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

Lac Vieux Desert - Vilas County, WI & Gogebic County, MI

Final Reporting

Date: 11.28.2014

Submitted To:

Lac Vieux Desert Lake Association

Wisconsin Department of Natural Resources

Submitted By:

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Introduction

The Lac Vieux Desert Lake Association (LVDLA) solicited the services of Many Waters, LLC to utilize their Diver Assisted Suction Harvesting (DASH) system to manage for Eurasian watermilfoil (EWM) on Lac Vieux Desert (LVD), located approximately four miles east of Land O lakes, 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 July of 2014, Many Waters, LLC on the behalf of the LVDLA received a Mechanical Harvesting Permit from the WDNR to use DASH (Permit ID # MNOR-64-14-04, WBIC: 1631900).

Dive Methods

Diver Feeding EWM Plant into Suction Hose

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 works 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 it 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 fragmenting does occurs, the diver will catch floating fragments and feed them into the nozzle.

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. If visibility is poor, many times the deck hand will direct the diver from the surface to the plants. 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 then 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: DASH Work Area

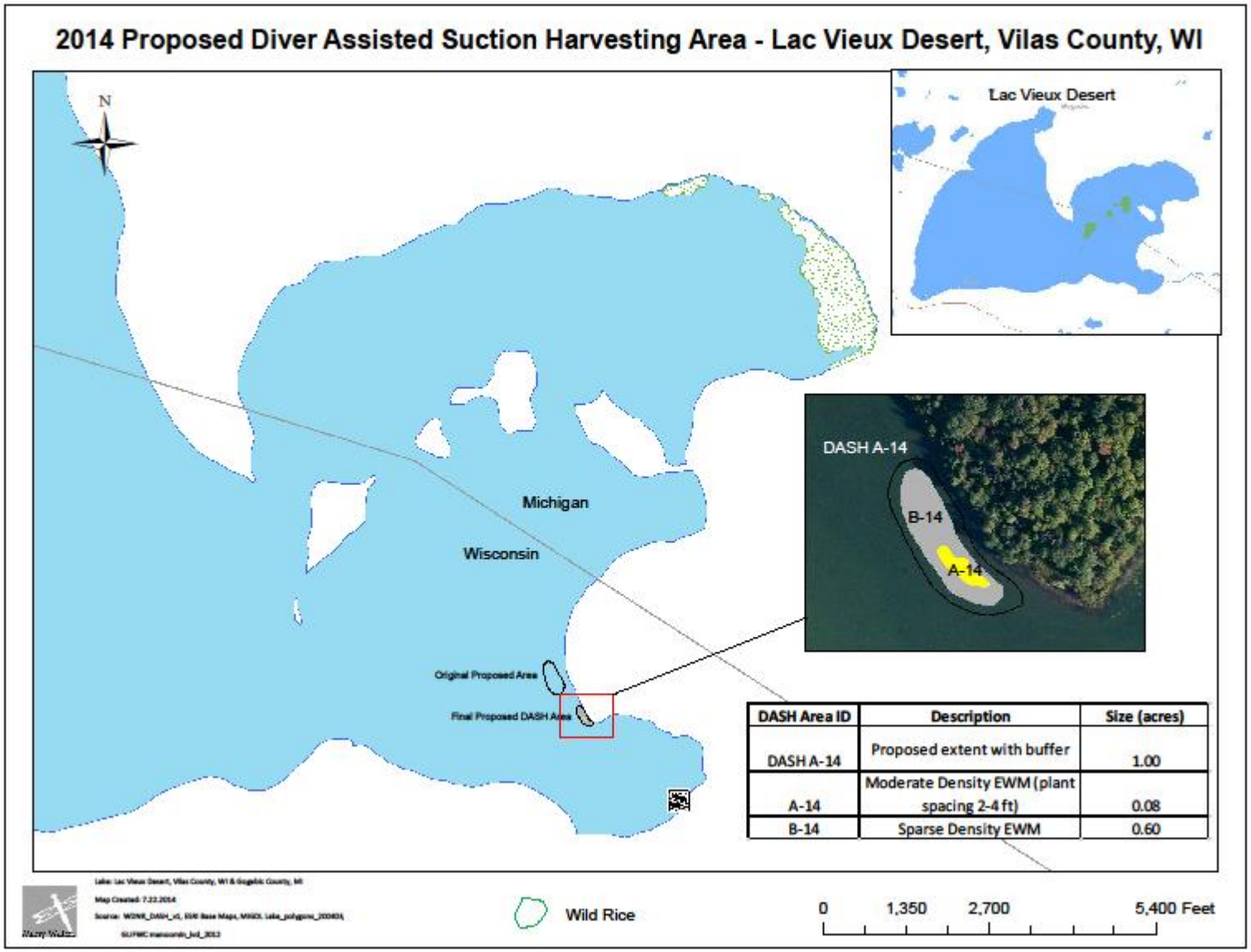

Figure 2: Additional DASH Work Area

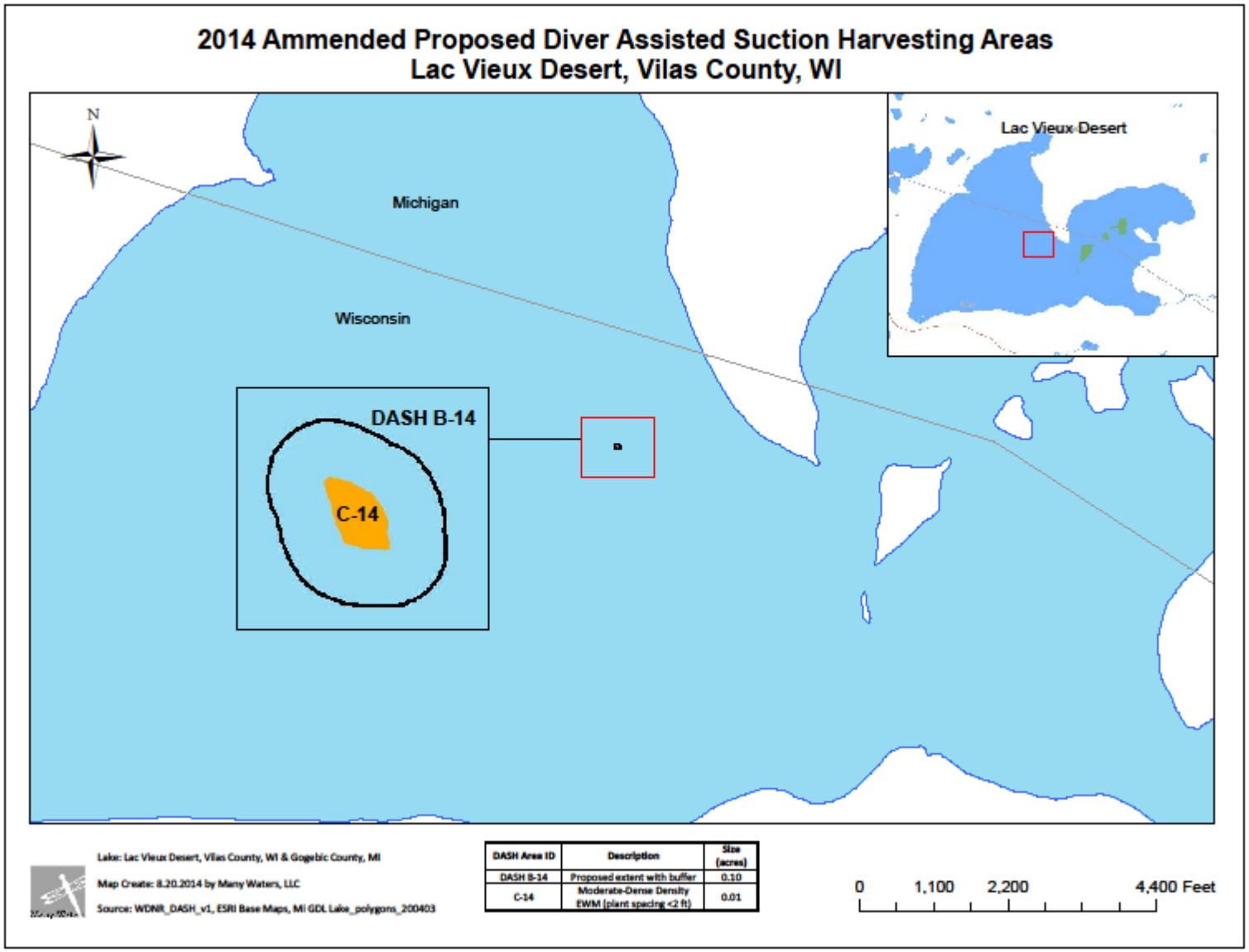

