

## Smoky Lake Control and Prevention of Eurasian Watermilfoil

### Rapid Response Project

Smoky Lake - Vilas County, WI and Iron County, MI

### Final Reporting (2016 &2017)

Submitted To:

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Solar Eclipse Over Smoky Lake - 2017

## **OVERVIEW**

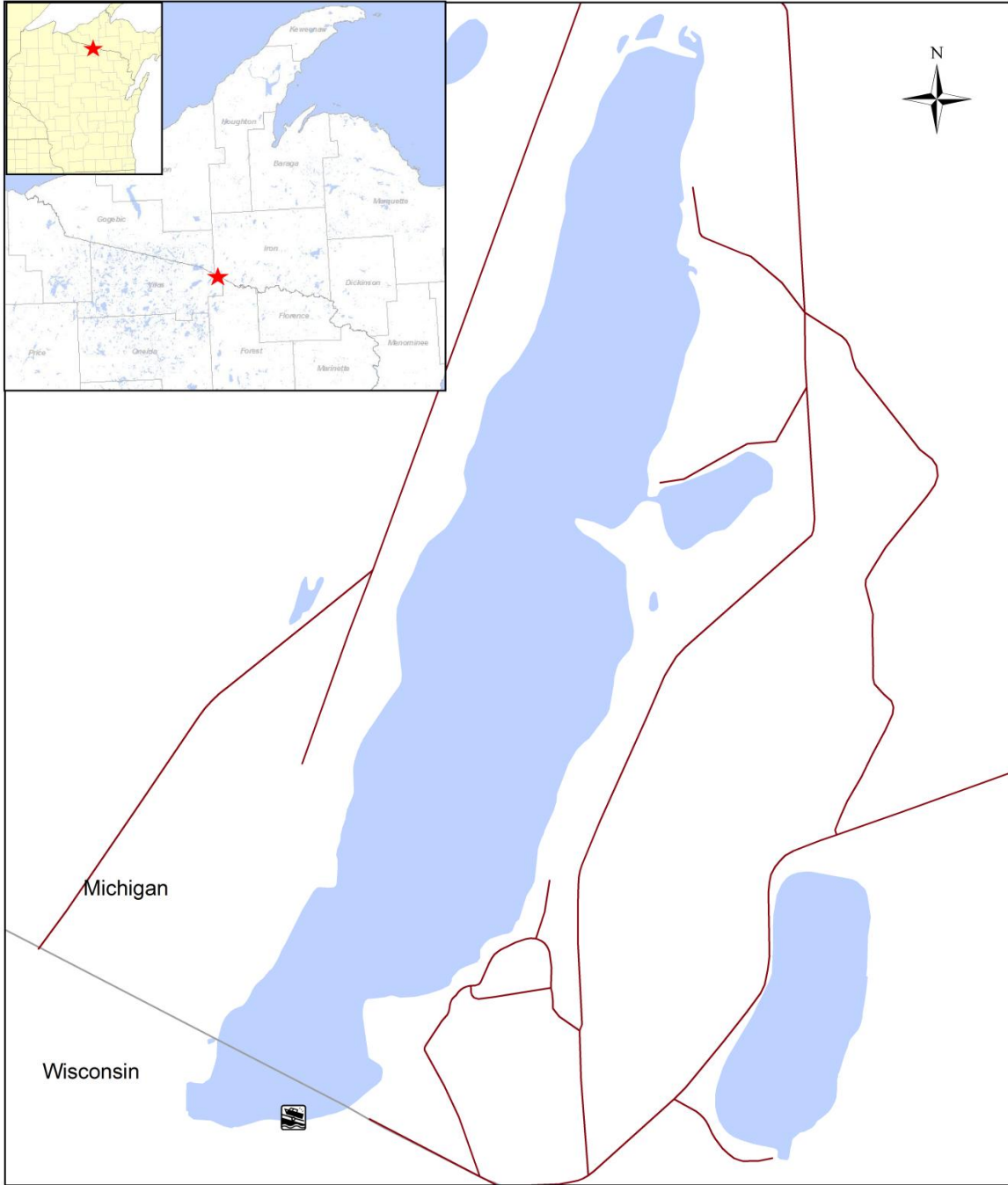
In 2014 the Town of Phelps, sponsoring the Smoky Lake Property Owners Association (SLPOA), applied for and successfully received a WDNR Aquatic Invasive Species Early Detection and Response Grant to manage for EWM on Smoky Lake from 2014 to 2015. Additional funding raised by SLPOA during this period contributed to management efforts beyond WDNR grant funds including local share requirements. In 2016, SLPOA, with sponsorship from the Town of Phelps, applied for and received an additional WDNR Aquatic Invasive Species Early Detection and Response Grant to manage EWM on Smoky Lake from 2016-2017. Again, SLPOA provided additional funding beyond the grant project scope for further management.

This report is a final summary of activities and efforts in part to fulfill requirements for the WDNR Aquatic Invasive Species Grant # AIRR20716 (2016 & 2017). Specifically this report is a synthesis of (1) Eurasian watermilfoil (EWM) monitoring, (2) EWM management, (3) overview of project highlights and (4) a summary of lake stewardship and AIS prevention activities.

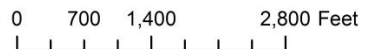
## **PROJECT AREA**

Smoky Lake, located in Vilas County, WI and Iron County, MI, is 590 acres with a max depth of approximately 65 feet. Smoky Lake, sitting at the northern tip of the Deerskin River Watershed, is an oligotrophic seepage lake locally known for clear and cool water. The Town of Phelps, WI owns and operates a public boat launch and recreational area at the southern end of the lake. Riparian ownership includes the Town of Phelps, State of Wisconsin and Wisconsin and Michigan riparians.

# Smoky Lake - Vilas County, WI & Iron County, MI



Created By: Many Waters, LLC  
Lake: Smoky Lake - Vilas Co., WI & Iron Co., MI  
Source: MIGDL Lake\_polygons\_200403, MIGDL allroads\_miv13a, ESRI USA Base Map



## SEASONAL EWM MONITORING

Eurasian watermilfoil monitoring surveys using a meander approach are primarily completed using visual observations, but also include the use of rake tosses and underwater cameras. Monitoring efforts are qualitative in nature, meaning that information collected describes the condition of EWM rather than using measured or quantitatively calculated values. For example, Table 1 describes the general observed abundance estimate of EWM found during each survey. Smaller sites are geo-referenced with a GPS point and extent is determined by using a visually estimated circumference converted to acres. This is an observed estimate of exact extent and not footprint. On average, these sites are less than a 0.10 of an acre in size. Larger sites, typically greater than a 0.10 of an acre in size are circumnavigated and extent in acres is calculated and represented by a polygon. Each year two surveys are completed. The first survey is timed during the first half of the growing season. This survey focuses on reconfirming previous years EWM locations to refine management strategies and monitor for EWM in shallower water. The second survey is timed to capture EWM plants at or near the greatest growth potential for a given year, typically the second half of the growing season and include deeper waters.

