

SQUASH LAKE PROTECTION & REHABILITATION DISTRICT

Squash Lake (Oneida County) AIS Control
2022 Annual Summary
DNR Grant ACEI-256-21

Dan Butkus – Treasurer and Grant Administrator, Squash Lake Protection & Rehabilitation District

9/28/2022

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Introduction

The Squash Lake Protection and Rehabilitation District requested, and was awarded grant ACEI-256-21 to cover part of 2021 and all of 2022. The grant was extended to cover all of 2023. With less EWM, and improved efficiencies in 2020 and 2021, the operations were consistently under budget over the lifetime of the grant.

This Summary is submitted to the Wisconsin DNR, and is to be used by Onterra LLC for preparing the Onterra's annual report for 2022.

Conclusions

The following conclusions were drawn from the diver hand harvesting data collected over the 2021 season.

- Squash Lake Protection and Rehabilitation District Diver Hand Harvesting of Eurasian Water Milfoil is on track to meet the objectives of EWM Control grant ACEI-256-21 of maintaining or reducing the EWM densities in the designated priority areas.
- While 2020 showed the lowest number of harvest priority areas since EWM Control began in 2010, there was an increase in the number of harvest priority areas based on the 2021 and again into 2022. Fourteen (14) priority polygons were identified for 2022. This is not a reflection of the efforts, but a reflection of the natural ebb and flow cycle of EWM in a lake.
- Some of the harvest priority areas identified in 2022 remained the same from 2021, and new areas added due to a shift in EWM. Historically most of the priority areas were located at the northwest end of the lake. In 2022, priority areas were scattered around the lake.
- The amount of EWM in 2022 continued to increase compared to the prior two years.. This may be related to the fact that the 2022 water level on Squash Lake continued to drop from record highs a few years ago.
- CBCW work continued under the auspices of the Squash Lake Association.

Results by Grant Activity/Deliverable

1.a. Annual Hand-Harvesting Coordination and EWM Population Monitoring

Diving/harvesting priority areas have been typically set by Onterra by late June or early July. Because diving usually starts before the ESAIS data is available, the divers typically use the prior the annual priority areas and data from the prior year's Late Season Peak Bio Mass Survey (PBM) to direct their activities until the ESAIS data is available. This practice does tend to skew the ESAIS survey results, but overall, it has been a successful strategy. In 2022, Onterra was performed the ESAIS survey after the divers began work. The priority areas were created both from the ESAIS Survey as well as diver feedback on areas of high EWM densities. Mostly only single plants or clumps of plants were found in the 2022 ESAIS Survey

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Harvesting based on the ESAIS Survey priorities continue until the PBM Survey. Once the PBM data is available and before diving ends for the season a few weeks later due to falling water temperatures, the divers direct their activities on areas of EWM found during the PBM Survey.

Onterra provides the District with individual GPS waypoints of EWM in Squash Lake collected during both surveys. The GPS data is loaded into a GPS unit onboard the boat for the divers to quickly locate areas of EWM. A passive GPS asset tracker is attached to the dive boat so that daily harvest logs can be correlated with tracking data recording the boat's location. The Grant Administrator verifies the diver's reports with recorded GPS locations of the boat as a cross reference for accuracy of data collection. EWM harvest data from the diver logs is reviewed and transcribed every two weeks during the season. Divers also perform systematic sweeps of the entire littoral area when not focused on priority areas or reports of EWM by volunteers.

