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

Virgin Lake-Three Lakes Chain of Lakes, Oneida County, WI - 2014

Final Reporting

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Three Lakes Waterfront Association

Wisconsin Department of Natural Resources

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Introduction

The Three Lakes Waterfront Association solicited the services of Many Waters, LLC to utilize their Diver Assisted Suction Harvesting (DASH) system to manage for Eurasian watermilfoil (EWM) on Virgin Lake, located approximately 5 miles east of Three Lakes, Oneida 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). In June of 2014, the Three Lakes Waterfront Association submitted and received a Mechanical Harvesting Permit from the WDNR to use DASH (Permit ID # MNOR-44-14-04, WBIC: 1614100). Onterra, LLC provided DASH locations and mapping information.

Dive Methods

While using DASH, a diver typically begins by locating a EWM plant from the surface, and then descends next to the plant while 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. Divers 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. Plants fed into the nozzle are carefully observed for fragmentation. If fragmentation does occur, the diver will catch floating fragments and feed them into the nozzle.

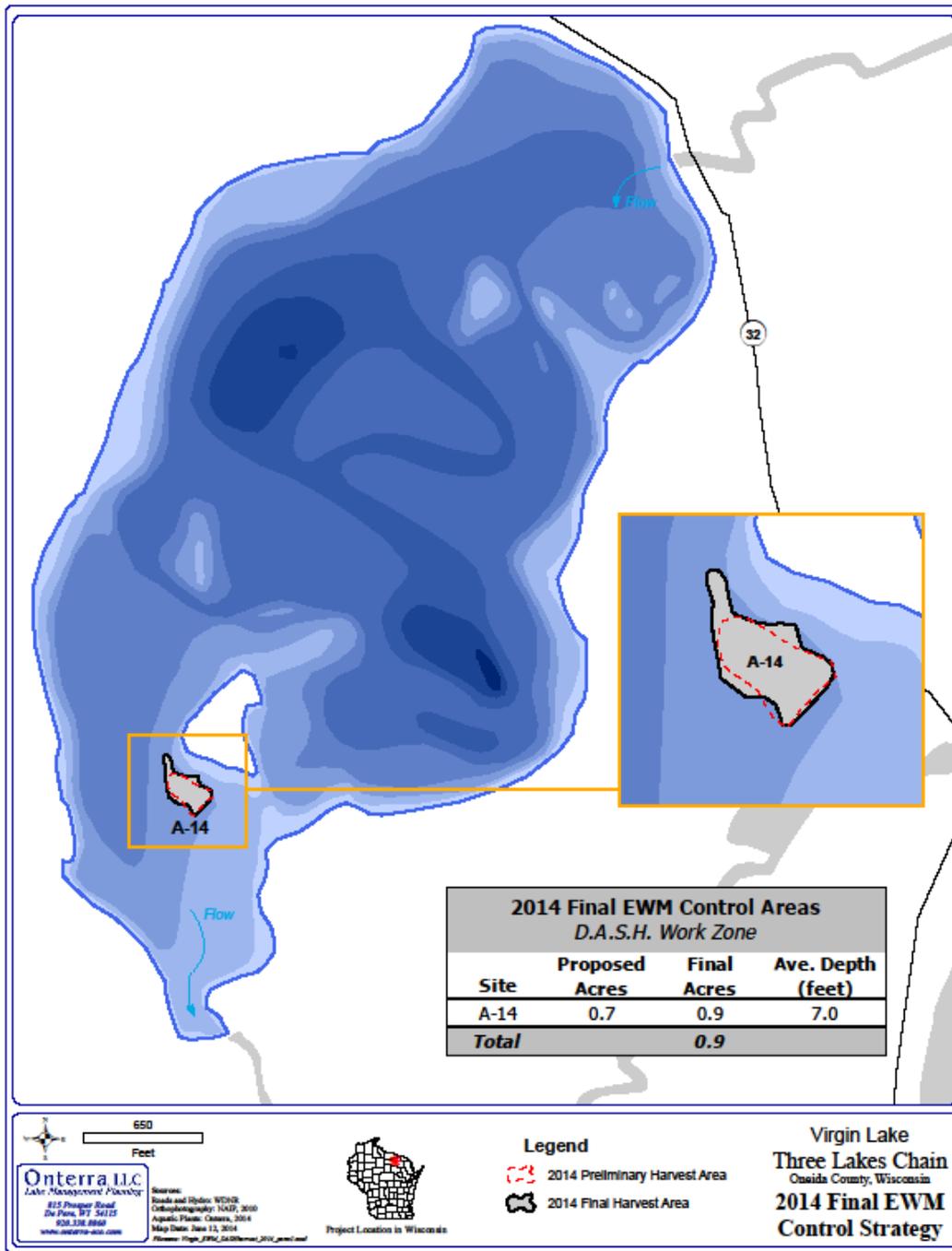


Diver Feeding EWM Plant into Suction Hose

Work sites that have dense and contiguous EWM beds, 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 dismantled, 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 plants, 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, the diver 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. The person on deck sorts plants into two categories: the targeted invasive plant and incidentally harvested native vegetation. Two wet weights taken include one weight of the target invasive plant and one weight for all native species combined. 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 2: 2014 DASH Work Area (Onterra, 2014)



Results and Summary

Table 1: Summary of DASH efforts

Date	Size (acres)	Ave. Depth	DASH Boat Location		Dive Time (hrs)	EWM (lbs*)	Native (lbs*)	Percent Bi-Catch	Total (lbs*)
			Lat (NAD 83)	Long (NAD 83)					
7/12/2014	0.9	7	45.78064	89.09067	1.00	36.0	15.0	42.0	51.0
9/19/2014	0.9	7	45.78063	89.09109	1.50	108.0	4.0	4.0	112.0
					2.50	144.0	19.0	23.0	163.0

*wet weight

July 12th 2014

Weather – 75° F, sunny, light west wind