**Table 1:** Estimated qualitative density rankings.

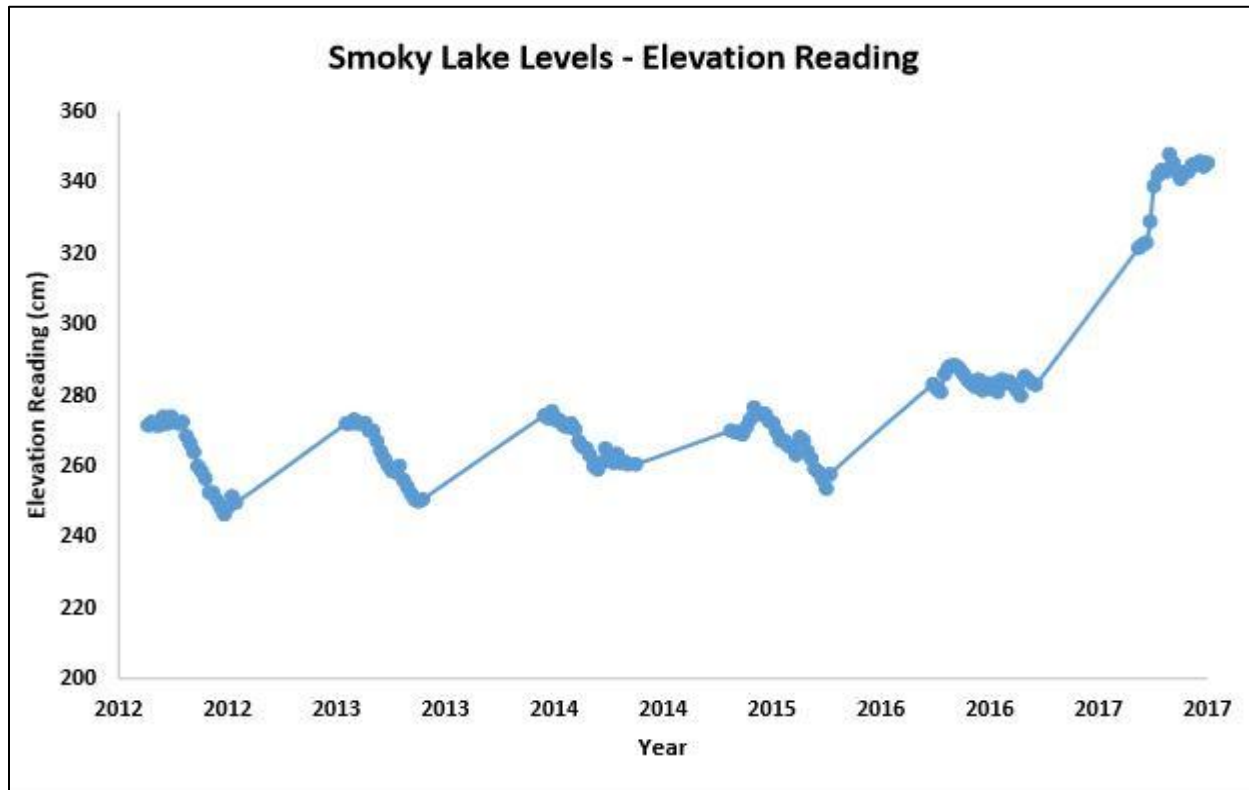
<b>Very Sparse</b>	Typically consists of less than 10 plants visually observed, unless otherwise noted. Extent varies and is estimated visually for smaller locations and noted. Larger locations are delineated using GPS to calculate area.
<b>Sparse to Scattered</b>	Typically consisted of 10-20 plants visually observed, unless otherwise noted. Extent varies and is estimated visually for smaller locations and noted. Larger locations are delineated using GPS to calculate area.
<b>Moderate</b>	Typically consists primarily of EWM with some native vegetation visually observed to be intermixed. Extent varies and is estimated visually for smaller locations and noted. Larger locations are delineated using GPS to calculate area.
<b>Moderate-Dense</b>	Typically consists of dominant EWM with little observed native vegetation intermixed. Extent varies and is estimated visually for smaller locations and noted. Larger locations are delineated using GPS to calculate area.
<b>Dense</b>	Dominant EWM, with little to no native vegetation observed. Dense locations may or may not have surface matting depending on the time of year. Extent varies and is estimated visually for smaller locations and noted. Larger locations are delineated using GPS to calculate area.

In 2016, early season efforts detected 1.63 acres of polygon based mapping beds of EWM at sparse to very sparse levels all within the far southwest bay of the lake. Several small pockets of moderate density EWM existed within these mapped beds. By the mid/late season EWM survey, all detected EWM consisted of isolated sparse to very sparse locations. Reduction from polygon to point based mapping seen from the early season survey to mid/late season survey was primarily a result of management that took place between this time.

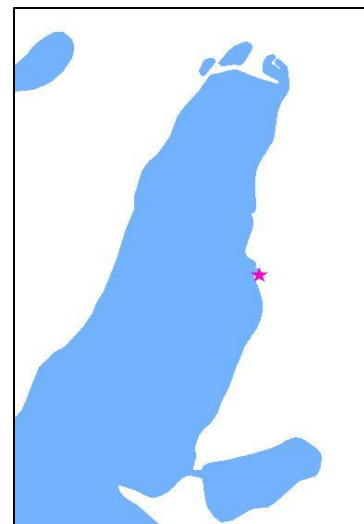
In the spring of 2017, a substantial amount of rain and runoff elevated Smoky Lake's water levels to over 30 inches from the previous year. Early season monitoring on June 21<sup>st</sup> detected very little EWM in the far southwest bay, particularly EWM in very shallow water (< 3ft average). Furthermore, water clarity remained poor, with bottom visibility limited to less than six feet. Based on these findings, a return visit occurred on July 18<sup>th</sup> to re-assess the far

southwest bay. Again, water clarity remained poor, however, some EWM had returned to near shore and shallow areas. Deeper water areas were surveyed with an underwater camera. Most EWM detected during this survey ranged from 7.5 to 11 feet of water. Mid/late season EWM monitoring detected sparse to very sparse isolated EWM locations within the southwest bay and additional locations along the western shore just north of the southwest bay.

