

Appendix A. Current and historical Park Lake aerial views

Image from Google Earth, July 7, 2018 (accessed 8 Feb 2020).



Image from Google Earth, October 2016 (accessed 9 March 2016)

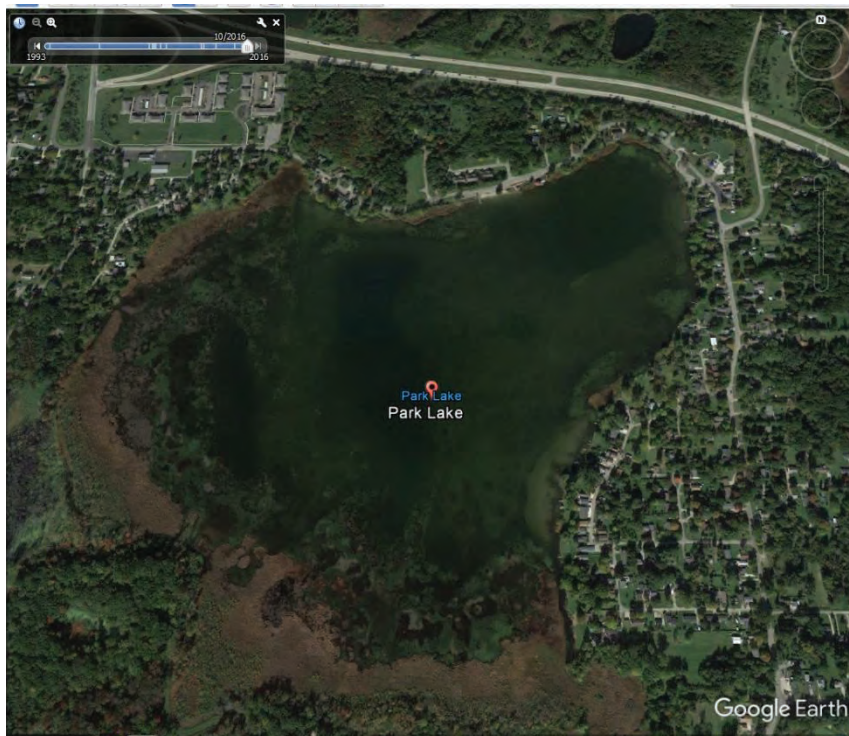


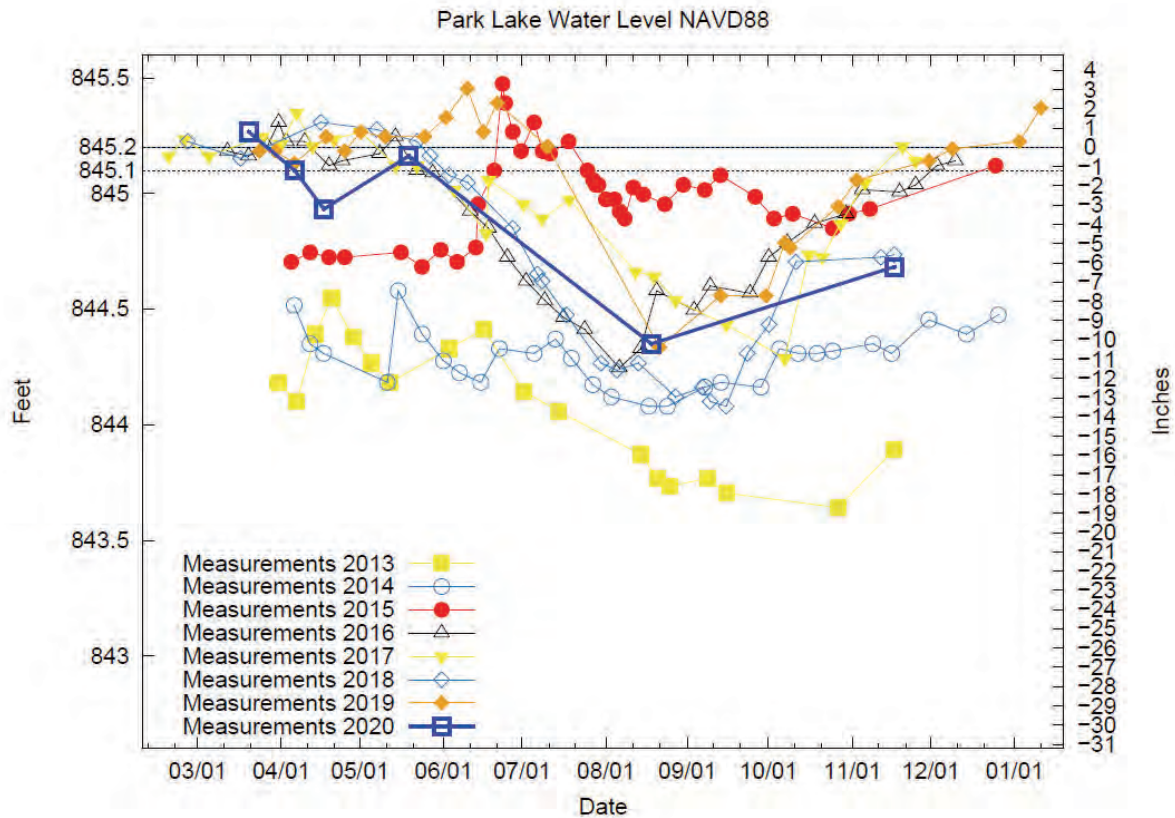
Image from Google Earth, April 2013 (accessed Feb 2015)



Image from Google Earth May 2005 (accessed Feb 2015)



Appendix B. Park Lake water levels (data provided by John Yurkon). Water control structure on the lake became operational in July 2014. One board was removed in early 2020 to facilitate repairs to a culvert located at the NW corner of the lake and was replaced later in the summer.



