FINAL REPORT

Invasive Plant Removal and Early Detection in Muskegon Lake and Bear Lake Coastal Wetlands
GL00E01439

Muskegon Lake AOC Fish and Wildlife Habitat Restoration and BUI Removal Strategy

Biodiversity Protection and Phragmites Management Plan (BPP)
Addendum 2

9/07/2017

WEST MICHIGAN SHORELINE
REGIONAL DEVELOPMENT COMMISSION

EPA United States Environmental Protection Agency

Great Lakes RESTORATION

WEST MICHIGAN SHORELINE

REGIONAL DEVELOPMENT COMMISSION

(WMSRDC)

The WMSRDC is a regional council of governments representing 127 local governments in the West Michigan counties of Lake, Mason, Muskegon, Newaygo, Oceana, and northern Ottawa.

The mission of WMSRDC is to promote and foster regional development in West Michigan… through cooperation amongst local governments.

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Biodiversity Protection and Phragmites Management Plan (Update)

Addendum 2

INTRODUCTION

The 2012 Biodiversity and Phragmites Management Plan Addendum 1 was developed by the West Michigan Shoreline Regional Development Commission to guide future invasive species management activities to protect biodiversity and the restoration that has been completed in the Muskegon Lake AOC.

In 2015 The West Michigan Shoreline Regional Development Commission (WMSRDC) received funding from a US Environmental Protection Agency (EPA), Great Lakes Restoration Initiative (GLRI) Non Native Invasive Species Removal Grant to update the 2012 plan, monitor and control non-native invasive species (Phragmites australis, Purple Loosestrife, Black Locust, Tartarian Honeysuckle, and Spotted Knapweed) within a 129-acre coastal wetland shoreline area around Muskegon Lake and Bear Lake, within the Muskegon Lake Area of Concern (AOC).

Natural resource managers, stakeholder and scientists determined that the successful implementation of the Muskegon Lake AOC Fish and Wildlife Habitat Restoration and BUI Removal Strategy would require monitoring and control of non-native invasive plants within the AOC's coastal wetlands and restored shoreline areas. Addendum 1 identified the extent of Phragmites australis along the shorelines of Muskegon Lake and Bear Lake in 2012. Addendum 2 summarizes the results of the GLRI grant, including two years of chemical treatments in prioritized coastal wetlands and shorelines around Muskegon and Bear Lakes, followed in the field by invasive species density surveys in 2015, 2016, and 2017. Treatment prioritization was completed by WMSRDC and GEI Consultants, using the Michigan Department of Environmental Quality prioritization protocol. Field surveys were completed using the Midwest Invasive Species Information Network (MISIN) Density Protocol. Survey Data Points collected will allow for the tracking and comparative analysis of Phragmites presence and densities within the Muskegon Lake AOC management area.

METHODOLOGY

MISIN density protocols were selected as a survey methodology that is widely accepted, consistent with partner agencies, supported in Michigan, usable by the general public and relevant to the level of management and planning required by local managers, partner organizations, landowners, and volunteer participants including the Muskegon Lake Watershed Partnership (MLWP). MISIN data protocols allow for the sharing of a unified database between local managers and partner/users throughout Michigan and the Midwest. The entry of MISIN protocol information with the available online Smartphone or website applications provides local volunteer organizations an accessible and sustainable vehicle for invasive species management and status over time.

To enhance the effectiveness of volunteer and partner data entry a project name (Muskegon Lake Watershed Partnership) has been established on the MISIN application website for trained volunteers, landowners, and partners whom have been provided training in the use of the MISIN application data entry procedure. Additionally, there is access to partner projects on the MISIN application that cover the local Muskegon and Bear Lake watershed areas and Muskegon County in general.

Survey Point data collected using the MISIN application protocols (via GPS, website, or phone app.) includes estimated area, estimated plant density, treatment status (year and/or years treated or not), GPS waypoint XY coordinates, and site specific comments assigned to a data point with a specific and unique ID and point number. Also recorded during the surveys was date, time, PDOP, number of Satellites viewed, and target plant at each point. Dispersal pathways, location information and habitat values, were added to the point data information from field observation or aerial photo interpretation using nearest survey year photography. The 2015, 2016, and 2017 field surveys were conducted from boat and on foot. GPS data points were taken as close as possible to the plant incidence. Where physical access was difficult or impossible due to property access, physical structures, or water depths, a handheld laser rangefinder was used to measure closest distance to target from data point and that distance was recorded as well.

Due to limited funding, and to provide for the most fair and effective treatment of Phragmites, treatment locations were prioritized using the Michigan Department of Environmental Quality (MDEQ) Phragmites Treatment/Management Prioritization Tool. This tool provides a value score which allows for the ranking of areas based on a variety of criteria including Ecological Criteria, Human Value, and Feasibility of Treatment. Landowner cooperation and accessibility were also factors in determining locations for the 2015 control treatments. Due to the success (Phragmites reductions) of the 2015 treatments, the priority areas were expanded in 2016 and included a majority of the shorelines of Muskegon and Bear Lakes. Several previously restored NOAA habitat restoration sites were treated to maintain habitat restoration values. Landowners in 2015 provided a two year permission window while permissions granted in 2016 were for one year. Treatments were not completed where landowners did not respond to permission requests or refused permission, where there were no current incidences of the target plant, and on two evaluation (non-treatment) data point areas.

The work was completed according to the project's EPA-approved QAPP and an Aquatic Nuisance Control Permit from the Michigan Department of Environmental Quality.

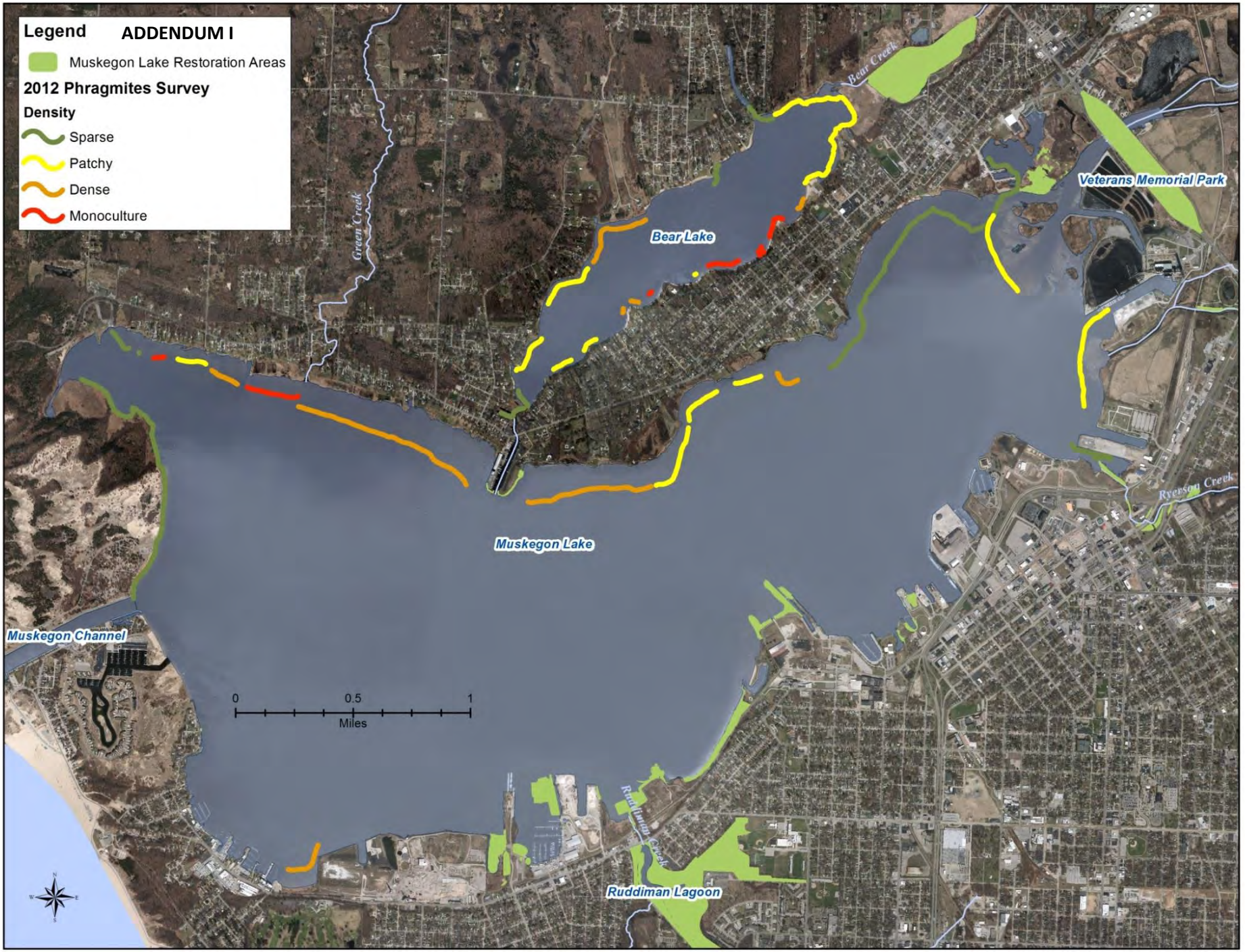
In addition to control of non-native invasive plants, the project provided experiential learning opportunities for 619 students and 10 trainings for 59 landowners and 159 volunteers on the importance of biodiversity, plant I.D., and/or methods for the control of non-native invasive plants.

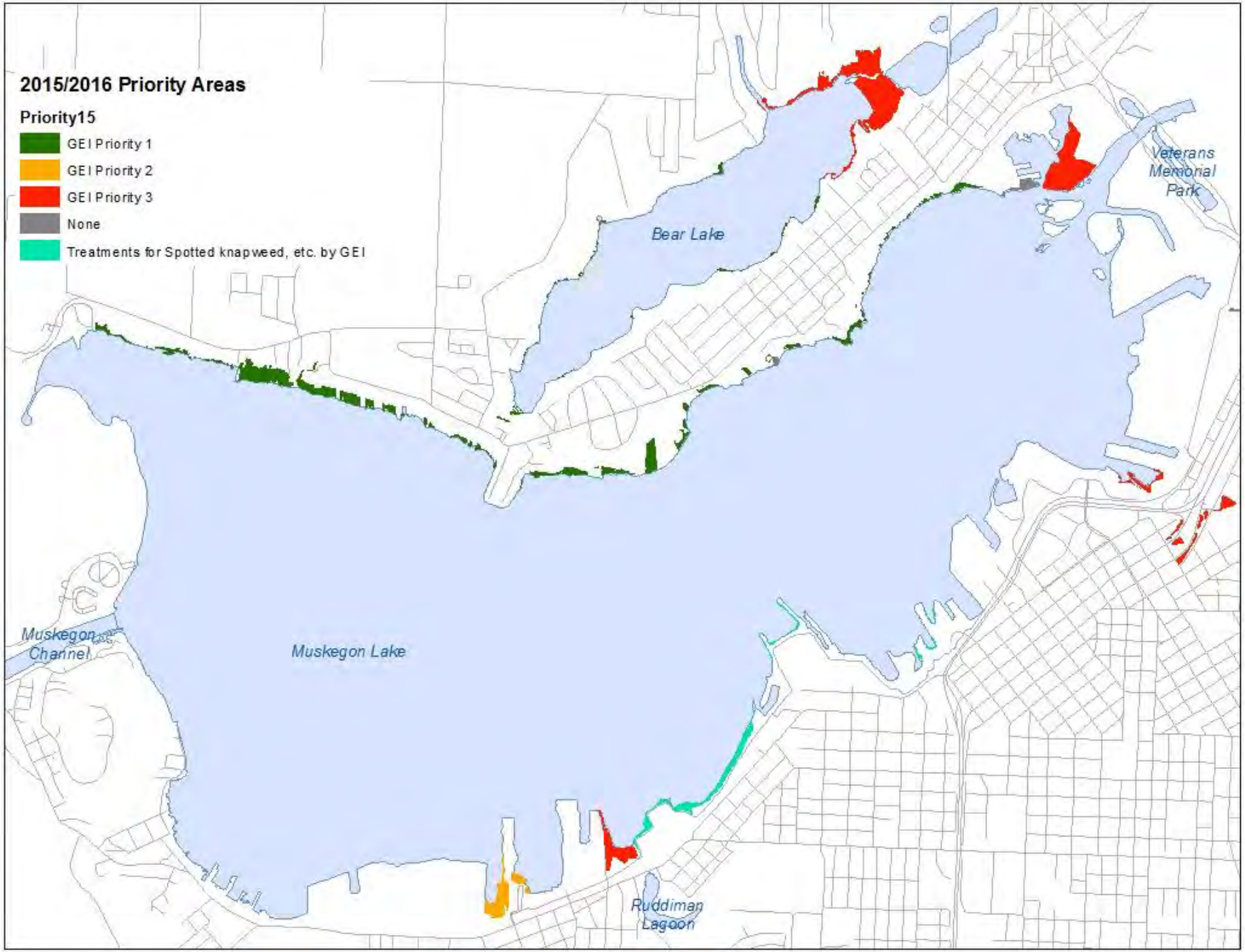
In order to establish a sustainability component, volunteers and landowners were trained in the use of the MISIN monitoring application, and plant I D. The West Michigan Shoreline Regional Development Commission (WMSRDC) established a partnership with the West Michigan Conservation Network and the West Michigan Cooperative Invasive Species Management Area (CISMA). WMSRDC also assisted the Muskegon Lake Watershed Partnership (MLWP) in establishing an Invasive Species sub-committee of the MLWP Habitat Committee to focus on monitoring, education, and management for Muskegon Lake as well as providing stakeholders of Bear Lake with information to assist with the formation of a Lake Board for Bear Lake.