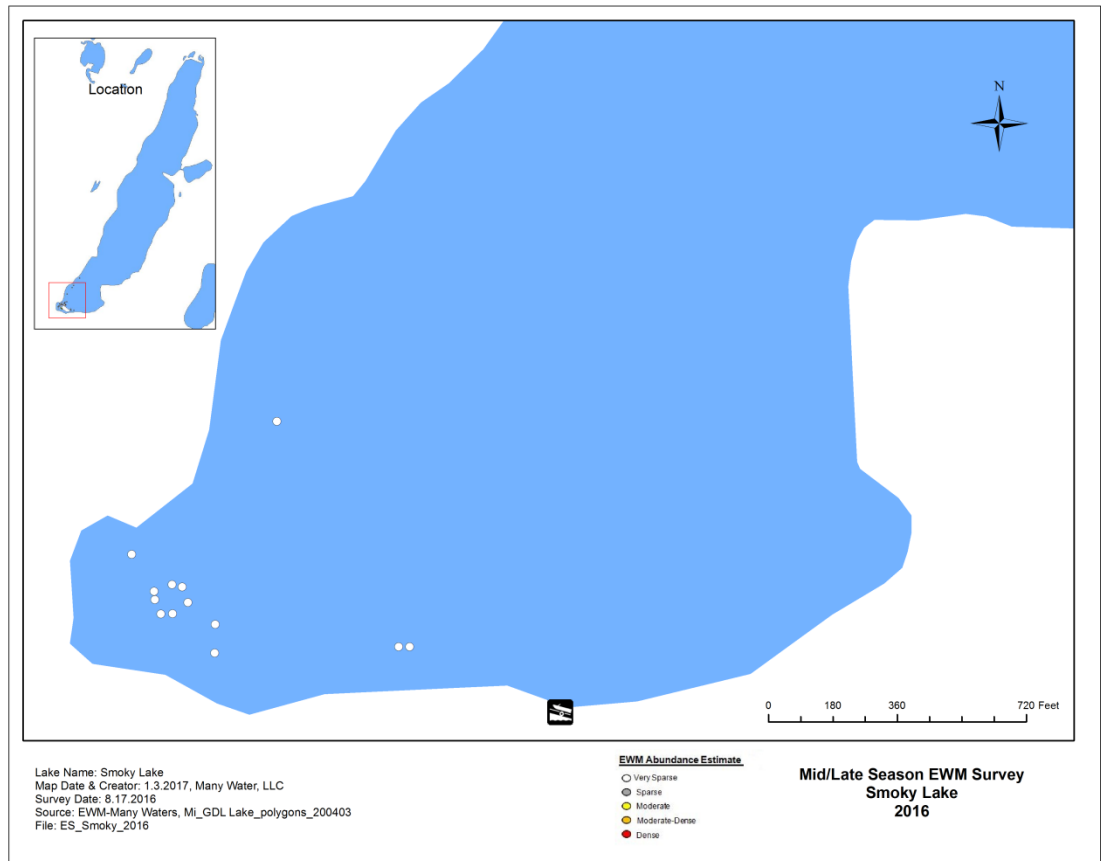
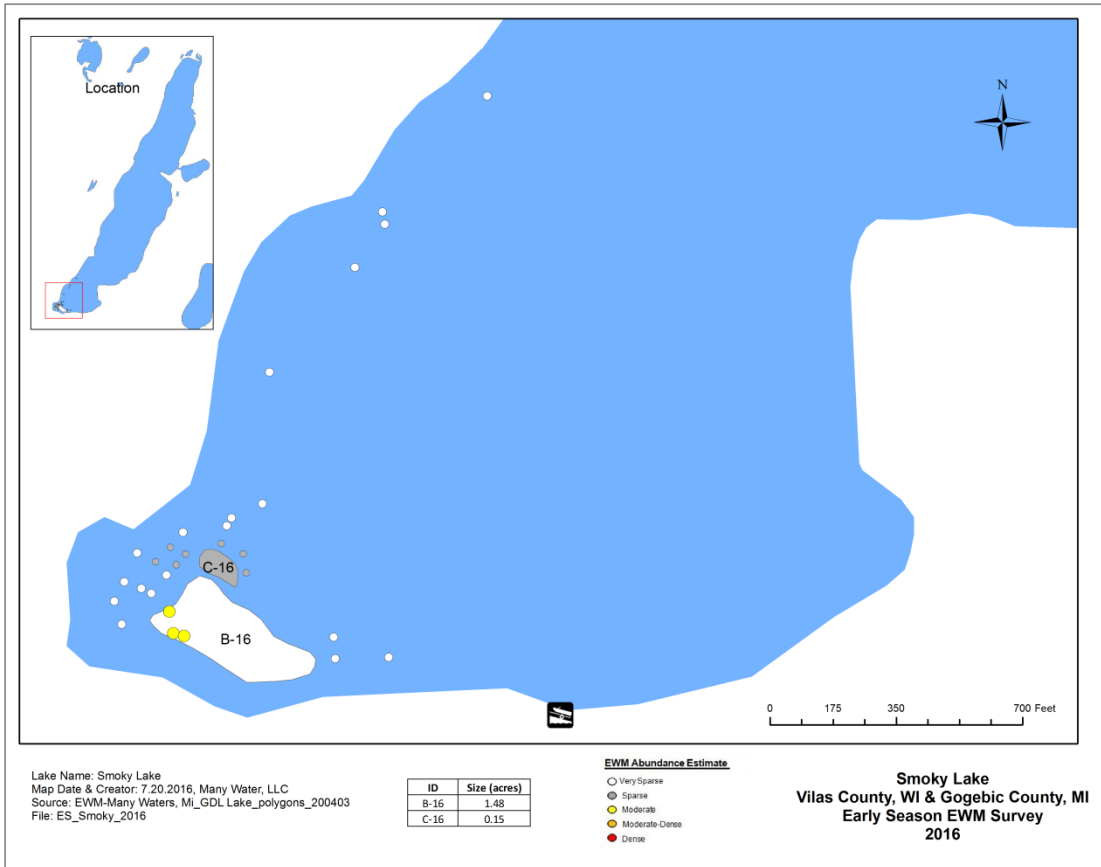
**Figure 1:** Change in water levels from 2012 to 2017. Readings taken by Lew Raker, Smoky Lake in cooperation with the Northland Discovery Center.