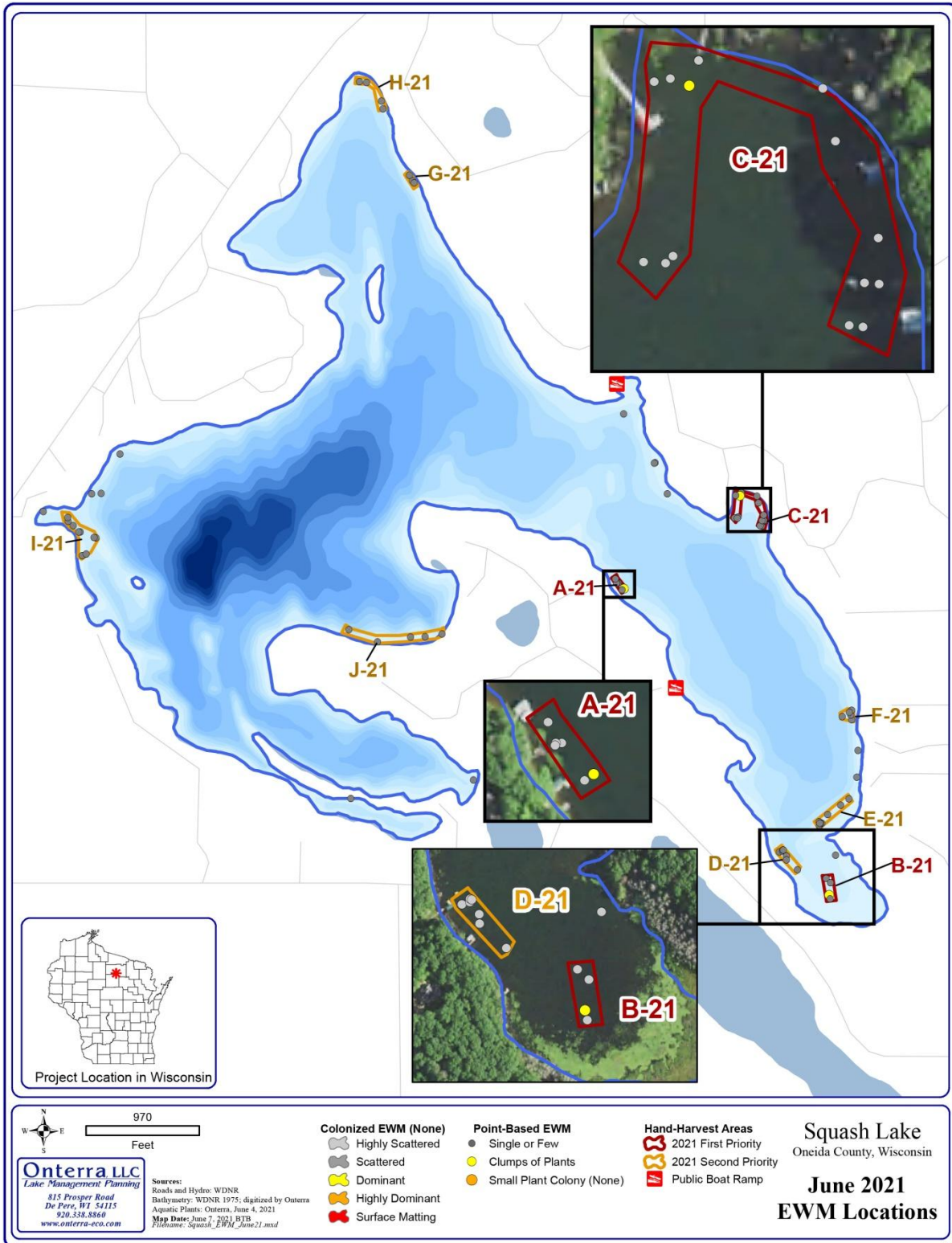
EWM collected on Squash Lake is transported to a nearby organic farm. It is then combined with other organic material for composting for farm use.

Note: The Lake Management Plan (2022) was completed in early 2022 satisfying the requirement for an aquatic plant management plan update for EWM Control .

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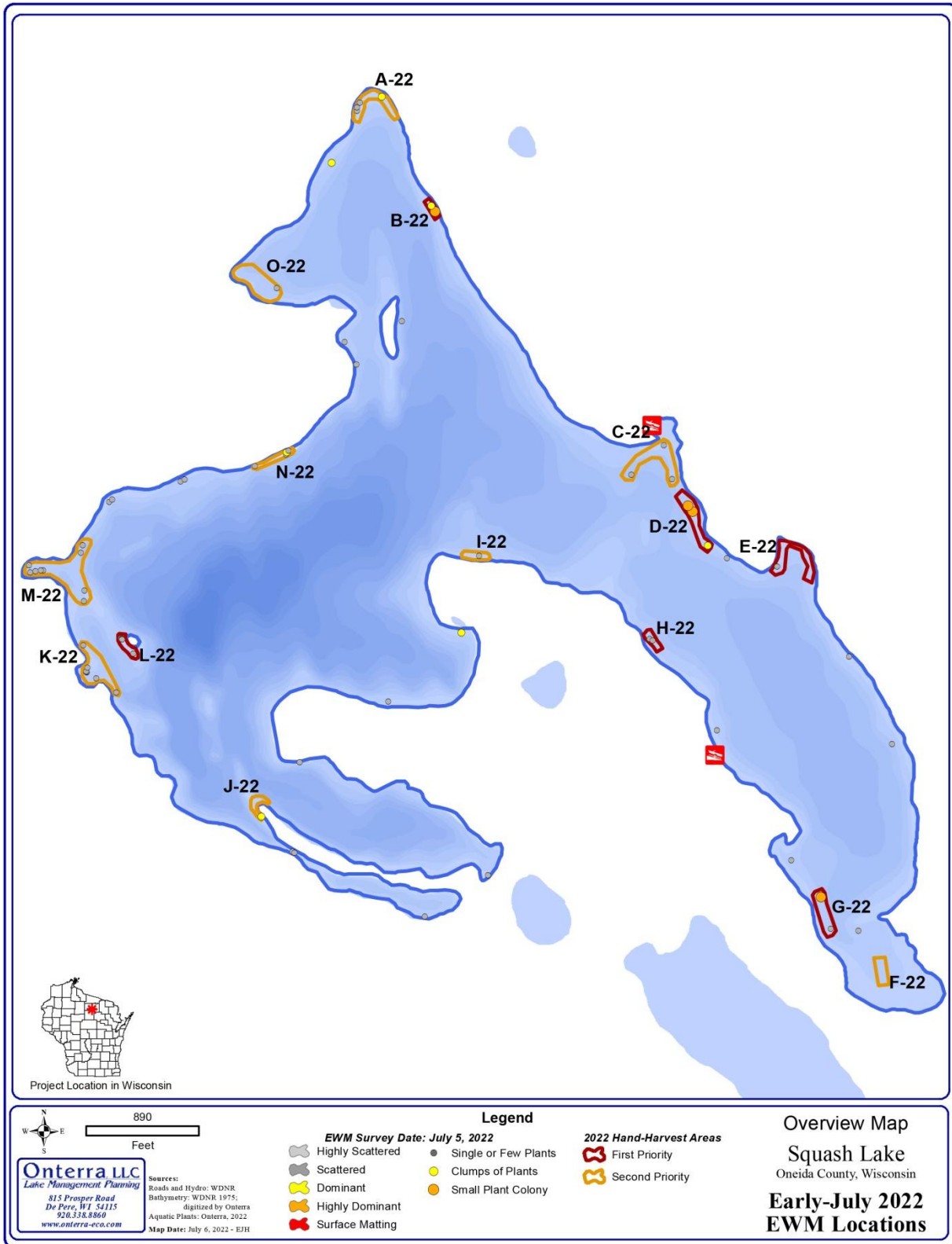
Figure 1.a.1: 2021 Early Season AIS Survey Map