Appendix C. Park Lake water clarity, 2012 - 2019. The Secchi disk depth is the depth at which the disk disappears from sight as it is lowered into the lake. Deeper Secchi disk readings (meaning more negative numbers) indicate clearer water. Data collection sponsored by Friends of Park Lake. Data collected by Don Parkey, Dan Hayes, John Yurkon, Emily Galassini, J. B. McCombs and Corey Higley.

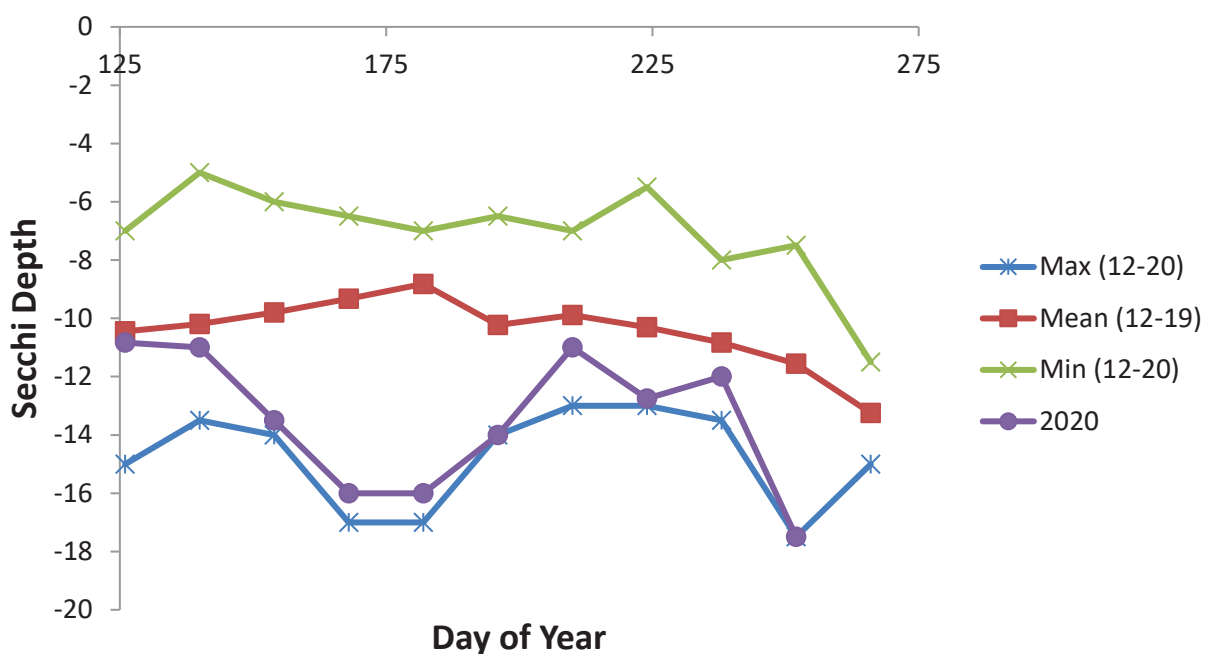


Table of mean Secchi clarity (ft), May 15 – Sept 15.

Year	Mean clarity
	(ft)
2012	9.8
2013	9.7
2014	11.1
2015	11.1
2016	8.5
2017	9.9
2018	10.1
2019	9.6
2020	13.1

Appendix D. Aquatic Plants observed in Park Lake as part of exotic plant watch survey as part of the Citizen's Lake Monitoring Program, Friends of Park Lake. Conducted by Don Parkey and Dan Hayes, 1 July 2012; Dan Hayes, Elle Gulotty, and Chaoqun Su 14 August and 8 September 2013; Dan Hayes, John Yurkon, Emi Fergus, Angela DePalma-Dow 4-6 August 2014; Dan Hayes, Hollie Lane, Tim Klifman, Erick Elgin, Dwight Washington 8-10 August 2016; Dan Hayes, Dwight Washington, Mike Vasievich 15 August, 2017; Dan Hayes, Hollie Lane, Gary Schafer 23 July, 2018; Dan Hayes, Seth Gibson, Hollie Lane 6 August, 2019; Dan Hayes 18-25 August 2020.

Common Name	Percent of sites							
	2012	2013	2014	2016	2017	2018	2019	2020
Muskgrass	65%	71%	75%	83%	69%	71%	86%	81%
White water lily	63%	32%	29%	31%	36%	45%	40%	38%
Pondweed	60%	59%	86%	35%	77%	78%	79%	83%
Eelgrass	52%	71%	32%	33%	38%	22%	36%	17%
Bladderwort	33%	8%	39%	50%	21%	31%	24%	14%
* Eurasian water milfoil	29%	59%	21%	0%	15%	49%	0%	5%
Yellow water lily	17%	4%	11%	10%	3%	6%	5%	2%
* Spiny naiad	8%	3%	0%	0%	5%	6%	2%	0%
Coontail	4%	-	14%	0%	3%	8%	7%	0%
* Starry Stonewort	2%	26%	18%	65%	85%	80%	62%	64%
Bushy pondweed	2%	45%	50%	0%	21%	12%	2%	17%
Native milfoil	-	8%	43%	6%	18%	33%	5%	2%
Elodea	0%	1%	0%	0%	3%	4%	19%	57%
Water bulrush (?)	-	-	18%	17%	15%	12%	7%	10%
*Curly-leaf pondweed	0%	0%	0%	0%	0%	0%	2%	0%

Notes:

* Non-native species highlighted in yellow.

Extensive growth of water lilies in all years prevented some areas with particularly heavy growth of white and yellow water lilies from being sampled, and thus may lead to an under estimate of the prevalence of these species.