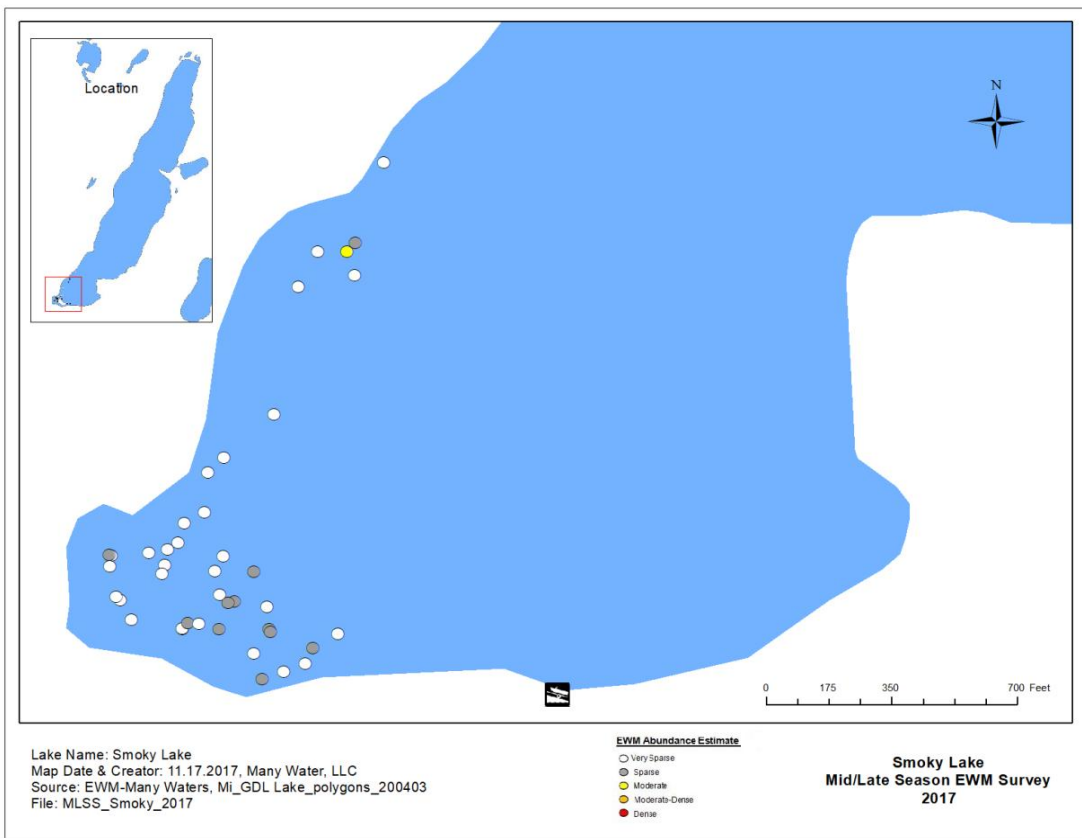
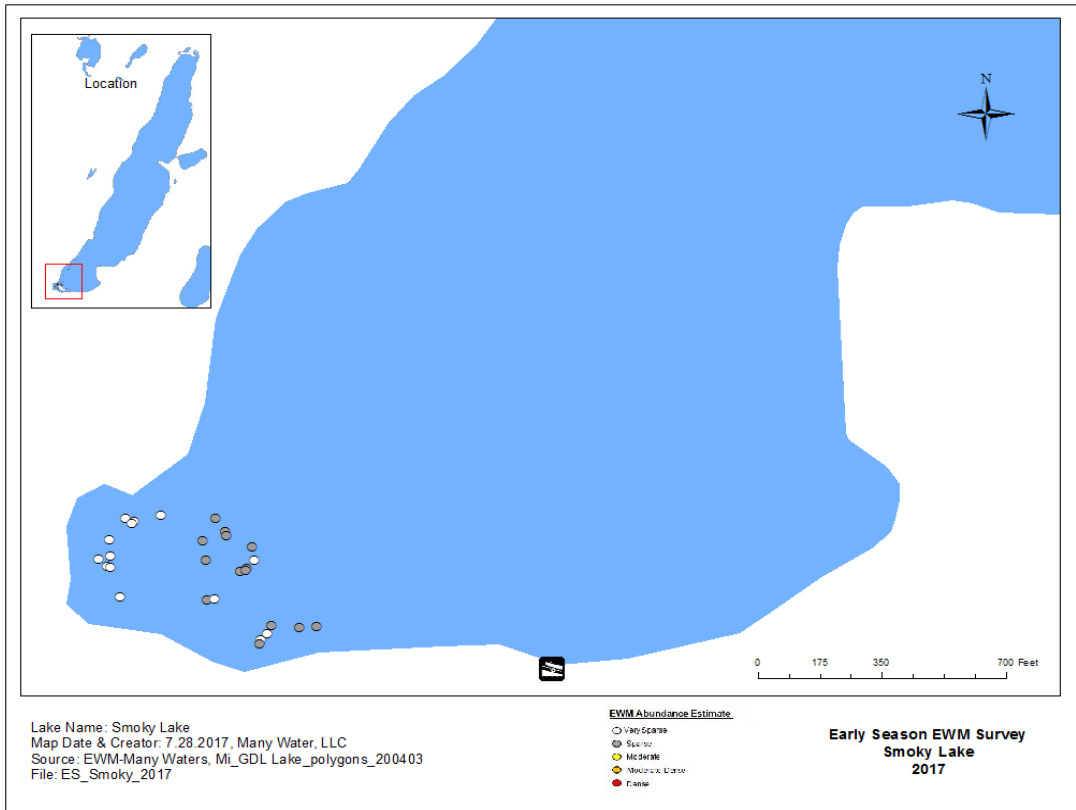


In October, a volunteer report of EWM confirmed by Lew Raker, found a new location of EWM within a protected “marina” along the north eastern shore. The initial report found a few scattered plants tucked near shore amongst some native floating leaf vegetation. Further investigation, determined a larger colony of EWM within a man-made marina area.



Location of EWM along the northeast shore of Smoky Lake.





