

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



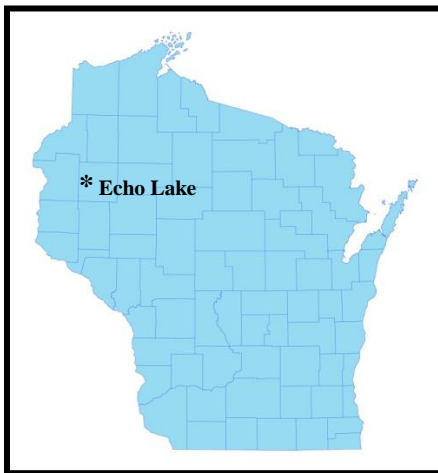
Eurasian water-milfoil (Berg 2007)



EWM removed 8/24/20

Project Initiated by:

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



Bright sun and calm survey conditions on Echo Lake 7/2/20

Surveys Conducted by and Report Prepared by:

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St. Croix Falls, Wisconsin
July 2 and August 24, 2020

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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). 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) (Figure 1). Echo Lake is mesotrophic bordering on oligotrophic in nature, and water clarity is good to very good with summer Secchi readings averaging 11.4ft from 2004-2019 (no data was reported for 2020) (WDR 2020). The lake’s bottom substrate is variable with sandy muck bottoms in most bays, and rock/sand bars along most points and around the islands.

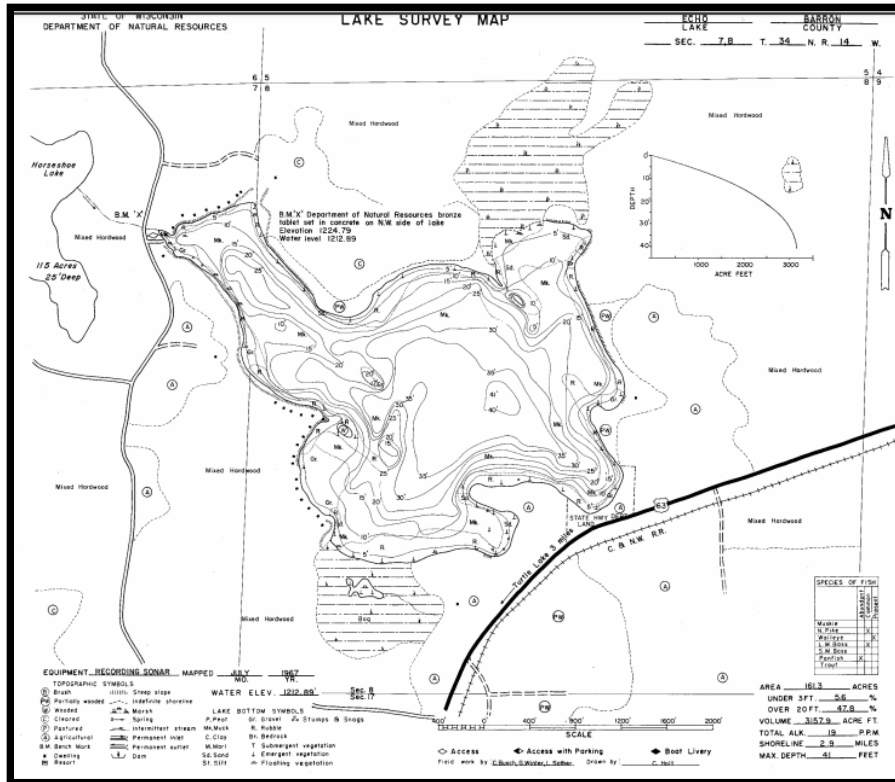


Figure 1: Echo Lake Bathymetric Map

BACKGROUND AND STUDY RATIONALE:

Eurasian water-milfoil (*Myriophyllum spicatum*) (EWM) was discovered in Echo Lake in 2004, and the Echo Lake Association (ELA) has been actively managing this invasive exotic species since 2008. Following the EWM monitoring and manual rake removal surveys in 2018 that documented a significant uptick in EWM in the northeast bay, the ELA, under the direction of Lake Education and Planning Services, Inc. (LEAPS), decided to treat 3.84 acres with granular 2, 4-D (Shredder Amine 4) with a target concentration of 4ppm on June 2, 2019. Two 2019 posttreatment surveys found and removed just five plants near the public boat landing. Because of this, no treatment occurred in 2020; however, the ELA again requested two rake removal/bed mapping surveys during the summer of 2020. This report is the summary analysis of those surveys conducted on July 2 and August 24. These data will be used to determine if and where EWM control might be considered in 2021.

METHODS:

Littoral Zone Rake Removal and Bed Mapping Surveys:

During the surveys, we searched the lake's visible littoral zone for Eurasian water-milfoil. When found, we used a telescopic rake to remove EWM plants by their roots and logged the location with a GPS waypoint. We also took extra care to gather any fragments that broke off of the plants. If we found a "bed" where we estimated that EWM made up >50% of the plants and was generally continuous with clearly defined borders; we motored around the perimeter of the area, took GPS coordinates at regular intervals, documented the rake range and depth range of plants, and estimated the average rake fullness rating and depth 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:

July Littoral Zone and Rake Removal Survey:

During our initial visit in July, we searched along transects totaling 16.0km (9.9 miles), and concentrated our efforts in the northeast bay (2019 treatment area) and near the boat landing where we found EWM plants during the fall 2019 survey (Figure 2). In total, we found and removed nine plants. Eight were near the boat landing and a ninth occurred near the entrance to the southwest bay.



Figure 2: July 2, 2020 Survey Tracks and EWM Locations

August Littoral Zone and Rake Removal Survey:

In late August, we covered transects totaling 16.9km (10.5miles) (Figure 3) and found 19 total Eurasian water-milfoil plants. This included a single large canopied plant on the northwest rock bar that may have been the source for the 11 small “sprouts” found near the landing. We also found a small scattering of five plants near and in the southwest bay. A single plant was also removed from the north-central shoreline and another from the southeast finger bay. No plants were seen anywhere in the 2019 treatment areas, along the eastern shoreline, or in the southeast bay. Although this was an increase from the five plants found in October of 2019 and the nine plants found in July 2020 (Figure 4), it was still down significantly from the 209 in the fall of 2017 and 180 in the fall of 2018 (Appendix I). These results also meant that **no true Eurasian water-milfoil beds were present** (Table 1).