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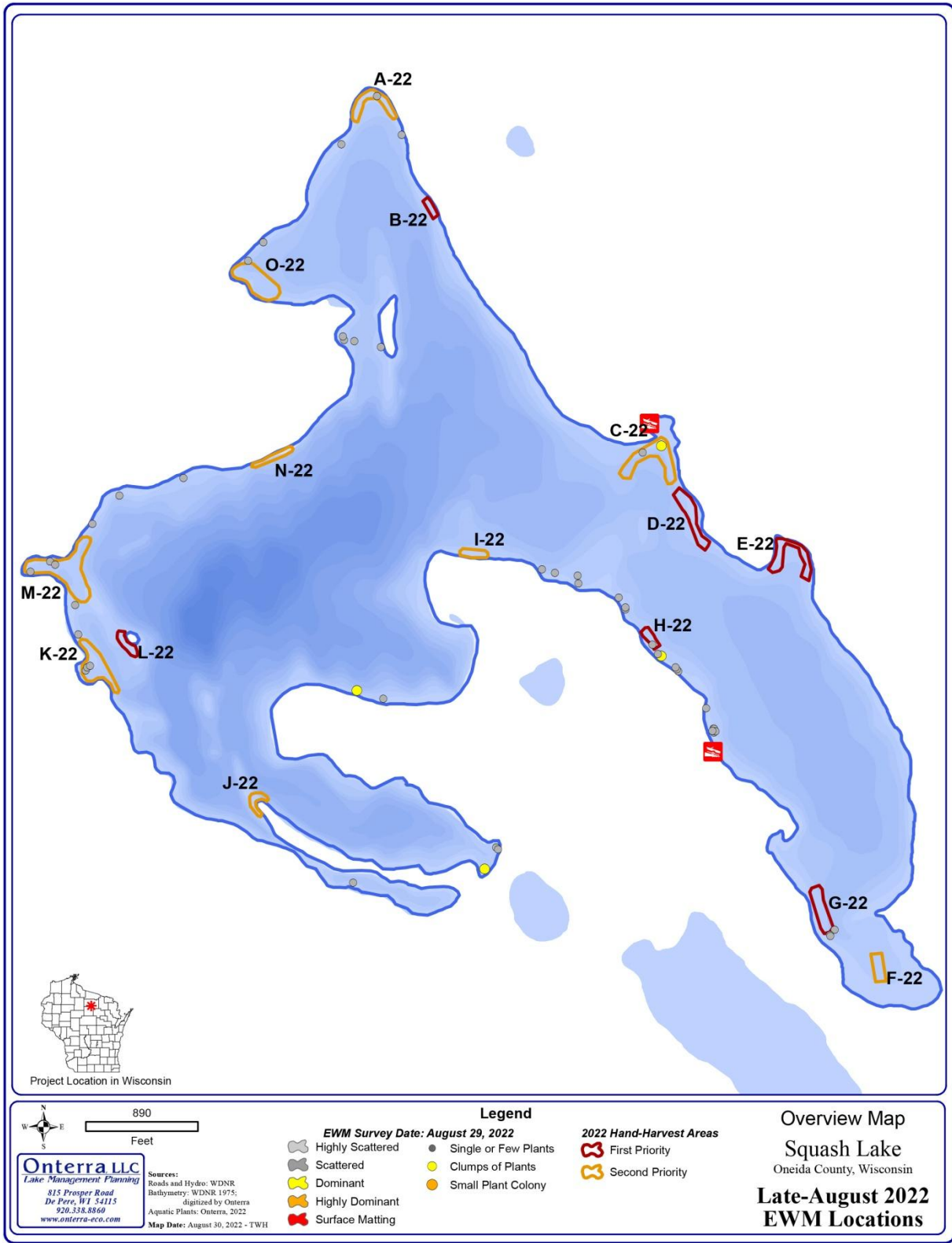
Figure 1.a.2: 2022 Early Season AIS Survey Map