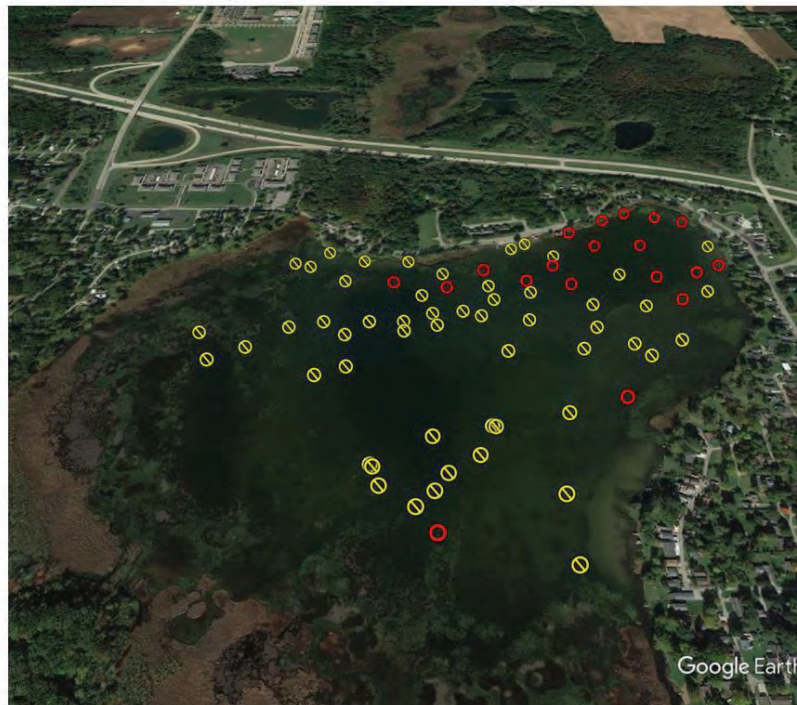
Sampling in 2014 was focused somewhat on the southern and western side of the lake, and as such percentages may not be directly comparable to other years.

Appendix E. Map of starry stonewort distribution 2012-2018. Note that no substantial change was observed in 2019 or 2020, so data from those years are not mapped.

Starry Stonewort Distribution (red circles) 2012



Starry Stonewort Distribution (red circles) 2013



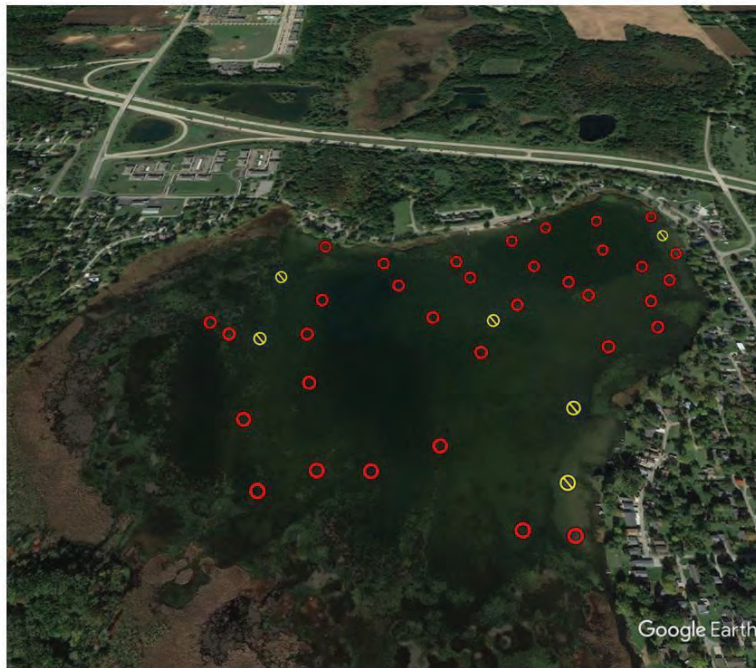
Starry Stonewort Distribution (red circles) 2014



Starry Stonewort Distribution (red circles) 2016



Starry Stonewort Distribution (red circles) 2017



Starry Stonewort Distribution (red circles) 2018



Appendix F. Results of water quality sampling conducted by Friends of Park Lake as part of the MICorps program (Michigan Clean Water Corps). Note no measurements were taken in 2020 due to COVID restrictions.

Date		Phosphorus
Sampled		(ug P/L)
2006-09-16	Late Summer	18
2012-04-07	Spring Overturn	33
2012-09-15	Late Summer	22
2013-04-21	Spring Overturn	18
2013-09-12	Late Summer	15
2014-05-05	Spring Overturn	15
2014-09-22	Late Summer	15
2015-04-01	Spring Overturn	14
2015-09-21	Late Summer	13
2016-03-20	Spring Overturn	17
2016-09-19	Late Summer	17
2017-04-02	Spring Overturn	26
2017-09-19	Late Summer	13
2018-05-17	Spring Overturn	14
2018-09-15	Late Summer	17
2019-04-10	Spring Overturn	20
2019-09-14	Late Summer	16

Date	Chlorophyll
Sampled	(mg/L)
2013-05-19	< 1.0
2013-06-19	3.9
2013-07-11	4.3
2013-08-11	3.5
2013-09-12	2.8
2014-05-14	1.1
2014-06-18	3.3
2014-07-15	5.7
2014-08-13	3.1
2014-09-22	1.9
2015-06-15	2.4
2015-07-15	9.7
2015-08-19	2.1
2015-09-21	2.5
2016-05-11	4.9
2016-06-17	4.0
2016-07-13	1.0
2016-08-14	3.4
2016-09-18	4.2
2017-05-10	1.7
2017-06-17	<1.0
2017-07-11	1.1
2017-08-10	1.3
2017-09-14	<1.0
2018-05-16	4
2018-06-16	5.1
2018-07-11	3.1
2018-08-13	17.0
2018-09-11	1.8
2019-05-17	2.3
2019-06-13	3.0
2019-07-10	4.2
2019-08-16	10
2019-09-12	3.2

Appendix G. Michigan DNR Fisheries Division prescription for Park Lake

Michigan Department of Natural Resources
Fisheries Division

Printed: 02/17/2011
Page: 1

FISHERY MANAGEMENT PRESCRIPTION

Watershed	Grand	Water	PARK LAKE
Sub-Watershed	Looking Glass River		
PRESCRIPTION IDENTIFICATION		WATER IDENTIFICATION	
Unit	Southern Lake Michigan	Primary County	
Number	2330		Clinton
Date	01/05/2011		
Prepared By	Scott Hanshew	T / R / S	05N 01W 29
Valid From	02/01/2011		
Expires	01/31/2017	Area (Ac)	185.0
Status	Approved		
Replaces No.	1205	Last Yr. Surveyed	2004
Dated	11/22/2004		

I. PROBLEM/OPPORTUNITY LIST

- Bluegills in Park Lake were historically very small with slow growth rates. Since the introduction of channel catfish the bluegill population size structure has improved. Opportunity to further improve the bluegill fishery and provide angling opportunities for channel catfish.