Figure 3: August 24, 2020 Survey Tracks and EWM Locations

**Table 1: Late Summer/Fall Eurasian Water-milfoil Bed Mapping Summary
Echo Lake, Barron County
August 24, 2020**

Bed Number	2020 HDA Acreage	2019 Fall HDA Acreage	2018 Fall HDA Acreage	2017 Fall HDA Acreage	2016 Fall HDA Acreage	2015 Fall Bed Acreage	2014 Fall Bed Acreage	2013 Fall Bed Acreage	Years Treated	2020 Late Summer HDA Field Notes
1	0	0	0	0	0.32	0	0	0	2010, 2014, 2017	11 plants
2	0	0	0	0	0	0	0	0	2010	No EWM found
3	0	0	0	0	0	0	0	0	2010	No EWM found
4	0	0	0	0	0	0	0	0	2010	1 plant
4B	0	0	0	0	0	0	0	0	2014	1 plant
5	0	0	0	0	0	0	0	0	2010	No EWM found
5A	0	0	0	0.03	0	0	0	0	None	No EWM found
5B	0	0	6.38	0.16	0	0	0	0	2019	No EWM found
6	0	0	0	0	0	0	0	0	2010, 2013	No EWM found
6A	0	0	0	0.06	0	0	0	0	None	No EWM found
7	0	0	0	0	0	0	0	0	2010	No EWM found
8	0	0	0	0	0	0	0	0.02	'10, '11, '13, '14	No EWM found
8A, B, C, D	0	0	0	0	0	0	0	0.02	2012, 2013	No EWM found
9	0	0	0	0	0	0	0	0	2010, 2011	No EWM found
10	0	0	0	0	0	0	0	0	2010	No EWM found
11	0	0	0	0	0	0	0	0	'10, '11, '12, '14	5 plants
11A	0	0	0	0.01	0	0	0	0	None	No EWM found
12	0	0	0	0	0	0	0	0	2010, 2014	No EWM found
12A	0	0	0	0.33	0	0	0	0	None	1 plant
12B	0	0	0	0	0	0	0	0	None	No EWM found
13	0	0	0	0	0	0	0	0	2010, 2014	No EWM found
14	0	0	0	0	0	0	0	0	2010	No EWM found
15	0	0	0	0	0	0	0	0	2010, 2014	No EWM found
Total	0.00	0.00	6.38	0.59	0.32	0.00	0.00	0.04		

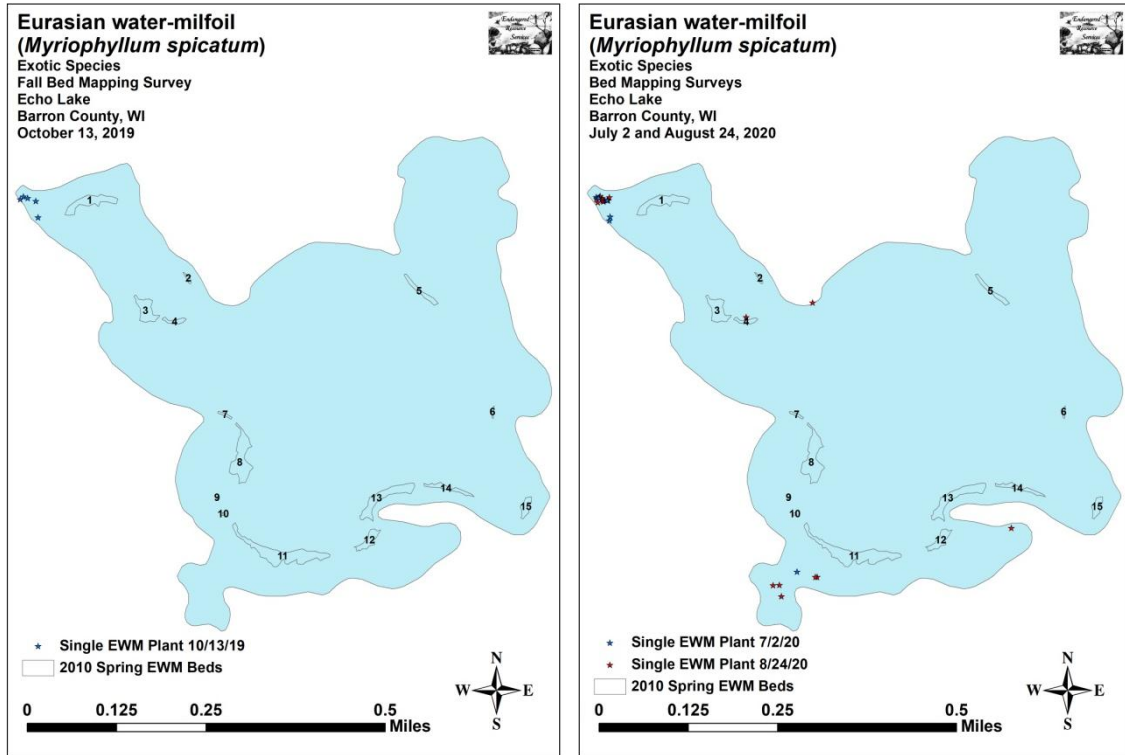


Figure 4: 2019 and 2020 EWM Locations

CONSIDERATIONS FOR MANAGEMENT:

The combination of the 2019 chemical treatment in the northeast bay coupled with volunteer and professional efforts to rake remove plants on the lake proved effective in keeping the EWM infestation well in check during the 2019 and 2020 growing seasons. Based on our findings, it appears that chemical control will not be necessary in 2021. However, we continue to recommend regular monitoring and rake removal of pioneer plants as this method has proved to be a cost effective way to slow the spread of EWM and minimize the need for herbicides.

LITERATURE CITED

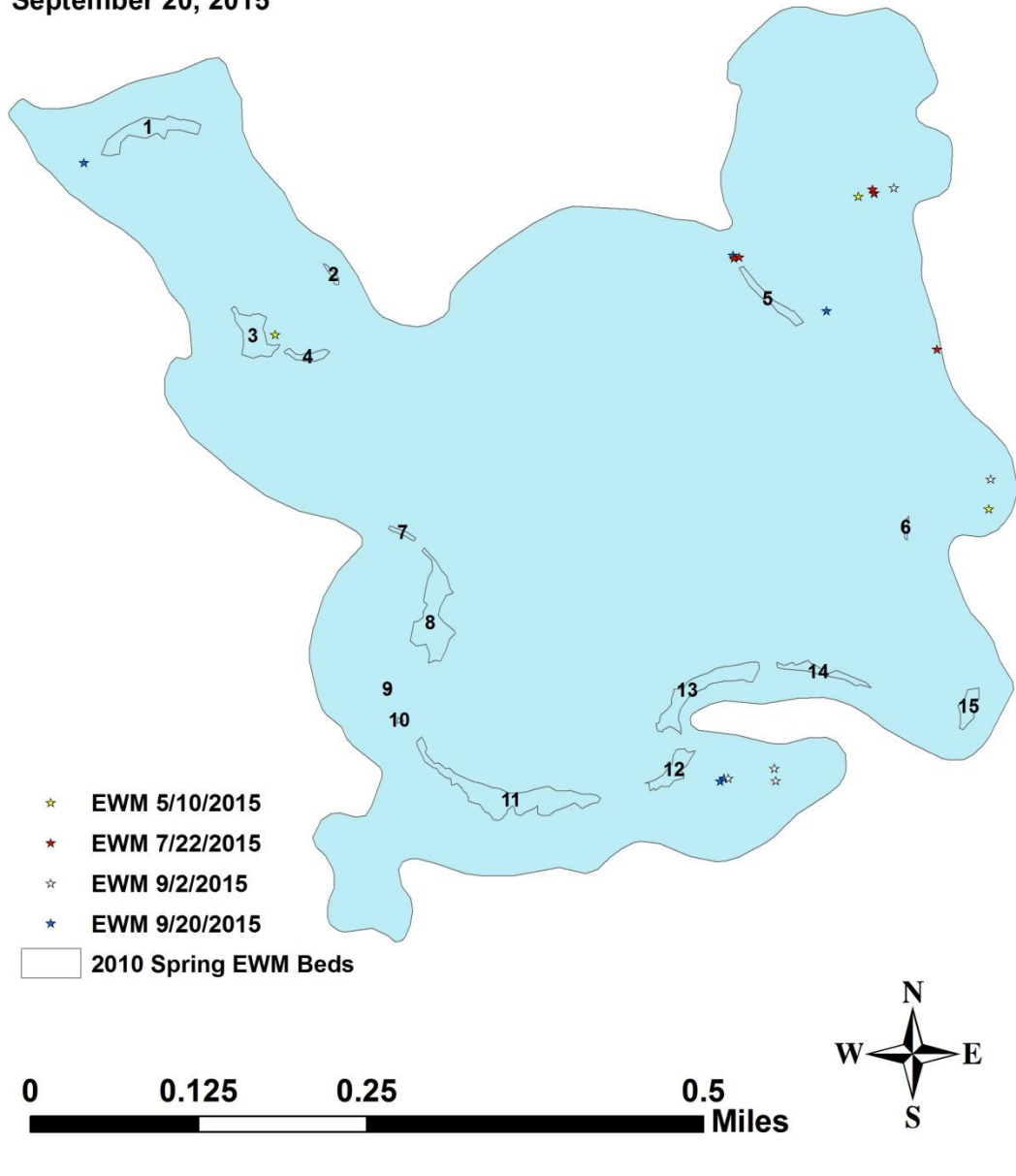
Busch, C., G. Winter, L. Sather, and C. Holt. [online]. 1967. Echo Lake Map. Available from <http://dnr.wi.gov/lakes/maps/DNR/2630200a.pdf> (August 2020).