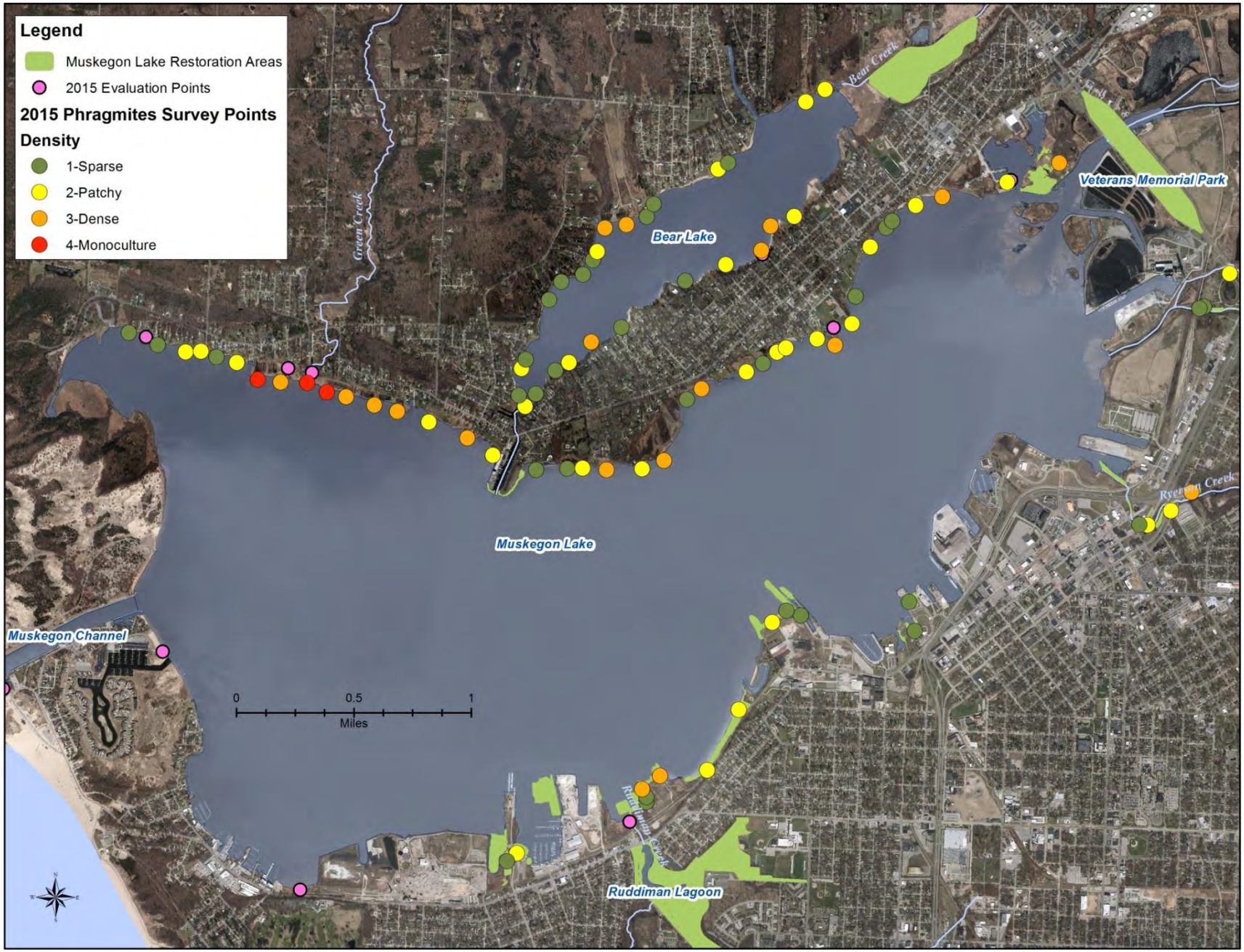
MAPS SECTION

DATA SECTION

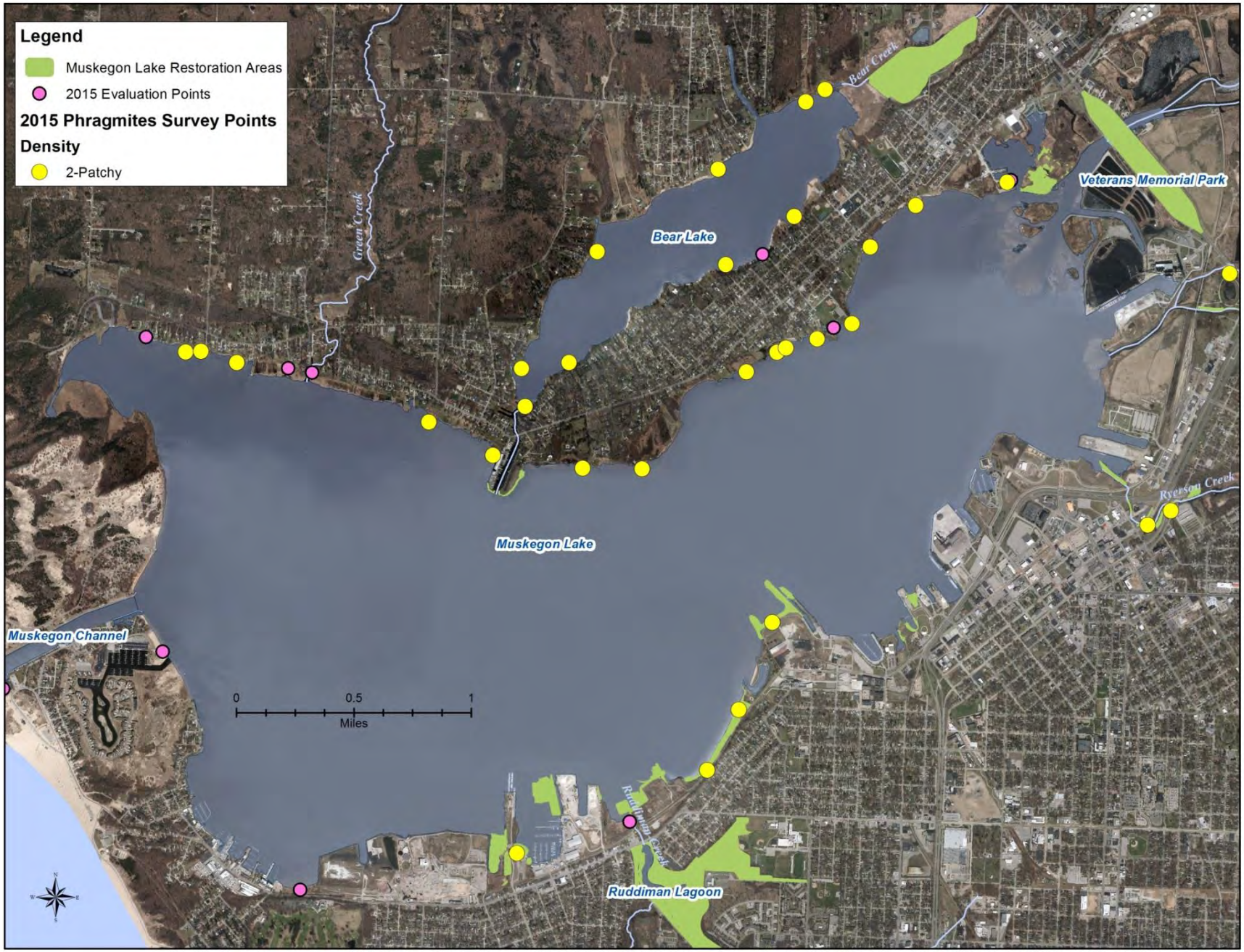
Assessment Charts


Legend
ADDENDUM I
Muskegon Lake Restoration Areas
2012 Phragmites Survey
Density
Sparse
Patchy
Dense
Monoculture
Green Creek
Bear Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
Ruddiman Creek
Ruddiman Lagoon
0
0.5
1
Miles


2015/2016 Priority Areas
Priority15
GEI Priority 1
GEI Priority 2
GEI Priority 3
None
Treatments for Spotted knapweed, etc. by GEI
Bear Lake
Veterans Memorial Park
Muskegon Channel
Muskegon Lake
Ruddiman Lagoon


Legend
Muskegon Lake Restoration Areas
2015 Evaluation Points
2015 Phragmites Survey Points
Density
1-Sparse
2-Patchy
3-Dense
4-Monoculture
Green Creek
Bear Creek
Bear Lake
Veterans Memorial Park
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Lagoon


Legend
Muskegon Lake Restoration Areas
2015 Evaluation Points
2015 Phragmites Survey Points
Density
1-Sparse
Bear Creek
Green Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon


Legend
Muskegon Lake Restoration Areas
2015 Evaluation Points
2015 Phragmites Survey Points
Density
2-Patchy
Bear Creek
Green Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon


Legend
Muskegon Lake Restoration Areas
2015 Evaluation Points
2015 Phragmites Survey Points
Density
3-Dense
Green Creek
Bear Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon


Legend
Muskegon Lake Restoration Areas
2015 Evaluation Points
2015 Phragmites Survey Points
Density
4-Monoculture
Bear Creek
Green Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon


Control Point / Evaluation Point Photos
Images
ControlPt_Photo Locations
Turtle Benchmark
Photo Not Shown
Veterans
Memorial
Park
Bear Lake
CP6
CP1
CP5
CP4
CP2
Muskegon
Channel
Muskegon Lake
CP3
CP7
Ruddiman
Lagoon

2015 Control Point Images (from west to east and north to south) All images were taken prior to the first year treatment in 2015.