## **EWM MANAGEMENT**

### **2016**

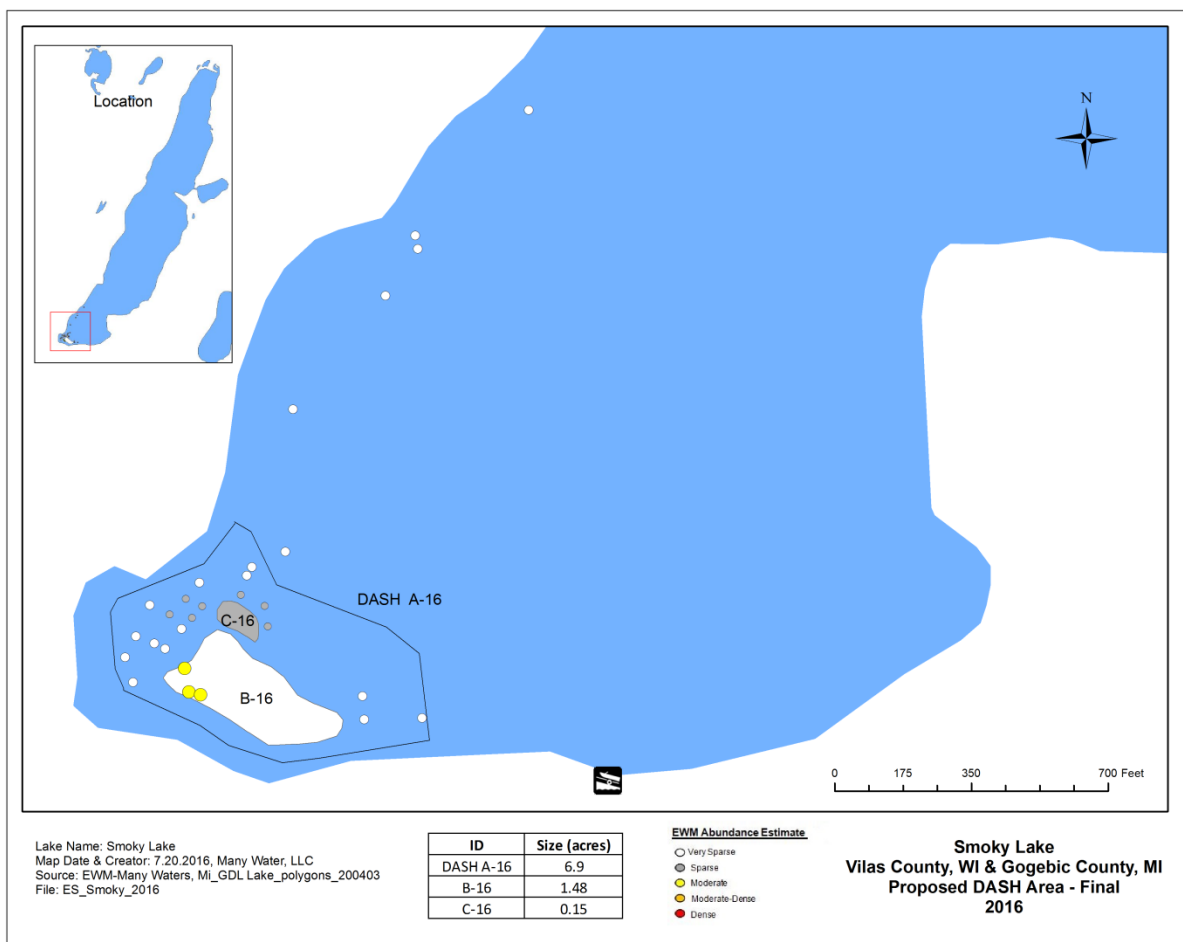
Due to the low density and scattered nature of the EWM, the primary tool for management has been the use of hand removal. A three-pronged management approach in 2016 included the use of divers alone, DASH and snorkel pullers. The western shore locations were dove with the use of scuba gear due to the fact these sites were relatively deep. Small pockets of moderate density and deeper water colonies in the southwest bay were managed with the use of DASH. The remaining sites located within the far southwestern bay were dove with the use of snorkel gear by contracted professionally and with the use of volunteers.

Many Waters addressed the dive and DASH locations, whereas Aquatic Plant Management (APM) contracted directly with SLPOA to address the remaining sites within the southwestern bay. Volunteers sought to remove EWM within the very shallow water zone (less than 5 feet); however, the association held one session accomplishing some hand removal, but did not detect enough EWM in shallow enough water to organize more events. They did observe EWM in deeper water, however based on previous experience, volunteers will typically limit their snorkel range to five feet or less due for efficiency and safety.

#### **Diver Assisted Suction Harvesting**

DASH efforts worked within DASH A-16 over 4 days from July 25<sup>th</sup> to September 21<sup>st</sup>. DASH sites initially focused on the moderate density colonies identified during the spring survey prior to APM snorkel pulling. DASH removed a total of 497 pounds of wet weight EWM in 18 dive hours. Diver Assisted Suction Harvesting was only used in Wisconsin (WI Permit # NO-2016-64-102M).





**Table 2 : 2016 Daily Summaries of DASH Efforts.**

Date	Location	Size (acres)	DASH Boat Location		Dive Time (hrs)	EWM (lbs*)	Native Plants (lbs*)	Percent Incidental Native Harvest (%)	Total (lbs*)
			Lat (NAD 83)	Long (NAD 83)					
7/25/2016	DASH A-16	6.9	46.080780	88.955920	5.00	200.5	3.5	2%	204.0
7/26/2016	DASH A-16	6.9	46.081280	88.955520	5.50	185.0	3.0	2%	188.0
7/29/2016	DASH A-16	6.9	46.081210	88.955820	2.25	38.0	1.5	4%	39.5
7/29/2016			46.081020	88.955810	1.25	45.5	2.0	4%	47.5
9/21/2016	DASH A-16	6.9	46.080910	88.956100	2.50	16.0	0.5	3%	16.5
9/21/2016			46.080880	88.956170	1.50	12.0	0.5	4%	12.5
					<b>18.0</b>	<b>497.0</b>	<b>11.0</b>	<b>3% Ave.</b>	<b>508.0</b>

\* wet weight

## Daily DASH Log

**July 25<sup>th</sup> 2016** Weather- sunny, 70°F, west wind 5-10 mph  
DASH efforts focused on the three small moderate density patches of EWM of area A-16. Five dive hours removed 200.5 pounds of EWM. Incidental harvest of native plant species remained similar to previous year's efforts. Species consisted of slender naiad (*N. flexilis*), *Nitella* sp., fern pondweed (*P. robbinsii*), slender waterweed (*E. nuttallii*) clasp leaf pondweed (*P. richardsonii*) and small pondweed (*P. pusillus*).

**July 26<sup>th</sup> 2016** Weather- sunny, 72°F, west wind 5-10 mph  
DASH efforts again focused along the southwestern portion of A-16. Five and a half dive hours removed 185 pounds of EWM. Incidental harvest of native plant species remained similar to previous efforts. Dive conditions were good as storms approached from the west, southwest.

**July 29<sup>th</sup> 2016** Weather- sunny, 74°F, calm to light and variable winds  
Again, working on area A-16, three and a half dive hours removed 83.5 pounds of EWM. Incidental harvest of native plant species remained similar to previous efforts. Dive conditions remained very good.

**September 21<sup>st</sup> 2016** Weather- mostly sunny, 55°F, north wind 5-10 mph  
DASH efforts focused on area A-16, primarily where the three smaller, denser areas found earlier in the year. Four dive hours removed 28 pounds of EWM, all of which were plants of very small stature. Incidental harvest of native plants remained similar to previous efforts.