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Figure 1.a.3: 2022 Fall Peak Biomass Survey Map



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1.b. Conduct EWM Diver Hand Harvesting

The District contracted with 2 divers in 2022. The following tables provide a summary of the Diver Hand Harvesting activities. While the focus was on identified priority areas, the divers also harvested outside these areas and collected EWM in areas that historically were areas of concern in prior years. Of the 2960 lbs of EWM collected, 76% was from the 2022 Priority Areas.

Table 1.b.1: 2022 Diver Hand Harvesting Data

	2022	2021	2020	2019
Dive Season	June 9 to September 8	June 8 to September 9	June 3 to September 15	June 10 to September 10
Diving Days	29 days	27 days	30 days	34 days
Diving Hours	374.5 hrs	430.5 hrs	501.5 hrs	461 hrs
Pounds EWM Collected	2960 lbs	1092 lbs	349 lbs	694 lbs

Table 1.b.2: 2022 EWM Collected per Onterra LLC Priority Location

2022 Priority Locations	Pounds EWM Collected YTD	# Of Visits by Divers	Hours Diving
A-22	100	4	12.25
B-22	233	4	9.75
C-22	199	4	16.00
D-22	254	4	13.25
E-22	254	8	24.00
F-22	80	6	14.50
G-22	56	3	6.00
H-22	37	5	25.00
I-22	85	3	7.50
J-22	3	1	2.50
K-22	44	4	9.50
L-22	183	3	9.00
M-22	279	8	33.00
N-22	87	3	7.00
O-22	40	4	11.50
Total for Priority Areas	2251 lbs of 2960 total	64 visits	200.75 hrs of 374.5 hrs total

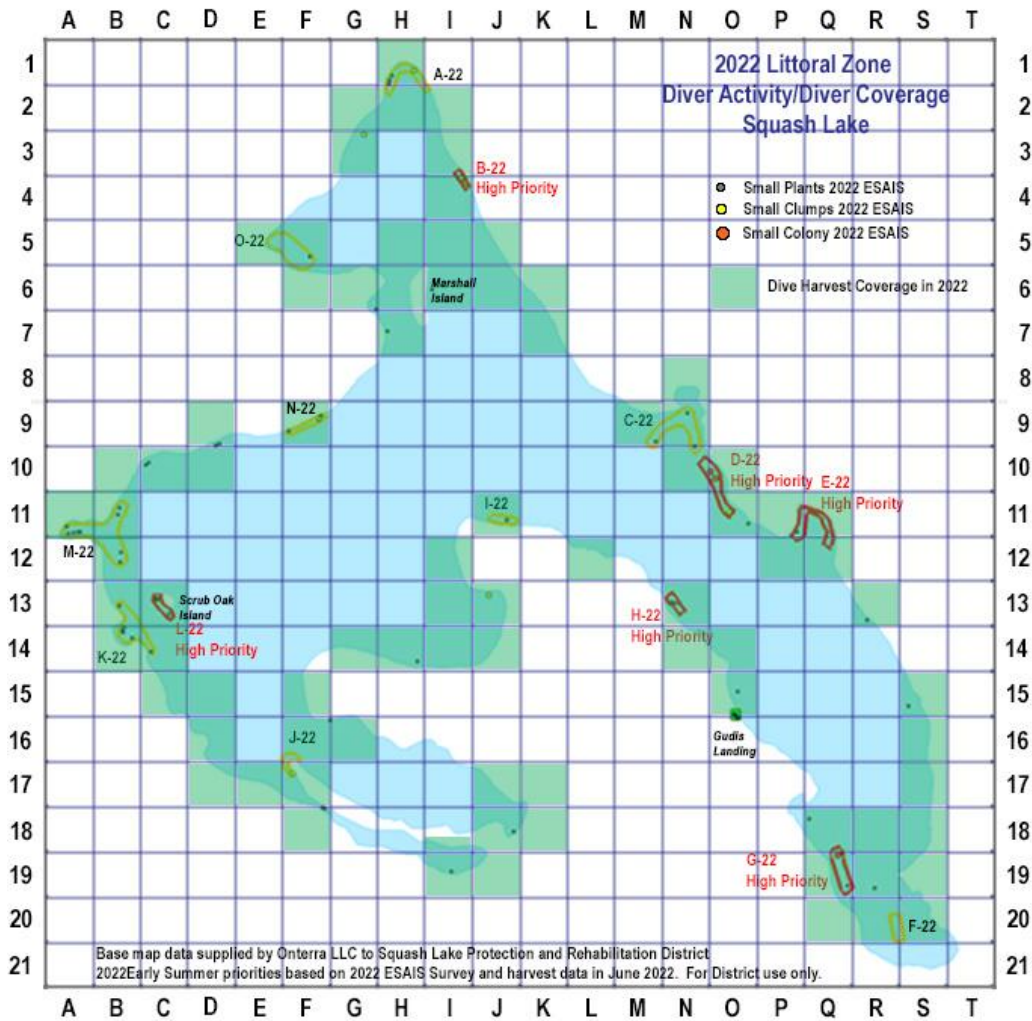
Again in 2022, a passive GPS tracker (asset tracking device) on the dive boat was used so that the dive locations on diver log sheets could be compared against the actual dive boat location. Onterra priority locations, polygons on the ESAIS survey maps, are noted on the log sheets.

