2527 Lake Ottawa Road
Iron River, MI 49935
906.284.2198

Summary of Diver Assisted Suction Harvesting

Long Lake - Vilas County, WI

2018 WDNR Mechanical Harvesting Permit Annual Report

Permit ID: NO-2018-64-0090M

Date: 9.21.2018

Submitted To:

Long Lake of Phelps Lake District
and
Wisconsin Department of Natural Resources

Submitted By:

Many Waters, LLC
2527 Lake Ottawa Road
Iron River, MI 49935

906.284.2198

Contact:
Bill Artwich: billartwich@gmail.com
Barb Gajewski: skih2o@hotmail.com

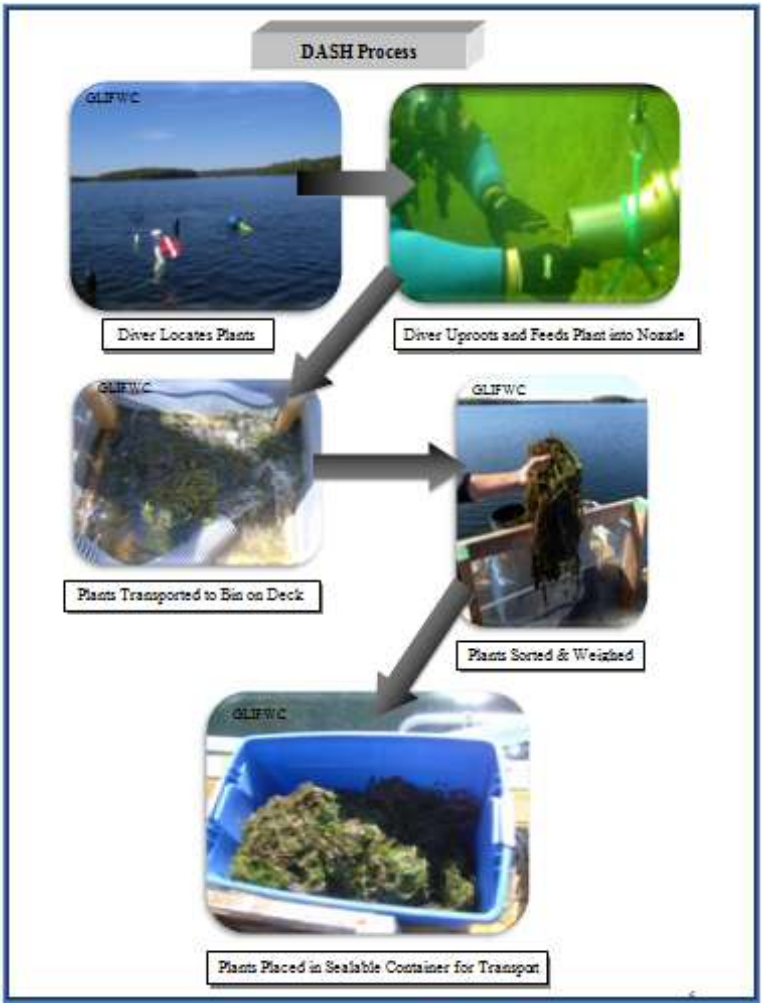
Introduction

The Long Lake of Phelps Lake District solicited the services of Many Waters, LLC to use Diver Assisted Suction Harvesting (DASH) to manage for Eurasian watermilfoil (EWM) on Long Lake, located near Phelps, Vilas County. DASH is a mechanical process and requires a mechanical harvesting permit (Form 3200-113 (R 10/16)) from the Wisconsin Department of Natural Resources (WDNR). The 2018 WDNR Mechanical Harvesting Permit ID is NO-2018-64-0090M.

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 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. 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 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. 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.