### Diving Efforts

Dive efforts focused on deeper water EWM locations detected during the early and mid/late season survey efforts. In 9 dive hours approximately 206 EWM plants totaling 35 pounds wet weight were removed.

**Table 3: 2016 Dive Efforts Summary**

Date	~ Number of Plants	Pounds of Plants	Location
8/1/2016	3	1.5	Northern Most EWM Known along Southwest Shore (early season survey)
	100	20	Central EWM Locations along Southwest Shore (early season survey)
9/20/2016	21	1.5	Southern Most EWM Location along Southwest Shore (early season survey)
	82	12	Location along Southwest Shore (mid/late season survey)
<b>TOTAL</b>	<b>206</b>	<b>35</b>	

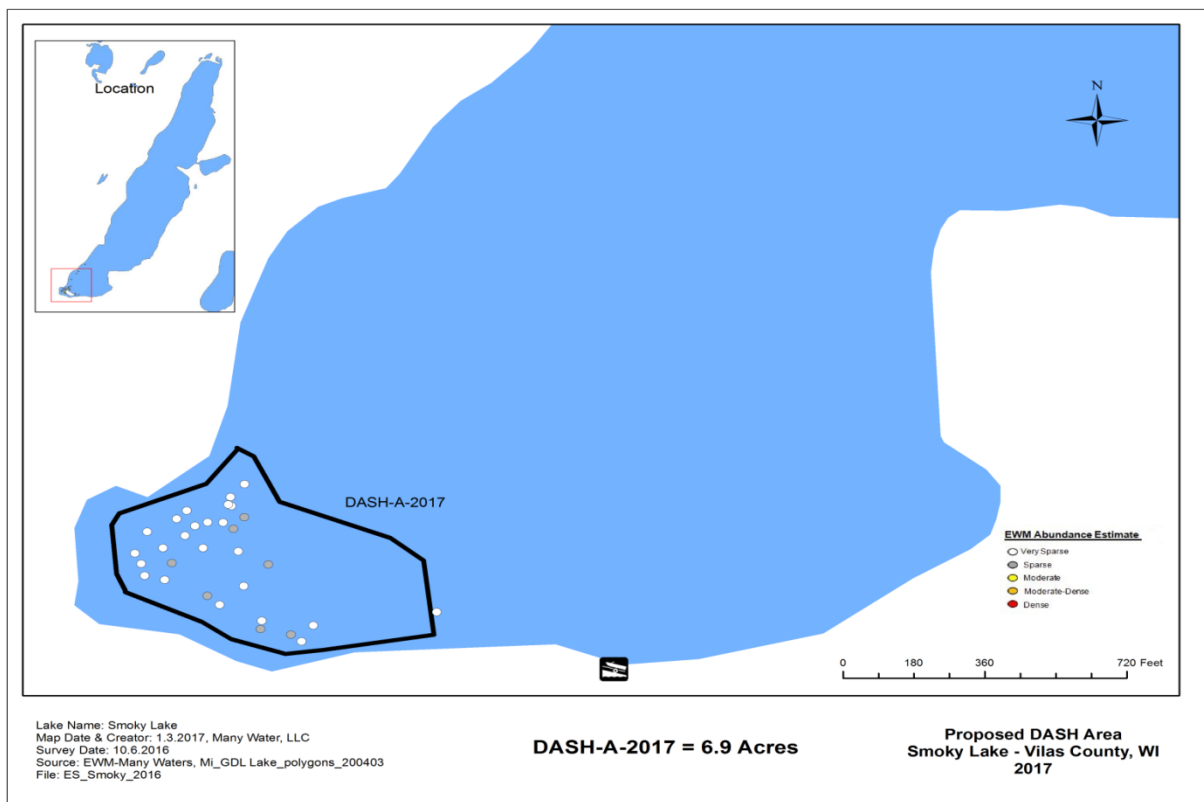
## Snorkle Hand Removal

Between August 4<sup>th</sup> to August 9<sup>th</sup> Aquatic Plant Management conducted snorkel removal of EWM on Smoky Lake. Aquatic Plant Management was instructed to beginning at the eastern end of B-16 working clockwise around the bay to the north near C-16 from shallow to deeper water. A total of 96 dive hours removed 135 cubic feet of EWM from Smoky Lake.

## 2017

Due to the unusual delayed in EWM growth in 2017, dive efforts mainly took place during the second half of the growing season. With very little shallow growth, it was determined that organization of volunteer efforts may not be the most beneficial use of volunteer time. Rather, volunteers periodically checked on the far southwest bay for growth and reported any findings to Many Waters to assist in adjusting survey timing and professional lead hand removal efforts. Management efforts focused on a two-pronged approach based on the EWM seasonal growth with more emphasis on snorkel pulling. This was mainly due to the scattered distribution of EWM, where mobility from snorkeling may be more efficient versus DASH or diving. DASH efforts were limited to one day, removing a few isolated deeper water colonies, whereas dive efforts took place mainly along the west shore in deeper water.

## Diver Assisted Suction Harvesting



**Table 3: 2017 Daily Summary of DASH Efforts.**

Date	Location	Size (acres)	DASH Boat Location		Dive Time (hrs)	EWM (lbs*)	Native Plants (lbs*)	Percent Incidental Native Plant Harvest (lbs)*	Total (lbs*)
			UTM	UTM					
9/21/2017	DASH A-2017	6.9	16t 0348758	5104750	4.5	15.5	<.25	2%	15.75
			16t 0348739	5104738		28.0	<.25	0%	28.25
						<b>43.5</b>	<b>0.5</b>	<b>1%</b>	<b>44.00</b>

Daily DASH Log

**September 21<sup>st</sup> 2017**

Weather- Sunny, 62°F, light and variable winds

Water clarity was good and bright sunny skies with a light ripple made for excellent diver visibility. The soft substrate requires the diver to maintain minimal contact with the bottom to avoid creating plumes that reduces visibility. One diver working for four and half hours in two locations was able to remove 43.5 pounds of EWM.

Dive Efforts

Dive efforts focused on deeper water EWM locations detected during the early and mid/late season survey efforts. In 10 dive hours approximately 473 EWM plants totally 49.5 pounds wet weight were removed.