II. ACTION LIST AND SCHEDULE

	Begin Date	End Date	EA Excl	GL Issue	Mark/ Tag
A. Continue to stock yearling channel catfish at the rate of 10/acre on an alternate year basis.	01/01/2011	12/31/2016	Y	N	N

III. EXPECTED RESULTS, BENEFITS, AND LONGEVITY

Park Lake is a 185 acre lake located in Clinton County east of the City of Lansing in an area with few fishing lakes. It has a maximum depth of 25 feet, but half of the lake is less than 5 feet deep. It has a long history of small, slow growing bluegills. In 1994, adult channel catfish were transferred into the lake to control the stunted bluegill population. This management action was followed by alternate year plants of yearling catfish starting in 1999. Since the introduction of channel catfish the growth rates of bluegill have increased and the population size structure has improved. Bluegill collected during the 2004 survey included ages 0-IX and ranged in size from one to eight inches. Bluegill growth rates were slightly less than the state average.

The 2004 survey also showed that other fish species are doing well. The channel catfish ranged in size from 8 to 27 inches. Largemouth bass caught were 3-15 inches and northern pike were 19-31 inches. Black crappies were 5-12 inches and pumpkinseed sunfish were 2-8 inches.

It is unlikely that the channel catfish will reproduce naturally. But the survival of the planted fish appears to be good and their introduction has had a positive effect on the fish community and the fishery. Continuation of the alternate year stocking is recommend to maintain the fishery.

IV. ALTERNATIVE ACTIONS AND REASONS NOT SELECTED

- Discontinue stocking of yearling channel catfish.
Reason Not Selected:
The size structure of the bluegill population would decline and a popular channel catfish fishery would be lost.

V. RESOURCE REQUIREMENTS - Fish Stocking, Capital Outlay, Other

Activity	Cost (All Years)
Capital Outlay	\$0.
Fish Stocking	\$833.

FISHERY MANAGEMENT PRESCRIPTION

Watershed **Grand** Water **PARK LAKE**
Sub-Watershed **Looking Glass River**
PRESCRIPTION IDENTIFICATION **WATER IDENTIFICATION**
Unit **Southern Lake Michigan** Primary County
Number **2330** **Clinton**
Date **01/05/2011**

V. RESOURCE REQUIREMENTS - Fish Stocking, Capital Outlay, Other

Activity	Cost (All Years)
Other	\$0.

VI. ENVIRONMENTAL CONSIDERATIONS

1. Threatened/Endangered Species	N	11. Farm and Forest Land	N
2. Designated Wild or Scenic Area	N	12. Federal Land	N
3. Historical	N	13. Habitat Alteration	N
4. Socio-Economic Considerations	N	14. Flood Plain	N
5. Public Opposition or Concern	N	15. Wetland	N
6. Health & Safety	N	16. Bottomland/Shoreland	N
7. Construction or Modification	N	17. Discharge	N
8. Toxicant	N	18. Energy	N
9. Species Introduction	N	19. Cumulative Impacts	N
10. Land Manager Approval Needed	N	20. State Forest Implication	N

VII. ENVIRONMENTAL ASSESSMENT

Prescription is Categorically Excluded (Y/N?): Y
Public Involved and Supportive (Y/N?): Y

VIII. COORDINATION OR OUTSIDE ASSISTANCE NEEDED (Specify and Describe)

Will need to coordinate with an out-of-state hatchery in St. Marys, Ohio.

IX. ATTACHMENTS

Stocking Request Number	984
E.A.R. (Y/N)	N
Public Involvement Plan (Y/N)	N
Maps (Y/N)	N
Plans (Y/N)	N
Other (List)	N/A

XI. APPROVALS

Approval Level	Approved By	Approval Date
FMU Approval	Jay Wesley	02/01/2011

FISHERY MANAGEMENT PRESCRIPTION

Watershed	Grand	Water	PARK LAKE
Sub-Watershed	Looking Glass River		
PRESCRIPTION IDENTIFICATION		WATER IDENTIFICATION	
Unit	Southern Lake Michigan	Primary County	Clinton
Number	2330		
Date	01/05/2011		

PRESCRIPTION COMMENTS

FMU Review Comments	III. EXPECTED RESULTS, BENEFITS, AND LONGEVITY	SOM_waybranlj 01/10/2011 10:04:00
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I recommend approval.

Statewide Comments	X. PRESCRIPTION COMMENTS	SOM_lesagec 01/27/2011 16:46:00
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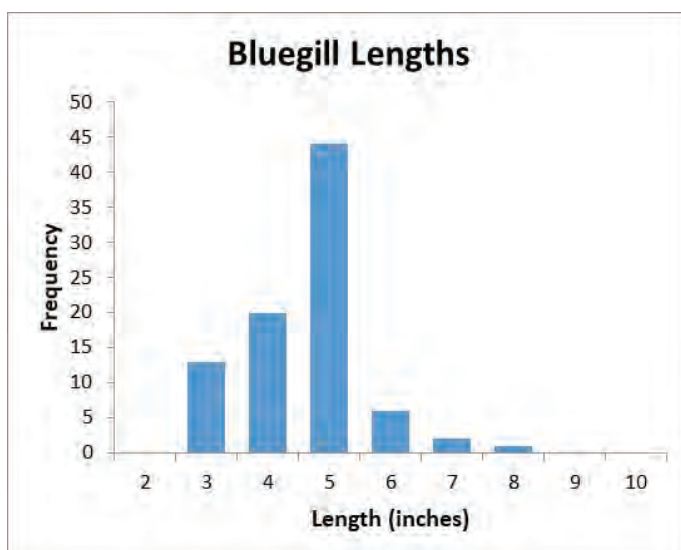
Sounds like a good plan. In other places, channel cat survival has been so good that eventually a stocking reduction has been needed because of the high predation on panfish. Just something to consider.