WDNR. [online]. 2020. Echo Lake - Citizen Lake Water Quality Monitoring Database. Available from <http://dnr.wi.gov/lakes/waterquality/Station.aspx?id=033210> (August 2020).

Appendix I: 2015, 2016, 2017, 2018, 2019, and 2020 Bed Mapping Surveys

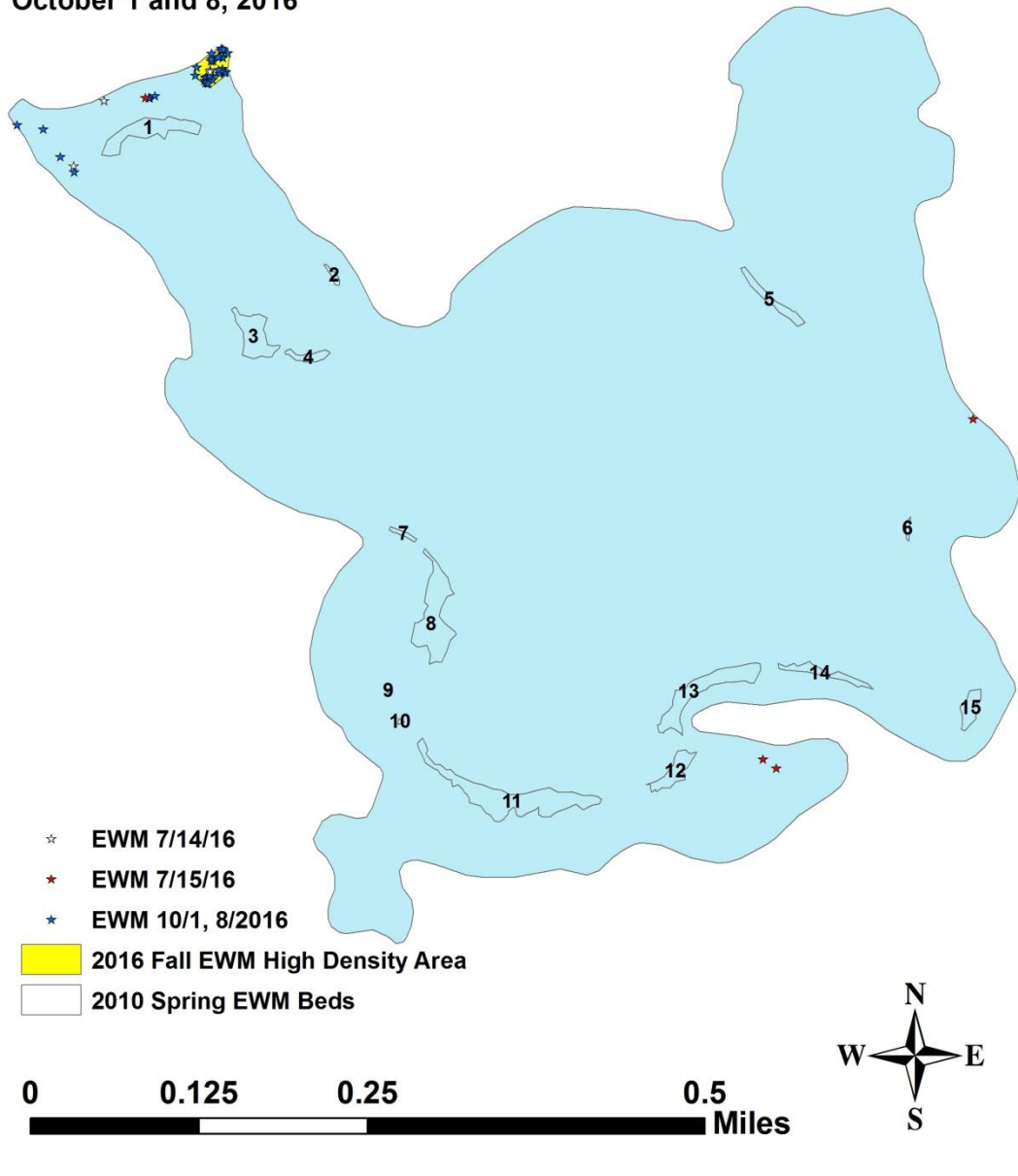
Eurasian water milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
September 20, 2015