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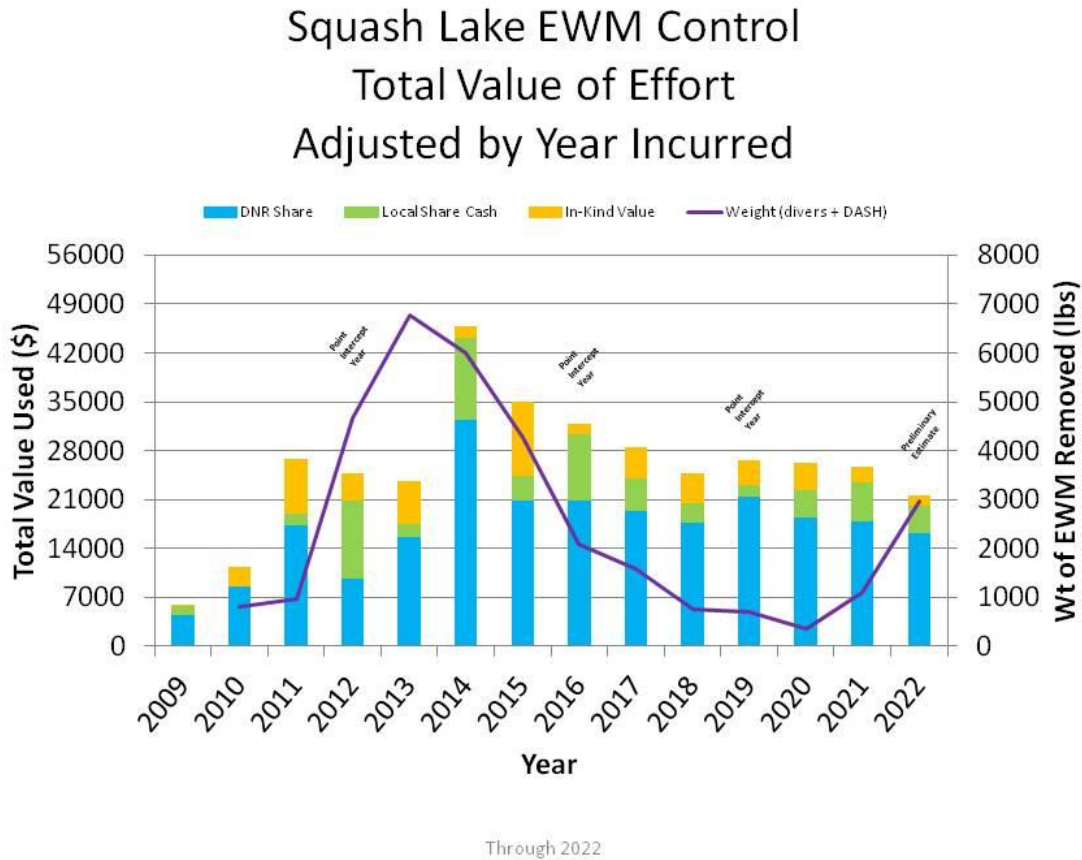
In 2020, Squash Lake upgraded their Garmin Striker Plus 4 fish finder to a Garmin Striker Plus 7c on the boat and uploaded all EWM locations identified by Onterra as waypoints on the fish finder. The upgrade also allowed for uploading of a bathymetric map of Squash Lake, further enhancing the divers' ability to locate EWM. This greatly improved the divers' accuracy and speed in finding EWM located by Onterra.