Statewide Comments	X. PRESCRIPTION COMMENTS	SOM_lesagec 01/28/2011 16:47:00
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All set. I recommend approval.

Appendix H. Summary of fish seen or captured in Park Lake by MSU students in FW101L (Introduction to Fish and Wildlife Lab) and FW474 (Field Techniques in Fisheries and Limnology). Length-frequency of Bluegill in 2019, based on samples from netting. No data were collected in 2020 due to COVID restrictions.

Fish Species	2011	2012	2013	2014	2015	2016	2017	2018	2019
Black chinned shiner					X				
Black Crappie	X	X	X	X	X	X		X	X
Bluegill	X	X	X	X	X	X		X	X
Bowfin	X		X	X	X				
Brown Bullhead					X	X			X
Channel Catfish	Seen	Seen	X	Seen	X	X		X	X
Common Carp	X	Seen	X	Seen	Seen			X	X
Golden Shiner	X				X				
Grass Pickerel	X		X	X	X	X		X	X
Iowa Darter					X				
Lake Chubsucker	X				X	X		X	X
Largemouth Bass	X	X	X	X	X	X		X	X
Minnows		X	X	X		X		X	X
Northern Pike	X	X			X	X		X	X
Pumpkinseed	X	X	X	X	X	X		X	X
Spot-tailed shiner								X	
Warmouth	X	X	X	X	X	X		X	X
White Sucker					X	X			
Yellow Bullhead	X				X			X	X
Yellow Perch	X	X	X	X	X	X		X	X



Appendix I. Roster of the Park Lake Advisory Board.

Year	Chair	Secretary	Committee Members
2012	Rick Price	Dan Hayes	Ray Kotke, Don Parkey, Leon Puttler, John Yurkon
2013	Dan Hayes	Cheryl Murphy	Ray Kotke, Don Parkey, Rick Price, Leon Puttler, John Yurkon
2014	Dan Hayes	Cheryl Murphy	Ray Kotke, Don Parkey, Rick Price, Leon Puttler, John Yurkon
2015	Dan Hayes	Emi Fergus	Ray Kotke, Don Parkey, Rick Price, Leon Puttler, John Yurkon
2016	Dan Hayes	Emi Fergus, Cheryl Murphy	Ray Kotke, Don Parkey, Rick Price, Leon Puttler, John Yurkon
2017	Dan Hayes	Cheryl Murphy	Ray Kotke, Don Parkey, Rick Price, Denise McCrimmon, John Yurkon
2018	Dan Hayes	Cheryl Murphy	Ray Kotke, Don Parkey, Rick Price, Denise McCrimmon, John Yurkon
2019	Dan Hayes	Cheryl Murphy	Ray Kotke, Don Parkey, Rick Price, Denise McCrimmon, John Yurkon
2020	Dan Hayes	Cheryl Murphy	Don Parkey, Rick Price, Leon Puttler, John Yurkon
2021	Dan Hayes	Cheryl Murphy	Don Parkey, Rick Price, Leon Puttler, John Yurkon

Appendix J. Climatological record for Lansing area, 2020. Accessed through <https://w2.weather.gov/climate/index.php?wfo=grr> , selecting for annual climate report (CLA).

...THE LANSING CLIMATE SUMMARY FOR THE YEAR OF 2020...

CLIMATE NORMAL PERIOD: 1981 TO 2010

CLIMATE RECORD PERIOD: 1864 TO 2021

WEATHER	OBSERVED VALUE	DATE(S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR`S VALUE	DATE(S)
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.....
TEMPERATURE (F)

RECORD

HIGH	103	07/06/2012				
LOW	-37	02/02/1868				
HIGHEST	95	07/03	MM	MM	93	07/20
		07/07				
		07/09				
						07/19
LOWEST		02/14	MM	MM	-14	01/31
						01/21
						01/30

AVG. MAXIMUM	59.0		57.5	1.5	0.0	
AVG. MINIMUM	40.6		39.1	1.5	0.0	
MEAN	49.8		48.3	1.5	0.0	
DAYS MAX >= 90	15		7.0	8.0	8	
DAYS MAX <= 32	30		51.0	-21.0	53	
DAYS MIN <= 32	98		131.0	-33.0	143	
DAYS MIN <= 0	1		7.6	-6.6	9	

PRECIPITATION (INCHES)

RECORD

MAXIMUM	41.45	2013				
MINIMUM	27.75	2010				
TOTALS	36.21		31.77	4.44	40.68	
DAILY AVG.	0.10		0.09	0.01	0.11	
DAYS >= .01	23		136.8	-113.8	159	
DAYS >= .10	12		69.0	-57.0	82	
DAYS >= .50	1		19.3	-18.3	27	
DAYS >= 1.00	1		5.2	-4.2	10	

GREATEST

24 HR. TOTAL 2.48

SNOWFALL (INCHES)

RECORDS

TOTAL	86.3	2008				
24 HR TOTAL	9.5	01/05/2014 TO 01/05/2014				
SNOW DEPTH	19	02/19/2014				
		02/18/2014				
TOTALS	37.9		51.1	-13.2	33.5	
SINCE 7/1	4.2		16.8	-12.6	MM	
SNOWDEPTH AVG.	0				0	
DAYS >= TRACE	16		44.7	-28.7	49	
DAYS >= 1.0	1		16.3	-15.3	10	

GREATEST

SNOW DEPTH	6	02/14	8	02/13
		02/15		
		02/13		
24 HR TOTAL	0.5	11/30 TO 11/30		

DEGREE DAYS				
HEATING TOTAL	6257	6711	-454	0
SINCE 7/1	2325	2551	-226	MM
COOLING TOTAL	827	623	204	0
SINCE 1/1	827	625	202	0

FREEZE DATES

RECORD

EARLIEST 08/03/1894

LATEST 07/15/1863

EARLIEST 10/15

LATEST 05/13

.....