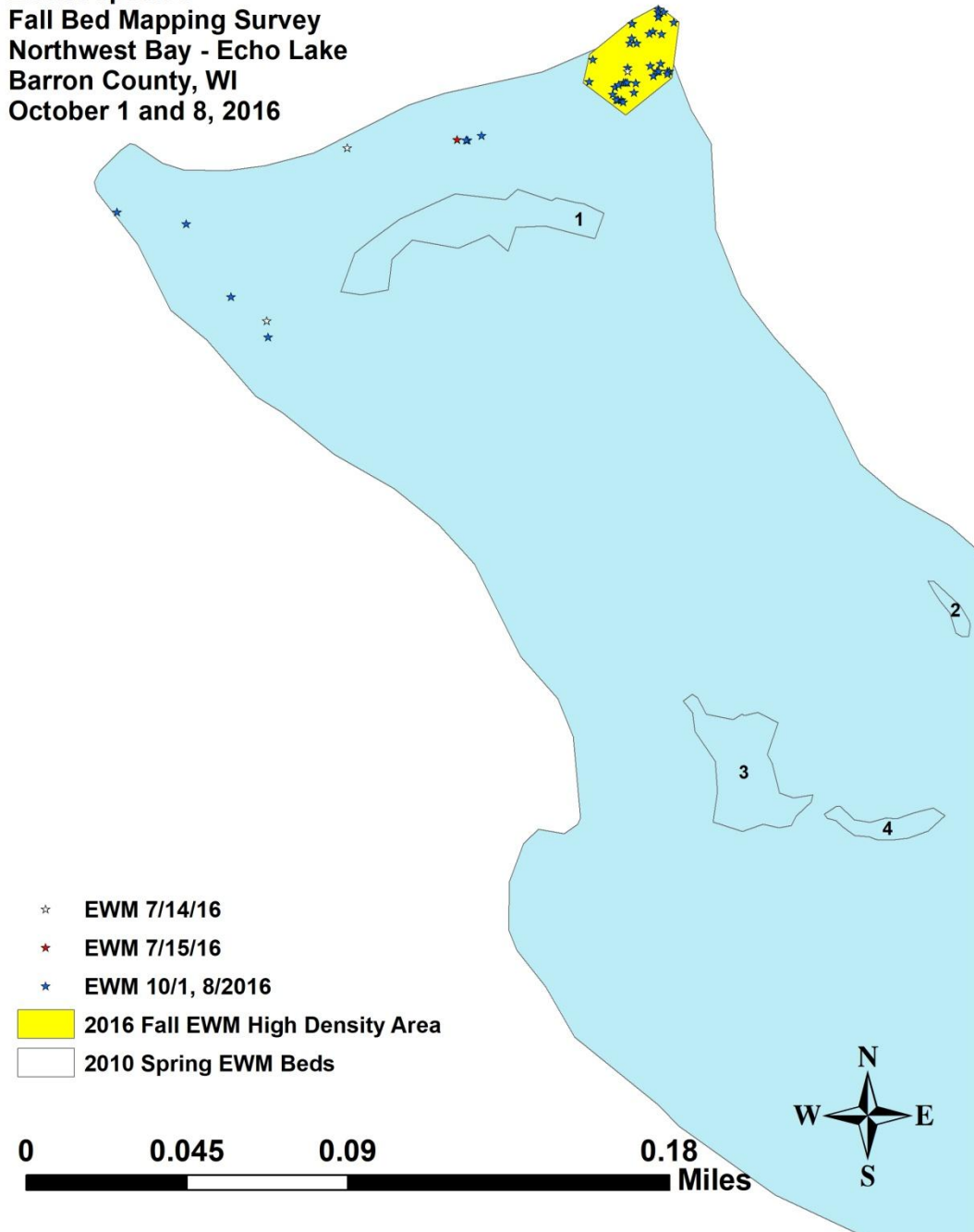
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
October 1 and 8, 2016



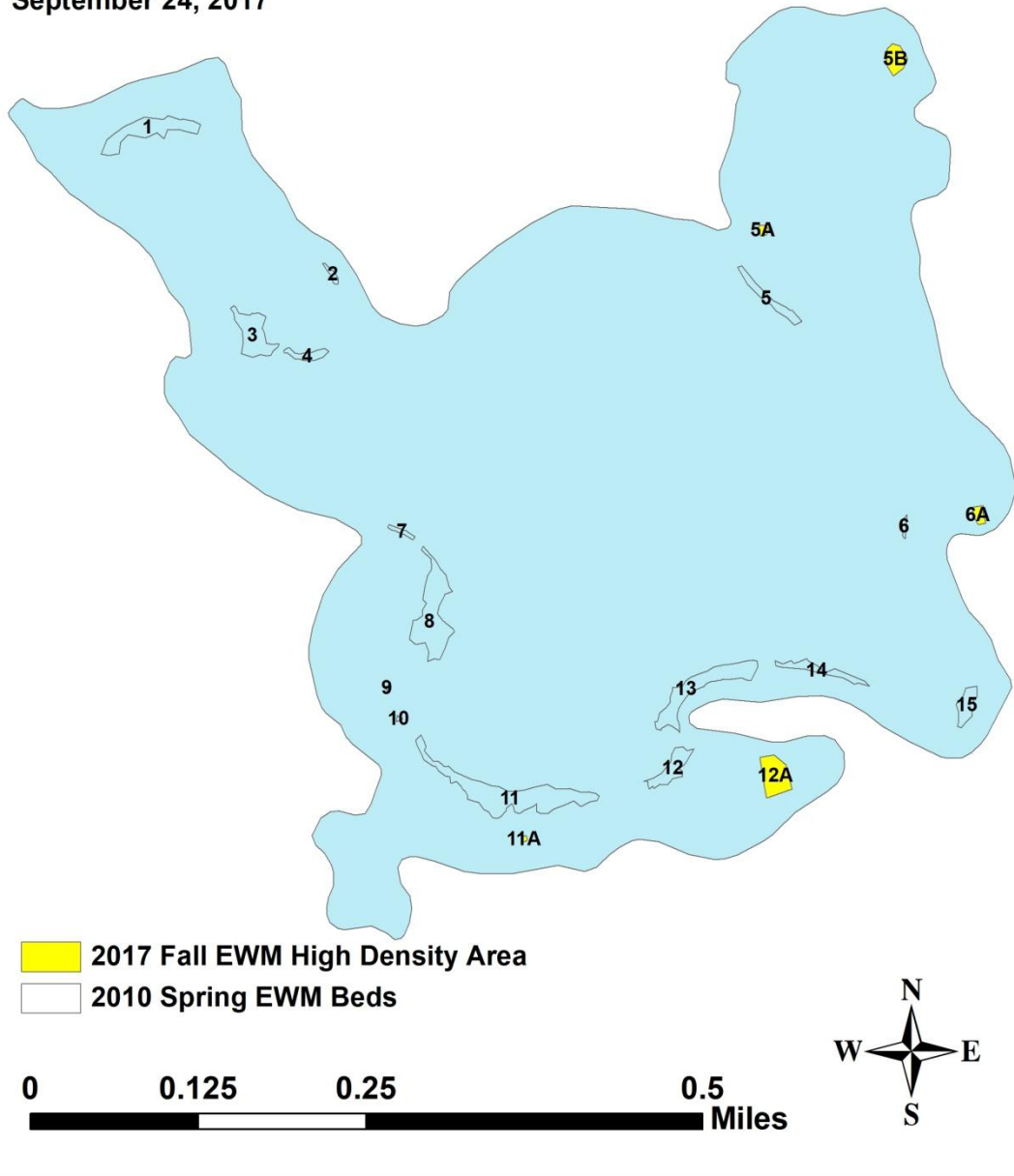
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Northwest Bay - Echo Lake
Barron County, WI
October 1 and 8, 2016



