

EGLE

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY AQUATIC NUISANCE CONTROL PROGRAM

LAKE MANAGEMENT PLAN

Pursuant to Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and Part 33, Aquatic Nuisance Control, of the NREPA, and the administrative rules promulgated thereunder, a lake management plan is required as part of the permit application for a whole-lake chemical treatment to the waters described below for the control of nuisance aquatic vegetation.

WATERBODY NAME	COUNTY(COUNTIES)	TOWN(S)	RANGE(S)	SECTION(S)
PAW PAW LAKE	BERRIEN	35	17 W	10, 11, 14, 15, 16, 21
TITLE OF MANAGEMENT ACTIVITY		LATITUDE/ LONGITUDE		
THERMOCLINE FLURIDONE TRTMT		42° 12' 22.14" N 86° 16' 26.33 W		
I. PHYSICAL CHARACTERISTICS OF THE WATERBODY:				
LAKE SIZE (ACRES): <u>922 ac</u>				
MAXIMUM DEPTH (FEET): <u>90 ft</u>				
MEAN DEPTH (FEET): <u>31.37</u>				
LAKE VOLUME (ACRE-FEET) – Include volume calculations as an attachment:				
WHOLE LAKE = <u>28,927 acft</u>				
BASED ON 0-10 FEET DEPTH = <u>7,939.15 acft</u>				
SIZE OF LITTORAL ZONE (ACRES): <u>235.7 ac</u>				
SHORELINE LENGTH (FEET): <u>55,114 ft</u>				
SHORELINE DEVELOPMENT FACTOR: <u>2.454</u>				
RETENTION TIME (DAYS): <u>506 days</u>				
OUTLET FLOW RATE (CFS): <u>26 cfs</u> SOURCE: <u>EGLE H.S. + D.S.U</u>				
<small>(retention time and flow rate based on April mean value. See Attachment A)</small>				
<input checked="" type="checkbox"/> Location Map – include a map showing the location of the waterbody within the county(ies). <small>(See Attachment B)</small>				
<input checked="" type="checkbox"/> Bathymetric Map – include a map of the waterbody indicating the depth contours at five-foot intervals. The following attributes must be identified on the map: tributaries, outlets, inlets, public and private access sites, public land, critical fish spawning areas, wetlands, special habitats, parks, and water control structures. See guidance for instructions. <small>(See Attachment C)</small>				
<input checked="" type="checkbox"/> Land Use Map – include a map of the waterbody indicating the land use of the surrounding area. The following categories shall be used to describe the land use on the map: high density residential, low density residential, commercial/industry, agricultural, parks, and undeveloped areas. <small>(See Attachment D)</small>				

V. VEGETATION MANAGEMENT GOALS:

Indicate the appropriate management goals that are the desired outcome(s) of this program.

- Create/Maintain Swimming Areas
- Create/Protect Fish/Wildlife Habitat
- Improve Native Plant Diversity
- Protect Endangered/Threatened Species
- Create Areas for Recreational Use (boating, water skiing, fishing, etc.)
- Remove Non-native Plant Species
- Other: _____

- Management Goal Maps – include map(s) indicating locations where each of the goals may be achieved through the proposed management activities. (See Attachment J)

VI. HISTORY OF VEGETATION MANAGEMENT FOR THIS WATERBODY:

- Provide a written description of the management activities performed on the waterbody within the past ten years. Include mechanical, chemical, or biological control efforts, lake level manipulation, dredging, and fish stocking activities (including species stocked and stocking schedule). (See Attachment K)

VII. VEGETATION MANAGEMENT OPTIONS:

List all management options considered to achieve the management goals established for this waterbody. Briefly explain why each proposed management option was chosen or not chosen.

To meet the goals established for this waterbody, the management options considered are as follows, 1) The education of riparians as to reducing the external nutrient loading. 2) The use of herbicide and algaecide applications, 3) The use of mechanical/manual harvesting, 4) Biological control methods, 5) Fisheries/Invertebrate evaluations and 6) Any new treatment products or treatment strategies that become available.

A whole lake fluridone option was chosen because it is the most feasible considering the wide spread and dense growth of EWM. We can expect lake wide, long term control using this option.

VIII. VEGETATION MANAGEMENT PLAN:

Propose a three-year aquatic vegetation management plan that will be used to attain the management goals for this project by checking the appropriate box(es) below.

Year 1: 2021

	Systemic herbicides	Contact herbicides	Algaecides	Harvesting	Biological Control	Fluridone or Other
<i>Non-native Submerged Species</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Native Submerged Species</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Non-native Emergent Species</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Native Emergent Species</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Algae</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Non-native Macroalgae</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Native Macroalgae</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Year 2: 2022

	Systemic herbicides	Contact herbicides	Algaecides	Harvesting	Biological Control	Fluridone or Other
<i>Non-native Submerged Species</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Native Submerged Species</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Non-native Emergent Species</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Native Emergent Species</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Algae</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Non-native Macroalgae</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Native Macroalgae</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

IX. MONITORING AND EVALUATION:

List the proposed monitoring activities to be performed on the waterbody during the 3 years of the management plan, include proposed date(s) of each activity. Be as specific as possible.