DASH initiated along the northeast portion of A-14. Dense native vegetation made it difficult for the diver to maneuver the hose while hand removing EWM. Furthermore, efforts resulted in an above average incidental harvest of non-target native plant species. One hour of DASH removed 36 pounds of EWM and 15 pounds of native plants resulting in a 42% incidental harvest of native plants. Discussion with the Three Lakes Waterfront Association lead to a decision that hand removal may be the better option for the remainder of the day and that DASH efforts may be better suited for later in the season when native vegetation begins to senesce.

Many Waters spent the remaining of the day hand removing plants without using DASH. Anchored roughly in the middle of A-14, markers placed about 50 yards east and west of the boat referenced the work area. Swimming a grid pattern to the east, efforts removed 21 pounds (wet weight) of EWM. After exchanging bags, a grid search to the west side of the boat removed an additional 38 pounds of EWM. In total, effort removed 59 pounds of EWM.

When not using DASH, Many Waters, LLC uses a systematic process to hand remove EWM. Working in pairs, divers locate EWM plants from the surface, many times placing buoys at the site and descend next to the plant. Prior to any hand removal, divers inspect the area for additional plants and fragments. Inspecting the area prior to hand removal allows the divers to visually inspect their work area, which will become disturbed by dislodged sediments that reduce diving visibility. One diver will carefully reach into the sediments and uproot the plant dislodging as little sediment as possible. Once uprooted, the diver will slowly bunch the plant up while the other diver readies a bag. One diver slowly places the plant into the bag that the other dive is holding. Plants are typically buoyant and float to the top of the bag that is held vertical in the water column with the opening facing down. During the entire process, both divers watch for fragments, capture fragments found and place them in the bag.

July 19th 2014

Weather – 70 F, mostly cloudy, SSW winds at 10-15 mph

Many Waters LLC returned to Virgin Lake to continue hand removing (without DASH) EWM within A-14. Anchored near the center of A-14, approximately ten buoys marked large and small clusters of plants. Beginning to the east and southeast, efforts removed eight pounds of EWM. Working to the north and west of the boat, efforts removed an additional 76.5 pounds of EWM. Daily efforts totaled 84.5 pounds of EWM.

September 19th 2014

Weather – 48 F, overcast, S wind 10 – 15 mph

DASH efforts focused on the highly dense colony of plants located centrally along the western portion of A-14. One and a half hours of dive time removed 144 pounds of EWM. Incidental harvest of non-target native species improved to a total of 4 pounds resulting in less than 3% of the total harvest. Cool water conditions and limited visibility hindered efforts. Visibility deteriorated from July to two feet or less at the lake bottom.