

**Spread Eagle Chain of Lakes
(Florence County, Wisconsin)**

**Eurasian water-milfoil
Control and Monitoring Report**

This is a product of a WDNR AIS (Education, Prevention & Planning) Grant

Awarded to:

Spread Eagle Chain of Lakes Association
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Photo of Eurasian water-milfoil on cover page is by Dean Premo, White Water Associates, Inc.

INTRODUCTION AND HISTORY

On September 5, 2012, during Early Detection Monitoring, the Wisconsin Department of Natural Resources (WDNR) discovered Eurasian water-milfoil (*Myriophyllum spicatum*) in North Lake of the Spread Eagle Chain of Lakes (SECOL) in Florence County, Wisconsin. Zebra Mussels (*Dreissena polymorpha*) were found in North Lake during the same inspection. At that time, an Early Detection and Rapid Response Project was awarded to the Spread Eagle Chain of Lakes Association (SECOLA) for response to the simultaneous discoveries of these two aquatic invasive species. This initial grant was used in 2014 and 2015. A subsequent grant (Education, Prevention, and Planning) was awarded to continue monitoring and hand-pulling efforts for EWM, zebra mussel population monitoring, the yellow iris monitoring and mapping, general aquatic invasive species (AIS) monitoring, and education of SECOLA members. To date, the Eurasian water-milfoil (EWM) in North Lake has been successfully managed by hand-pulling. Low population levels of EWM have been achieved and maintained.

In 2017, the WDNR awarded another AIS Education, Prevention, and Planning grant to the SECOLA. This grant has allowed an expansion of monitoring efforts to include the entire Spread Eagle Chain of Lakes and included additional education to take place. Activities under this grant took place in 2017 and 2018. The specified goals under this project were to (1) conduct monitoring on the Spread Eagle Chain to locate and document new EWM colonies (and other aquatic invasive plant species) and (2) train lake stewards to monitor for AIS. The project was designed to reinforce long-term stewardship for the Spread Eagle Chain of Lakes. Over the course of these efforts on the Spread Eagle Chain of Lakes, scientists at White Water Associates have acted as consultants to the SECOLA.

In 2017, the WDNR awarded an Established Population Control Grant to SECOLA. This grant allowed monitoring efforts for the entire Spread Eagle Chain and for hand-pulling EWM on North Lake. This document reports on the efforts conducted under this grant. We organize this report in four sections (including the Introduction). In the next section (Eurasian water-milfoil Background), we summarize the species' identification, reproduction, and dispersal. The Methods section details our approach to monitoring and education under this project. Findings and project outcomes are reported in the Results and Discussion section.

EURASIAN WATER-MILFOIL BACKGROUND

Eurasian water-milfoil (EWM) can be aggressive AIS. Eurasian water-milfoil is identified by having whorls of finely divided leaves. EWM usually has 14 or more leaflets on each side of the leaf axis (see Exhibit 1). Native water-milfoils usually have fewer than 12 pairs of leaflets. EWM is detrimental to lakes because it can form dense mats, preventing light from reaching other native plants and can interfere with boating and other recreational activities. EWM reproduces by buds, rhizomes and by mechanical fragmentation (such as being chopped up by boat engine propellers). The high level of boating traffic in the Spread Eagle Chain of Lakes increases the chances for this species to disperse throughout the chain.



Exhibit 1. Photograph of Eurasian water-milfoil (*Myriophyllum spicatum*).

METHODS

White Water scientists and SECOLA volunteer monitors conducted informed meander searches in the littoral zone of the Spread Eagle Chain of Lakes with two to three observers watching from a slow moving watercraft. In areas that seemed especially suitable for EWM or other AIS, White Water scientist Angie Stine used snorkel to better observe the plant community. Formal searches took place in spring and fall bouts in 2017, 2018, and 2019. Midsummer spot checks were also conducted if volunteers observed suspicious plants. The SECOLA continually aspires to educate and train lake stewards willing to conduct volunteer monitoring for AIS. Volunteers helped with the meander searches and the hand-pulling.

Hand-pulling was conducted using SCUBA and snorkel gear. Plants were placed into mesh bags and brought to the boat. A person in the main work boat (or from other watercraft) collected any fragments that appeared with a rake or dipnet. On occasion, EWM was pulled using a long-handled rake from the boat. These techniques allowed for very selective hand-pulling of EWM with almost no collection of native species in the process.