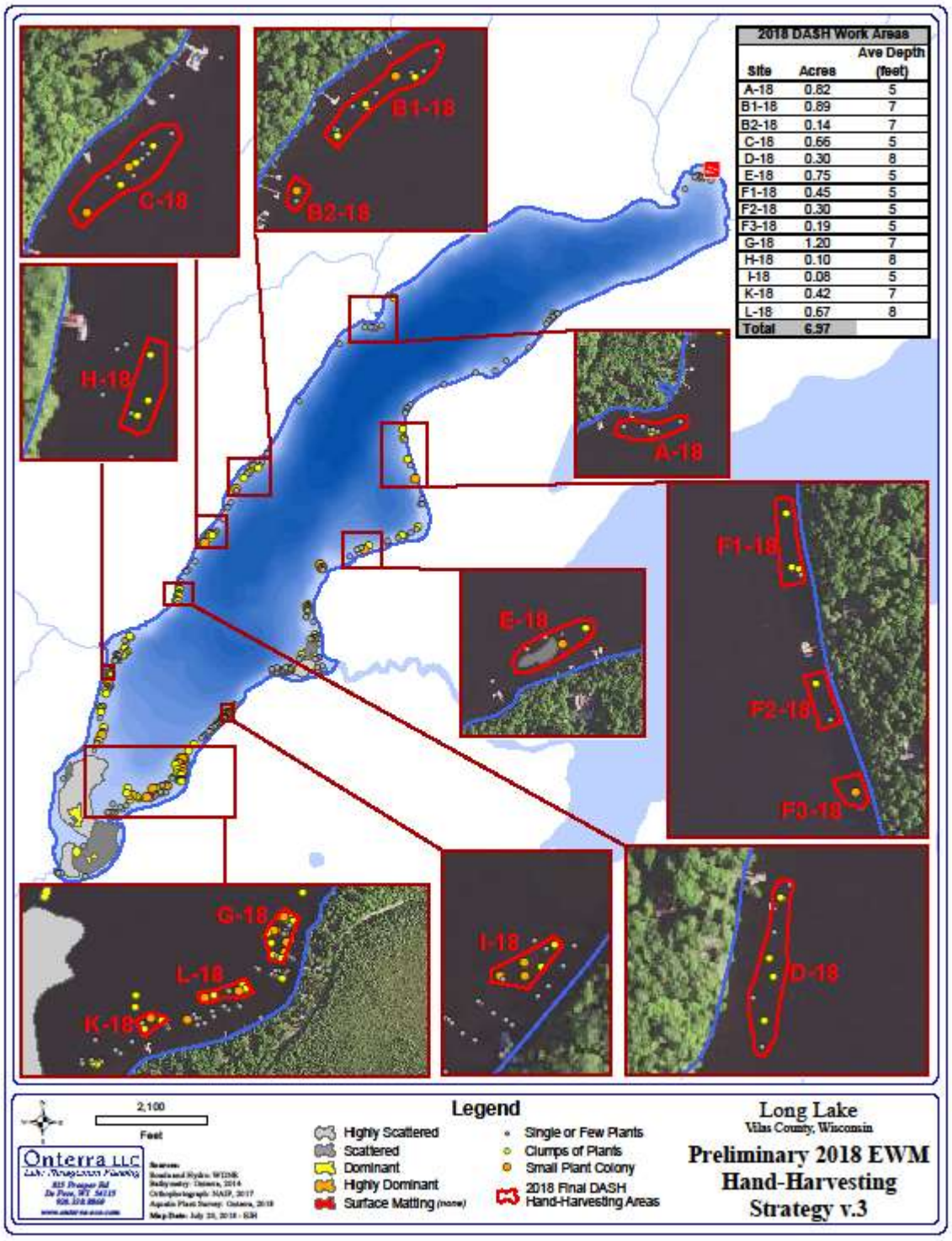


Once plants reach the surface, a hose dispenses the plant material into a series of screened bins located on the deck of the boat. These bins capture plants and allow water to drain out back into the lake. Plants on deck are sorted into two categories: the targeted invasive plant and native vegetation. 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.

2018 DASH Strategy

In previous years, DASH efforts focused on clearing all identified sites within the DASH management strategy. However, given the 2018 expansion of the EWM/HWM population, utilizing this approach would be challenging and potentially unrealistic. Strategies for each site varied based on density, degree of which the site could be successfully cleared and location adjacent to lake access and recreational use. Entire sites that had a mix of single plants to small plant colonies worked include A-18, B1-18, B2-18, F1-18, F2-18 and F3-18. Some DASH efforts focused on clearing sections of work sites perceived to impair recreation use and access. In these cases, the goal was not to work the entire site, but just portions and include sites H-18, C-18 and D-18. Sites E-18, K-18, L-18 and G-18 would take a substantial amount of time and resource and/or were not in front of piers or access points to the lake.

Figure 1: Final Hand Harvesting Work Areas (Onterra, 2018).