**Table 4: 2017 Summary of Dive Efforts.**

Date	~ Number of Plants	Pounds of Plants	Location
9/19/2017	367	35.5	Moderate density colony and surrounding locations along the west shore
10/3/2017	106	14	Same location as earlier efforts. Efforts cut shore due to storm.
<b>TOTAL</b>	<b>473</b>	<b>49.5</b>	

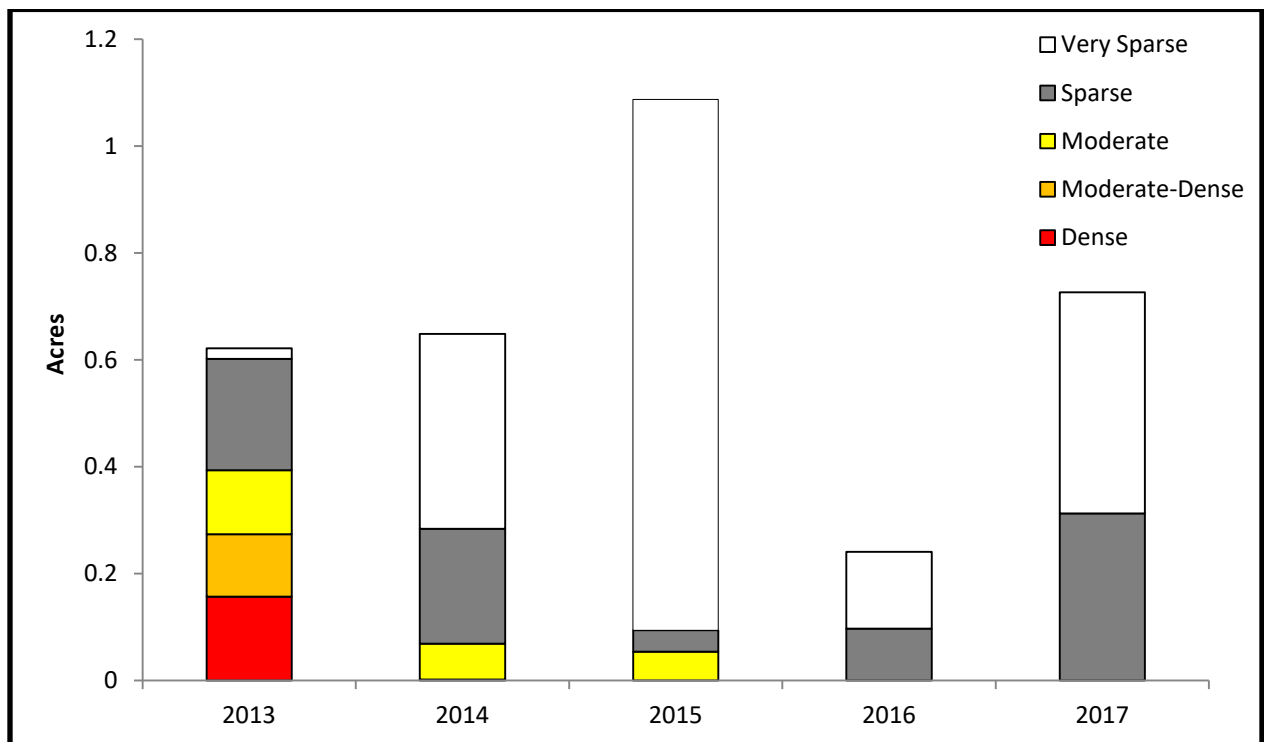
Snorkel Pulling

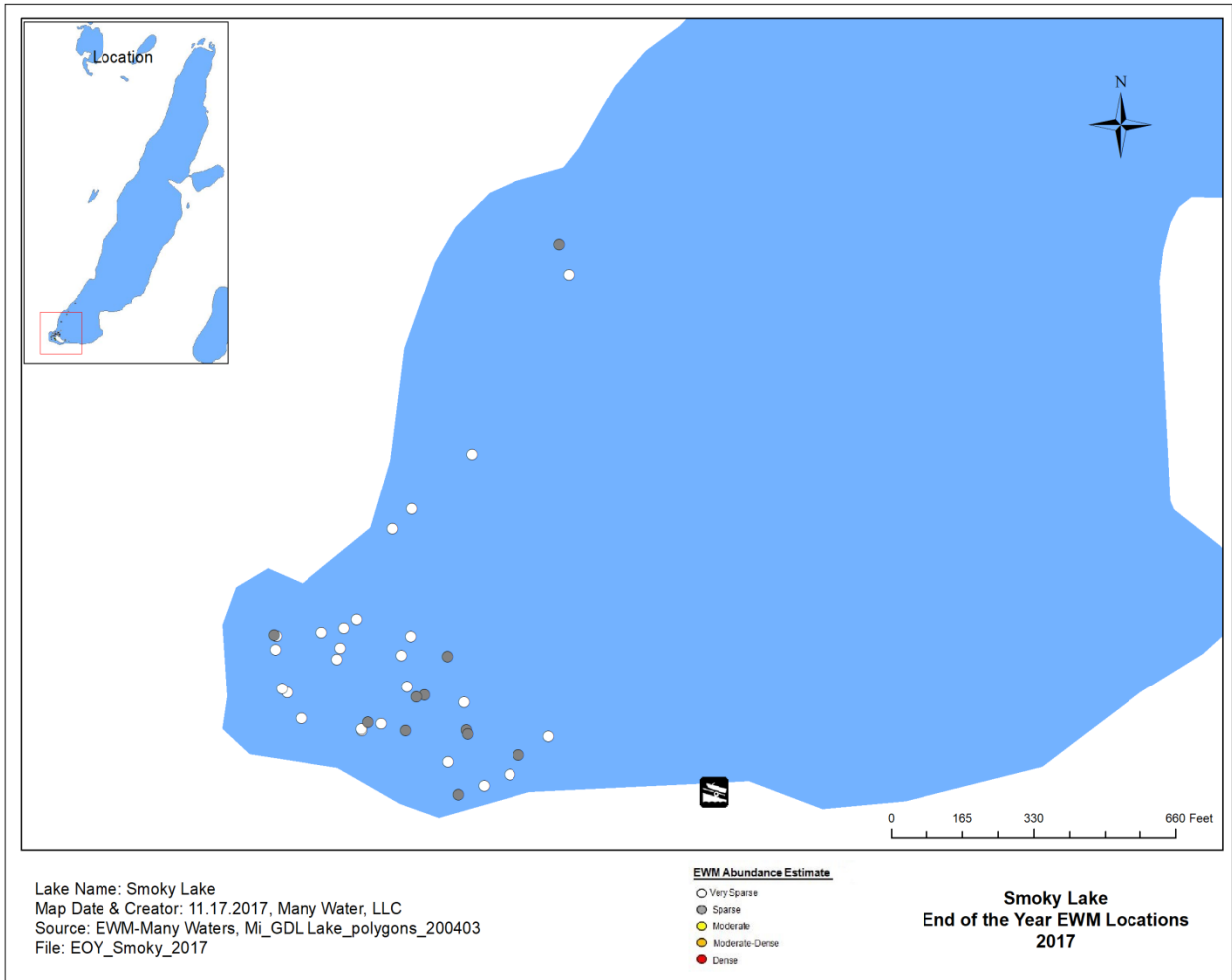
Between August 2<sup>nd</sup> to August 9<sup>th</sup> Aquatic Plant Management conducted snorkel removal of EWM on Smoky Lake. Aquatic Plant Management was instructed to work within the same perimeter as in 2016 starting shallow and working to deeper water. In 112 dive hours AMP removed 61.5 cubic feet of EWM.