1.) Control Point # CP5 H/S

2.) Control Point # CP4 Beechtree Court

3.) Control Point # CP2 Green Creek

4.) Control Point # CP6 C

5.) Control Point # CP1 NM Waterfront Park

6.) Control Point # CP7 Cottage Grove

7.) Control Point #CP3 RC

2016 Control Point Images (from west to east and north to south) All images were taken after year 1 treatments.

1.) Control Point # CP5 H/S

2.) Control Point #CP4 Beechtree Court

3.) Control Point # CP2 Green Creek

4.) Control Point # CP6 C

5.) Control Point #CP1 NM Waterfront Park

6.) Control Point #CP7 Cottage Grove

7.) Control Point #CP3 RC

2017 Control Point Images Photos taken in July 2017 after 2 years of treatments

1.) Control Point # CP5 H/S

2.) Control Point #CP4 Beechtree Court

3.) Control Point #CP2 Green Creek

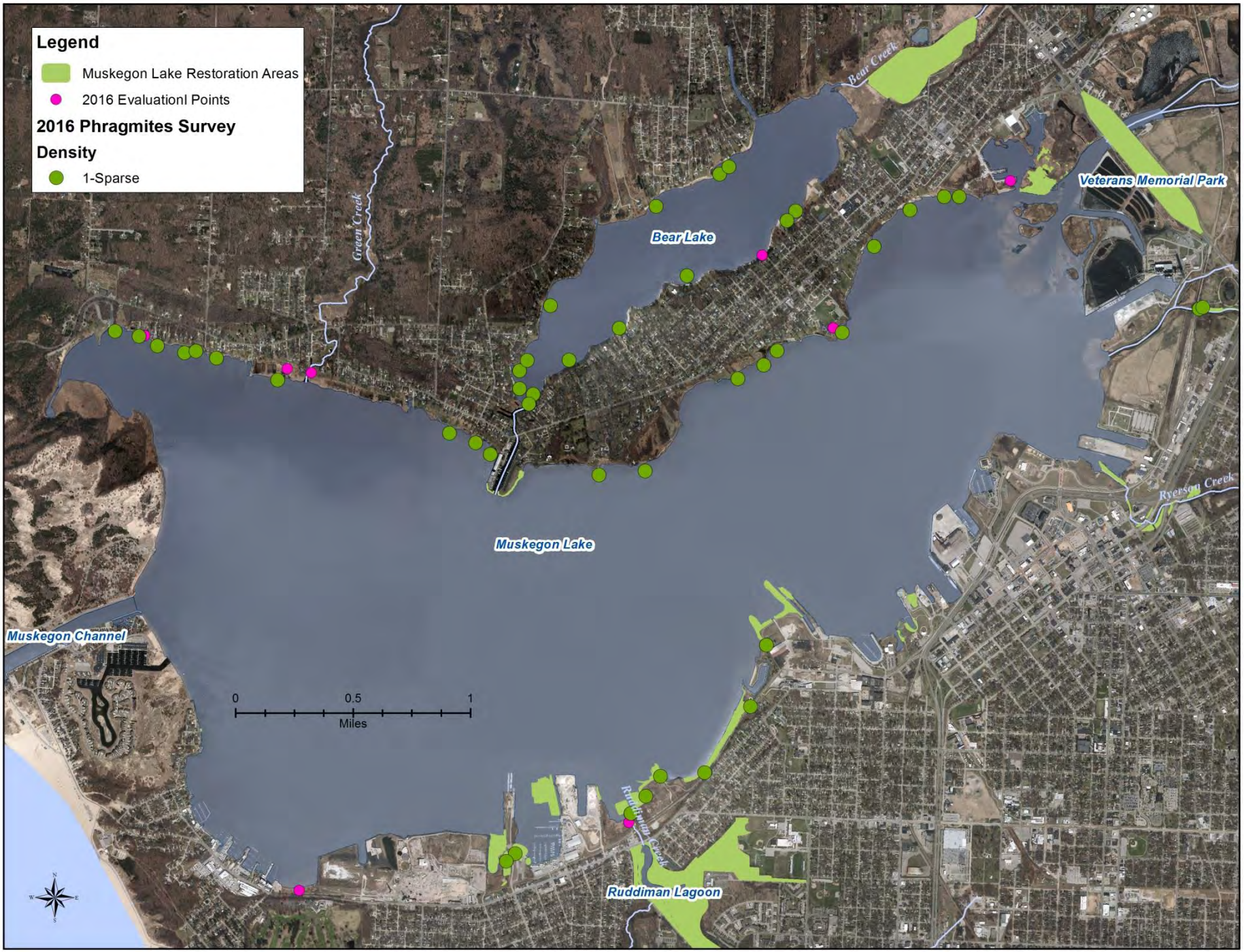
4.) Control Point # CP6 C

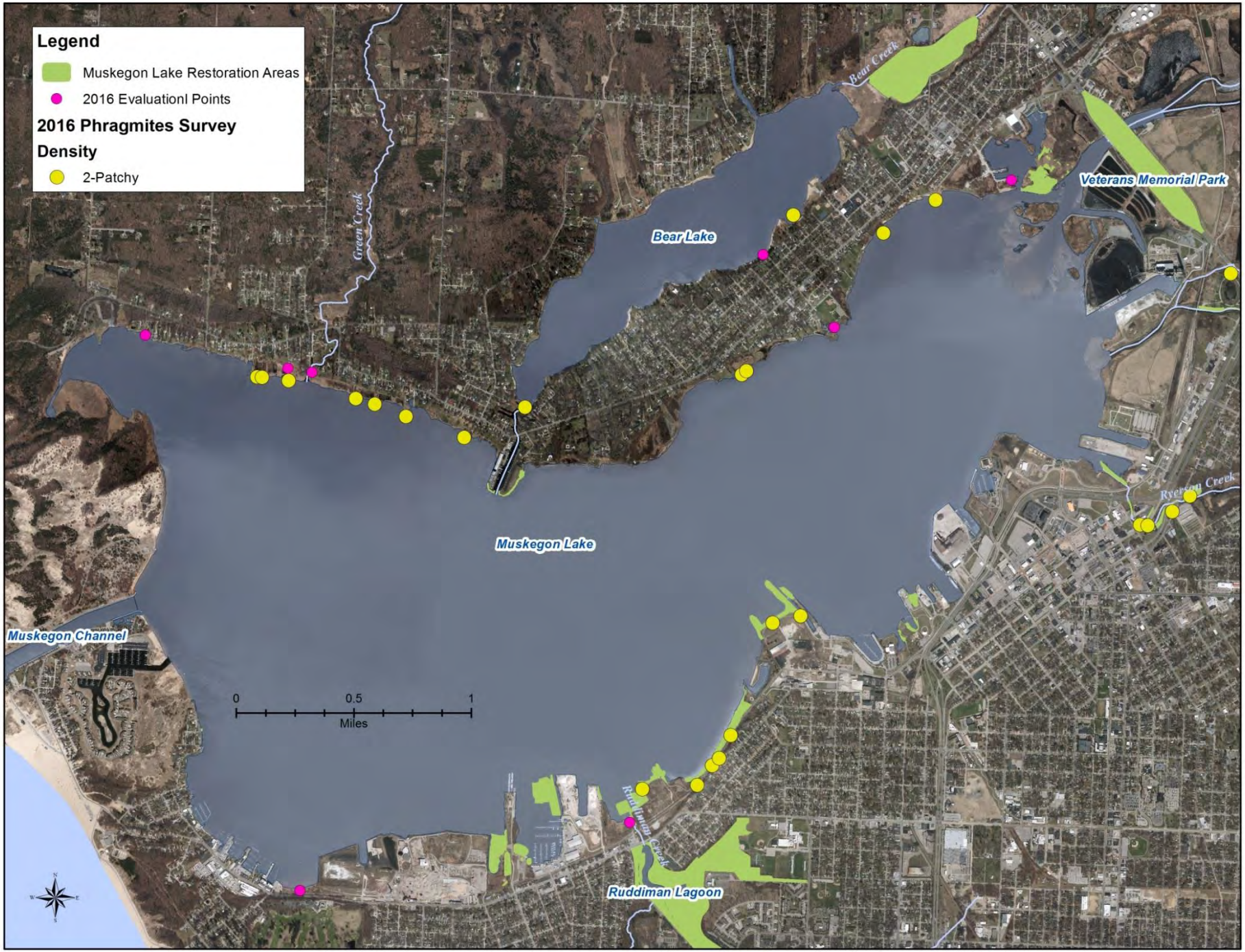
5.) Control Point #CP1 NM Waterfront Park

6.) Control Point #CP7 Cottage Grove

7.) Control Point #3 RC

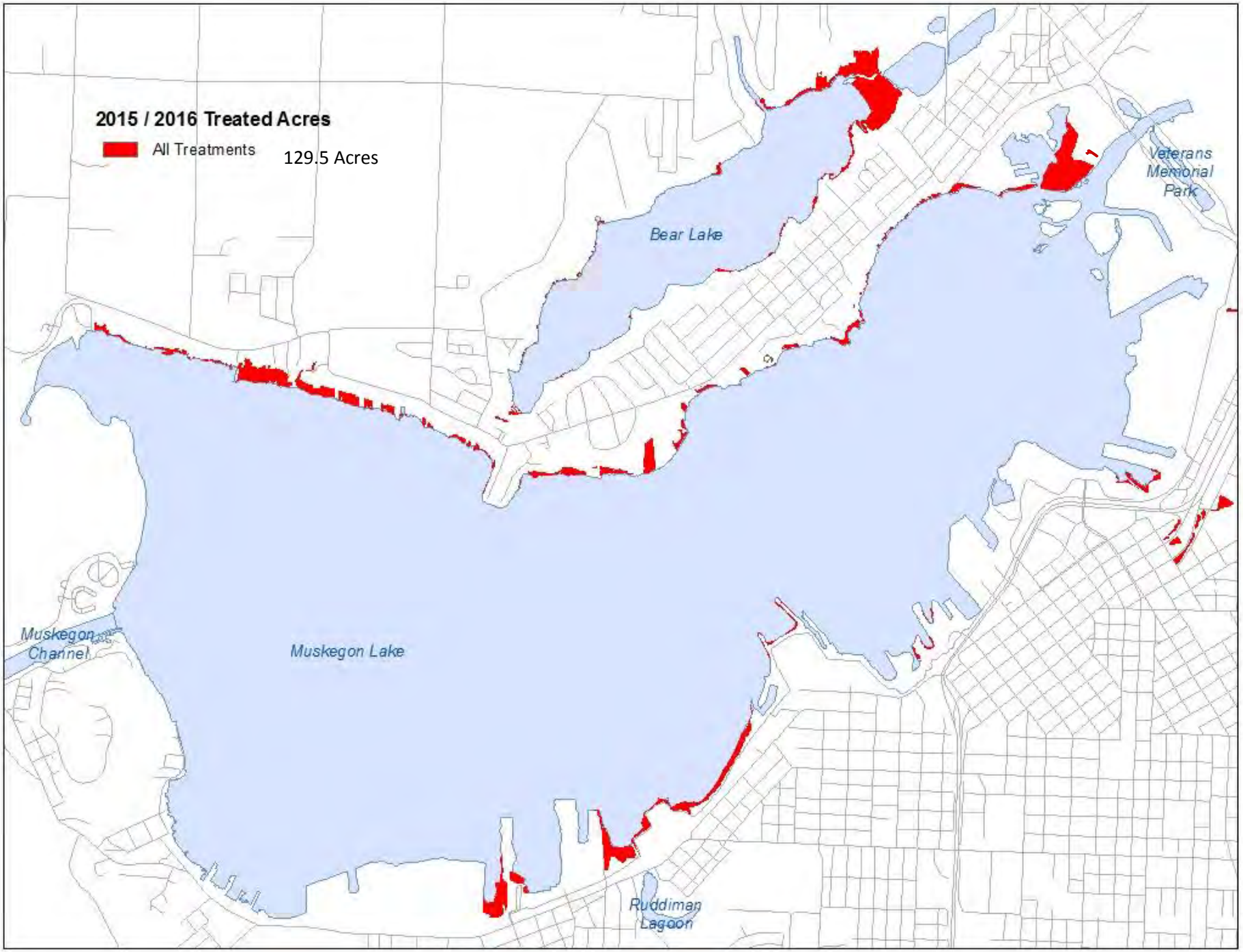

Legend
2016 Phragmites Survey Purple loosestrife
Density
1-Sparse
2-Patchy
3-Dense
4-Monoculture
Density
Sparse
Patchy
Dense
2016 Control Points
trtl
Veterans Memorial Park
Bear Lake
CP6
CP1
CP5
CP4
CP2
Sanford Bayou
Muskegon Lake
Muskegon Channel
0
0.275
0.55
1.1 Miles
CP3
CP7
Ruddiman Lagoon

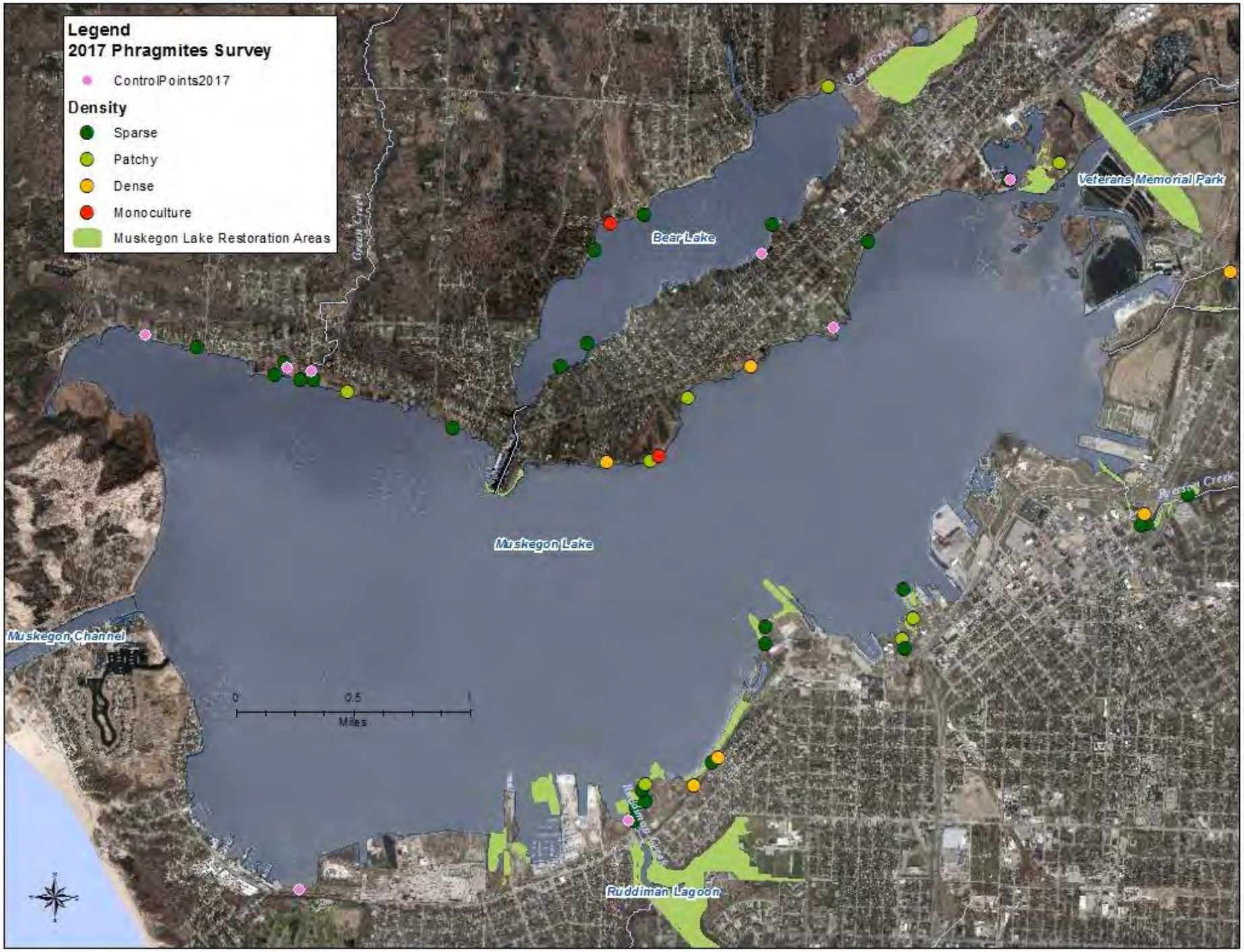

Legend
Muskegon Lake Restoration Areas
2016 Evaluationl Points
2016 Phragmites Survey
Density
1-Sparse
Bear Creek
Green Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon


Legend
Muskegon Lake Restoration Areas
2016 Evaluationl Points
2016 Phragmites Survey
Density
2-Patchy
Bear Creek
Green Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon


Legend
Muskegon Lake Restoration Areas
2016 Evaluationl Points
2016 Phragmites Survey
Density
3-Dense
Bear Creek
Green Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon

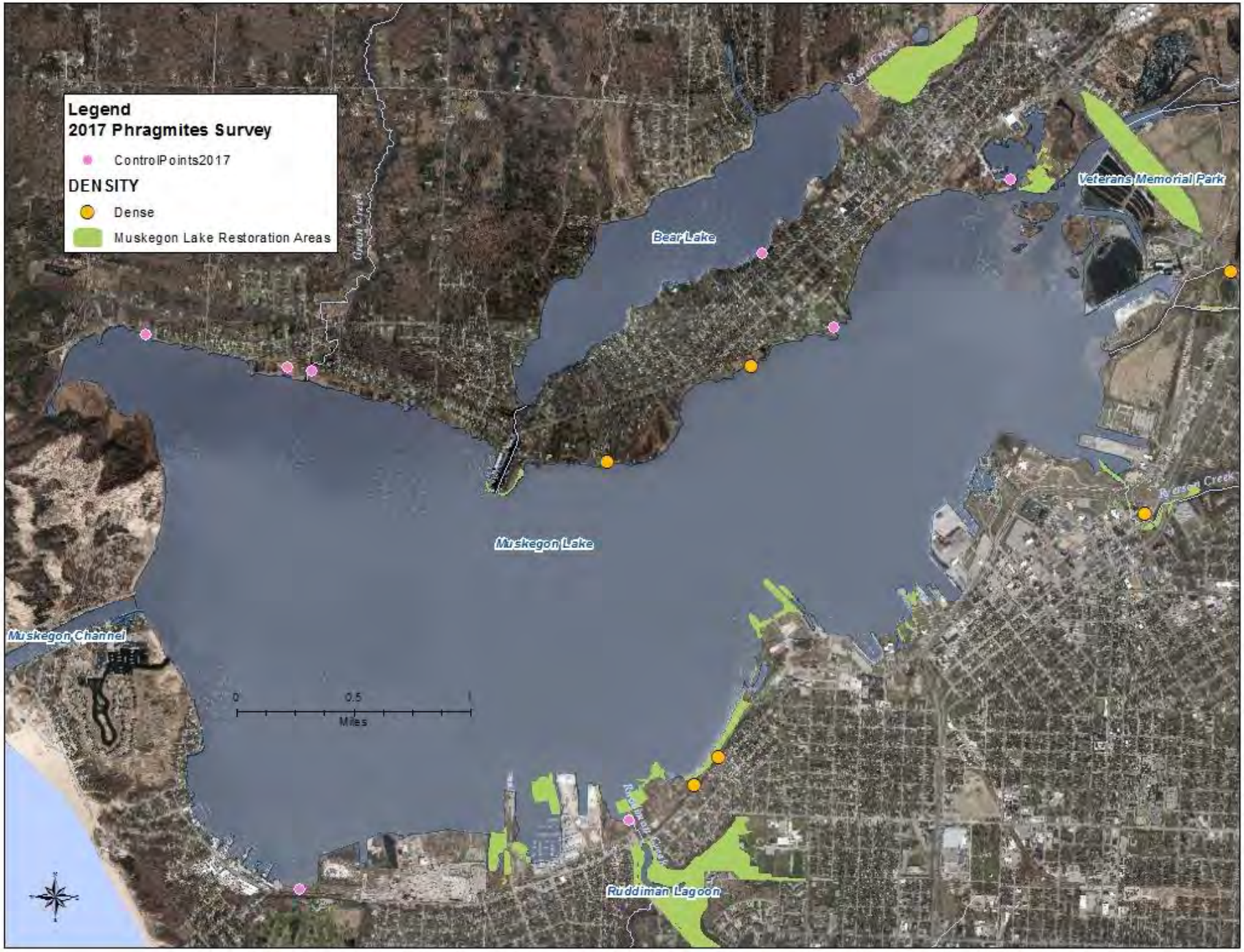

Legend
Muskegon Lake Restoration Areas
2016 EvaluationI Points
2016 Phragmites Survey
Density
4-Monoculture
Green Creek
Bear Creek
Bear Lake
Veterans Memorial Park
Ryerson Creek
Muskegon Lake
Muskegon Channel
0
0.5
1
Miles
Ruddiman Creek
Ruddiman Lagoon