RESULTS & DISCUSSION

On June 5 and 6, 2017, Angie Stine (White Water Associates, aquatic biologist), Gary Weber (SECOLA volunteer and President), and Carolyn Weber-Starling (AIS Team Leader for Florence County), conducted a meander search around the entire Spread Eagle Chain of Lakes (with the exception of South Lake). Gary Weber returned later to use a kayak on South Lake where access for larger boats is difficult. EWM was located at five locations in North Lake. Four of these sites were known sites where EWM had been detected and managed by hand-pulling in the past (EWM 8, EWM 9, EWM 11, and EWM 13 on Exhibits 2 and 3). One site near Robbins Island was a new location (EWM 14 on Exhibits 2 and 3).

On June 23, 2017, Tracey Stine and Angie Stine (White Water) met Jay Weber to SCUBA dive and hand-pull the EWM. Forty pounds were pulled at EWM 14. The substrate was sandy and rocky so it was more difficult to get the plant by the roots. There was a large fallen tree off the island that the EWM had rooted under and this patch was difficult to pull all of the plants because of safety concerns. Some of the EWM plants were rooted in 13 feet of water while others were shallow. Approximately 15 EWM plants were pulled at EWM 11. The substrate at this site is soft and the plants are easy to pull. Exhibit 4 displays the date, site, and wet weight in pounds of EWM pulled on North Lake during 2017, 2018, and 2019.

On August 4, 2017 Angie Stine and Carolyn Weber gave a presentation about aquatic invasives, water quality and the work conducted for the Education and Monitoring Grant. Twenty-four participants attended.

On August 11, 2017 Tracey Stine and Angie Stine met Jay Weber to search for EWM in North Lake and part of Middle Lake. EWM was found by Robbins Island (EWM 14), Buchanan's dock (EWM 8) and the raft along the north shore of North Lake (EWM 9). A total of nine pounds of EWM was pulled (Exhibit 4).

On September 19, 2017 Angie Stine and Gary Weber conducted a meander search on the Spread Eagle Chain of Lakes. No EWM was found except in North Lake. There were a few plants by Robbins Island (EWM 14) and one between the island and the boat landing (EWM 13). There was also a plant in the shallow bay (EWM 11). Only five EWM plants (<1 pound) were pulled using the rake by Robbins Island (EWM 14).

On October 25, 2017, Angie Stine met Jay Weber and searched North Lake. Two plants were found by Robbins Island (EWM 14) and were pulled with a rake.

On June 7, 2018 Angie Stine, Andrea Grosskopf (White Water), and Gary Weber went out to meander search for EWM in the Spread Eagle Chain of Lakes. Two Florence AIS personnel (Rachel and Ashley) were also part of the group. Angie snorkeled areas of North Lake. EWM was observed near the raft (EWM 9, two pounds removed), Buchanan's dock (EWM 8, eight pounds removed), and the shallow bay (EWM 11, four pounds removed). A new find was located along the northeast shore of North Lake (EWM 15, two pound removed). Total of sixteen pounds was hand-pulled.

Jay Weber hand-pulled five pounds of EWM at EWM 13 on June 14, 2018, fifteen pounds at EWM 13 on June 23, 2018, and three pounds at EWM 11 on July 25, 2018.

On June 28, 2018 Angie Stine and Tracey Stine met Jay Weber and used SCUBA to hand-pull EWM by Robbins Island (EWM 14, six pounds pulled) and approximately 20 EWM plants by Buchanan's dock (EWM eight, eight pounds pulled). There were also a few plants hand-pulled at EWM 11 (two pounds). In all, sixteen pounds were pulled.

On August 28, 2018, Angie Stine and Jay Weber looked for EWM in North Lake. Three plants were found near Robbins Island (EWM 14, two pounds pulled). There were ten plants by Buchanan's dock (EWM 8, three pounds pulled). We searched out into Middle Lake and found a new EWM location (EWM 16). There were approximately 15-20 plants in 15 feet of water. A new rapid response grant was proposed to conduct hand-pulling for Middle Lake.

On May 15, 2019, Angie Stine and Ryan Warmboe (White Water), Scott Goodwin (Florence County), and Jay Weber searched for EWM in North Lake and Middle Lake and

continued on to search the entire Chain of Lakes (except South Lake). At EWM 13, there were three plants. At EWM 14 there were seven plants. At EWM 17 (new find) there was a single plant. At EWM 8 there were five plants. At EWM 18 (new site) there was one plant. At EWM 12 there were five plants. At EWM 16 in Middle Lake there were numerous EWM plants. Scott Goodwin brought an underwater drone to look for EWM. SECOLA contributed money in the purchase of the drone with Florence County Land and Conservation Department. The drone has a camera and some mechanical arms that could possibly pick up something from the bottom. We were able to see EWM by way of the drone camera.

On May 17, 2019, Angie Stine met Jay Weber to continue a meander search on the rest of the Chain of Lake and no new AIS were found.

