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Management of Eurasian Watermilfoil (*Myriophyllum spicatum*) using Diver Assisted Suction Harvesting

Anvil Lake - Vilas County, WI

2016 Final Reporting

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Submitted To:

Anvil Lake Association
and
Wisconsin Department of Natural Resources

Submitted By:

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Introduction

The Anvil Lake Association solicited the services of Many Waters, LLC to utilize their Diver Assisted Suction Harvesting (DASH) program to manage for Eurasian watermilfoil (EWM) on Anvil Lake, located east of Eagle River, in Vilas County, WI. DASH is a mechanical process and requires a mechanical harvesting permit (Form 3200-113 (R 3/04)) from the Wisconsin Department of Natural Resources (WDNR). The 2016 Permit ID for Anvil Lake is NO-2016-64-80M.

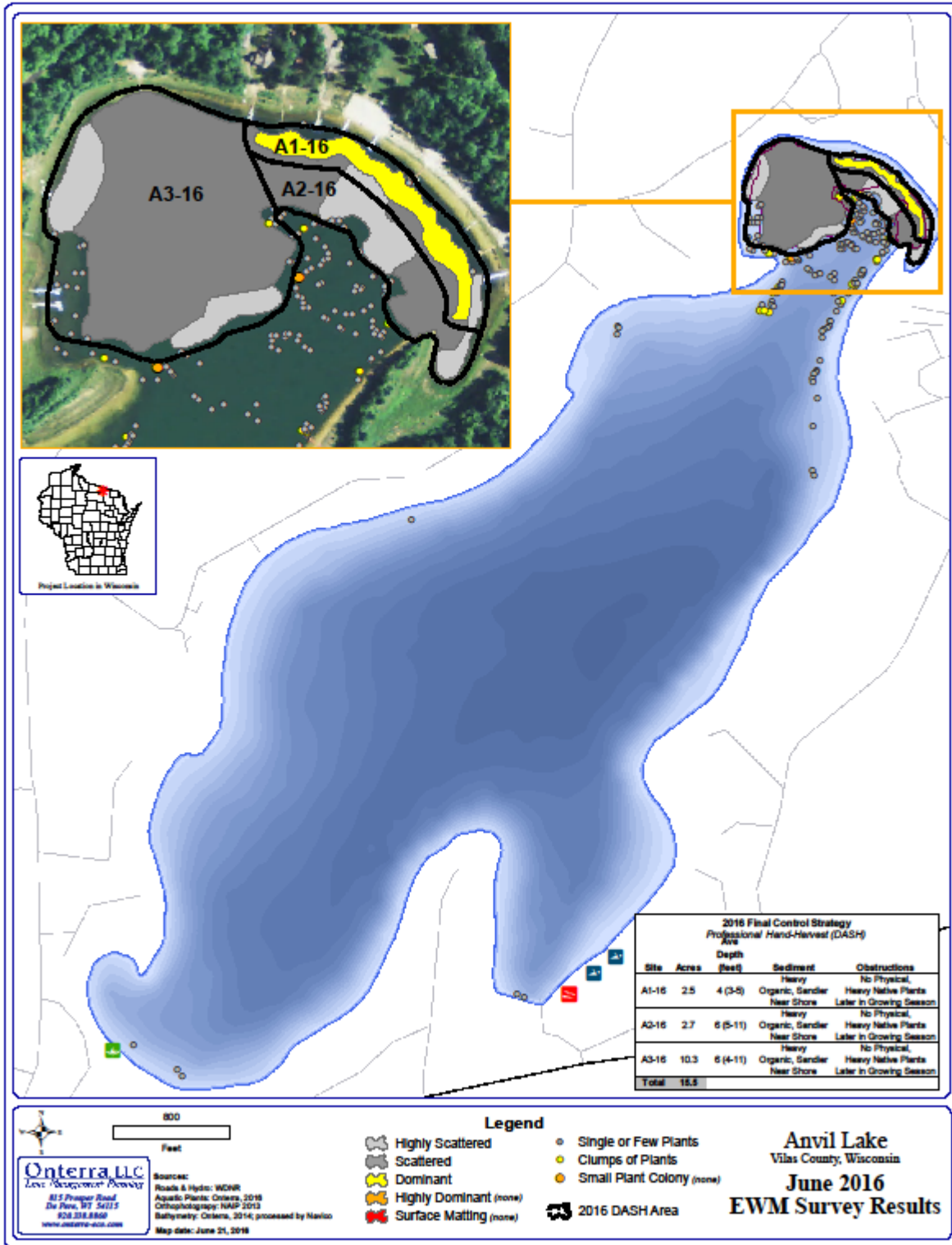
Dive Methods

While using DASH, a diver typically will begin by locating a EWM plant from the surface, and then descend next to the plant while simultaneously lowering the nozzle. Divers work along the bottom by using fin pivots, kneeling on the bottom or hovering above the bottom at a distance where the root mass of the plant is within hands reach. The diver will either feed the top of the plant into the hose first and then uproot the plant or uproot the plant and feed its root wad first into the hose. It is very important that the diver shake as much sediment from the root wad before getting the root wad near the nozzle. Shaking the root wad away from the nozzle helps maintain visibility for the diver and minimizes debris and sediment in the holding bins. As plants are fed into the nozzle, the diver carefully observes for possible fragments. Fragments are caught by hand and fed into the nozzle.