Figure 1.b.1: 2022 Dive Harvest Coverage of Littoral Zone



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Figure 1.b.2: Historical EWM Harvest (lbs) vs Value of Removal Effort



1.c. Assess EWM Strategy

Overall improvements to the efficiency and effectiveness of diver hand harvesting were maintained. However the presence of EWM on Squash Lake increased in 2022 as it had on many lakes in the region. The current strategy was able to keep pace with the increase.

1.d. Native and Invasive Plant Monitoring (Point Intercept)

Because this grant was extended, part of the extension included postponing the PI to the fall of 2023.

1.e. Overall Project Evaluation

Because this grant was extended, the overall project evaluation for this grant is postponed until the final report in 2023.

1.f. Boat Inspections (CBCW)

Boat inspections continued in 2022. The Clean Boats Clean Waters program is maintained by grant with the Squash Lake Association.

Appendix A – Dive Harvest Log Sheets

2022 Diver Harvest Log
Transcribed

Date	# of Divers	Onterra Priority	Onterra Map Non-Priority GPS		Grid #	Total Dive Time		Pounds Collected	Comments
			Lat	Long		Hours	Minutes		
2021 PBM Map Ref									
6/9/22	2	E-22 (C-21)			P11, P12, Q11, Q12	7	30	98	
6/9/22	2	F-22 (B-21)			R20, S19, S20, S21	3	0	38	
6/9/22	2					2	0	0	Travel on water, setup, etc
6/9/22	1					0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
2022 PBM Map Ref									
6/10/22	2	H-22 (A-21)			N13, N14, O14, O15	9	0	32	
6/10/22	2					2	0	0	Travel on water, setup, etc
6/10/22	1					1	0	0	Time for Dan Jesse to drop off/pick up dive tanks
2023 PBM Map Ref									
6/14/22	2	H-22 (A-21)			M12, M13, N13	6	0	76	
6/14/22	2				L12	3	0	38	
6/14/22	2	(E-21)			R18, R19, S18, S19	2	0	15	
6/14/22	2					2	0	0	Travel on water, setup, etc
6/14/22	1					0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
2024 PBM Map Ref									
6/16/22	2	(J-21)			H14, I14, J12, J14,	3	0	9	
6/16/22	2		N45.590942	W89.547905	J17, J18, K17, K18	3	30	18	
6/16/22	2					2	0	0	Travel on water, setup, etc
6/16/22	1					1	30	0	Time for Dan Jesse and Fred drop off/pick up tanks
TIME AND POUNDS OK TO HERE									
2025 PBM Map Ref									
6/20/22	2	F-22 (B-21)			R20, R21, S20, S21	3	0	17	
6/20/22	2	(F-21)			S16	1	30	32	
6/20/22	2	C-22	N45.599716	W89.542671	N9	2	0	57	
			N45.599720	W89.542671					
2026 PBM Map Ref									
6/20/22	2	(H-21 G-21)			H1, H2, I1, I2, I3	3	30	39	
6/20/22	2					2	0	0	Travel on water, setup, etc
6/20/22	1					0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
Begin Using 2022 ESAIS Survey									
6/21/22	2	M-22	N45.597061	W89.562202	A11	5	0	50	Use of Early Season AIS Survey
			N45.597084	W89.562119					
			N45.597107	W89.561790					
6/21/22	2	L-22	N45.595398	W89.559113	C13	3	0	94	
			N45.595360	W89.559158					

Dan Butkus
Treasurer
2022

Appendix A – Dive Harvest Log Sheets

2022 Diver Harvest Log
Transcribed

Date	# of Divers	Onterra Priority	Onterra Map Non-Priority GPS		Grid #	Total Dive Time		Pounds Collected	Comments
			Lat	Long		Hours	Minutes		
6/21/22	2	M-22 (I-21)	B11, B12, B13		3	30	122		
6/21/22	2				2	0	0	0	Travel on water, setup, etc
6/21/22	1				0	0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
6/22/22	2	D-22	E5, F4, F5, F6		3	0	29		
6/22/22	2		N45.602921 W89.554001		G6, H6, H7	3	0	10	
6/22/22	2				J19	2	30	1	
6/22/22	2		C15, D15		3	0	10		
6/22/22	2				2	0	0	0	Travel on water, setup, etc
6/22/22	1				1	0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
6/27/22	2	M-22	N45.597637 W89.560585 N45.597942 W89.560478 N45.598606 W89.559822 N45.598648 W89.559769 N45.598656 W89.559753 N45.598663 W89.559731 N45.598728 W89.559593		D10	10	0	48	
6/27/22	2		N45.601536 W89.552185 H7, I7		B10, B11, C10, D9,	2	0	4	
6/27/22	2				2	0	0	0	Travel on water, setup, etc
6/27/22	1				0	0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
6/28/22	2	(E-21)	R18, S18, S19		1	30	3		
6/28/22	2		S17, S18		3	0	46		
6/28/22	2	E-22 (C-21)	P11, Q11, Q12		2	0	9		
6/28/22	2	I-22	J11		3	0	52		
6/28/22	2				2	0	0	0	Travel on water, setup, etc
6/28/22	1				1	0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
TIME AND POUNDS OK TO HERE									
7/6/22	2	D-22	O10, O11		3	30	145		
7/6/22	2	E-22	P11, Q11		1	0	5		
7/6/22	2		S15		0	30	4		
7/6/22	2	G22	P18, P19		2	30	40		
7/6/22	2	I22	J11		1	0	4		
7/6/22	2		K6		2	30	6		
7/6/22	2				1	30	0	0	Travel on water, setup, etc