Summary

Table 1: Summary of Daily DASH Efforts

Date	Location	Size (acres)	Ave. Depth (ft)	DASH Boat Location		Dive Time (hrs)	EWM (lbs*)	Native (lbs*)	Percent Incidental Harvest of Native Plant Species	Total (lbs*)
				Lat (NAD 83)	Long (NAD 83)					
8/13/2018	F3-18	0.19	5	46.06518	89.01708	2.00	73.00	2.25	3%	75.25
8/13/2018	F1-18	0.45	5	46.06728	89.01787	2.25	42.00	1.50	4%	43.50
8/14/2018	B2-18	0.14	7	46.06478	89.02992	3.50	154.00	9.00	6%	163.00
8/15/2018	F2-18	0.3	5	46.06618	89.01752	3.25	78.00	2.50	3%	80.50
8/15/2018	F1-18	0.45	5	46.06761	89.01782	1.50	20.00	0.50	3%	20.50
8/16/2018	A-18	0.82	5	46.07319	89.01913	5.00	58.50	1.50	3%	60.00
8/17/2018	B1-18	0.89	7	46.06621	89.02830	5.75	116.50	3.25	3%	119.75
8/20/2018	B1-18	0.89	7	46.06553	89.02937	4.00	64.00	3.25	5%	67.25
8/20/2018	B2-18	0.14	7	46.06492	89.03000	1.50	26.00	1.25	5%	27.25
8/21/2018	H-18	0.1	8	46.05564	89.03918	4.50	129.00	2.00	2%	131.00
8/22/2018	D-18	0.3	8	46.05980	89.03416	4.50	89.00	3.25	4%	92.25
8/23/2018	C-18	0.66	5	46.06234	89.03206	5.00	131.00	3.75	3%	134.75
						42.75	**981.0**	**34.0**	**3% Ave.**	**1015.0**

*wet weight

Daily Log

August 13th 2018 Weather- Sunny, 70˚F, SW winds 5-10 mph

DASH efforts focused on F3-18 and F1-18. Four and a quarter dive hours removed 115 pounds of EWM/HWM. Incidental harvest of native plant species included *Elodea* sp., *Ceratophyllum demersum* (coontail) and *Najas guadalupensis* (southern naiad).

August 14th 2018 Weather- sunny, 65˚F, W winds 5-10 (storms predicted)

DASH efforts focused on B2-18. Three and a half dive hours removed 154 pounds of EWM/HWM. The onset of storms ceased DASH harvesting in the afternoon. Incidental harvest of native plant species remained similar to the previous day but also included *Vallisneria americana* (water celery), *Myriophyllum sibericum* (Northern watermilfoil) and *Heteranthera dubia* (water star grass).

August 15th 2018 Weather- mostly cloudy, 65˚F, E winds 5 mph (storms predicted)

DASH efforts focused on F1-18 and F3-18. Four and three quarter dive hours removed 98 pounds of EWM/HWM. The onset of storms ceased DASH harvesting in the afternoon. Incidental harvest of native plant species remained similar to previous days.

August 16th 2018 Weather- overcast & fog, 67˚F, light E winds

DASH efforts focused on A-18. Five dive hours removed 58 pounds of EWM/HWM. Incidental harvest of native plant species remained similar to previous days.

August 17th 2018 Weather- sunny, 63˚F, light N winds (storms predicted)

DASH efforts focused on B1-18. Five and there quarter dive hours removed 116 pounds of EWM/HWM. Incidental harvest of native plant species remained similar to previous days.

August 20th 2018 Weather- overcast & fog, 58˚F, calm (storms predicted)

DASH efforts focused on B1-18 and B2-18. Five and half dive hours removed 90 pounds of EWM/HWM. The onset of storms ceased DASH harvesting in the afternoon. Incidental harvest of native plant species remained similar to previous days.

August 21st 2018 Weather- cloudy & misting, 58˚F, N winds 10-25 mph (storms predicted)

DASH efforts focused on H-18. Four and half dive hours removed 129 pounds of EWM/HWM. Incidental harvest of native plant species remained similar to previous days; however, heavy vegetation was noted.

August 22nd 2018 Weather- sunny, 56˚F, north WSW winds (storms predicted)

DASH efforts focused on D-18. Four and half dive hours removed 89 pounds of EWM/HWM. Incidental harvest of native plant species remained similar to previous days.

August 23nd 2018 Weather- sunny, 56˚F, north WSW winds 5-10 mph (strong afternoon winds predicted)

DASH efforts focused on C-18. Five dive hours removed 131 pounds of EWM/HWM. Incidental harvest of native plant species remained similar to previous days.