Work sites that have dense monotypic beds of EWM, the initial DASH efforts are quite simple. The diver will descend adjacent to the bed and begin hand pulling or harvesting systematically across the bed to dismantle the bed. Once the majority of the bed is removed, a more systematic approach follows to target remaining clustered, scattered or outlier plants in the work site. As part of our method for covering a work area while using DASH (or divers alone), a grid pattern is used. A diver will start at either the port or starboard side of the boat and work to and from the boat perpendicular to the direction the boat is facing. For example, with the boat facing north and the diver starting on the port side, the diver begins by heading west. The diver will continue to work perpendicular to the boat until reaching the end of the suction hose. The diver then works back to the boat on a new transect line. Distance between each transect is dictated by visibility, density of EWM, and obstructions. This process is repeated on the opposite side and in front of the boat. Depending on the site, once the diver has adequately covered the area, which the suction hose can reach, they will signal the deckhand to let out more anchor line or determine that the boat needs re-positioning.

Once plants reach the surface, a hose dispenses the plant material into a series of screened bins located on the deck of the boat. These bins capture plants and allow water to drain out back into the lake. Plants on deck are sorted into two categories: the targeted invasive plant and native vegetation. A wet weight of both the invasive plant and all native species combined is taken. Plants are placed in sealable containers or bags for transport to the dumping site. The dumping site is a pre-determined site upland, away from any water body.

Figure 1: 2016 DASH Work Areas (Onterra, LLC - 2016)

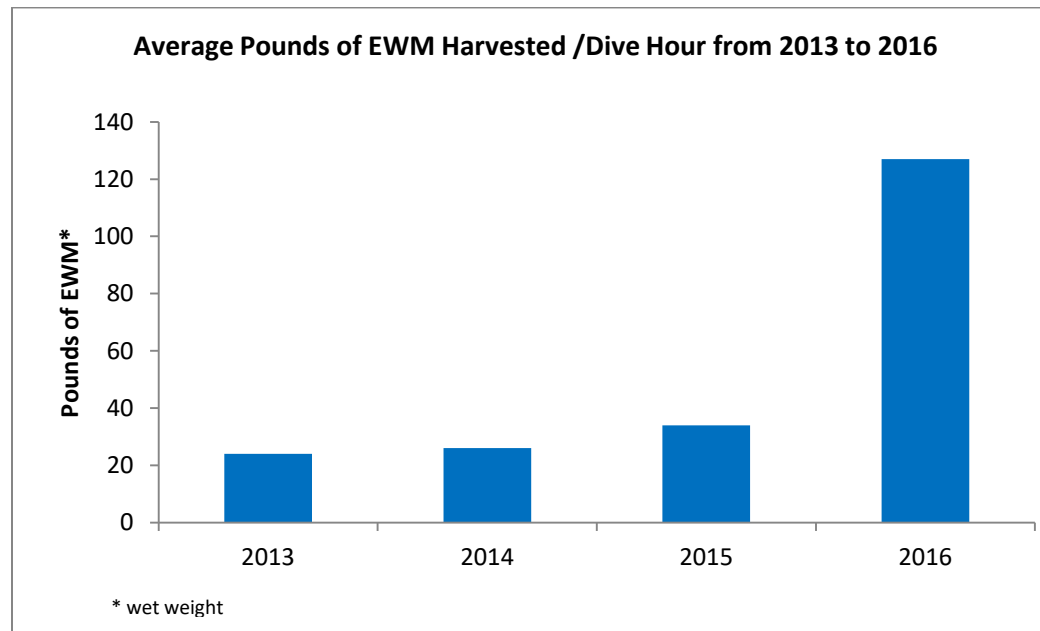


Results and Summary

Table 1: DASH Efforts

Date	Location	Size (acres)	DASH Boat Location		Dive Time (hrs)	EWM (lbs*)	Native (lbs**)	Percent Incidental Native Plant Harvest	Total (lbs*)
			Lat (NAD 83)	Long (NAD 83)					
7/1/2016	A1-16	2.5	45.9516	89.05313	3.75	355.0	18.0	5%	373.0
7/5/2016	A1-16	2.5	45.95216	89.05361	3.50	480.0	20.0	4%	500.0
7/6/2016	A1-16	2.5	45.95235	89.05419	3.75	518.0	18.5	4%	536.5
7/7/2016	A1-16	2.5	45.95224	89.05383	3.50	449.0	19.5	4%	468.5
7/10/2016	A1-16	2.5	45.95213	89.05368	3.75	520.0	13.5	3%	533.5
					18.25	2322.0	89.5	4% (ave)	2411.5

* wet weight ** native estimates were averaged based on samples taken approximately every hour of harvest time.



July 1st 2016

Weather- Clear skies, 65°, north wind 5-10 mph

DASH efforts focused on A1-16, per guidance from Onterra. Three and three quarter dive hours removed 355 pounds of EWM. Incidental harvest of none target plant species included water celery (*V. americana*), curly pondweed (*P. crispus*), *Nitella* species, and *Elodea* species. Filamentous algae was prevalent in screened bins.

July 5th 2016

Weather- Clear skies, 65°, south winds 5-10 mph

DASH efforts continued in A1-16. Three and a half of dive hours harvested 480 pounds of EWM. Incidental harvest of none target plant species remained similar from the previous day.

July 6th 2016

Weather- Light overcast, 70°, calm winds

Three and three quarter dive hours harvested 518 pounds of EWM. Incidental harvest of none target plant species remained similar from previous efforts, but also included large leaf pondweed (*P. amplifolius*).

July 7th 2016

Weather – Fog and overcast, 60°, calm winds

Work continued along A1-16. Three and a half dive hours harvested 449 pounds of EWM. Incidental harvest of none target plant species remained similar from previous efforts.

July 10th 2016

Weather- Overcast skies, storms approaching, 65°, light south-southeast winds

The last day of harvesting efforts continued to focus in A1-16. Three and three quarter dive hours harvested 520 pounds of EWM. Incidental harvest of none target plant species remained similar from previous efforts.