On June 11, 2019, Angie Stine, Ryan Warmboe, and Scott Denzer (White Water) met Jay Weber to hand-pull EWM in North Lake. At Robbins Island (EWM 14), 58 pounds were pulled. Six pounds were pulled at EWM 13 and four pounds were pulled at EWM 8. Three pounds of EWM were pulled at EWM 19 (new site). Six pounds were pulled at EWM 17. On the May 17, 2019 outing, a total of 77 pounds of EWM were pulled from North Lake.

On June 21, 2019, Angie Stine, Ryan Warmboe, and Scott Denzer met Jay Weber to hand-pull EWM in North Lake. SCUBA was used and Ryan worked from a kayak to catch any EWM fragments on the surface. EWM 13 had eleven pounds pulled. EWM 14 had three pounds of EWM pulled. EWM 16 had a few EWM plants present.

On September 5, 2019, Angie Stine and Jay Weber meander searched. EWM 13 had five plants. EWM 19 had two EWM plants. EWM 12 had two plants. Middle Lake had a new find at EWM 20 (Exhibit 5) with only two EWM plants. EWM 16 had two EWM plants.

During the hand-pulling process there were only a few fragments of native vegetation that were pulled because they intertwined in the EWM. *Elodea canadensis* and *Ceratophyllum demersum* have been found when emptying the bags of EWM on shore but only one or two in an outing. GPS tracking was not used on these surveys but we meandered the lake margin and wherever we could visually see aquatic plants. The Spread Eagle Chain lakes have good water transparency and it is easy to spot EWM when weather conditions are appropriate.

In addition to the monitoring work reported above, SECOLA volunteers Jay Weber and Carl Sundberg conducted numerous monitoring outings on their own. Over the course of this work, there were a total of 201 pounds of EWM hand-pulled in North Lake (Exhibit 4). It will be beneficial for the SECOLA volunteers and consultants to continue to monitor and hand-pull EWM where it occurs in the Chain (currently North and Middle Lakes). The entire Chain of Lakes should be monitored during the open water season for EWM and new AIS.

Exhibit 2. History of EWM on the Spread Eagle Chain of Lakes

Point	Year Found	Latitude/Longitude	Comments
EWM1	2013	45.90135, -88.13724	These are the locations of the original EWM finds on 9/18/13 south of Robbins Island by Caitlin Clarke and Carl Sundberg. Specimens from EWM1 were sent out for verification.
EWM2	2013	45.90090, -88.13726	
EWM3	2013	45.90125, -88.13728	This is the site of an additional find made by Angie Stine and Caitlin Clarke (White Water Associates) on 9/23/13 during a Spread Eagle Chain of Lakes EWM monitoring bout.
EWM4	2013	45.90121, -88.13731	On 9/25/13 Clarke and Stine returned to the EWM to conduct hand-pulling while snorkeling. These two additional points were marked where EWM plants were removed. About 100 plants (stems) were removed from these five sites. On 6/2/15, Stine hand-pulled 2 EWM plants.
EWM5	2013	45.90119, -88.13736	
EWM6	2014	45.90123; -88.13736	Points marked by Angie Stine during hand-pulling efforts in 2014 (south of Robbins Island). Part of the same general group of points EWM1-EWM5.
EWM7	2014	45.90122; -88.13731	
EWM8	2014	45.90485; -88.13362	NE corner of North Lake. Double-garage door boat house
EWM9	2014	45.90545; -88.13846	Near raft along the north shore of North Lake
EWM10	2014	45.90511; -88.14153	large clump, in open water north of boat landing
EWM11	2014	45.90565; -88.14156	In fine sediment near shore.
EWM12	2012	45.90604, -88.13928	Site of original North Lake EWM find in 2012 by WDNR
EWM13	2016	45.90294; -88.13970	2016 new site by Robbins Island across from Boat Landing discovered by Weber and Sundberg.
EWM14	2017	45.90327; -88.13880	Site found along north side of Robbins Island
EWM15	2018	45.90506; -88.13595	Site found along the northeast side of North Lake
EWM16	2018	45.89825; -88.13615	Site found in Middle Lake (see Exhibits 3 & 4)
EWM17	2019	45.90469; -88.13340	Area South of double garage boat house
EWM18	2019	45.90494; -88.13385	Site near EWM12
EWM19	2019	45.90346; -88.1371	Robbins Island East of EWM14
EWM20	2019	45.89553; -88.13932	Middle Lake near Dunn's Point by metal rip-rap (shown on Exhibit 4)

Note: EWM1 through EWM7 represent the same area of about 150 feet in length. No EWM have been

Exhibit 3. EWM Locations on North Lake (Spread Eagle Chain of Lakes)