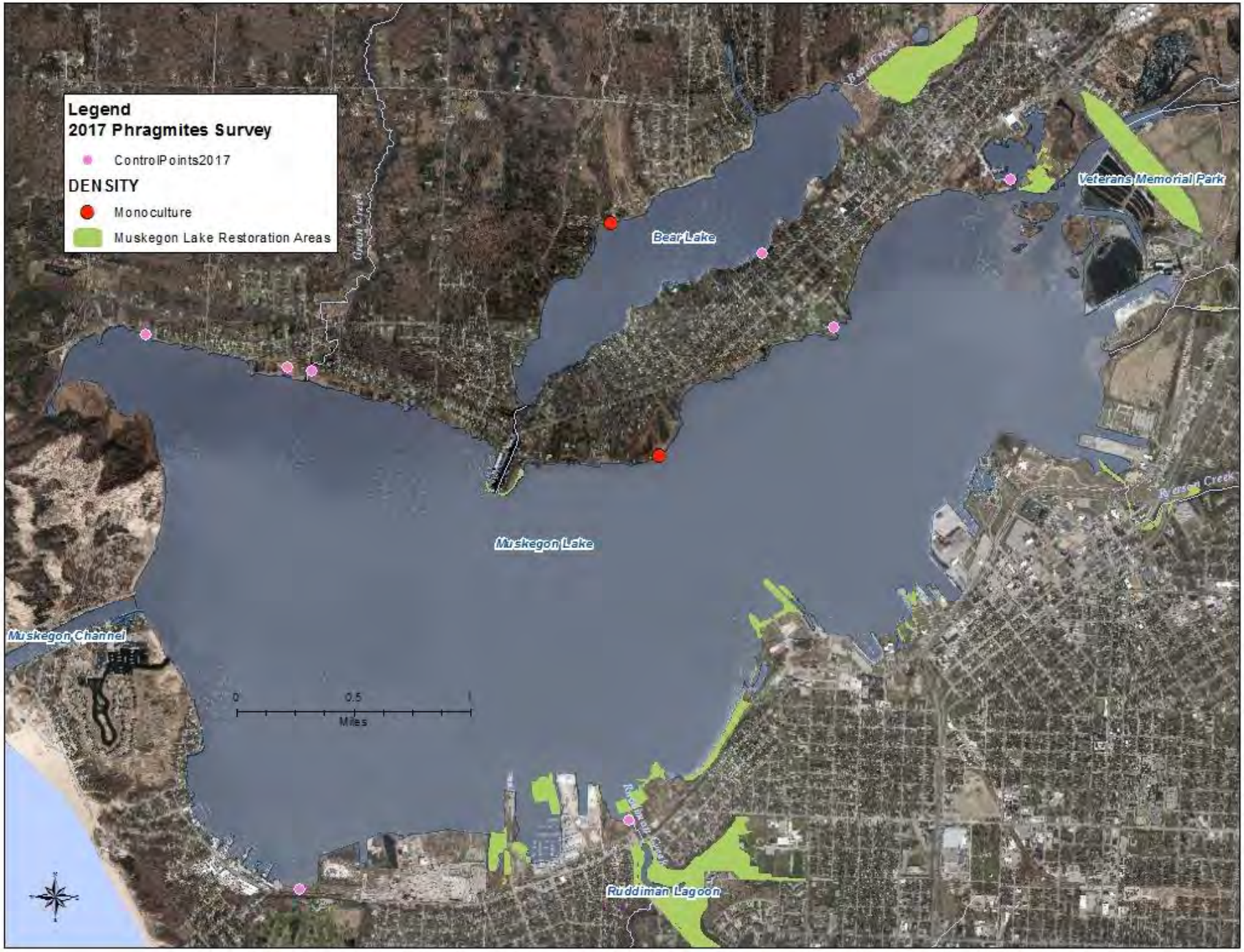

2015 / 2016 Treated Acres
All Treatments
129.5 Acres
Bear Lake
Veterans Memorial Park
Muskegon Channel
Muskegon Lake
Ruddiman Lagoon


Legend
2017 Phragmites Survey
ControlPoints2017
Density
Sparse
Patchy
Dense
Monoculture
Muskegon Lake Restoration Areas
Bear Lake
Veterans Memorial Park
Muskegon Lake
Muskegon Channel
Ruddiman Lagoon
0
0.5
1
Miles


Legend
2017 Phragmites Survey
ControlPoints2017
DENSITY
Sparse
Muskegon Lake Restoration Areas
Bear Lake
Veterans Memorial Park
Muskegon Lake
Muskegon Channel
Ruddiman Lagoon
0
0.5
1
Miles


Legend
2017 Phragmites Survey
ControlPoints2017
DENSITY
Patchy
Muskegon Lake Restoration Areas
Bear Lake
Veterans Memorial Park
Muskegon Lake
Muskegon Channel
Ruddiman Lagoon
0
0.5
1
Miles


Legend
2017 Phragmites Survey
ControlPoints2017
DENSITY
Dense
Muskegon Lake Restoration Areas
Bear Lake
Veterans Memorial Park
Muskegon Lake
Muskegon Channel
Ruddiman Lagoon
0
0.5
1
Miles


Legend
2017 Phragmites Survey
ControlPoints2017
DENSITY
Monoculture
Muskegon Lake Restoration Areas
Bear Lake
Veterans Memorial Park
Muskegon Lake
Muskegon Channel
Ruddiman Lagoon
0
0.5
1
Miles

DATA SECTION (Landscape Layout)

Survey Report Key (Area and Density - MISIN Protocols for general survey)

Area	Density	Dispersal Pathways	Values	Location Code
0 = None / NA	0 = None / NA	N = Nearby Population	A = High Biodiversity	MLL = Muskegon Lake (Laketon Twp)
1 = Individual/Few/Several	1 = Sparse (Scattered stems or very small stands)	D = Ditch	B = Game Species habitat	MLM = Muskegon Lake (City of Muskegon)
2 = < 1,000 SQ FT (Half Tennis Court)	2 = Patchy (mix of sparse and dense areas)	L = Boat Launch	C = Rare Animals	BLL = Bear Lake (Laketon Twp.)
3 = 1,000 SQ FT to 0.5 acre	3 = Dense (Greater than 40% of area)	G = Beach Grooming	D = Critical nursery habitat for fish	BLN = Bear Lake (North Muskegon)
4 = 0.5 acre to 1 acre	4 = Monoculture (nearly 100% of area)	T = Tributary	E = Recreational boating or fishing	
5 = > 1 acre		O = Other		

Plant Codes: Phragmites-PH, Purple Loosestrife-PL, Spotted Knapweed: SK, Tartarian Honeysuckle-LT, Black Locust:-BL

2015 (GIS Layers Attribute Tables)

Photo point Attribute Tables

2015

Photo Point	Waypoint ID	Photo Name	Lake	Notes	Bearing	Control Type	Time	Date collected	Coordinates	Image Unit	Format	File Size
1	IWJWPH001-42D	PP1 waterfront pk N Musk 9 16 15	M	Taken from dock/boardwalk	218	treatment	1:40 PM	9/16/15	-86.16102119 43.151182	Nikon P610	jpeg	7302 KB
2	SWJWPH002-33W	PP2 Green Creek 9 16 15 control pt	M	Near Mouth of Creek, south of Birch	230	Treatment	2:45 PM	9/16/15	-86.1848059 43.1448269	Nikon P610	jpeg	6828 KB
3	SWJWPH003-43U	PP3 RC Control Pt Photo1	M	taken from ditchbank near creek mouth	74	Non-Treatment	2:10 PM	9/17/15	-86.1708.84 43.1309.96	Ashtech	jpeg	35 KB
4	SWJWPH004-51D	PP4 Beechtree Ct behind cattails	M	taken south of roadend	182	Treatment	3:15 PM	9/17/15	-86.315504 43.247317	Ashtech	jpeg	23 KB
5	SWJWPH005-21U	PP5 H/S control pt	M	Taken from north of control pt	200	Treatment	10:52 AM	10/7/15	-86 1939.083 43 1455.685	Nikon P610	jpeg	6789 KB
6	SWJWPH006-23U	PP6 PH006 pp	B	From NW corner of deck post *	10	Treatment	9:03 AM	10/14/15	-86 16 32.261 43 15 16.782	Nikon P610	jpeg	6452 KB
7	SWJWPH007-33U	PP7 007 control pt	M	Photo at wood stk south of t-post	12	Non-treatment	2:15	10/27/15	86°18'47.964" 43°12'52.951"	Nikon P610	jpeg	6863

2016

Photo Point	Waypoint ID	Photo Name	Lake	Notes	Bearing	Control Type	Date collected	Lat	Long	Image Unit	Format
1	SWJWPh07232	DSCN7582 NM Watersports Park	M	Taken at post on boardwalk	200	Treatment	9/6/2016	43 15 1.0799	-86 16 10999	Nikon P610	Jpeg
2	SWJWPh07051T	DSCN7578 Green Crk1	M	<3% Phrag, Birch Tree, Willow, Lily Pads, Reed Canary, Nutsedge, SK, BL	270	Treatment	9/6/2016	43 14 48.39000	-86 18 48.39600	Nikon P610	Jpeg
3	SWJWPh075	DSCN7587 RC 1	M	50% Phrag	5	Non-Treatment	9/6/2016	43 13 9.14999	-86 17 7.39199	Nikon P610	Jpeg
4		DSCN7577 Beechtree Ct	M	Cattails, some Pl	190	Treatment	9/6/2016	43 14 50.60399	-86 18 55.91999	Nikon P610	Jpeg
5	SWJWPh001	DSCN7576 H/S	M	10% Veg, 0% Phrag, Cattail, Bullrush, Scirpis, Reed Canary Grass, T-Post missing	205	Treatment	9/6/2016	43 14 55.91399	-86 19 39.03600	Nikon P610	Jpeg
6	SWJW07130T	DSCN7580 C 1	B	0% Phrag, Bear Lk *	10	Treatment	9/6/2016	43 15 16.31400	-86 16 32.76000	Nikon P610	Jpeg
7	SWJWPh073	DSCN7583 Cottage Grove1	M	90% Phrag, Post hidden in Phrag	10	Non-Treatment	9/6/2016	43 12 52.97399	-86 18 48.31800	Nikon P610	jpeg

2017

Photo Point	Waypoint ID	Photo Name	Lake	Notes	Bearing	Control Type	Date collected	Coordinates	Image Unit	Format	File Size
1	CP001	DSCN9158 Waterfront Sports Park 1	M	NO Phrag - 0%	220	treatment	7/20/2017	43° 15' 1.050" N 86° 16' 10.068" W	Nikon P610	jpeg	3.60MB
2	CP002	DSCN9148 Green Creek	M		265	Treatment	7/20/2017	43° 14' 48.186" N 86° 18' 48.012" W	Nikon P610	jpeg	2.95MB
3	CP003	DSCN9178 RC	M	No Phrag - 0%, willow and PL	10	Treatment	7/20/2017	43° 13' 10.266" N 86° 17' 8.448" W	Nikon P610	jpeg	3.35MB
4	CP004	DSCN9135	M	some PL	180	Treatment	7/20/2017	43° 14' 50.406" N	Nikon	jpeg	3.52MB

		Beechtree						86° 18' 55.344" W	P610		
5	CP005	DSCN9133 H/S	M	No Phrag - 0%, <3% emergent, Post gone (missing)	220	Treatment	7/20/2017	43° 14' 55.710" N 86° 19' 38.724" W	Nikon P610	jpeg	2.78MB
6	CP006	DSCN9156 C	B	No Phrag - 0% seen *	10	Treatment	7/20/2017	43° 15' 15.984" N 86° 16' 32.424" W	Nikon P610	jpeg	3.41MB
7	CP007	DSCN9169 Cottage Grove	M	95% PH, 5% cattail, willow, milkweed, raspberry	5	Non-treatment	7/20/2017	43° 12' 52.902" N 86° 18' 48.480" W	Nikon P610	jpeg	3.45MB

*Photopoint 6 (C) is located at the base of a bluff. The Nikon P610 GPS unit could never get a reliable coordinate fix at this location. The photo was taken from the same fixed point each year (Deck corner post). The tables have been corrected to the estimated bearings. Sites that included landowner names in their description were abbreviated to protect landowner privacy.

