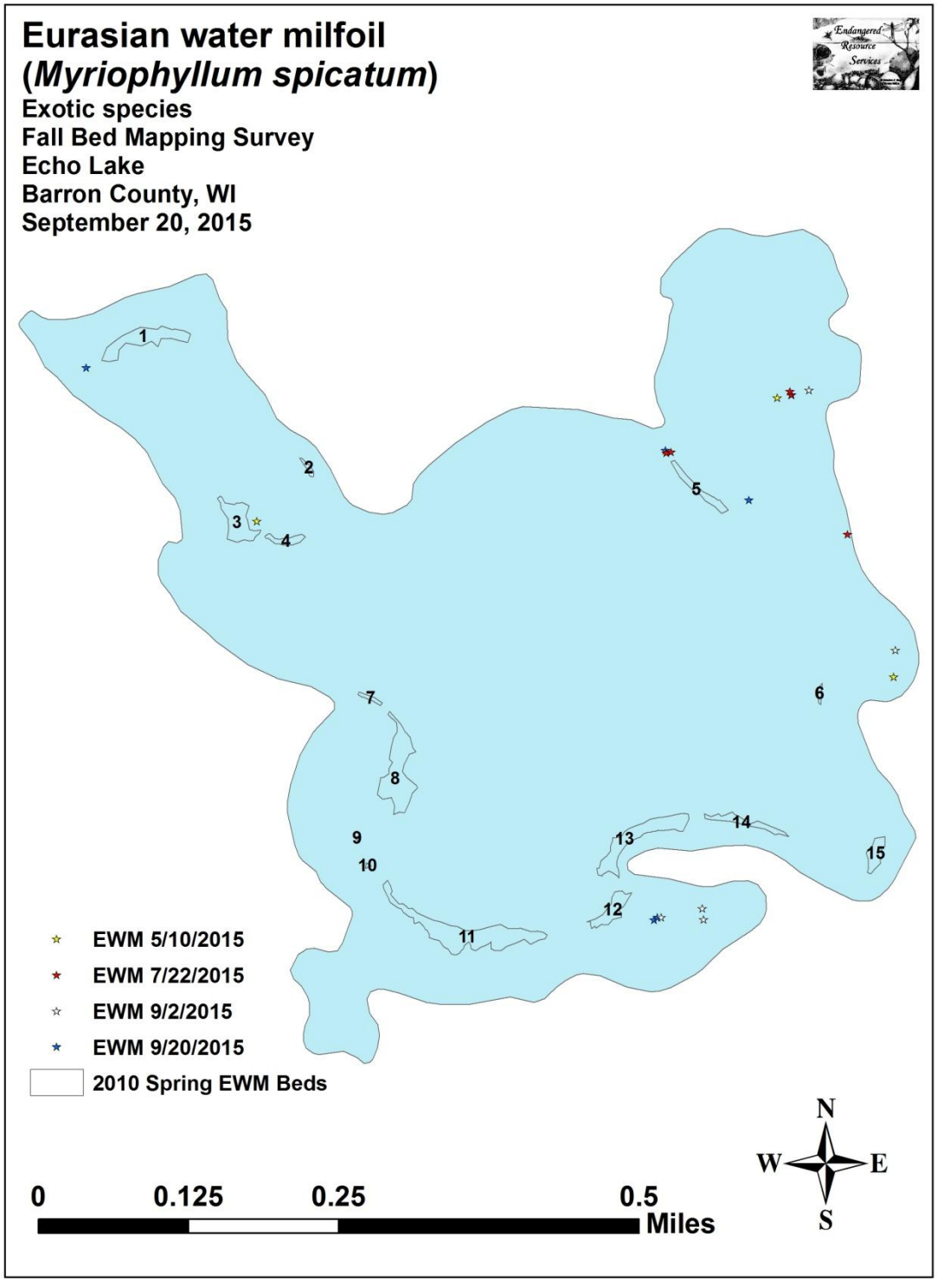
LITERATURE CITED

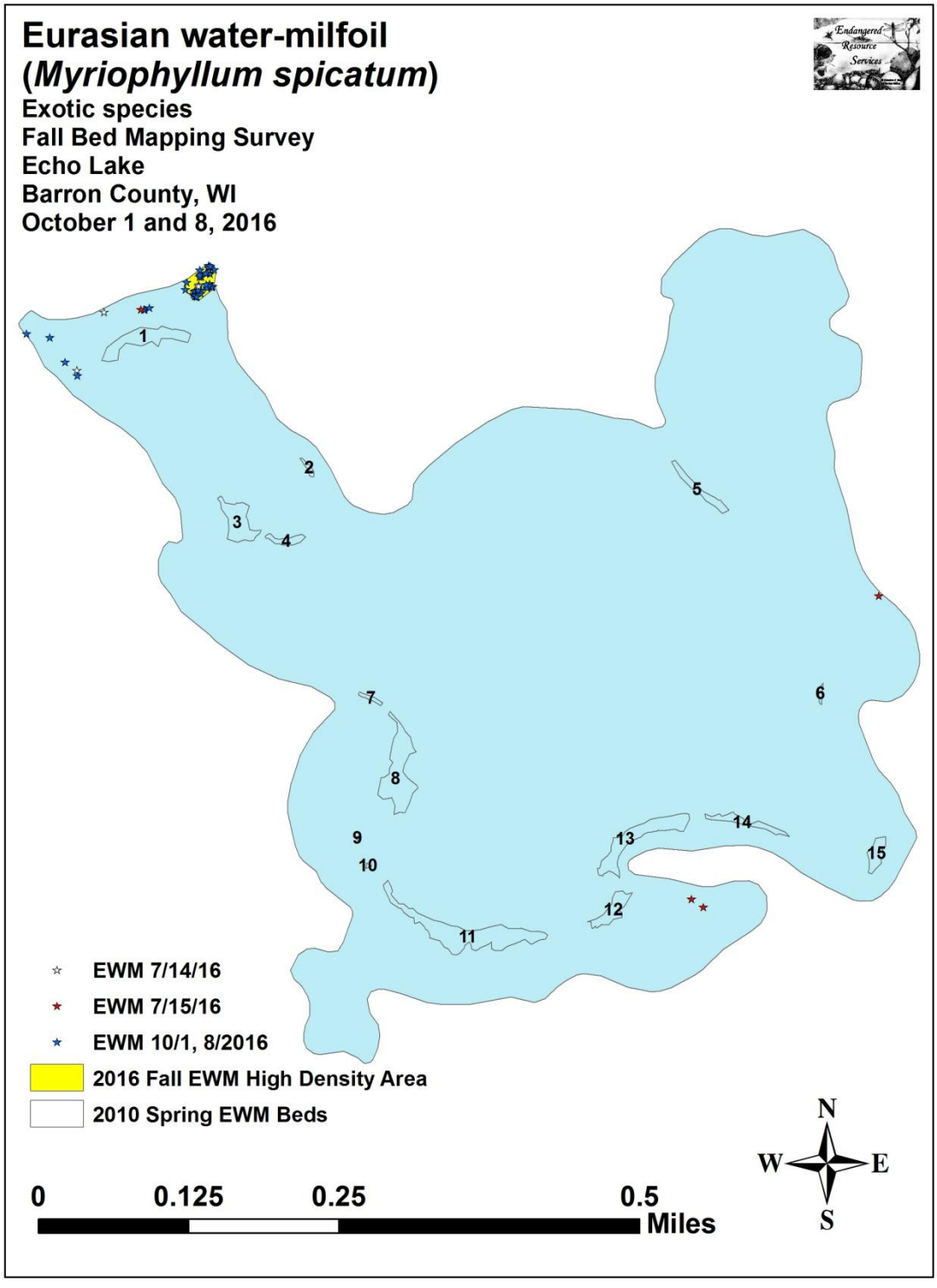
Busch, C., G. Winter, L. Sather, and C. Holt. [online]. 1967. Echo Lake Map. Available from http://dnr.wi.gov/lakes/maps/DNR/2630200a.pdf (2016, October).