WIND (MPH)

AVERAGE WIND SPEED	8.6		
RESULTANT WIND SPEED/DIRECTION	3/240		
HIGHEST WIND SPEED/DIRECTION	40/240	DATE	11/15
HIGHEST GUST SPEED/DIRECTION	58/320	DATE	06/11

SKY COVER

POSSIBLE SUNSHINE (PERCENT) MM

AVERAGE SKY COVER 0.47

NUMBER OF DAYS FAIR MM

NUMBER OF DAYS PC MM

NUMBER OF DAYS CLOUDY MM

AVERAGE RH (PERCENT) 69

WEATHER CONDITIONS. NUMBER OF DAYS WITH

THUNDERSTORM	26	MIXED PRECIP	0
HEAVY RAIN	32	RAIN	47
LIGHT RAIN	120	FREEZING RAIN	3
LT FREEZING RAIN	3	HAIL	0
HEAVY SNOW	3	SNOW	13
LIGHT SNOW	55	SLEET	0
FOG	165	FOG W/VIS <= 1/4 MILE	17
HAZE	51		

- INDICATES NEGATIVE NUMBERS.

R INDICATES RECORD WAS SET OR TIED.

MM INDICATES DATA IS MISSING.

T INDICATES TRACE AMOUNT.

Appendix K. Water quality testing results from samples collected in 2014-2019. No E. coli samples were collected in 2020 due to COVID restrictions.

Date	Geometric Mean E. coli /100 ml
11 June 2014	75.2
6 July 2016	53.0
27 June 2017	32.9
5 July 2018	89.9
22 July 2019	135.2

Appendix L. Approximate annual payments for Park Lake management by Bath Township

Year	Cost	Notes
2009	\$9,731	Includes plant harvesting and vegetation survey, but not DEQ permit
2010	\$17,069	Includes plant harvesting and vegetation survey, and DEQ permit
2011	\$11,097	Itemized listing not available
2012	\$10,888	Includes treatment, vegetation survey, and DEQ permit
2013	\$15,767	Includes treatment, vegetation survey, and DEQ permit
2014	\$15,630	Includes treatment, vegetation survey, and DEQ permit
2015	\$7,338	Includes treatment, vegetation survey, and DEQ permit
2016	\$20,409	Includes regular treatment plus whole-lake milfoil treatment, veg. survey, and DEQ permit
2017	\$3,352	Includes treatment, vegetation survey, but not DEQ permit. Costs much lower due to whole lake treatment previous year
2018	\$6,303	Includes costs of treatment, vegetation survey, and DEQ permit paid to PLLM, and cost of lake survey by Restorative Lake Sciences.
2019	\$25,000	Township budget allocated
2020	\$25,000	Township budget allocated

Appendix M. Water temperature and dissolved oxygen profiles, 15 August 2018. Sampling conducted by Daniel Hayes and Susan Macias.

Deep Site: Latitude 42.790961 Longitude 84.441035					
	Dissolved Oxygen (ppm)			Temperature (°F)	
Depth (ft)	6:00 AM	6:00 PM		6:00 AM	6:00 PM
0	8.5	8.9		79.3	82.8
-3	8.4	8.7		80.4	82.8
-6	8.2	8.6		80.8	82.4
-9	5.3	4.7		79.7	79.9
-12	0.2	0.3		75.4	76.5
-15	0			71.4	
Shallow Site: Latitude 42.792083 Longitude 84.435203					
	Dissolved Oxygen (ppm)			Temperature (°F)	
Depth (ft)	6:00 AM	6:00 PM		6:00 AM	6:00 PM
0	9.3	10.1		80.8	82.8
-3	9.2	10.9		81.5	82.9

Appendix N. Results of genetic testing of watermilfoil for hybridization

Michigan Hybrid Watermilfoil Project

2018 Report for Park Lake, Clinton County

Thank you for participating in this research project! Our goals are to better understand the extent of hybrid watermilfoil in Michigan's inland lakes, and to develop effective management strategies. By collecting and submitting samples from your lake, you have helped us towards those goals. In return, we are providing these genetic analysis results for the samples you submitted.

Below, you will find a table summarizing the genetic analyses, and a map showing the locations and identity of each analyzed sample. Map points may represent multiple occurrences of a species from a single location. Locations of samples that were submitted but not analyzed, or that failed analysis, may not be included.

Hybrid watermilfoil is a cross between invasive Eurasian watermilfoil (*Myriophyllum spicatum*) and native Northern watermilfoil (*M. sibiricum*). In some cases, other native milfoil species were identified, such as variable watermilfoil (*M. heterophyllum*) or whorled watermilfoil (*M. verticillatum*). Some lakes submitted samples that were not watermilfoils at all. Occasionally, genetic analysis failed for unknown reasons; this could mean that the sample was not handled appropriately in the field, or the sample was not a milfoil. To minimize these failed analyses, careful adherence to the sampling protocol is important, including ensuring that only milfoils are submitted for analysis. Finally, for lakes that submitted many samples, we chose to analyze only a subset. That subset was enough for us to understand the extent of hybrid watermilfoil in that lake.

2018 Milfoil Genetic Analysis Summary for Park Lake, Clinton County.

No. of samples submitted	39
No. of samples analyzed	21
Total Eurasian watermilfoil	15
Total hybrid watermilfoil (Eurasian x Northern)	0
Total Northern watermilfoil	0
Total Variable watermilfoil	0
Total Whorled watermilfoil	0
Total Failed analyses	6

Appendix O. Information on goose, swan, and sandhill crane nests along Park Lake, 2019-2020. The location of all nests (or broods) visible from kayak. Data collected by Dan Hayes 28 April 2019 and 24 April 2020.