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Treasurer
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Date	# of Divers	Onterra Priority	Onterra Map Non-Priority GPS		Grid #	Total Dive Time		Pounds Collected	Comments
			Lat	Long		Hours	Minutes		
7/6/22	1					0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
7/7/22	2	B-22				4		164	
7/7/22	2		N45.60591	W89.55294	G2, G3	3	30	21	
7/7/22	2	A-22				4	30	4	
7/7/22	2					1	0	0	Travel on water, setup, etc
7/7/22	1					0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
7/11/22	2	F-22			R19, R20	2	0	5	
7/11/22	2	N-22			E9	1	30	45	
7/11/22	2				G6, G7	3	30	2	
7/11/22	2	J-22			F16, F17	2	30	3	
7/11/22	2					1	30	0	Travel on water, setup, etc
7/11/22	1					0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
7/12/22	2		N45.60203	W89.55256	G7, G8	4	0	1	
7/12/22	2		N45.60155	W89.5522					
7/12/22	2		N45.60247	W89.55079	G6, H6, H7	6	0	10	
7/12/22	2					2	0	0	Travel on water, setup, etc
7/12/22	1					1	0	0	Time for Dan Jesse to drop off/pick up dive tanks
7/14/22	2	E-22			P11, Q11	3	0	26	
7/14/22	2	B-22			I3	1	0	2	
7/14/22	2		N45.5957	W89.549	I12, I13, I14, J13, J14	4	0	19	
7/14/22	2	M-22/K-22			B12, B13	3		11	
7/14/22	2					2	30	0	Travel on water, setup, etc
7/14/22	1					0	0	0	Time for Dan Jesse to drop off/pick up dive tanks
									TIME AND POUNDS OK TO HERE
7/18/22	2				S16, S17, S18	1	30	17	
7/18/22	2				S19, R19, R10	1	30	5	
7/18/22	2	G-22			Q18, Q19	1	0	6	
7/18/22	2				E17	1	0	2	
7/18/22	2		N45.58956	W89.55019	I19	1	0	2	
7/18/22	2	L22			C13	3	0	52	
7/18/22	2	K22			B13, B14, C14	3	0	44	
7/18/22	2					1	30	0	Travel on water, setup, etc

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Treasurer
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Date	# of Divers	Onterra Priority	Onterra Map Non-Priority GPS		Grid #	Total Dive Time		Pounds Collected	Comments
			Lat	Long		Hours	Minutes		
7/18/22	1					0	0	0	0 Time for Dan Jesse to drop off/pick up dive tanks
7/19/22	2	M-22			A11, B10, B11	2	30	27	
7/19/22	2		N45.5986	W89.55987	C10, D9, D10, E9	3	0	34	
			N45.59864	W89.55978					
			N45.59904	W89.55766					
			N45.59907	W89.55753					
7/19/22	2		N45.59423	W89.55128	H14	2	0	1	
7/19/22	2		N45.59045	W89.54822	J17, J18	2	30	4	
7/19/22	2	O-22			E5, F5	2		11	
7/19/22	2					1	30		Travel on water, setup, etc
7/19/22	1					1		0	Time for Dan Jesse to drop off/pickup dive tanks
									TIME AND POUNDS OK TO HERE
8/1/22	2	G22			Q19	2	30	10	
8/1/22	2	C22			M9, N9	8	0	110	
8/1/22	2					2	0		Travel on water, setup, etc
8/2/22	2	D22	N45.5973	W89.54078	N10, O10, O11	3	30	73	
8/2/22	2	C22			M9, N9	4	30	24	
8/2/22	2				K7	2	30	9	
8/2/22	2					1	30		Travel on water, setup, etc
8/3/22	2		N45.5973	W89.54078	O15	2	30	10	
8/3/22	2	H22			N13	2	30	29	
8/3/22	2		N45.59356	W89.54113	N14, O14	2	30	44	
8/3/22	2				16	1	30	1	
8/3/22	2				12, 13	2	0	5	
8/3/22	2					1	30		Travel on water, setup, etc
8/3/22	1					1	0		Time for Dan Jesse to drop off/pickup dive tanks
8/9/22	2	F22			R20, S20	3	0	10	
8/9/22	2	E22			R11, Q11, Q12	7	0	102	
8/9/22	2	B22			14	3	0	48	
8/9/22	2					2	0		Travel on water, setup, etc
8/10/22	2	H22			M12, M13, N12, N13	4	0	37	