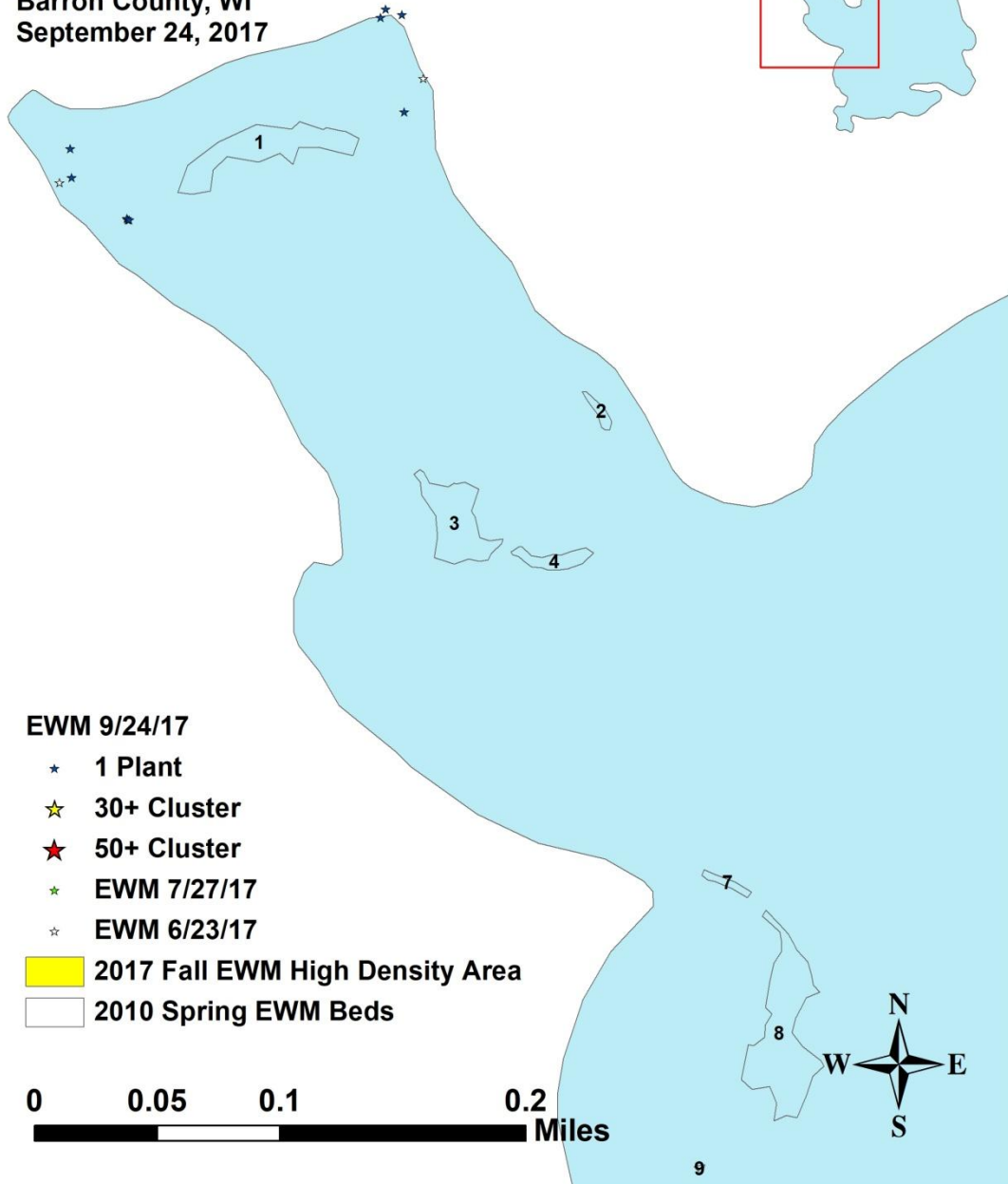
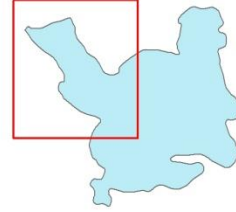
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
September 24, 2017



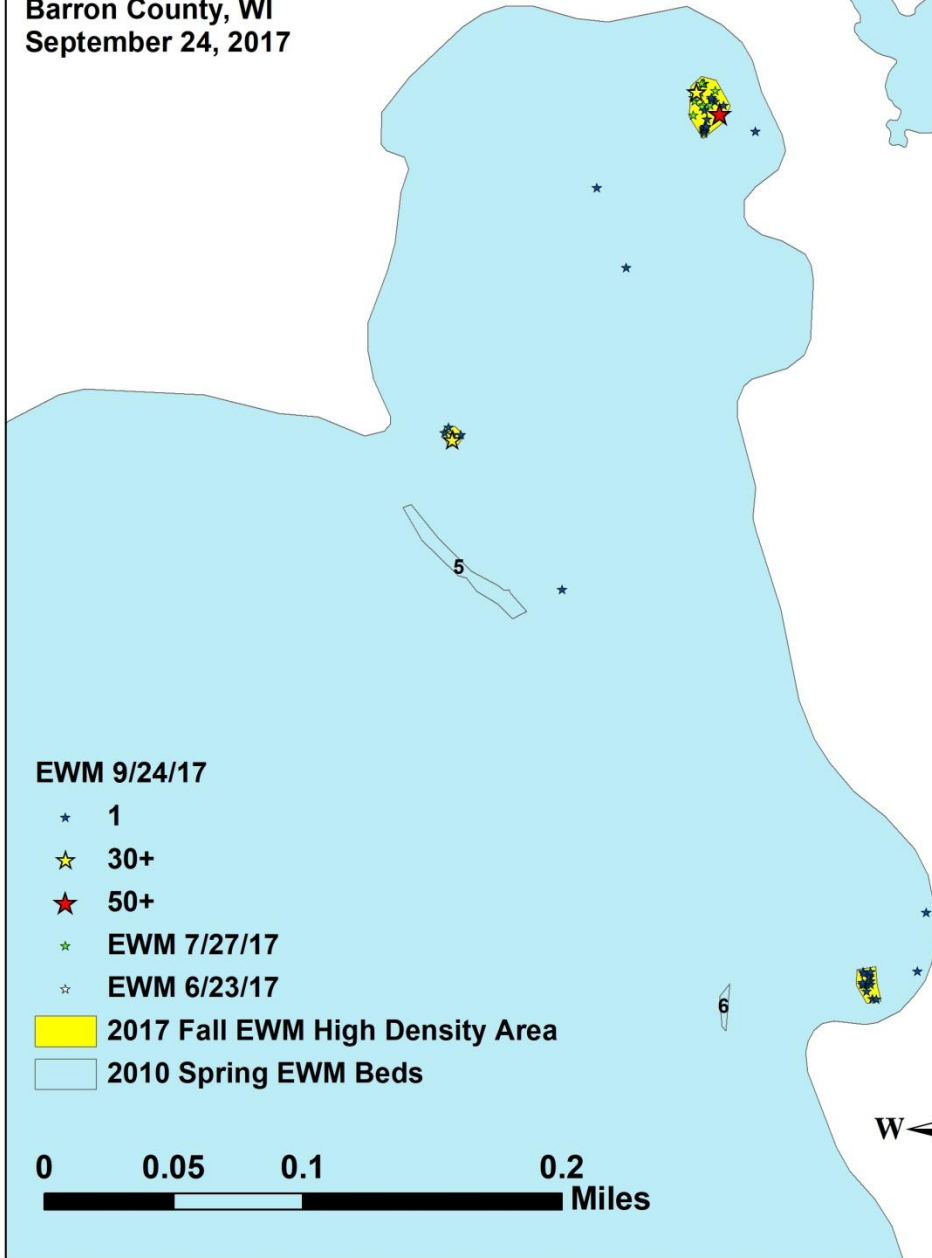
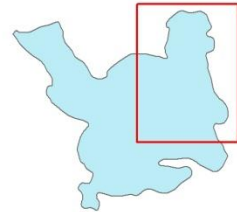
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
 Fall Bed Mapping Survey
 Echo Lake - Northwest Bay
 Barron County, WI
 September 24, 2017



Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Echo Lake - Northeast Bay
Barron County, WI
September 24, 2017



EWM 9/24/17

★ 1

★ 30+

★ 50+

★ EWM 7/27/17

★ EWM 6/23/17

■ 2017 Fall EWM High Density Area

■ 2010 Spring EWM Beds

0 0.05 0.1 0.2 Miles



Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Echo Lake - South Bays
Barron County, WI
September 24, 2017

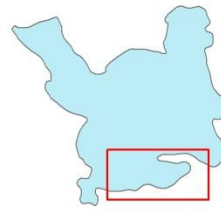


EWM 9/24/17

- * 1 Plant
- ☆ 30+ Cluster
- ★ 50+ Cluster
- * EWM 7/27/17
- ☆ EWM 6/23/17

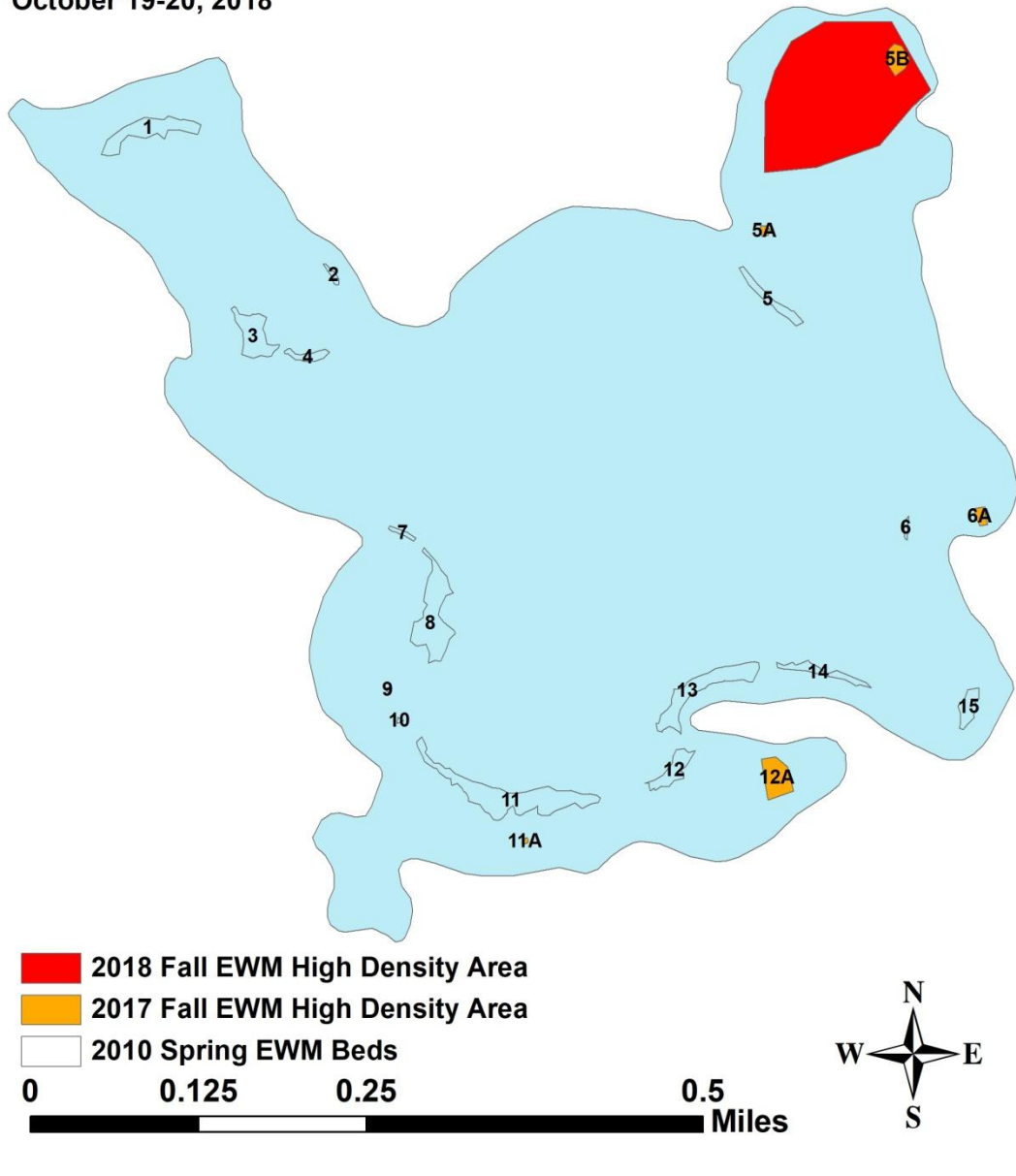
 2017 Fall EWM High Density Area

 2010 Spring EWM Beds



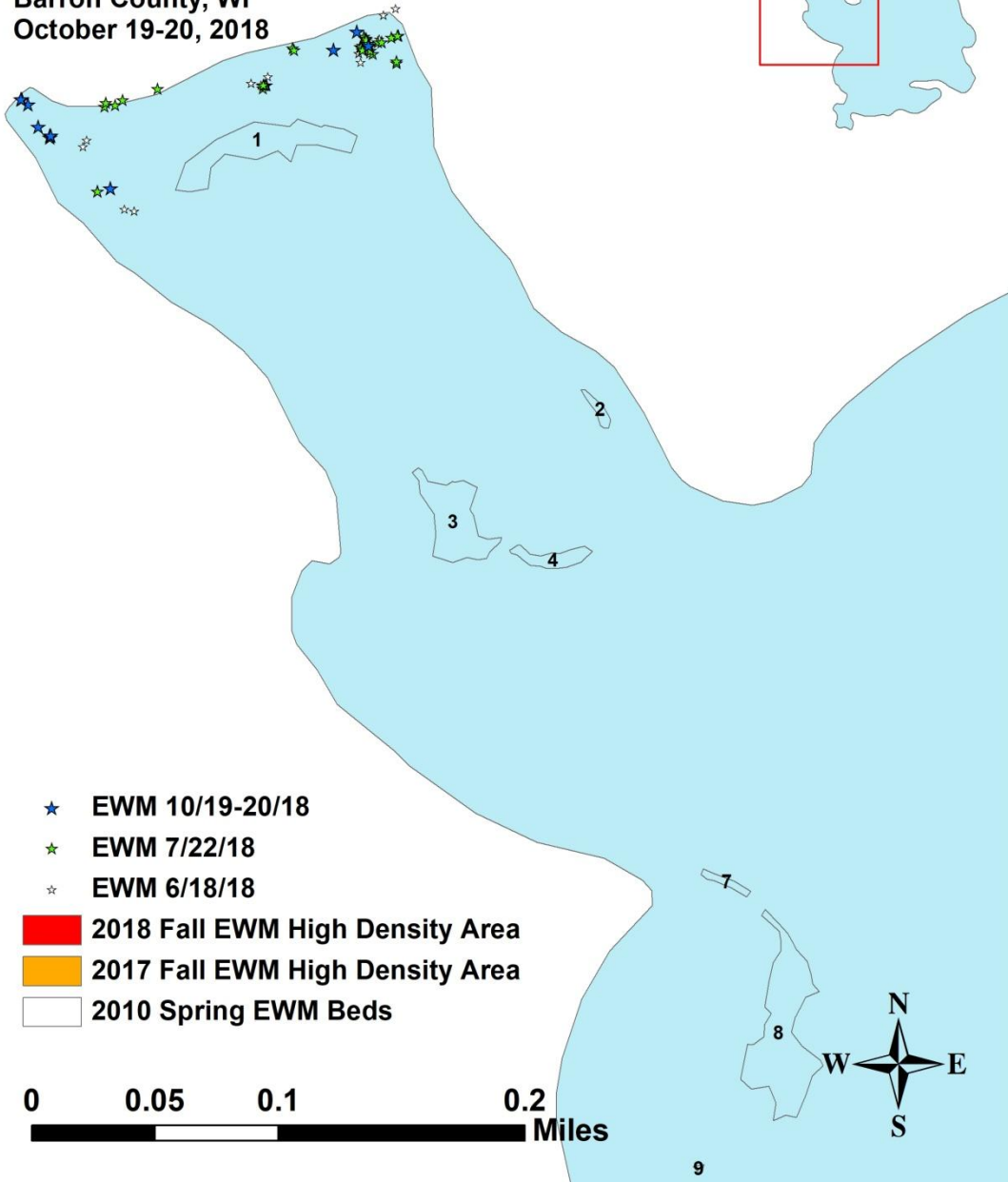
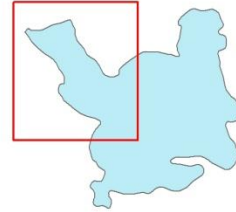
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
October 19-20, 2018



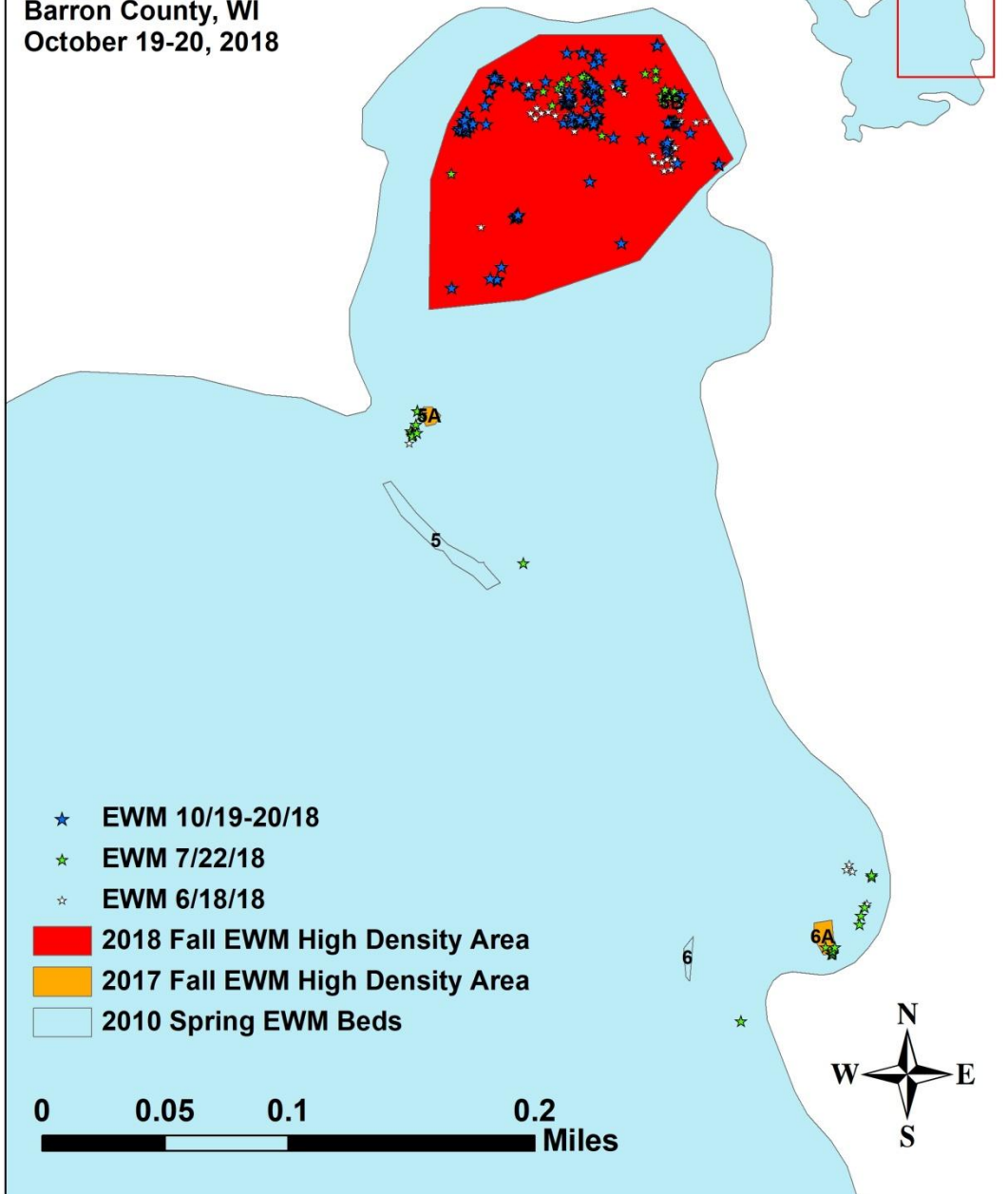
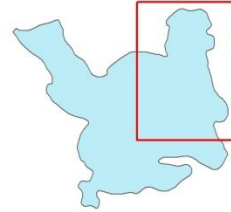
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Echo Lake - Northwest Bay
Barron County, WI
October 19-20, 2018