2015 Plant Survey Attribute Tables

Pt No	NAME	Area	Density	YrsTrt	DspPath	Value	LocCode	NOTES: Yards from point to plant incident	OTHER	YCoor	XCoor	Date_Collected
1	SWJWPH001-51U	5	1-Sparse	D	lt	abde	mll	12 yds	Windy Day 10 - 11 MPH	43° 14' 56.046" N	86° 19' 44.326" W	11/5/15
2	SWJWPH002-11U	1	1-Sparse	N	ngo	e	mll	25 yds	no treatment permission, landowner self treated	43° 14' 53.520" N	86° 19' 35.469" W	11/5/15
3	SWJWPH003-52U	5	2-Patchy	D	nlg	be	mll	57yds sse from Area	west of Weber Rd., docks	43° 14' 52.064" N	86° 19' 26.971" W	11/5/15
4	SWJWPH004-22U	2	2-Patchy	D	nl	be	mll	18 yd s from Area	adjacent to road end access	43° 14' 52.337" N	86° 19' 22.274" W	11/5/15
5	SWJWPH005-21U	2	1-Sparse	D	ln	e	mll	27 yd shore s from Area	patch on both sides, docks	43° 14' 51.107" N	86° 19' 17.487" W	11/5/15
6	SWJWPH006-52U	5	2-Patchy	D	nl	ed	mll	43 yd shore from Area	docks	43° 14' 49.983" N	86° 19' 11.274" W	11/5/15
7	SWJWPH007-54U	5	4-Monoculture	U	nl	ed	mll	38 yds from Area	near road end, Pinewood	43° 14' 46.310" N	86° 19' 4.858" W	11/5/15
8	SWJWPH008-53U	5	3-Dense	N 2013?	nl	abde	mll	29 yds from Area	minimal docks present, County owned, Beechwood	43° 14' 45.887" N	86° 18' 57.897" W	11/5/15
9	SWJWPH009-54U	5	4-Monoculture	U	nt	bde	mll	30yrds from Area	mouth of green crk,	43° 14' 45.879" N	86° 18' 49.730" W	11/5/15
10	SWJWPH010-54U	5	4-Monoculture	U	n	abde	mll	29yrds from Area	mono density with cattails in band near shore	43° 14' 43.870" N	86° 18' 43.722" W	11/5/15
11	SWJWPH011-53U	5	3-Dense	U	n	be	mll	18 yrds from Area		43° 14' 42.957" N	86° 18' 37.879" W	11/5/15
12	SWJWPH012	5	3-Dense	U	nl	e	mll	18 yrds from Area	docks	43° 14'	86° 18'	11/5/15

	-53U									41.265" N	29.189" W	
13	SWJWPH013 -53U	5	3-Dense	U	nl	e	mll	37 yrds from Area	seawalls, docks, nearby marina	43° 14' 39.996" N	86° 18' 22.233" W	11/5/15
14	SWJWPH014 -52U	5	2-Patchy	U	nd	be	mll	28 yrds from Area	Ph in ditch @ Buys Rd N. of Memorial, no perm	43° 14' 37.801" N	86° 18' 12.586" W	11/5/15
15	SWJWPH015 -53U	5	3-Dense	U	nl	e	mll	40 yrds from Area, took photo	no permission for parcel adjacent to rd end	43° 14' 34.428" N	86° 18' 0.731" W	11/5/15
16	SWJWPH016 -52U	5	2-Patchy	D	lng	e	mll	78 yrds from Area	grooming below seawall to north, no permission	43° 14' 30.706" N	86° 17' 52.896" W	11/5/15
17	SWJWPH017 -21U	2	1-Sparse	U	n	e	mln	24 yrds from Area	east of NOAA restoreation Pointe Marine, pilings	43° 14' 27.665" N	86° 17' 39.625" W	11/5/15
18	SWJWPH018 -11U	1	1-Sparse	D	n	b	mln	83 yrds from Area	water to toe of bank, shallow, Mayors place	43° 14' 28.160" N	86° 17' 30.143" W	11/5/15
19	SWJWPH019 -22U	2	2-Patchy	D	n	b	mln	45 yrds from Area		43° 14' 28.280" N	86° 17' 25.499" W	11/5/15
20	SWJWPH020 -33D	3	3-Dense	U	nl	abce	mln	37 yrds from Area		43° 14' 28.078" N	86° 17' 18.251" W	11/5/15
21	SWJWPH021 -42U	4	2-Patchy	U	n	abde	mln	41 yrds from Area	no permission, old dock	43° 14' 28.461" N	86° 17' 7.413" W	11/5/15
22	SWJWPH022 -53D	5	3-Dense	U	n	abe	mln	53 yrds from Area	no permission	43° 14' 30.383" N	86° 17' 0.857" W	11/5/15
23	SWJWPH023 -51U	5	1-Sparse	D	ng	e	mln	50 yrds from Area	no permission	43° 14' 44.081" N	86° 16' 54.356" W	11/5/15
24	SWJWPH024 -33U	3	3-Dense	U	n	abd	mln	38 yrds from Area	winds picked up 15 mph, whitecaps	43° 14' 46.556" N	86° 16' 49.972" W	11/5/15
25	SWJWPH025 -52D	5	2-Patchy	D	lg	abde	mln	47 yrds from Area	dock,	43° 14' 50.512" N	86° 16' 36.419" W	11/5/15
26	SWJWPH026 -51U	5	1-Sparse	D	nlg	e	mln	35 yrds from Area	Tostinabe Assoc community area, access site	43° 14' 52.427" N	86° 16' 31.421" W	11/5/15
27	SWJWPH027 -42U	4	2-Patchy	D	nlg	e	mln	54 yrds from Area	seawalls, dock, and lawns	43° 14' 55.014" N	86° 16' 27.339" W	11/5/15
28	SWJWPH028 -52U	5	2-Patchy	D	nlg	e	mln	38 yrds from Area	Dock	43° 14' 56.050" N	86° 16' 24.586" W	11/5/15
29	SWJWPH029 -22U	2	2-Patchy	D	nlg	e	mln	41 yrds from Area	no permission	43° 14' 58.173" N	86° 16' 15.191" W	11/5/15
30	SWJWPH030 -53U	5	3-Dense	U	n	e	mln	22 yrds from Area	point adjacent to park, pilings and slabwood	43° 14' 56.848" N	86° 16' 9.678" W	11/5/15
31	SWJWPH031 -52U	5	2-Patchy	N 2012	nlg	bde	mln	46 yrds from Area	Waterfont sports park, dirt launch & dock	43° 15' 1.768" N	86° 16' 4.636" W	11/5/15
32	SWJWPH032 -21U	2	1-Sparse	D	nlg	de	mln	56 yrds from Area	dock	43° 15' 7.784" N	86° 16' 3.739" W	11/5/15
33	SWJWPH033 -42U	4	2-Patchy	U	ng	e	mln	30 yrds from Area	no permission	43° 15' 18.918" N	86° 15' 59.686" W	11/5/15
34	SWJWPH034 -11U	1	1-Sparse	D	ng	e	mln	30 yrds from Area		43° 15' 23.232" N	86° 15' 54.943" W	11/5/15

35	SWJWPH035-11U	1	1-Sparse	D	gn	e	mln	24 yrds from Area	no permission	43° 15' 24.768" N	86° 15' 53.165" W	11/5/15
36	SWJWPH036-42U	4	2-Patchy	D	g	e	mln	35 yrds from Area		43° 15' 28.369" N	86° 15' 46.107" W	11/5/15
37	SWJWPH037-53U	5	3-Dense	U	nl	abde	mln	27 yrds from Area	dock, road end	43° 15' 30.384" N	86° 15' 38.105" W	11/5/15
38	SWJWPH038-42U	4	2-Patchy	U	nl	abde	bll	7 yrds from Area all the way to shore	channel mouth west side	43° 14' 41.728" N	86° 17' 43.435" W	11/5/15
39	SWJWPH039-21U	2	1-Sparse	U	nl	e	bll	17 yrds from Area		43° 14' 44.113" N	86° 17' 45.399" W	11/5/15
40	SWJWPH040-22D	2	2-Patchy	D	nlgt	abe	bll	17 yrds from Area	beach grooming on point, no permission	43° 14' 50.129" N	86° 17' 44.743" W	11/5/15
41	SWJWPH041-11U	1	1-Sparse	U	nl	e	bll	17 yrds from Area	no permission	43° 14' 52.109" N	86° 17' 43.536" W	11/5/15
42	SWJWPH042-21U	2	1-Sparse	U	l	ae	bll	14 yrds from Area	no permission	43° 15' 5.567" N	86° 17' 36.869" W	11/5/15
43	SWJWPH043-31U	3	1-Sparse	U	g	ade	bll	18 yrds from Area	phrag adjacent to groomed beach	43° 15' 9.570" N	86° 17' 33.283" W	11/5/15
44	SWJWPH044-21U	2	1-Sparse	D	lg	e	bll	15 yrds from Area	dock, phrag nearby	43° 15' 11.325" N	86° 17' 26.796" W	11/5/15
45	SWJWPH045-11U	1	1-Sparse	D	ngl	de	bll	33 yrds from Area		43° 15' 14.563" N	86° 17' 23.809" W	11/5/15
46	SWJWPH046-32U	3	2-Patchy	U	ng	abde	bll	15 yrds from Area	no permission	43° 15' 16.481" N	86° 17' 22.566" W	11/5/15
47	SWJWPH047-53U	5	3-Dense	D	ntgl	abde	bll	22 yrds from Area	no permission	43° 15' 21.756" N	86° 17' 20.408" W	11/5/15
48	SWJWPH048-43U	4	3-Dense	U	n	abde	bll	27 yrds from Area	no permission	43° 15' 22.617" N	86° 17' 13.883" W	11/5/15
49	SWJWPH049-31U	3	1-Sparse	U	ng	abe	bll	19 yrds from Area	no permission, groomed beach to east	43° 15' 24.439" N	86° 17' 7.829" W	11/5/15
50	SWJWPH050-11U	1	1-Sparse	U	ngdl	abde	bll	22 yrds from Area	no permission	43° 15' 27.313" N	86° 17' 5.781" W	11/5/15
51	SWJWPH051-22U	2	2-Patchy	D	ngl	e	bll	16 yrds from Area	lawns and grooming	43° 15' 35.376" N	86° 16' 46.438" W	11/5/15
52	SWJWPH052-21D	2	1-Sparse	D	gl	e	bll	26 yrds from Area	docks and grooming	43° 15' 36.846" N	86° 16' 43.405" W	11/5/15
53	SWJWPH053-52D	5	2-Patchy	U	gl	abde	bll	23 yrds from Area	small access site, limited development, no perm	43° 15' 50.777" N	86° 16' 20.246" W	11/5/15
54	SWJWPH054-52U	5	2-Patchy	D	nt	abd	bll	33 yrds from Area, patchy on heavy side	shallow, weedy, creek mouth, no permission	43° 15' 53.591" N	86° 16' 14.427" W	11/5/15
55	SWJWPH055-32D	3	2-Patchy	D	ng	e	bln	25yrds from Area	no permission, residential area	43° 15' 25.258" N	86° 16' 22.987" W	11/5/15
56	SWJWPH056-33U	3	3-Dense	U	ng	e	bln	25 yrds from Area	between groomed beaches	43° 15' 23.044" N	86° 16' 30.058" W	11/5/15
57	SWJWPH057	2	3-Dense	U	gl	ae	bln	25 yrds from Area	road end, near control point	43° 15'	86° 16'	11/5/15

	-23U									17.579" N	32.765" W	
58	SWJWPH058-22D	2	2-Patchy	D	ngl	e	bln	33 yrds from Area	no permission	43° 15' 14.244" N	86° 16' 43.469" W	11/5/15
59	SWJWPH059-21D	2	1-Sparse	D	gl	e	bln	25 yrds from Area	no permission, residenses	43° 15' 10.391" N	86° 16' 55.657" W	11/5/15
60	SWJWPH060-21D	2	1-Sparse	D	gl	e	bln	24 yrds from Area	No permission	43° 14' 59.752" N	86° 17' 14.690" W	11/5/15
61	SWJWPH061-33U	3	3-Dense	U	gl	e	bln	18 yrds from Area	no permission	43° 14' 56.408" N	86° 17' 23.795" W	11/5/15
62	SWJWPH062-22D	2	2-Patchy	D	g	e	bln	23 yrds from Area		43° 14' 51.693" N	86° 17' 30.430" W	11/5/15
63	SWJWPH063-21U	2	1-Sparse	D	g	e	bln	17 yrds from Area		43° 14' 49.864" N	86° 17' 34.445" W	11/5/15
64	SWJWPH064-11D	1	1-Sparse	D		e	bln	15 yrds from Area	no permission	43° 14' 44.568" N	86° 17' 40.262" W	11/5/15
65	IWJWPH065-32D	3	2-Patchy	2012	ndt	abcd	mlm	Richards Park along pond outlet	NOAA Restoration location	43° 15' 14.750" N	86° 14' 10.227" W	11/10/15
66	SWJWPH066-41N	4	1-Sparse	2012, 2015	nl	abde	mlm	Grand Trunk wet at brdwk	treated in 10/15, a few scattered plants, NOAA	43° 13' 0.672" N	86° 17' 45.836" W	11/10/15
67	SWJWPH067-42N	4	2-Patchy	2012, 2015	nlo, disturbed	a	mlm	Grand Trunk upland	Spotted Knapweed, NOAA restoration site	43° 13' 2.442" N	86° 17' 42.868" W	11/10/15
68	SWJWPH068-52N	5	2-Patchy	2012	ngl	abe	mlm	Phrag strts 30 yds west of gps point	Dense along shore here	43° 13' 35.483" N	86° 16' 36.391" W	11/10/15
69	SWJWPH069-21N	2	1-Sparse	2012	nl	e	mlm	City Marina	Phrag on both sides of channel, near NOAA site	43° 13' 56.753" N	86° 16' 18.194" W	11/10/15
70	SWJWPH070-21N	2	1-Sparse	2012	nlg	e	mlm	W. MI Stl	SE crnr of bay, NOAA restoration	43° 13' 57.679" N	86° 16' 22.585" W	11/10/15
71	SWJWSK071-52N	5	2-Patchy	2012, 2015	ng		mlm	Kirksey bk pth	Spotted Knapweed, NOAA restoration	43° 13' 54.995" N	86° 16' 26.846" W	11/10/15
72	SWJWSK072-11N	1	1-Sparse	2012	n		mlm	Heritage Landing east bay	Spotted Knapweed, NOAA Restoration site	43° 14' 0.296" N	86° 15' 45.388" W	11/10/15
73	SWJWPH073-11N	1	1-Sparse	2012		de	mlm	Hertiage Landing west bay	NOAA Restoration site	43° 13' 53.793" N	86° 15' 43.507" W	11/10/15
75	SWJWPH075-53U	5	3-Dense	2012	ndlt	abcde	mln	Reinfestation	Meres treated in 2012	43° 15' 38.525" N	86° 15' 2.820" W	11/25/15
76	SWJWPH076-42U	4	2-Patchy	U	ndlg	abde	mln	Conservation Club	West side of pennisula	43° 15' 33.968" N	86° 15' 18.499" W	11/25/15
77	IWJWTH077-21D	2	1-Sparse	2012	nlt	abcde	mlm	Richards Park	saw none, lots of other shrubs	43° 15' 7.229" N	86° 14' 17.827" W	11/25/15
78	IWJWTH078-11U	1	1-Sparse	2012	ntl	abcde	mlm	Richards Park near bike trail	Stumps Visable	43° 15' 6.909" N	86° 14' 19.215" W	11/25/15
79	IWJWPH079-53N	5	3-Dense	2012	nt	abd	mlm	Old farmers market	Ryerson crk at park	43° 14' 26.004" N	86° 14' 20.415" W	11/25/15
80	IWJWPH080	2	2-Patchy	2012	nt		mlm	Ryerson	Restoration site, in median	43° 14'	86° 14'	11/25/15