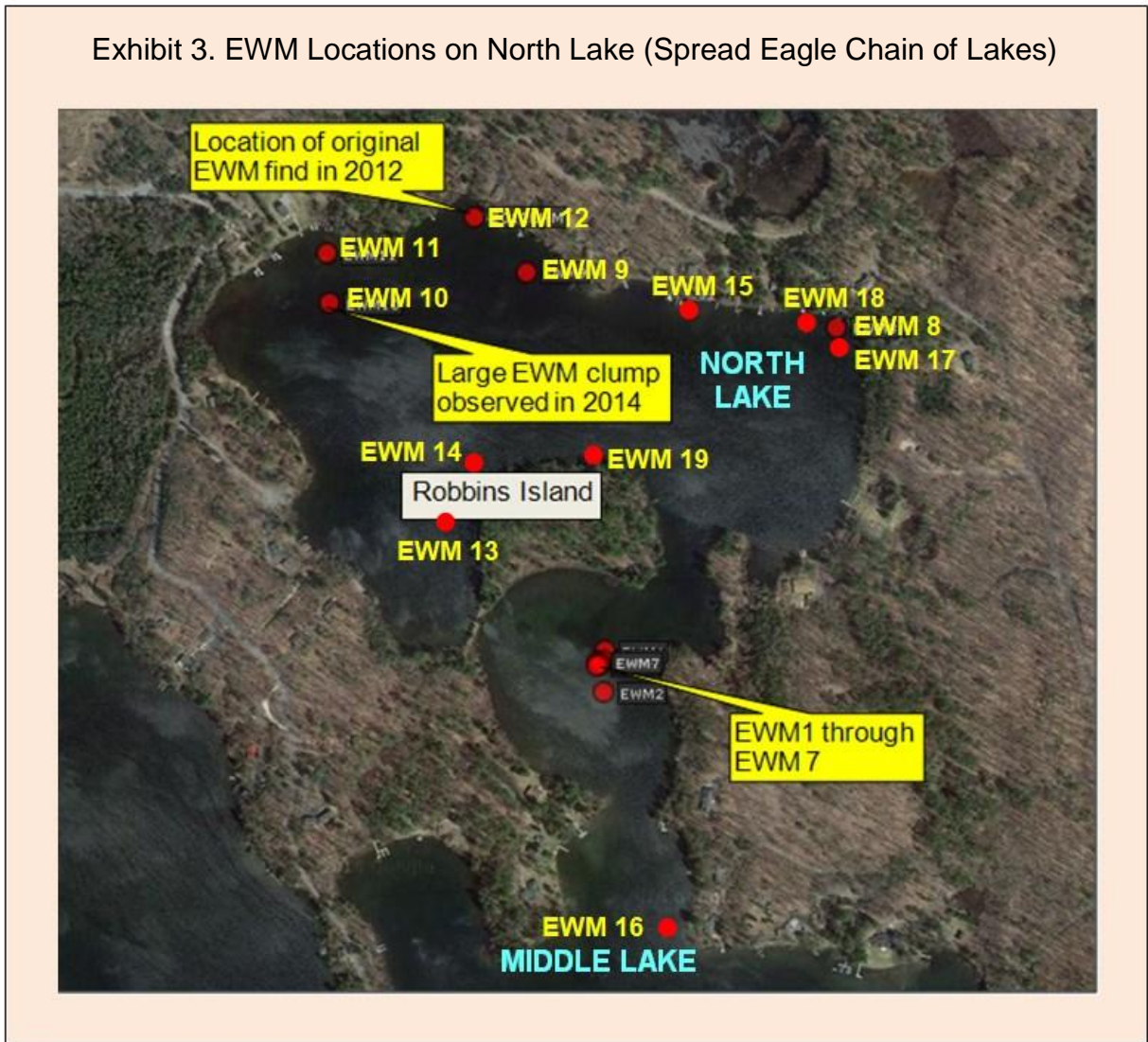


Exhibit 4. Record of hand-pulling harvest of North Lake EWM (pounds of EWM harvested).									
Dates of Hand-pulling	EWM Locations								Total Pounds by Date
	EWM 8	EWM 9	EWM 11	EWM 13	EWM 14	EWM 15	EWM 17	EWM 19	
6/23/2017			1		39				40
8/11/2017	3	1			5				9
9/19/2017			0.25		0.25				0.5
10/25/2017					0.5				0.5
6/7/2018	8	2	4			2			16
6/14/2018				5					5
6/23/2018				15					15
6/28/2018	8		2		6				16
7/25/2018			3						3
8/28/2018	3				2				5
6/11/2019	4			6	58		6	3	77
6/21/2019				11	3				14
Total Pounds by Site	26	3	10.25	37	113.75	2	6	3	201

Exhibit 5. EWM Locations on Middle Lake (Spread Eagle Chain of Lakes)