Table 1: DASH Summary Efforts

Location	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)					
DASH A-14	1.0	7.0	46.12730 (beginning)	89.08005 (beginning)	1.75	72.0	11.0	15%	83.0
DASH A-14	1.0	7.0	46.12740 (end)	89.08014 (end)					
DASH B-14	0.1	9.5	46.13771	89.11361	2.25	93.0	2.0	2%	95.0
					4.00	**165.0**	**13.0**	**8.5% (ave)**	**178.0**

* wet weight

7/30/14 Weather – 62˚ F, light and variable wind becoming WNW 5-10 mph, mostly sunny

The DASH boat anchored on the south central portion of DASH A -14 and faced north/northwest and worked a transect heading north. A substantial algae bloom limited visibility to around 1-2 ft. Due to low visibility, the deck hand assisted divers by directing them to EWM plants. One and three quarter dive hours removed 72 pounds of EWM. Incidental non-target harvest of native plant species comprised of *C. demersum, M. sibericum, E. canadensis* and *P. zosteriformis*, however the majority of incidental harvest consisted of *C. demersum.*

9/18/2014 Weather – 45˚ F, cloudy, south wind 5-10 mph

The DASH boat positioned along the central western portion of DASH B-14 and faced east. Two divers entered the water and worked a grid pattern around the boat. A combination of overcast skies, water depth, water turbidly, and soft sediments affected visibility. Two and one quarter hour of dive time removed 93 pounds of EWM. Incidental non-target harvest of native plant species remained similar to those from DASH A-14, and again, primarily consisted of *C. demersusm.*