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Date	# of Divers	Onterra Priority	Onterra Map Non-Priority GPS		Grid #	Total Dive Time		Pounds Collected	Comments
			Lat	Long		Hours	Minutes		
8/10/22	2	J11			J11	3	30	24	
8/10/22	2				J5	2	30	3	
8/10/22	2					2	30		Travel on water, setup, etc
8/10/22	1					1	0		Time for Dan Jesse to drop off/pickup dive tanks
TIME AND POUNDS OK TO HERE									
8/15/22	2	F22			R20, R21, S19, S20	2	30	5	
8/15/22	2				S16	1	0	8	
8/15/22	2				R13	2	0	1	
8/15/22	2	E22			R11, Q11, Q12, Q13	2	0	18	
8/15/22	2	M22			A11, A12, B11, B12	5	0	50	
8/15/22	2					1	30		Travel on water, setup, etc
8/17/22	2	M22			B10, B11, C10	3	30	18	
			N45.59864	W89.55978					
			N45.5986	W89.55987					
8/17/22	2	D22			E5, F4, F5	3	15	7	
8/17/22	2		N45.60203	W89.55256	G6	2	0	1	
8/17/22	2		N45.59292	W89.55403	F15, F16, G16	3	0	20	
8/17/22	2					2	15		Travel on water, set up, etc
8/17/22	1					1	0		Time for Dan Jesse to drop off/pickup dive tanks
8/22/22	2				C15, C16	1	30	5	
8/22/22	2	L22			C13	3		37	
8/22/22	2				B12, B13	3	30	47	
8/22/22	2	K22			B13, B14, C13	2	30	10	C13 backside of small island
8/22/22	2					1	30		Travel on water, set up, etc.
8/23/22	2	E22			Q11, Q12, P11	5	30	71	
8/23/22	2		N45.5957	W89.549	J13	2	0	25	
8/23/22	2	A22			H1, I1, I2	3	30	60	
8/23/22	2					1	30		Travel on water, set up, etc.
8/24/22	2		N45.59504	W89.55766	D9, E9	5	30	46	
			N45.59907	W89.55753					

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Date	# of Divers	Onterra Priority	Onterra Map Non-Priority GPS		Grid #	Total Dive Time		Pounds Collected	Comments
			Lat	Long		Hours	Minutes		
8/24/22	2	N22			F9, G8, G9	3	30	21	
8/24/22	2	O22			E5, F5, F6	2	30	5	
8/24/22	2					1	30		Travel on water, set up, etc.
8/24/22	1					1	0	0	Time for Dan Jesse to drop off/pickup dive tanks
TIME AND POUNDS OK TO HERE									
<i>Begin using 2022 Fall PBM Survey</i>									
9/6/22	2		N45.59904 N45.59907	W89.55766 W89.55753	D9, E9	3	0	46	
9/6/22	2	N22			F9, G8, G9	2	0	21	
9/6/22	2	O22			E5, F5, F6	1	0	5	
9/6/22	2	H22			N13, N14, O14, O15	3	30	61	
9/6/22	2		N45.59423	W89.55128	G14, H14	1	0	16	
9/6/22	2		N45.59045	W89.54822	J18, K17, K18	1	0	22	
9/6/22	2					1	30		Travel on water, set up, etc.
9/7/22	2	C22			N9	1	30	8	
9/7/22	2				L12	1	30	6	
9/7/22	2		N45.60203 N45.60155	W89.55256 W89.5522	G6, H6, H7	2	30	18	
9/7/22	2	A22			G1, G2, H1, H2, I2	2	30	16	
9/7/22	2	O22			E5, F5	3	30	19	
9/7/22	2					1			Travel on water, set up, etc.
9/8/22	2	F22			R20	1	0	5	
9/8/22	2	E22			O10, O11	3	0	44	
9/8/22	2	M22			A11, B11, B12	2	0	3	
9/8/22	2	K22			B13, B14, C14	2	30	7	
9/8/22	2					1	0		Travel on water, set up, etc.
9/8/22	1						30		Time for Dan Jesse to drop off/pickup dive tanks
						374.50	2960.00		2022 Season Totals

Dan Butkus
Treasurer
2022