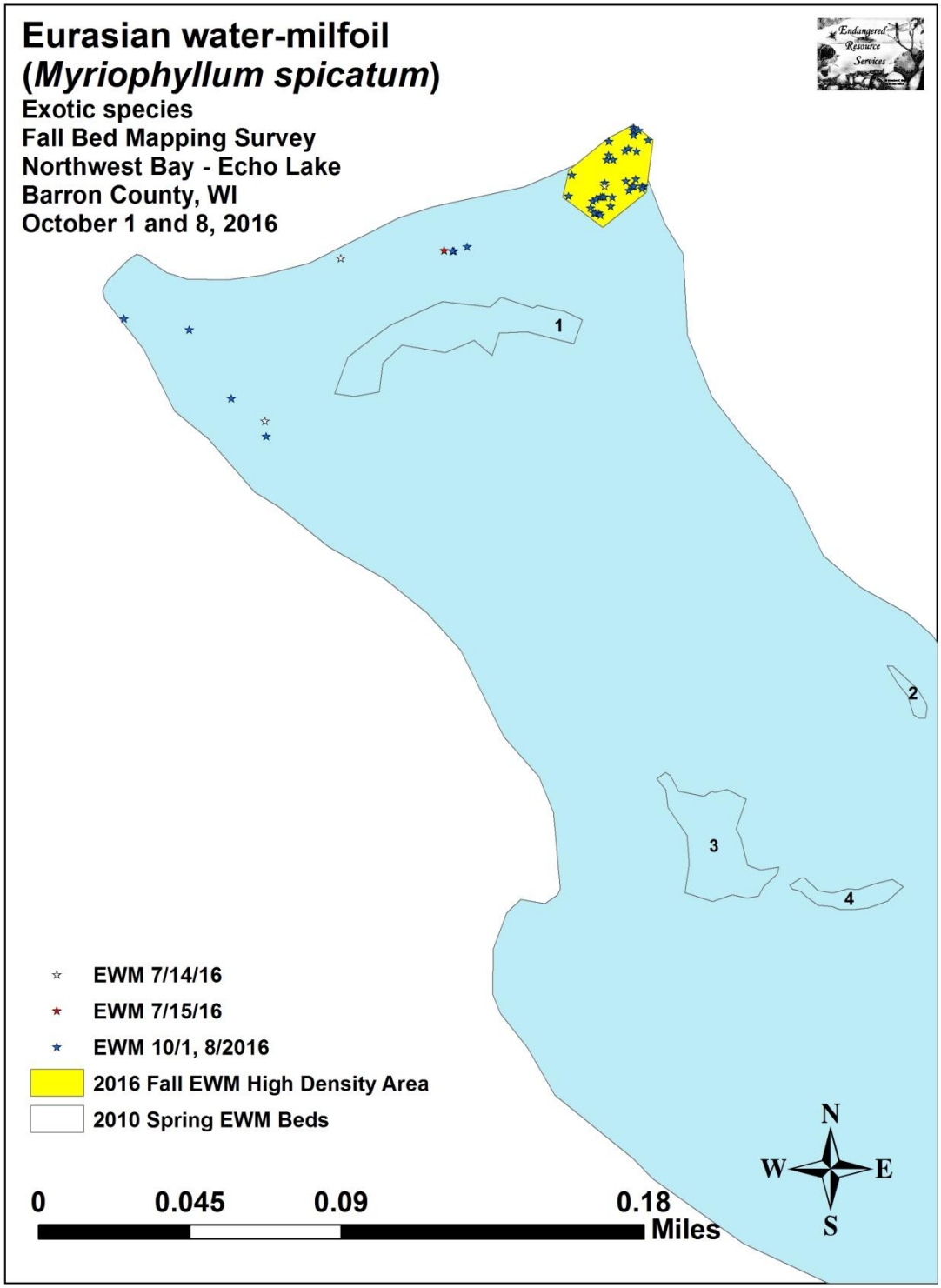
WDNR. [online]. 2016. Echo Lake - Citizen Lake Water Quality Monitoring Database. Available from http://dnr.wi.gov/lakes/waterquality/Station.aspx?id=033210 (2016, October).

Appendix I: 2014, 2015, and 2016 Fall Bed Mapping Surveys


Eurasian water milfoil
(Myriophyllum spicatum)
Exotic species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
September 28, 2014
Endangered Resource Services
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
2014 Fall EWM Plant
2010 Spring EWM Beds
N
W
E
S
0
0.125
0.25
0.5
Miles


Eurasian water milfoil
(Myriophyllum spicatum)
Exotic species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
September 20, 2015
Endangered Resource Services
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
EWM 5/10/2015
EWM 7/22/2015
EWM 9/2/2015
EWM 9/20/2015
2010 Spring EWM Beds
N
W
E
S
0
0.125
0.25
0.5
Miles


Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
October 1 and 8, 2016
Endangered Resource Services
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
EWM 7/14/16
EWM 7/15/16
EWM 10/1, 8/2016
2016 Fall EWM High Density Area
2010 Spring EWM Beds
0
0.125
0.25
0.5
Miles
N
W
E
S


Eurasian water-milfoil
(Myriophyllum spicatum)
Exotic species
Fall Bed Mapping Survey
Northwest Bay - Echo Lake
Barron County, WI
October 1 and 8, 2016
Endangered Resource Services
1
2
3
4
EWM 7/14/16
EWM 7/15/16
EWM 10/1, 8/2016
2016 Fall EWM High Density Area
2010 Spring EWM Beds
0
0.045
0.09
0.18
Miles
N
W
E
S