	-22N									21.805" N	26.483" W	
81	IWJWPH081-21N	2	1-Sparse	2012	nt	a	mlm	Ryserson	Restoration site	43° 14' 18.530" N	86° 14' 36.058" W	11/25/15
82	IWJWPH082-42N	4	2-Patchy	2012	nt	a	mlm	Ryerson	between highway 10 yds north of vegetation	43° 14' 18.543" N	86° 14' 33.528" W	11/25/15
83	IWJWPH083-50D	5	0-None	D	nt	a	mlm	Ruddiman	Point taken from top of ravine	43° 12' 52.860" N	86° 16' 55.134" W	11/25/15
84	SWJWSK084-21N	2	1-Sparse	2012, 2015	n	a	mlm	along trail	in disturbed areas along path, restoration site	43° 13' 14.479" N	86° 17' 3.889" W	11/25/15
85	SWJWPH085-31N	3	1-Sparse	2012	n	a	mlm	adjacent to bike path	a few plants showing, NOAA	43° 13' 15.600" N	86° 17' 3.876" W	11/25/15
86	SUJWSK086-33N	3	3-Dense	2012, 2015	n	a	mlm	Bike Trail Pavillion	Spotted Knapweed, NOAA	43° 13' 20.346" N	86° 16' 59.851" W	11/25/15
87	SWJWPH087-52N	5	2-Patchy	2012	n		mlm	Bike Trail	Spreading between trail and tracks	43° 13' 21.842" N	86° 16' 45.610" W	11/25/15
88	SWJWSK088-23N	2	3-Dense	2012, 2015			mlm	Bike Trail	on bank at shoreline NOAA restoration	43° 13' 17.342" N	86° 17' 5.281" W	11/25/15

2016 Plant Survey Attribute Tables

PtNo	NAME	Area	Density	YrsTrt	DspPath	Values	LocCode	NOTES	OTHER	Date_Coll	YCoor	XCoor	Plant
3	SWJWPH003-11N	1	1-Sparse	D	l	e	mll	33y	lawn to seawall, no permission	8/9/2016	43° 14' 53.422" N	86° 19' 35.319" W	Phrag
4	SWJWPH004-11N	1	1-Sparse	2015, 2016	nl	be	mll	21y	small patch by dock in cattails	8/9/2016	43° 14' 52.048" N	86° 19' 27.065" W	Phrag
5	SWJWPH005-11N	1	1-Sparse	2015 2016	nlg	be	mll	37.5y	est. 95%+ kill of Phragmites from 2015 treatment	8/9/2016	43° 14' 52.419" N	86° 19' 23.634" W	Phrag
7	SWJWPH007-22N	2	2-Patchy	2015, 2016	nlo	abde	mll	61y	patchy near shore, near road end	8/9/2016	43° 14' 46.889" N	86° 19' 5.076" W	Phrag
8	SWJWPH008-32N	3	2-Patchy	2015, 2016	nlo	abde	mll	27y	near road end	8/9/2016	43° 14' 46.883" N	86° 19' 3.586" W	Phrag
9	SWJWPH009-21N	2	1-Sparse	2015, 2016	nl	abde	mll	26y	near center of county property	8/9/2016	43° 14' 46.434" N	86° 18' 58.533" W	Phrag
10	SWJWPH010-42N	4	2-Patchy	2015, 2016	nlo	abde	mll	29y	est. 80% kill, road end	8/9/2016	43° 14' 46.262" N	86° 18' 55.395" W	Phrag
11	SWJWPH011-54U	5	4-Monoculture	U	n	e	mll	40y	no permission,	8/9/2016	43° 14' 42.858" N	86° 18' 37.391" W	Phrag
12	SWJWPH012-42N	4	2-Patchy	2015, 2016	nl	e	mll	48.5y	partial kill est. 40%	8/9/2016	43° 14' 42.659" N	86° 18' 34.942" W	Phrag
13	SWJWPH013-43N	4	3-Dense	2015, 2016	nl	e	mll	45y	young plants, landowner cut	8/9/2016	43° 14' 42.055" N	86° 18' 32.183" W	Phrag

14	SWJWPH014-32N	3	2-Patchy	2015, 2016	nl	e	mll	33y	near 2015 no permission parcel	8/9/2016	43° 14' 41.508" N	86° 18' 29.159" W	Phrag
15	SWJWPH015-43D	4	3-Dense	2016	nl	e	mll	30y	not treated in 2015	8/9/2016	43° 14' 41.301" N	86° 18' 27.593" W	Phrag
16	SWJWPH016-22U	2	2-Patchy	U	l	e	mll	35y	no permission ?, marina property	8/9/2016	43° 14' 38.883" N	86° 18' 19.593" W	Phrag
17	SWJWPH017-21U	2	1-Sparse	U	g	e	mll	35y	no permission	8/9/2016	43° 14' 35.535" N	86° 18' 6.078" W	Phrag
18	SWJWPH018-42U	4	2-Patchy	2015, 2016	nl	e	mll	45y	west of road end	8/9/2016	43° 14' 34.565" N	86° 18' 1.794" W	Phrag
19	SWJWPH019-11N	1	1-Sparse	D, 2015?	g	e	mll	66y		8/9/2016	43° 14' 33.533" N	86° 17' 58.044" W	Phrag
20	SWJWPH020-11N	1	1-Sparse	2015, 2016	ng	e	mll	60y	on peninsula	8/9/2016	43° 14' 31.006" N	86° 17' 53.523" W	Phrag
21	SWJWPH021-11N	1	1-Sparse	2015, 2016	ngl	de	mln	81.5y	at base of seawall	8/9/2016	43° 14' 27.001" N	86° 17' 20.362" W	Phrag
22	IUJWPH022-23U	2	3-Dense	2015, 2016	ngl	e	mln	59.5y	dense patch above seawall on bank	8/9/2016	43° 14' 28.513" N	86° 17' 17.816" W	Phrag
23	SWJWPH023-11N	1	1-Sparse	2015, 2016	nl	de	mln	73	near Johnsons Point	8/9/2016	43° 14' 28.105" N	86° 17' 6.313" W	Phrag
24	SWJWPH024-44U	4	4-Monoculture	U	ng	de	mln	43y	solid patch no permission	8/9/2016	43° 14' 30.651" N	86° 17' 0.951" W	Phrag
25	SWJWPH025-23U	2	3-Dense	U	g	de	mln	51	no permission	8/9/2016	43° 14' 44.478" N	86° 16' 52.838" W	Phrag
26	SWJWPH026-11U	1	1-Sparse	2016	ngl	de	mln	57	purple loostrife getting foothold, no perm	8/9/2016	43° 14' 49.091" N	86° 16' 38.818" W	Phrag, PL
27	SWJWPH027-32U	3	2-Patchy	U	ngl	de	mln	44	pl too, no permission	8/9/2016	43° 14' 49.895" N	86° 16' 37.900" W	Phrag, PL
28	SWJWPH028-22U	2	2-Patchy	2015, 2016	nl	be	mln	29.5	pl here as well	8/9/2016	43° 14' 50.732" N	86° 16' 36.571" W	Phrag, PL
29	SWJWPH029-53U	5	3-Dense	U	nl	be	mln	36	no permission	8/9/2016	43° 14' 51.087" N	86° 16' 34.871" W	Phrag
30	SWJWPH030-33N	3	3-Dense	2015	nlg	abe	mln	31.5	landowner treated	8/9/2016	43° 14' 51.914" N	86° 16' 32.622" W	Phrag
31	IUJWPL031-21U	2	1-Sparse	2016	nlg	e	mln	96	a little phrag here as well, 1st yr treatment	8/9/2016	43° 14' 52.212" N	86° 16' 31.081" W	Phrag, PL
32	SWJWPH032-21N	2	1-Sparse	2015?	lg	e	mln	35	treatment not recorded as complete, lots of docks	8/9/2016	43° 14' 55.491" N	86° 16' 27.098" W	Phrag
33	SWJWPH033-43U	4	3-Dense	2016	nlg	e	mln	56		8/9/2016	43° 14' 57.699" N	86° 16' 15.048" W	Phrag
34	SWJWPH034-43U	4	3-Dense	2016	nlg	de	mln	30	purple loosestrife on east end	8/9/2016	43° 14' 57.203" N	86° 16' 10.667" W	Phrag, PL
35	SWJWPH035-31N	3	1-Sparse	2015, 2016	nlg	de	mln	62	Purple Loostrife is sparse, City of NM park	8/9/2016	43° 14' 59.849" N	86° 16' 7.424" W	Phrag, PL

38	SWJWPH038-11D	1	1-Sparse	2015, 2016	g	e	mln	65	small group of young plants	8/9/2016	43° 15' 19.118" N	86° 15' 58.365" W	Phrag
39	SWJWPH039-22N	2	2-Patchy	2015, 2016	n	abe	mln	49	City park, no access at toe of bank	8/9/2016	43° 15' 22.041" N	86° 15' 55.930" W	Phrag
40	SWJWPH040-23D	2	3-Dense	2015, 2016	g	e	mln	34		8/9/2016	43° 15' 24.770" N	86° 15' 52.499" W	Phrag
41	SWJWPH041-11N	1	1-Sparse	2015, 2016	lg	e	mln	41		8/9/2016	43° 15' 27.420" N	86° 15' 47.736" W	Phrag
42	SWJWPH042-22N	2	2-Patchy	2015, 2016	ng	be	mln	30	beach grooming adjacent to west	8/9/2016	43° 15' 29.641" N	86° 15' 40.298" W	Phrag
43	SWJWPH043-21N	2	1-Sparse	2015, 2016	ng	abe	mln	40	end of lake street	8/9/2016	43° 15' 30.544" N	86° 15' 37.404" W	Phrag
44	SWJWPH044-11N	1	1-Sparse	2015, 2016	n	abe	mln	42	conservation club	8/9/2016	43° 15' 30.602" N	86° 15' 32.847" W	Phrag
46	SWJWPH046-22N	2	2-Patchy	2015, 2016	nlg	abe	bll	10	docks, channel entrance	8/9/2016	43° 14' 41.551" N	86° 17' 43.535" W	Phrag
47	SWHWPH047-11N	1	1-Sparse	2015? 2016	ng	e	bll	30		8/9/2016	43° 14' 45.781" N	86° 17' 45.032" W	Phrag
49	SWJWPH049-23N	2	3-Dense	D	nlg	e	bll	17		8/9/2016	43° 14' 50.430" N	86° 17' 44.423" W	Phrag
50	SWJWPH050-11N	1	1-Sparse	2015, 2016	nlg	e	bll	30		8/9/2016	43° 14' 52.035" N	86° 17' 42.918" W	Phrag
51	SWJWPH051-11N	1	1-Sparse	2015, 2016	lg	be	bll	51		8/9/2016	43° 15' 4.392" N	86° 17' 36.238" W	Phrag
52	SWJWPH052-44U	4	4-Monoculture	U		e	bll	18	no permission	8/9/2016	43° 15' 16.256" N	86° 17' 22.371" W	Phrag
53	SWJWPH053-33N	3	3-Dense	2015, 2016	n	ed	bll	46	treated west of pt., no permission	8/9/2016	43° 15' 21.478" N	86° 17' 18.940" W	Phrag
54	SWJWPH054-44U	4	4-Monoculture	U	n	e	bll	28	no permission	8/9/2016	43° 15' 22.214" N	86° 17' 14.522" W	Phrag
55	SWJWPH055-11U	1	1-Sparse	U	nlgd	e	bll	55	no permission	8/9/2016	43° 15' 26.961" N	86° 17' 4.849" W	Phrag
56	SWJWPH056-11N	1	1-Sparse	2015, 2016	lg	e	bll	57y	residential w/docks	8/9/2016	43° 15' 34.441" N	86° 16' 45.830" W	Phrag
58	SWJWPH058-53U	5	3-Dense	2016	g	de	bll	116	too shallow to approach	8/9/2016	43° 15' 48.818" N	86° 16' 20.536" W	Phrag
59	SWJWPH059-11U	1	1-Sparse	2016	ng	e	bln	57		8/9/2016	43° 15' 26.592" N	86° 16' 22.410" W	Phrag
60	SWJWPH060-22N	2	2-Patchy	U	n	e	bln	53y		8/9/2016	43° 15' 25.553" N	86° 16' 23.381" W	Phrag
61	SWJWPH061-11D	1	1-Sparse	D	n	e	bln	26		8/9/2016	43° 15' 24.478" N	86° 16' 24.954" W	Phrag
62	SWJWPH06	1	1-Sparse	2015	lg	e	bln	70	landowner treatment	8/9/20	43° 15'	86° 16'	Phrag

	2-11N									16	11.668" N	54.926" W	
63	SWJWPH063-11D	1	1-Sparse	U	lg	e	bln	37		8/9/2016	43° 14' 59.682" N	86° 17' 15.159" W	Phrag
64	SWJWPH064-23U	2	3-Dense	2015, 2016	lg	e	bln	32		8/9/2016	43° 14' 56.742" N	86° 17' 23.303" W	Phrag
65	SWJWPH065-11U	1	1-Sparse	2015, 2016	nlg	e	bln	47		8/9/2016	43° 14' 52.348" N	86° 17' 30.183" W	Phrag
66	SWJWPH066-23U	2	3-Dense	2016	nlg	e	bln	30	1st yr treatment	8/9/2016	43° 14' 51.428" N	86° 17' 31.811" W	Phrag
67	SWJWPH067-11U	1	1-Sparse	U	nlg	e	bln	35	no permission	8/9/2016	43° 14' 44.610" N	86° 17' 40.861" W	Phrag
68	SWJWPH068-11U	1	1-Sparse	U	nlg	e	bln	28	no permission	8/9/2016	43° 14' 42.429" N	86° 17' 42.073" W	Phrag
76	IWJWPH076-53N	5	3-Dense	2012, 2016	ndlt	abde	bln	MERES, #UIJWPH10053T	Restoration site	10/13/2016	43° 15' 38.482" N	86° 15' 2.758" W	Phrag
77	IUJWLT077-54U	5	4-Monoculture	U	n	ab	bln	MERES, #UIJWHS101		10/13/2016	43° 15' 40.676" N	86° 15' 3.413" W	Hnysckl-LT
78	IWJWPH078-32D	3	2-Patchy	2012	nt	abde	mlm	#IWJWPH102	Richards Pk, City property, @pond outlet	10/13/2016	43° 15' 14.737" N	86° 14' 10.140" W	Phrag
79	IWJWLT079-11D	1	1-Sparse	D	nt	a	mlm	#IWJWth103	Near rail line, bike trail	10/13/2016	43° 15' 6.853" N	86° 14' 19.247" W	Hnysckl-LT
80	IWJWLT080-21N	2	1-Sparse	2012, 2013	nt	a	mlm	#IUJWth104	near small boat launch, cut stumps	10/13/2016	43° 15' 7.276" N	86° 14' 18.141" W	Hnysckl-LT
81	IWJWPH081-42N	4	2-Patchy	2013, 2016	nt	abd	mlm	#IWJWPH105	Green Acres pk, NOAA site, treated 2013	10/13/2016	43° 14' 25.225" N	86° 14' 21.071" W	Phrag
82	IWJWPH082-22N	2	2-Patchy	2013, 2016	nt		mlm	#IWJWPH106	Ryerson Crk, in MDOT median, City Mgt.	10/13/2016	43° 14' 21.676" N	86° 14' 26.359" W	Phrag
83	IWJWPH083-22N	2	2-Patchy	2013, 2016	nt	ad	mlm	united way, #IWJWPH107	Ryerson Crk, along creek	10/13/2016	43° 14' 18.580" N	86° 14' 36.058" W	Phrag
84	IWJWPH084-42N	4	2-Patchy	2013, 2016	nt		mlm	#IWJWPH107/8	Ryerson Crk, in MDOT median, City Mgt.	10/13/2016	43° 14' 18.409" N	86° 14' 33.646" W	Phrag
85	IWJWSK085-41N	4	1-Sparse	2012, 2016	nlg	ae	mlm	#IUJWsk108	Grand Trunk, NOAA site, City Mgt.	10/13/2016	43° 13' 2.471" N	86° 17' 43.094" W	SK
86	SWJWPH086-N	4	1-Sparse	2012, 2015-16	nlg	abde	mlm	#SWJWPH110, almost gone-good	point taken on GT boardwalk, NOAA site	10/13/2016	43° 13' 0.681" N	86° 17' 45.818" W	Phrag
87	IWJWPH087-21U	2	1-Sparse	U		a	mlm	rudd cr, #IWJWPH111	upstream of lagoon near road	10/13/2016	43° 12' 38.669" N	86° 16' 36.631" W	Phrag
88	IWJWPH088-21N	2	1-Sparse	2012	nt	be	mlm	rudd cr, #IWJWPH111 duplicate #	Along bike path @ outlet, NOAA restoration	10/13/2016	43° 13' 11.941" N	86° 17' 8.342" W	Phrag
89	IUJWSK089-21N	2	1-Sparse	2012, 2015, 16	nt	be	mlm	#IUJWsk112	bike path, NOAA site	10/13/2016	43° 13' 11.942" N	86° 17' 8.342" W	SK
90	IUJWPH090-31N	3	1-Sparse	2012, 2016	n	abe	mlm	#IWJWPH112	bike path, NOAA restoration, scattered phrag	10/13/2016	43° 13' 15.872" N	86° 17' 3.862" W	Phrag
91	IUJWSK091-	2	2-Patchy	2012,	n		mlm	#IUJWsk113	near bike path, NOAA site	10/13/	43° 13'	86° 17'	SK