## POST MANAGEMENT EVALUATION AND DISUCSSION

An end of the year survey evaluating management efforts took place on October 9<sup>th</sup> 2017. The purpose of the end of year evaluation was to visit all known managed sites, not survey for additional EWM locations. Eurasian Watermilfoil is still present within the most southwest bay, most notably are the scattered colonies in deeper water beginning to appear along the west shore. As noted above, a new location of EWM within a “private” man made marina located by volunteers will be evaluated during the spring 2018 survey.

**Figure 2:** Abundance and extent estimate based on end of the year evaluation results from 2013 to 2017 – Smoky Lake.





Eurasian watermilfoil in Smoky Lake continues to be present at low levels, primarily as a scattered population within the far southwest bay. Minus one small moderate density colony, all locations of EWM are at the lower end of the abundance estimate, and in 2017, no contiguous polygon mapped beds were detected. Overall, an increase in the depth of plants detected from 2016 to 2017 rose from 5 feet to 7.5 feet. Interestingly, this is the average rise in water levels recorded for 2017.

The continued approach at this level will be to target EWM plants with a combination of divers, snorkelers and DASH. Future management and increase water levels, does not pose much challenge for dive and DASH efforts, however, limited EWM growth in shallow water, generally less than five feet, will make volunteer snorkeling difficult and may pose some limitations on professional snorkel pulling. Management will continue in 2018 in a similar pattern to previous years, however, depending on water level rise seen in the spring, snorkel pulling may be best utilized in water depths up to about that 8 foot range and depths greater than that utilize divers and DASH depending on EWM densities.

Higher water levels may require some adjustment to survey timing, especially if the pattern continues into 2018. As in 2017, mid-June efforts detected very little EWM in shallow water, where a month later, EWM was easily detectable. Deeper water locations, once easily detected visually will require the use of underwater cameras, which does take more time to complete. Discussion with volunteer monitoring leaders and the AIS committee, suggest that a slight change to the annual monitoring surveys be made. In addition to the early and mid/late season monitoring, a mid season “sweep” is suggested. This may help identify pioneering colonies that may arise in between the otherwise planned surveys and augment volunteer efforts. Furthermore, an AIS refresher training for volunteers is suggested for 2018, to re-familiarize current volunteers on identification and allow new volunteers to become more familiar with the aquatic plants in Smoky Lake and EWM identification.

# Appendix A

Summary of AIS Prevention and Lake Stewardship Activities



Since the discovery of Eurasian water milfoil (EWM) in 2013 the Smoky Lake Property Owners Association (SLPOA) has worked to educate itself about proper identification and control methods, proper remediation techniques and to identify available financial resources. It has worked to gather volunteers to offer their time, talents and financial resources to help diminish the impact in pristine Smoky Lake. There is an established Aquatic Invasive Species Committee that meets at several points during the year to oversee issues, develop planning strategies and assure compliance with WDNR grant deadlines and reporting requirements.

The Wisconsin DNR has awarded two \$20,000 Aquatic Invasive Species Early Detection and Response grants for remediation work on Smoky Lake. These have been sponsored grants working with the Town of Phelps. The first grant funds were fully utilized in 2014-15 and this report is for year two on the current grant, awarded in spring of 2016. A sponsored grant application for a WDNR Lake Planning Grant has also been submitted in December 2016 and awarded in the spring of 2017.

Remediation has consisted of hand removal methods during the first two years of control efforts. In early 2016, after considerable study and research with other regional lakes, SLPOA met with the DNR to discuss the possible use of herbicides. The WDNR determined that the extent and density of EWM did not justify the issuance of a permit and so hand pulling efforts have continued during the summer of 2016 and 2017. The extent and density did not change dramatically in 2017. We are still dealing with a presence of milfoil in the southwest bay with only a few stray plants discovered elsewhere in the lake.

Lake levels rose close to 2.5 feet between the winter of 2016 and the fall of 2017. Early survey work found far less milfoil at shallow depths and more at deeper depths. This made volunteer removal sessions less feasible and so reliance on professional remediation through hand removal was essential. During the summer of 2017 professional remediation efforts was offered by Many Waters using grant funding. SLPOA also contracted directly for additional professional snorkel removal sessions with Aquatic Plant Management. Cost for these Many Waters services totaled \$6321 and for Aquatic Plant Management Services totaled \$6387.52. Milfoil was largely present at greater depths.

Though volunteers provided less remediation efforts SLPOA continued to rely on its dedicated group of lake volunteers to visually monitor assigned areas. This program is coordinated by Lew Raker and assisted in data collection by Mary Lou Raker. Volunteers are asked to track their time, boat usage and observations. The goal is to identify areas of established weed growth and to look for the spread of EWM throughout the lake so that new outgrowth can be immediately attacked. Very late in the season a few milfoil plants were discovered on the northeastern shore.

SLPOA volunteers reported volunteer time with a reporting value of \$1749 and donated watercraft time (pontoon boats, outboard motor boats, kayaks, canoes and rowboats) with a value of \$620.21. Many Waters also donated professional time in the amount of \$106.20.

#### Outreach Efforts

SLPOA is a Michigan lake association and so works on an ongoing basis with the Town of Phelps in its sponsored relationship for DNR projects. The Town of Phelps has a boat launch on the lake and been consistently strong in supporting SLPOA efforts on remediation and

conservation efforts. A SLPOA representative sits on the Town Lakes Board and SLPOA was the recipient of \$2000 in grants funds for remediation in 2017.

#### Wisconsin Incorporation

In October of 2016 a new Wisconsin Corporation, Smoky Lake Preservation Association, Inc. was filed with the State of Wisconsin dedicated to conservation and preservation efforts for the lake. A fundraising appeal to lake-owners is currently underway with a positive response. This corporation will be qualified to apply for future grants without sponsorship after October 24, 2017.

#### Clean Boats Clean Waters Program

SLPOA at its own expense contracted for 100 hours with the University of Wisconsin-Oshkosh to participate in the Clean Boats Clean Waters program to provide boater AIS education and observations at the Smoky Lake Boat Launch. Volunteers also attended the regional training sessions offered by Cathy Higley and worked to establish contact with the student volunteers over the summer.

Smoky Lake Preservation Association, Inc., intends to directly apply for a DNR grant for the summer of 2018 having completed the one-year waiting period following incorporation.