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

Anvil Lake, Vilas County, WI

2015 Final Reporting

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**Submitted To:**

Anvil Lake Association  
and  
Wisconsin Department of Natural Resources

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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 2015 Permit ID for Anvil Lake is NO-2015-64-85M.

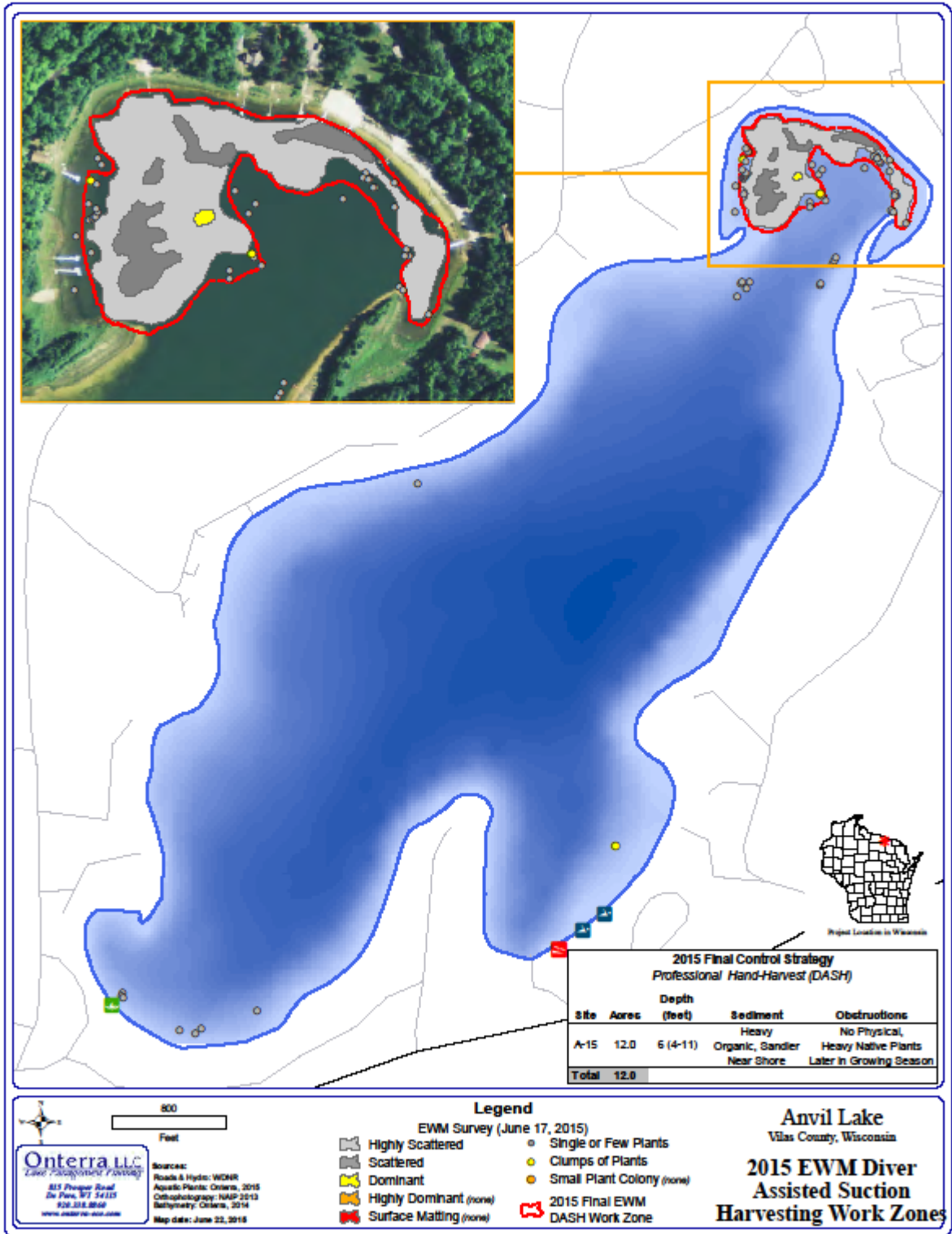
## **Dive Methods**

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: 2015 DASH Work Areas (Onterra, LLC - 2015)