	22N			2015, 16						2016	17.378" N	5.283" W	
92	IUJWSK092-31N	3	1-Sparse	2012, 2015-16	n		mlm	#IUJWsk114	near bike path and pavillion	10/13/2016	43° 13' 20.368" N	86° 16' 59.579" W	SK
93	IUJWSK093-22N	2	2-Patchy	D	no, RR tracts		mlm	#IUJWsk115	east of bike path	10/13/2016	43° 13' 18.549" N	86° 16' 48.602" W	SK
94	IUJWPH094-51N	5	1-Sparse	2012, 2016	ng	abde	mlm	#IWJWPH116	just north of observation deck, NOAA restoration	10/13/2016	43° 13' 21.400" N	86° 16' 46.231" W	Phrag
95	IUJWPH095-22N	2	2-Patchy	2012, 2016	ng	abde	mlm	#IUJWsk117, PH in lake	SK along bike path	10/13/2016	43° 13' 22.981" N	86° 16' 44.176" W	Phrag
96	IUJWPH096-12N	1	2-Patchy	2012	n		mlm	#IUJWPH118, sk at base of slope	PH in lake is patchy but spreading, sk along RRT's	10/13/2016	43° 13' 24.680" N	86° 16' 42.134" W	Phrag
97	IUJWPH097-52N	5	2-Patchy	2012, 2016	n	ae	mlm	#IWJWPH119	thick in spots	10/13/2016	43° 13' 29.779" N	86° 16' 38.733" W	Phrag
98	IUJWBL098-11N	1	1-Sparse	2012	no		mlm	#IUJWBL120	SE of bike path along tracts	10/13/2016	43° 13' 36.295" N	86° 16' 32.733" W	Blk Lcst-BL
99	IUJWPH099-11N	1	1-Sparse	D	n		mlm	#IUJWPH12	by pond on Kirksey property	10/13/2016	43° 13' 50.058" N	86° 16' 28.341" W	Phrag
100	IUJWSK100-52N	5	2-Patchy	2012, 2016	n		mlm	#IUJWsk113, duplicate #	bike path near Kirksey	10/13/2016	43° 13' 54.972" N	86° 16' 26.833" W	SK
101	IUJWPH101-23N	2	3-Dense	2012	ndl	be	mlm	#SWJWPH114, 50 yds	on E. side of channel - City marina	10/13/2016	43° 13' 57.734" N	86° 16' 20.779" W	Phrag
102	IUJLPH102-22N	2	2-Patchy	2012	ndl	bde	mlm	#SWJWPH115	on west side of channel - City marina	10/13/2016	43° 13' 56.633" N	86° 16' 18.371" W	Phrag
103	IUJWSK103-20N	2	0	2016	n		mlm	#IUJWsk116	MCC student work area, NOAA site, Heritage Lnd	10/13/2016	43° 13' 52.717" N	86° 15' 47.297" W	SK

2017 Plant Survey Attribute Table

Pt	NAME	AREA	DENSITY	TREAT	LocCode	DspPath	Value	COMMENTS	Notes	Date_Coll	YCoor	XCoor
0	swgnph001	2	1	1	MLN	N, L, T,		mcd		7/11/2017	43° 15' 34.369" N	86° 15' 17.544" W
1	swgnph002	1	1	2	MLL	O roadend	E	3 plants showing		7/11/2017	43° 14' 53.232" N	86° 19' 22.988" W
2	magnph003	1	1	2	MLL	L	D,E	100 yds		7/11/2017	43° 14' 47.378" N	86° 18' 59.531" W
3	magnph004	1	1	2	MLL	T	B,D,E	only a very few resprouts		7/11/2017	43° 14' 46.502" N	86° 18' 51.563" W
4	mlgnph005a	1	1	2	MLL	T	B,D,E,	near grn crk mouth		7/11/2017	43° 14' 46.338" N	86° 18' 47.657" W
5	magnph005	1	2	U	MLL	O	E			7/11/2017	43° 14' 43.822" N	86° 18' 37.301" W
6	swgnph006	1	1	U	MLL	N, G	D,E	5 yds out from shore - resprouts		7/11/2017	43° 14' 36.372" N	86° 18' 5.036" W
7	swgnph007	2	1	d	BLL	N	E	BL		7/11/2017	43° 15' 16.687" N	86° 17' 22.896" W
8	swgnph008	2	4	u	BLL	T,N,L	D,E	BL		7/11/2017	43° 15' 22.552" N	86° 17' 18.374" W
9	swgnph009	1	1	u	BLL	N, G	E	BL very few		7/11/2017	43° 15' 24.853" N	86° 17' 8.253" W
10	bagnph010	2	2	2	BLL	T	B,D	BL Bear crk mouth		7/11/2017	43° 15' 54.095" N	86° 16' 13.009" W
11	bagnph011	1	1	2	BLN	G	E	resprouts		7/11/2017	43° 15' 23.315" N	86° 16' 29.316" W
12	bagnph012	1	1	d	BLN	G, L	E	next to untreated parcel		7/11/2017	43° 14' 55.948" N	86° 17' 24.476" W
13	bagnph013	1	1	d	BLN	G, L	E	next to untreated parcel		7/11/2017	43° 14' 50.603" N	86° 17' 32.462" W
14	mlupgnph015	1	3	u	MLN	O	E	upland patch GEI photo taken	phrag on hillside above shoreline 16 yds	7/11/2017	43° 14' 29.554" N	86° 17' 17.906" W
15	swgnph016	3	2	d	MLN	N	A,D,E	next to untreated parcel		7/11/2017	43° 14' 30.185" N	86° 17' 4.588" W
16	swgnph017	3	4	u	MLN	N	D,E			7/11/2017	43° 14' 31.239" N	86° 17' 2.026" W
17	swgnph018	1	2	d	MLN	N, L	D,E	40 yds		7/11/2017	43° 14' 44.436" N	86° 16' 53.584" W
18	swgnph019	4	3	d	MLN	L, N	B,D	next to untreated parcel		7/11/2017	43° 14' 51.649" N	86° 16' 34.933" W
19	swgnph020	1	1	d	MLN	L	D,E			7/11/2017	43° 15' 19.812" N	86° 16' 0.064" W
20	swjwpl021	5	1	U	MLL	N	B	pl	along lawn area PL not treated	7/20/2017	43° 14' 50.015" N	86° 18' 56.515" W

21	swjwph022	5	2	1	MLN	T, N, L, D	A,B,C,D	MERES		7/20/2017	43° 15' 38.316" N	86° 15' 2.379" W
22	iwjwph023	4	3	U	MLM	T, N	A,	Richards PK at middle channel	This side of pk not treated	7/20/2017	43° 15' 14.978" N	86° 14' 9.688" W
23	swjwpl024	1	1	U	MLM	T, N	A	Bike pth at Ruddiman outlet	Upland only treated here	7/20/2017	43° 13' 10.087" N	86° 17' 7.230" W
24	swjwsk025	2	1	2	MLM	N	E	bike trail		7/20/2017	43° 13' 13.000" N	86° 17' 6.573" W
25	swjwbl026	1	1	u	MLM	N	E	bl in fenced area	SK treated along path	7/20/2017	43° 13' 14.490" N	86° 17' 3.781" W
26	swjwsk027	1	1	2	MLM	N	E			7/20/2017	43° 13' 17.039" N	86° 17' 4.976" W
27	swjwsk028	3	2	2	MLM	N	E			7/20/2017	43° 13' 18.144" N	86° 17' 4.006" W
28	swjwsk029	5	3	u	MLM	N		rail corridor, upland, no permission		7/20/2017	43° 13' 18.238" N	86° 16' 49.102" W
29	swjwsk030	1	1	u	MLM	N				7/20/2017	43° 13' 23.492" N	86° 16' 43.684" W
30	upjwph031	1	3	U	MLM	O		s of tracks on hillside, no perm		7/20/2017	43° 13' 24.693" N	86° 16' 42.140" W
31	iwjwph032	1	1	U	MLM	N		pond, no access		7/20/2017	43° 13' 50.148" N	86° 16' 28.323" W
32	upjwsk033	5	1	U	MLM	N		City Parks mows, not spot treated		7/20/2017	43° 13' 53.857" N	86° 16' 28.591" W
33	swjwsk033	2	2	d	MLM	N	A,E	Heritage Lnd, NOAA restoration		7/25/2017	43° 13' 56.514" N	86° 15' 43.702" W
34	upjwsk034	2	2	2	MLM	N		also blk locust		7/25/2017	43° 13' 51.753" N	86° 15' 46.944" W
35	swjwpl035	1	1	0	MLM	N, T, L	E	kayak launch		7/25/2017	43° 13' 49.817" N	86° 15' 46.100" W
36	swjwsk037	1	1	d	MLM	N		ne point		7/25/2017	43° 14' 2.801" N	86° 15' 46.878" W
37	swjwpl038	1	1	1	MLM	N, T	A	Green Acres Pk, NOAA restoration	Phrag	7/25/2017	43° 14' 25.271" N	86° 14' 21.129" W
38	iwjwpl039	3	1	d	MLM	T,D,N		MDOT median along ryerson		7/25/2017	43° 14' 18.605" N	86° 14' 33.173" W
39	iwjwph040	1	1	1	MLM	T,D,N		MDOT Right of Way	some PL as well	7/25/2017	43° 14' 18.432" N	86° 14' 35.242" W
40	iwjwph041	2	3	u	MLM	T, D, N		also pl	Imediately adjacent to building	7/25/2017	43° 14' 20.901" N	86° 14' 34.053" W

2015 Treatment Evaluation Attribute Table

Pt No	Location	Area	Density	% PH	Notes	Date_colle	Coordinates
CP1	NM Water Sports Park	4 - 1/2 acre to 1 acre	2 Patchy <35% Phrag or less, 50% Woody, 15% Other	**<35**	Sparse? Area_3 100 Degree EES at waterline	9/16/2015	86°16'9.88"W, 43°15'0.467"N
CP2	DS Res/Green Creek	2 - < 1,000 sq ft	3 Dense - 60% Phrag, 40% Reed Canary grass	**60**	40% Reed canary grass, willow, wh birch, SK	9/16/2015	86°18'48.284"W, 43°14'48.093"N
CP3	RC, Ruddiman Cr, 2 stakes(N,S), 1/2Acre	4 - 1/2 acre	3 Dense - 50 % Phrag, 50% Goldenrod, grasses, nettles, thistle, willow	**50**	50%Prag,50% Goldenrod/Grasses/Nettles/Willow	9/17/2015	86°17'8.619"W, 43°13'9.893"N
CP4	Beechtree Ct, 24in water	5 - > 1 acre	1 Sparse - 5% Phrag, 95% Cattails	**5**	1/2-1Acre, Sparse, 5%Phrag, rest Cattails	9/17/2015	86°18'55.461"W, 43°14'48.828"N
CP5	H Res 3375 Memorial Dr	2 - < 1,000 sq ft	1 Sparse - <10% Phrag	**<10**	< 10% Phrag	10/7/2015	86°19'38.845"W, 43°14'55.127"N
CP6	C /J Res	2 - < 1,000 sq ft	3 Dense -90% Phrag, Godenrod, Reed CG, Grape, Dogwood	**90**	at toe of hill just inside property boundry. 60%	10/14/2015	86°16'32.228"W, 43°15'16.636"N
CP7	Cottage Grove 80% Phrag	3 - 1,000 sq ft to 1/2 acre	3 Dense - 80% Phrag, 20% other(goldenrod, cattails, managrass, thistle, rc)	**80**	cattails, scirpus americanis, reed canary grass	10/27/2015	86°18'48.321"W, 43°12'53.231"N