Nest_ID	Latitude	Longitude
Swan_A	42.787664	-84.436578
Sandhill_Crane_A	42.786353	-84.443358
Goose_2019_A	42.787664	-84.436578
Goose_2019_B	42.785606	-84.437492
Goose_2019_C	42.784881	-84.440506
Goose_2019_D	42.785511	-84.441628
Goose_2019_E	42.785869	-84.442489
Goose_2019_F	42.786522	-84.442178
Goose_2019_G	42.793503	-84.449111
Goose_2019_H	42.789250	-84.446517
Goose_2019_I	42.791961	-84.432358

Nest_ID	Latitude	Longitude
Goose_2020_A	42.788913	84.435681
Goose_2020_B	42.787101	84.436953
Goose_2020_C	42.785574	84.437430
Goose_2020_D	42.784968	84.438198
Goose_2020_E	42.784872	84.439904
Goose_2020_F	42.784982	84.441164
Goose_2020_G	42.785558	84.441638
Goose_2020_H	42.791972	84.439853
Goose_2020_I	42.793459	84.435038

Park Lake Advisory Board Annual Planning Cycle 2021

Month	Planned Priority
January	Start preparations for annual report
February	Annual report
March	Finalize annual report
April	
May	Generally cancel meeting
June	
July	
August	Submit budget request for following year Discuss results of plant survey
September	
October	
November	Plan for issues in upcoming year
December	Generally cancel meeting

Appendix Q. Approximate dates of continuous ice on and ice out on Park Lake. Date

Ice on	Ice out
	30-Mar-05
	19-Mar-11
	24-Feb-12
	29-Mar-13
	8-Apr-14
	25-Mar-15
2-Jan-16	8-Mar-16
10-Dec-16	21-Feb-17
10-Dec-17	25-Feb-18
11-Jan-19	24-Mar-19
8-Jan-20	9-Mar-20

Appendix R. Total of boat counts and percent of images with a boat present on Park Lake, May-Oct 2019. Counts conducted via game camera mounted at 15486 Park Lake Road, images captured every ½ hour 6 am to 8:30 pm daily. Summaries exclude photographs where light conditions were too dark, or too foggy to see boats on the lake. Photographs were collected in 2020, but have not yet been fully processed at the time of writing this report.

Count of Total Watercraft								
Month	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
5	93	46	22	28	14	47	42	292
6	235	36	90	103	47	109	233	853
7	288	140	105	137	174	115	184	1143
8	221	84	61	52	100	177	205	900
9	70	102	20	31	28	11	67	329
10	8	9	7	9	24	19	24	100
Grand Total	915	417	305	360	387	478	755	3617

Month	Total Number of Photographs Evaluated
5	927
6	891
7	929
8	883
9	766
10	670
Grand Total	5066

Month	Percent of Time with Boat Present
5	20.2%
6	46.8%
7	60.7%
8	52.3%
9	27.8%
10	12.7%
Grand Total	38.1%

Appendix S. Results of water quality and vegetation sampling by PLM, 2020.

Standard Aquatic Vegetation Summary Sheet

Sunny 65 Degrees		Total number of AVAS's for each Density Category				Calculations				Sum of Columns 5-8	Total No. of AVAS	Col 9 divided by Col 10
Code No	Plant Name	A	B	C	D	A x 1	B x 10	C x 40	D x 80			
		1	2	3	4	5	6	7	8	9	10	11
1	Eurasian watermilfoil	2	7	0	0	2	70	0	0	72	41	1.76
2	Curly leaf pondweed	0	0	0	0	0	0	0	0			
3	Chara	7	20	8	0	7	200	320	0	527	41	12.85
4	Thinleaf pondweed	1	0	0	0	1	0	0	0	1	41	0.02
5	Flatstem pondweed	0	0	0	0	0	0	0	0			
6	Robbins pondweed	0	0	0	0	0	0	0	0			
7	Variable pondweed	2	8	7	3	2	80	280	240	602	41	14.68
8	White stem pondweed	0	4	0	0	0	40	0	0	40	41	0.98
9	Richardsons pondweed	0	1	0	0	0	10	0	0	10	41	0.24
10	Illinois pondweed	0	9	0	0	0	90	0	0	90	41	2.20
11	Large leaf pondweed	1	9	0	0	1	90	0	0	91	41	2.22
12	American pondweed	0	0	0	0	0	0	0	0			
13	Floating leaf pondweed	0	1	0	0	0	10	0	0	10	41	0.24
14	Water stargrass	0	0	0	0	0	0	0	0			
15	Wild celery	4	16	3	0	4	160	120	0	284	41	6.93
16	Sagittaria (submersed)	0	0	0	0	0	0	0	0			
17	Northern watermilfoil	0	0	0	0	0	0	0	0			
18	Green watermilfoil	0	0	0	0	0	0	0	0			
19	Two-leaved watermilfoil	0	0	0	0	0	0	0	0			
20	Coontail	0	0	0	0	0	0	0	0			
21	Elodea	5	8	5	7	5	80	200	560	845	41	20.61
22	Bladderwort	0	0	0	0	0	0	0	0			
23	Mini Bladderwort	0	0	0	0	0	0	0	0			
24	Buttercup	0	0	0	0	0	0	0	0			
25	Naiad	3	5	2	0	3	50	80	0	133	41	3.24
26	Brittle naiad	0	0	0	0	0	0	0	0			
27	Sago Pondweed	3	15	9	1	3	150	360	80	593	41	14.46
28	Cabomba	0	0	0	0	0	0	0	0			
29	Starry Stonewort	4	14	1	0	4	140	40	0	184	41	4.49
30	Water Lily	3	11	15	11	3	110	600	880	1593	41	38.85
31	Spatterdock	0	0	1	0	0	0	40	0	40	41	0.98
32	Water shield	0	0	0	0	0	0	0	0			
33	Lemna minor	0	0	0	0	0	0	0	0			
34	Greater duckweed	0	0	0	0	0	0	0	0			
35	Watermeal	0	0	0	0	0	0	0	0			
36	Arrowhead	1	9	0	0	1	90	0	0	91	41	2.22
37	Pickereelweed	0	0	0	0	0	0	0	0			
38	Arrow arum	0	0	0	0	0	0	0	0			
39	Cattail	2	18	1	0	2	180	40	0	222	41	5.41
40	Bulrush	0	5	0	0	0	50	0	0	50	41	1.22
41	Iris	0	0	0	0	0	0	0	0			
42	Swamp loosestrife	1	5	0	0	1	50	0	0	51	41	1.24
43	Purple loosestrife	1	4	0	0	1	40	0	0	41	41	1.00
44												
45												