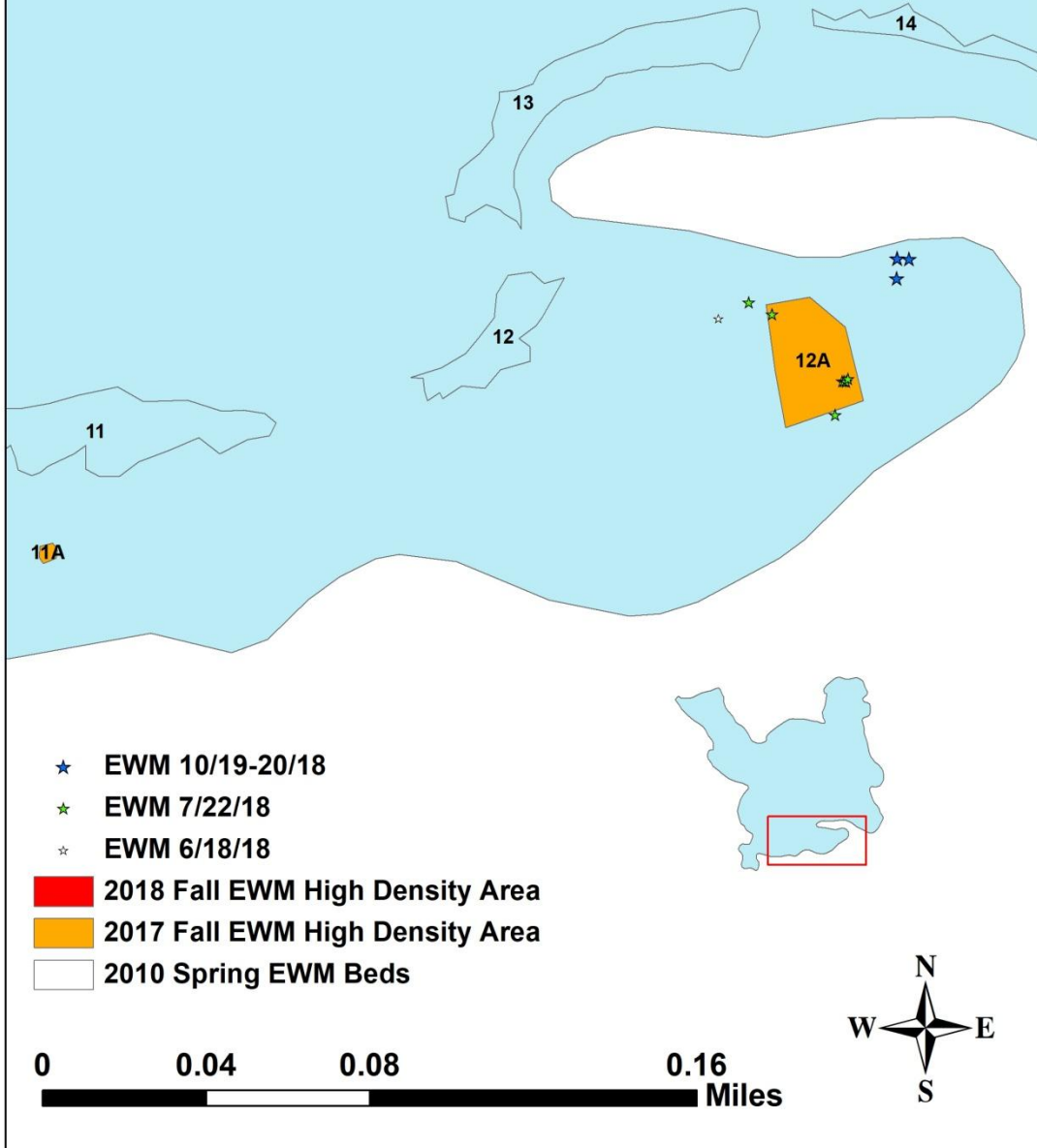
Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic species
Fall Bed Mapping Survey
Echo Lake - Northeast Bay
Barron County, WI
October 19-20, 2018



Eurasian water-milfoil (*Myriophyllum spicatum*)

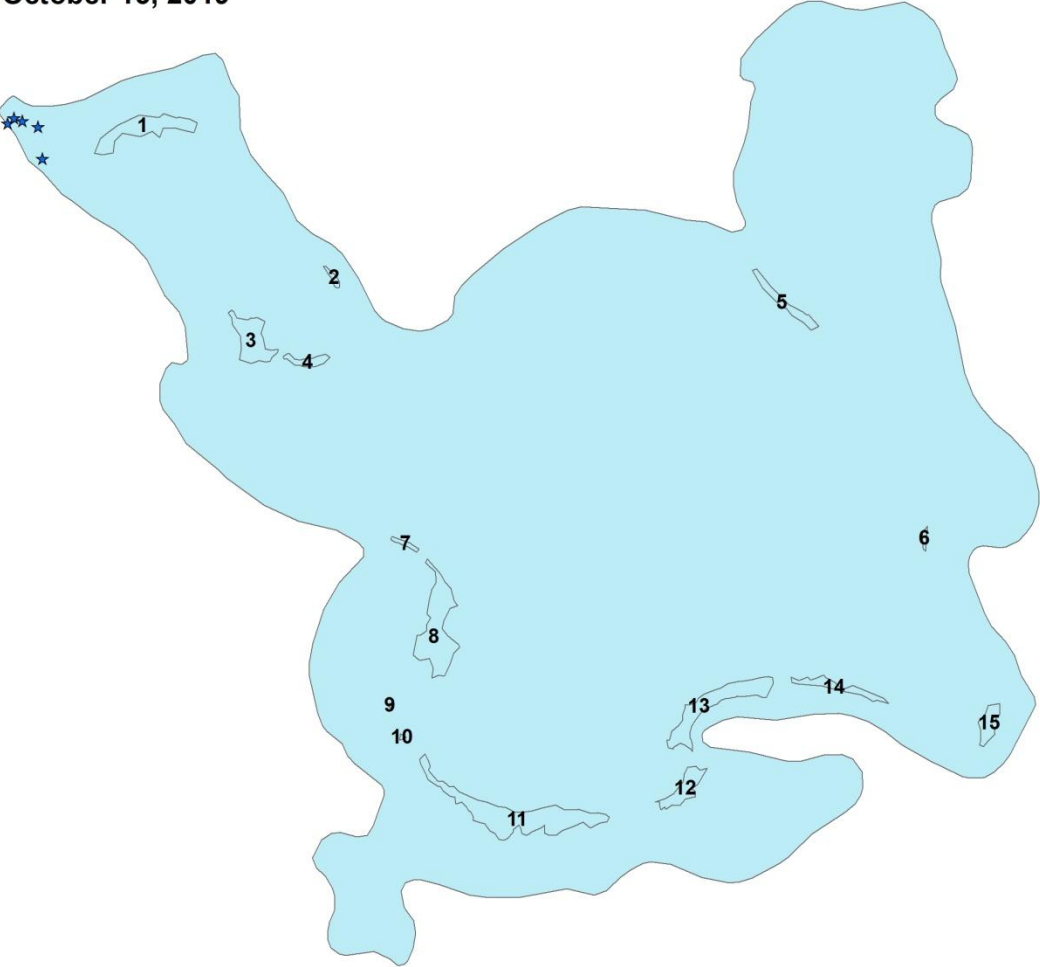
Exotic species
Fall Bed Mapping Survey
Echo Lake - South Bays
Barron County, WI
October 19-20, 2018



**Eurasian water-milfoil
(*Myriophyllum spicatum*)**



Exotic Species
Fall Bed Mapping Survey
Echo Lake
Barron County, WI
October 13, 2019



★ Single EWM Plant 10/13/19

□ 2010 Spring EWM Beds



Eurasian water-milfoil (*Myriophyllum spicatum*)

Exotic Species
Bed Mapping Surveys
Echo Lake
Barron County, WI
July 2 and August 24, 2020