Benchmark survey prior to any treatments

2016 Treatment Evaluation Attribute Table

Pt No	NAME	AREA	DENSITY	TREAT	LOCATION	% PH	Notes	Date Collected	Coordinates
CP1	swjwph072-32t	3	2	1yr	001 Water Sports Park	**<15**	scattered in shrubs and shoreline <15% 50% shrubs	9/6/16	86° 16' 10.123" W, 43° 15' 0.818" N
CP2	swjwph070-51t	5	1	1yr	002 Green Creek	**<5**	young phrag <5%	9/6/16	86° 18' 48.343" W, 43° 14' 48.212" N
CP3	swjwph075-43u	4	3	U*	003 RC	**50**	no basic change noted in phrag, less grass	9/6/16	86° 17' 8.732" W, 43° 13' 9.994" N
CP4	swjwph130-51n	5	1	1yr	Beechtree	**<5**	10/16/2016 good sucess here <5% left, some PL	9/6/16	86°18'55.596"W, 43°14'48.986"N
CP5	swjwph069-10t	1	0	1yr	005 H	**0**	Posts missing - 0% Phrag	9/6/16	86° 19' 39.132" W, 43° 14' 55.665" N
CP6	swjwph071-30t	3	0	1yr	006 C	**<5**	Hillside mowed at rd end, <5% Phrag, 3 stems	9/6/16	86° 16' 32.245" W, 43° 15' 16.648" N
CP7	swjwph074-54u	4	4	U	007 Cottage Grove	**>90**	very dense bumped into post - >90% Phrag	9/6/16	86° 18' 48.316" W, 43° 12' 53.197" N

***This site treated in 2016 subsequent to evaluation review

2017 Treatment Evaluation Attribute Table

Pt No	AREA	DENSITY	TREAT	COMMENTS	% PH	Date_Coll	YCoor	XCoor
CP1	2	1	2	woody 60 percent, no phrag 0% some PL, iris	**0**	7/20/2017	43° 15' 0.783" N	86° 16' 10.128" W
CP2	5	1	2	very few phrag, 3 stems in 30ft radius	**<3**	7/20/2017	43° 14' 48.208" N	86° 18' 48.357" W
CP3	4	1	1	no phrag 0%, some PL, willow Reed Canary	**0**	7/20/2017	43° 13' 9.998" N	86° 17' 8.719" W
CP4	5	1	2	A few in shallow, none at point 0% phrag, PL	**0**	7/20/2017	43° 14' 48.984" N	86° 18' 55.637" W
CP5	3	0	2	hosko, no phrag-0%, <3% emergent veg, no post	**0**	7/20/2017	43° 14' 55.606" N	86° 19' 38.969" W
CP6	1	0	2	no phrag 0%	**0**	7/20/2017	43° 15' 16.663" N	86° 16' 32.266" W
CP7	5	4	0	95% phrag, 5% cattails, willow, mlkwd, rspbrrs	**95**	7/20/2017	43° 12' 53.229" N	86° 18' 48.328" W

2017 Evaluation Survey reflects final treatments.

Lake Michigan Lake Levels 2012 – 2017

ASSESSMENTS & CONCLUSIONS

The 2012 Phragmites Survey provided a snap-shot of the impact of Phragmites australis in the coastal wetlands and shorelines surrounding Muskegon Lake and Bear Lake. The data was collected under a different spatial criteria than the 2015, 2016, or 2017 Phragmites Surveys. This was due to the 2012 survey describing a linear distance while the 2015-17 surveys used an area data point collection method based on the MISIN Invasive Species Mapping Protocols. MISIN Protocol suggests an average 25 data points per waypoint. However we identified our data points as waypoints and estimated the area for each waypoint based on the area ranges provided in the MISIN protocol area table. These data points have been loaded to a GIS layer identified by survey year in ARCmap along with the data point attributes. Point data includes area, plant density, and attributes described in the Survey Report Key Table.

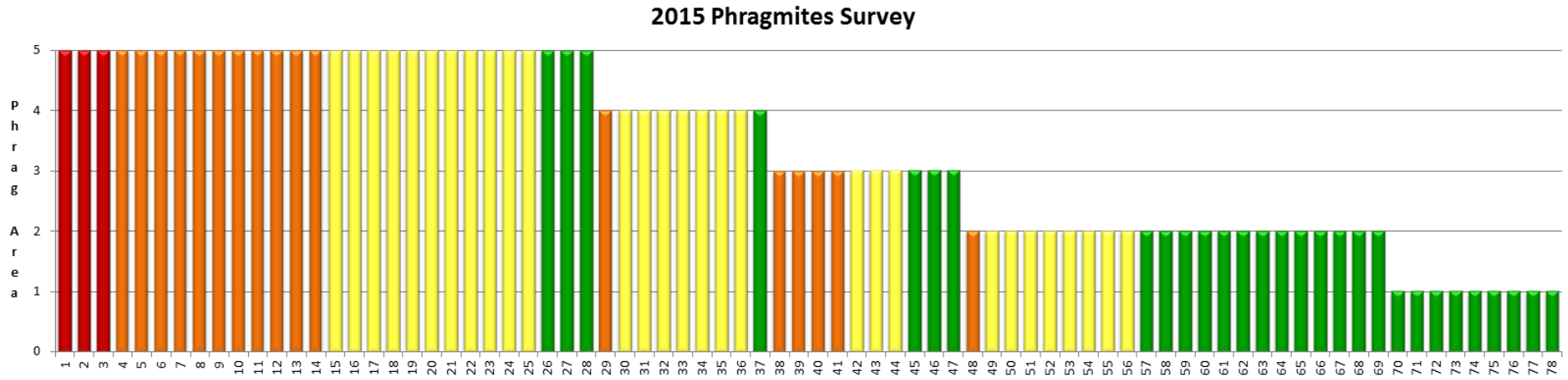
An evaluation data point layer was created to provide the comparative basis for treatment success analysis. Seven evaluation points were established. These points were also physically placed by installing metal fence posts at each of the seven evaluation data points. The posts were centered within a 10 meter diameter evaluation area. Five of these points were to be treated sites and two of these points un-treated sites in 2015. One of the two untreated sites was treated in 2016 after evaluation data was captured. Before and after photos were taken at each location and the same survey data as the Phragmites survey data was collected plus any pertinent additional notes including estimated percent treatment success / percentage phragmites remaining within the 10 meter diameter evaluation area. The onsite percent estimates per site, may be found in the evaluation data point attribute tables.

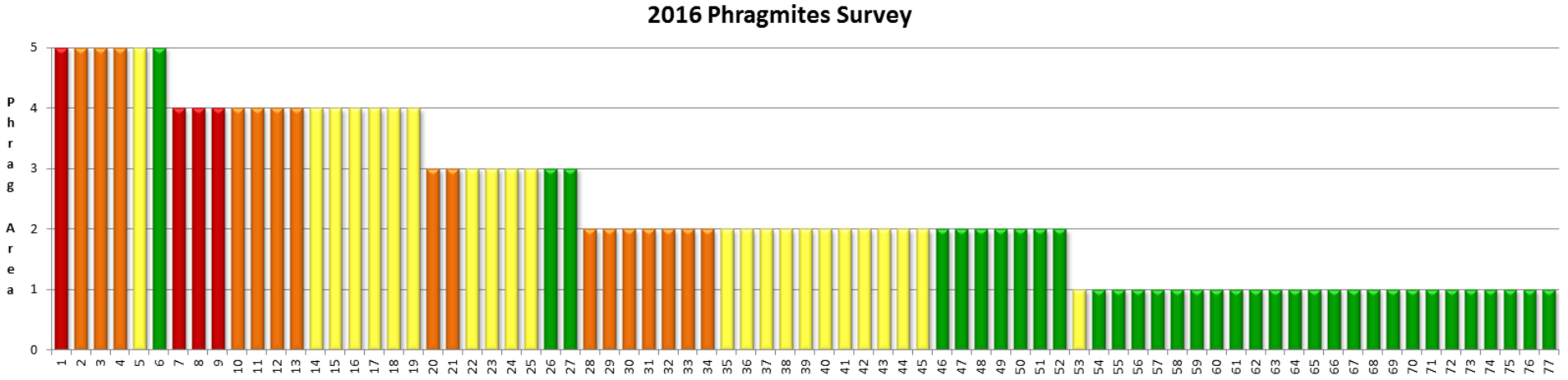
A NOAA Lakewide Annual Average Water (Blue Line) Level table (Michigan / Huron Basin) is included in the data section for reference and shows that water levels were higher than the long-term average (Red Line) levels during the grant period (2015 – 2017). This is important due to plant (Phragmites) response to water depth and allows the probability of lake levels to have had a positive influence on treatment success by providing an additional plant stressor.

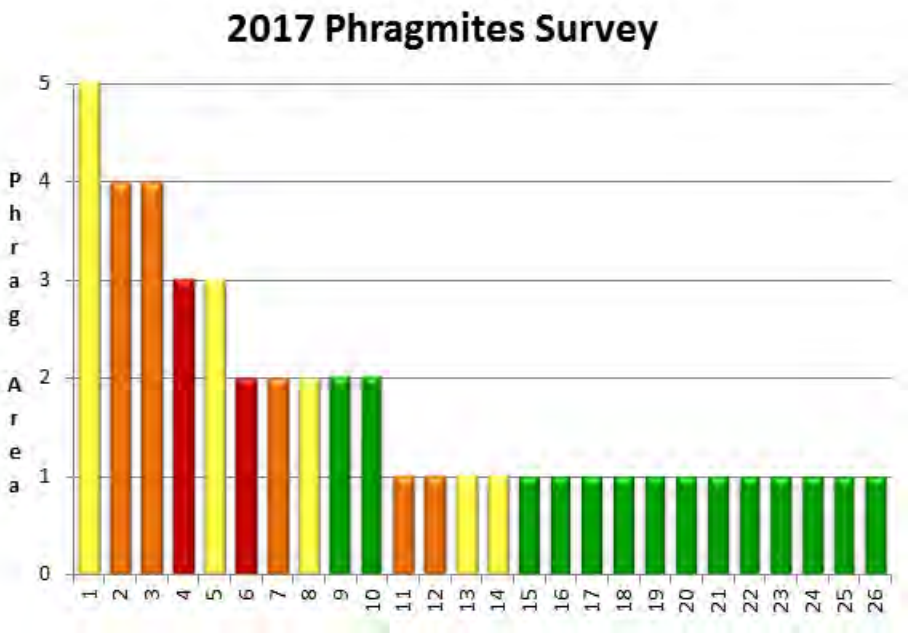
In 2015, 65.6 wetland acres and 11.9 upland acres were chemically treated for targeted invasive species removal. The acres treated in 2015 were retreated in 2016 and these treatment acres were expanded in 2016 to a total of 115.99 wetland acres and 12.558 upland acres. An additional .8 acres of upland Honeysuckle was manually removed in 2017.

Based on survey estimates of the evaluation points in 2017, the 2015 and 2016 treatments were an estimated average 97 % successful. The 2017 survey will provide a baseline benchmark of Phragmites locations and density for management decisions going forward.

Annual Phragmites Data Point Charts (Chart data includes only “PH” Phragmites data points)







MISIN AREA

1 = Individual, few, several
2 = <1000 sq ft
3 = 1000 sq ft to .5 acre
4 = .5 acre to 1 acre
5 = > 1 acre

MISIN Density

Monoculture
Dense
Patchy
Sparse

MANAGEMENT RECOMMENDATIONS

- Invasive Species Management inclusion in the Muskegon Lake Ecosystem and Habitat Management Plan.
- Addendum 2 Inventory included as component of future AOC BUI removal and habitat planning.
- Assess Invasive Species economic impacts within the Muskegon / Bear Lake watersheds.
- Plan and provide for management of untreated areas and areas of limited positive response (prevention of new stands or the spread of any remaining existing stands).
- Provide for the ability to treat Invasive Species through the development of a responsible permit holder, either MLWP, local government, or partner agency.
- Identify dispersal paths, mechanisms, and locations impacting local habitats. Develop options for expanding invasive species management areas to limit future negative impacts. Include these areas in future surveys.
- Continue monitoring.
- Provide landowners with information on alternative treatment methodology to lessen resistance to negative impacts of chemical treatments and increase treatment participation.

Local Stewardship

- Continue to work with local units of government to manage public properties, county drains, road ends, and highway corridors.
- Coordinate Management plans with partners. (Muskegon Lake Watershed Partnership, Muskegon Conservation District, West Michigan Conservation Network, Muskegon River Watershed Assembly, Annis Water Resources Institute, MDEQ, Bear Lake Board, Great Lakes Stewardship Initiative, West Michigan Shoreline Regional Development Commission, MISIN, and local units.
- Plan and carry out cyclical plant density surveys (3 -5 Yr.) and activities as listed below.
- Review target species annually, including aquatic Invasive Species.
- Provide training in Invasive Species Identification, management, and monitoring to public and partners.

STEWARDSHIP OPPORTUNITIES

Developing and promoting the active stewardship of the Muskegon and Bear Lake watersheds will be an important aspect of the Biodiversity Protection and Phragmites Management Plan Addendum 2 of the Muskegon Lake Fish and Wildlife Habitat Restoration and BUI Removal strategy. This Addendum update will provide opportunities for MLWP and its' volunteer stewards including the Invasive Species Sub-Committee of the MLWP Habitat Committee, partners (WMCN, Muskegon Conservation District, Bear Lake Board, etc.), local units of government, and landowners to address the future impacts of non-native invasive species to the health and biodiversity of Muskegon Lake and Bear Lake.

A list of Stewardship Opportunities may include but not be limited to the following.

Management actions:

- The Muskegon Lake Watershed Partnership (MLWP) will continue in its' leadership role in the stewardship of the Muskegon Lake watershed. The MLWP Habitat Committee and the Invasive Species Sub-committee will support MLWP technical over-site and objectives relating to habitat goals. The MLWP will provide the platform for partner coordination, public involvement and stakeholder interaction including social media and information exchange, and stewardship activities with the assistance of the Habitat Committee.
- Coordinate MISIN monitoring with CISMA Strike Teams or other partners with the facility to implement permits and manage treatment.
- Establish a management footprint or focus area for monitoring and treatment of Invasive Species.

Monitoring:

- Phragmites and Non-native Invasive Species GPS/GIS Survey taken on a 3 to 5 year cycle
- On site Volunteer MISIN data entry via cell phone app or website.
- Tracking Non-native Invasives and updating status in MLWP Project on MISIN website
- Volunteer and Landowner MISIN and Plant ID Training
- Student Experiential Monitoring and Training

Activities

- Annual Aquatic Invasive Species Boat Wash – Partners: MLWP, MDEQ, MRWA
- Annual Muskegon Lake Watershed/Shoreline Clean-up – Partners: MLWP, Community Groups, WMSRDC, Local Units of Government
- Annual Grand Trunk Participation Day – MLWP, Public
- Coordinating pertinent activities with West Michigan Conservation Network (formerly WM Cluster of the Stewardship Network) – CISMA Strike Teams, EDRR Plant List, Stewardship Network events, local partner events
- Invasive species removal events
- Native planting and shoreline habitat restoration events
- Host public education meetings and presentations
- Promote native shoreline plantings and BMPs with landowners