Total cumulative cover**135.85**

LAKE CHECK Water Quality Monitoring Report

2020330

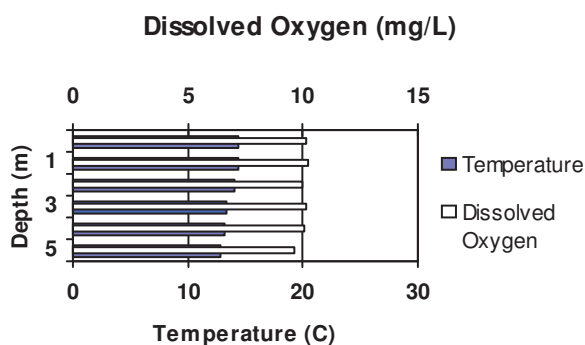
Customer	Waterbody	Sample Information
Park Lake	Park Lake	Date: 5/7/2020
		Site: Middle

On-Site Results

Depth (m)	Temperature (degrees C)	Dissolved Oxygen mg/L	%
0	14.4	10.2	99
1	14.4	10.2	100
2	14.1	10.0	98
3	13.4	10.1	98
4	13.1	10.0	95
5	12.9	9.7	93

Secchi Disk Depth 3.0 meters

Thermocline Depth meters



Analytical Results

Parameter	Result	Units	Interpretation
Fecal Bacteria (E. coli)		CFU/100 mL	N/A
Conductivity	485	uS/cm	
Total Dissolved Solids	315	mg/L	Moderate concentration of dissolved salts
pH	8.7	S.U.	Water is slightly alkaline
Alkalinity	164	mg CaCO3/L	Water is hard
Total Phosphorus	21	ug/L	Moderately phosphorus enriched
Nitrates	230	ug/L	Not nitrogen enriched
Chlorophyll	N/A		

Trophic State Evaluation

	TSI	Trophic Status
Based on Secchi Disk Depth	44	mesotrophic
Based on Total Phosphorus	44	mesotrophic
Based on Chlorophyll	N/A	

Conclusions

- Conditions are good for fish growth.
- Minimum dissolved oxygen is adequate for good fish production.
- pH is within acceptable limits.
- Phosphorus and Nitrogen are within acceptable limits.
- No remedial action recommended at this time.
- Repeat LakeCheck in Fall.

-
- WARNING, condition requires immediate attention.
 - CAUTION, condition requires further evaluation.
 - OK, condition within acceptable limits.
 - NEUTRAL, condition neither good nor bad.

Notes

Report describes conditions at the time the sample was collected.

Approved by

Jaimee Desjardins

Date 12/9/2020

Mrs. Jaimee Desjardins, Technical Services Manager

FROM YOUR



DEALER



PLM Lake & Land Management Corp
P.O. Box 132
Caledonia MI 49316-
Phone: (616) 891-1294

LAKE CHECK Water Quality Monitoring Report

2020331

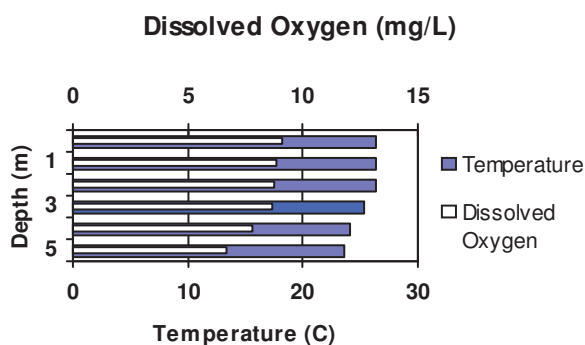
Customer	Waterbody	Sample Information
Park Lake	Park Lake	Date: 8/24/2020
		Site: Middle

On-Site Results

Depth (m)	Temperature (degrees C)	Dissolved Oxygen mg/L	%
0	26.4	9.1	96
1	26.4	8.8	88
2	26.4	8.7	87
3	25.3	8.7	86
4	24.1	7.8	67
5	23.5	6.7	61

Secchi Disk Depth 3.5 meters

Thermocline Depth 3 meters



Analytical Results

Parameter	Result	Units	Interpretation
Fecal Bacteria (E. coli)		CFU/100 mL	N/A
Conductivity	418	uS/cm	
Total Dissolved Solids	264	mg/L	Moderate concentration of dissolved salts
pH	9.0	S.U.	Water is slightly alkaline
Alkalinity	114	mg CaCO3/L	Water is soft
Total Phosphorus	19	ug/L	Moderately phosphorus enriched
Nitrates	230	ug/L	Not nitrogen enriched
Chlorophyll	N/A		

Trophic State Evaluation

	TSI	Trophic Status
Based on Secchi Disk Depth	42	mesotrophic
Based on Total Phosphorus	42	mesotrophic
Based on Chlorophyll	N/A	

Conclusions

- Conditions are good for fish growth.
- Minimum dissolved oxygen is adequate for good fish production.
- pH is within acceptable limits.
- Phosphorus and Nitrogen are within acceptable limits.
- No remedial action recommended at this time.
- REPEAT LakeCheck NEXT YEAR!

-
- WARNING, condition requires immediate attention.
 - CAUTION, condition requires further evaluation.
 - OK, condition within acceptable limits.
 - NEUTRAL, condition neither good nor bad.

Notes

Report describes conditions at the time the sample was collected.

Approved by

Jaimee Desjardins

Date 12/9/2020

Mrs. Jaimee Desjardins, Technical Services Manager

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