## Results and Summary

**Table 1:** DASH Efforts

Date	Location	DASH Boat Location		Dive Time (hrs)	EWM (lbs*)	Native Vegetation (lbs*)	Percent Incidental Harvest of Native Vegetation	Total (lbs*)	Notes
		WTM NAD83 (meters)	WTM NAD83 (meters)						
8/3/2015	1	693119.25	609028.59	3.00	40.0	4.5	11%	44.5	Curly leaf pondweed observed.
8/4/2015	2	593198.3	609116.57	4.50	136.5	22.5	16%	159.0	Curly leaf pondweed observed.
8/10/2015	3	593181.62	609085.62	3.25	179.0	14.5	8%	193.5	
8/10/2015	4	593151.21	609100.82	2.00	83.0	6.5	8%	89.5	
8/11/2015	5	593115.01	609081.5	5.50	178.0	22.0	12%	200.0	Curly leaf pondweed observed.
8/12/2015	6	593132.23	609067.26	5.00	174.5	20.5	12%	195.0	
				<b>23.25</b>	<b>791.0</b>	<b>90.5**</b>	<b>11% Average</b>	<b>881.5</b>	

\* wet weight

\*\* native plant wet weight calculated by weighing averages from samples collected approximately 3 times per hour of harvesting

Given the extent of total DASH area, the strategy as discussed with Onterra, LLC was to work keep track of efforts per quadrants setup across the north bay. All work was completed in the A4-15 quadrant.

**Figure 2: Overview of Quadrants (Onterra, LLC – 2015)**



**August 3<sup>rd</sup> 2015**

Weather- Overcast, 65° degrees, W wind 5-10 mph, light rain

Overcast skies and poor water clarity made for poor visibility and created some difficulty locating EWM plants to remove. Three hours of diving removed 40 pounds of EWM from the southern portion of A4-15. Incidental harvest of native species included water celery (*V. americana*), curly pondweed (*P. crispus*), *Nitella* species, and *Elodea* species, however primarily consisted of water celery.

**August 4<sup>th</sup> 2015**

Weather- Overcast, 64° degrees, W-SW wind 5-10 mph

DASH efforts continued in the northeastern portion of A4-15. Again, water clarity and overcast skies made for tough visibility while diving. Four and half hours of diving harvest 136.5 pounds of EWM. Incidental harvest of native plant species remained similar from the previous day.

**August 10<sup>th</sup> 2015**

Weather- Sunny, 63° degrees, NW wind 5-10 mph

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Sunny skies improved diver visibility for DASH work. Harvesting continued along the central portion of A4-15. Two locations were dove, one for 3.25 hours and another for two hours with 179 and 83 pounds of EWM removed respectively. Incidental harvest of native plant species remained similar from previous efforts.

**August 11<sup>th</sup> 2015**

Weather- Mostly sunny, 68° degrees, NW wind 5-10 mph

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Sunny skies kept visibility decent. Work continued along the central portion of A4-15 and progresses south and southwest. Five and a half hours of diving yielded 178 pounds of EWM. Incidental harvest of native plant species remained similar from previous efforts.

**August 12<sup>th</sup> 2015**

Weather- Partly sunny, 60° degrees, S wind 5-10 mph, storms just to the north

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The last day of harvesting efforts continued to focus along the central portion of A4-15. Weather conditions were “iffy” initially, with thunderstorms just to the north, but as the day progressed, the weather greatly improved. Five hours of dive time produced 174.5 pounds of EWM. Incidental harvest of native plant species remained similar from previous efforts.

## Photographs of Diving Conditions during DASH Efforts