Proposed Activity:	Proposed Date(s) and Responsible Party
<input checked="" type="checkbox"/> Aquatic vegetation survey	<u>August or September 2021, 2022, 2023 – PLM</u>
<input checked="" type="checkbox"/> Fluridone concentration sampling	<u>*48hrs, 14 days, 30 days, 60 days after initial treatment - PLM</u>
<input checked="" type="checkbox"/> EffecTEST™	<u>If EWM is present @ 60 days post treatment FasTest - PLM</u>
<input type="checkbox"/> PlanTEST™	_____
<input checked="" type="checkbox"/> Water quality sampling	<u>2020 Season - PLM</u>
<input type="checkbox"/> Fish surveys	_____
<input type="checkbox"/> Other: _____	_____

Describe how the monitoring results will be used to evaluate the success of this program in achieving the stated management goals:

Management Goals (from Section V.)

How will you evaluate your success of this goal using the monitoring results?

- Create/maintain swimming areas
- Create/protect fish/wildlife habitat
- Improve native plant density
- Create areas for recreation
- Remove exotic plant species

- Use AVAS survey to record dense nuisance areas of plant growth and rid those areas of them
- Use AVAS survey to record dense nuisance areas of plant growth and rid those areas
- Monitoring the success of the fluridone treatment through the use of FasTest and closely monitoring/controlling exotic plant growth, promoting native plant growth.
- Use AVAS survey to record dense nuisance areas of plant growth and rid those area of them
- Use AVAS survey to record dense nuisance areas of plant growth and rid those areas of them

Fluridone (or other product) Concentration Sampling Map – include a map of the waterbody showing locations where product concentration samples will be collected. Number each sample site. (See Attachment O)

* Please see potential additional fluridone sampling in Evaluation treatment proposal.

VEGETATION MANAGEMENT PLAN (CONTINUED)

Year 3: 2023

	Systemic herbicides	Contact herbicides	Algaecides	Harvesting	Biological Control	Fluridone or Other
<i>Non-native Submerged Species</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Native Submerged Species</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Non-native Emergent Species</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Native Emergent Species</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Algae</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Non-native Macroalgae</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Native Macroalgae</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Provide any additional information to clarify the proposed treatment strategy for each year of the management plan.

Year 1: Fluridone will be applied on a whole-lake basis for the control of EWM using the 6 bump 6 method as outlined in the evaluation proposal with the initial treatment in late April/early May. Algae treatments will be applied as necessary to keep to non-nuisance levels. Non- native macro algae will be treated where found. Mechanical harvesting may be utilized on nuisance native vegetation to reduce its stature but not kill plants, as to provide needed habitat for fish and wildlife. Year 2 & 3: The treatment strategy will be to promote the growth of native vegetation while deterring the growth of exotic species. To achieve this goal we will 1) Use contact or systemic herbicides or mechanical harvesting to address exotics wherever they are found, 2) Use contact herbicides or mechanical harvesting to address nuisance native vegetation in shoreline areas, 3) Use systemic herbicides to address nuisance emergent species, 4) Use algaecides or biological control methods to control nuisance algae, 5) Use algaecides or contact herbicides to control non-native macro algae. As new technologies are developed we may request to use additional tools as they become available. If EGLE determines that the Fluridone treatment was a failure the year of treatment then we may ask for the use of Fluridone during this period if EWM reaches high densities.


- Annual Vegetation Management Maps – include maps showing areas of management for each year. Be sure to compare the Management Goal Maps with the Annual Vegetation Management Maps to ensure that the proposed treatments are consistent with the management goals. (See Attachment L)
- Fluridone (or other product) Distribution Map – include a map of the waterbody indicating the proposed path of fluridone (or other product) distribution in the lake. (See Attachment M)
- Fluridone (or other product) Calculations – include any calculations used to determine the amount of fluridone (or other product) requested for use. (See Attachment N)

X. LAKE MANAGEMENT PLAN DEVELOPMENT:

Who has participated in developing the lake management plan for this project?

- | | |
|---|--|
| <input checked="" type="checkbox"/> Commercial Applicator | <input type="checkbox"/> State Agency(ies) (specify) _____ |
| <input type="checkbox"/> Lake Consultant | <input type="checkbox"/> Park Administrator/Board |
| <input type="checkbox"/> Lake Board | <input type="checkbox"/> Group of Individual Riparians |
| <input checked="" type="checkbox"/> Lake Association | <input type="checkbox"/> Back Lot Owner(s) |
| <input checked="" type="checkbox"/> Township(s)/County(ies) | <input type="checkbox"/> Other (specify) _____ |

Documentation of Lake Management Plan Development – provide documentation of participation in development of this Lake Management Plan by stakeholders and agencies responsible for managing public trust resources. Attach meeting minutes and other correspondence separately. (See Attachment P)

Lake Management Plan prepared by:  (signature)
ANDRZEW TOMASZEWSKI (print name)
SW LAKE MANAGER (Title)
PLM LAKE MANAGEMENT BOARD (Affiliation/Organization)
Date: 1/14/20

On behalf of the stakeholders or public agencies at _____, I have reviewed this lake management plan.

Lake Management Plan reviewed by: _____ (signature)
_____ (print name)
_____ (Title)
_____ (Affiliation/Organization)
Date: _____

DATE	DEPTH	TEMP F	DO	TEMP C
8/26/2020	1			
8/26/2020	2	79.3	9.16	26.27778
8/26/2020	4	79.3	9.12	26.27778
8/26/2020	6	79.3	9.1	26.27778
8/26/2020	8	79.2	9	26.22222
8/26/2020	10	79.2	8.97	26.22222
8/26/2020	12	79.2	8.96	26.22222
8/26/2020	14	79.1	8.84	26.16667
8/26/2020	16	78.2	7.19	25.66667
8/26/2020	18	76.6	4.12	24.77778
8/26/2020	20	73.9	0.99	23.27778
8/26/2020	22	69.2	0.09	20.66667
8/26/2020	24	66	0.1	18.88889
8/26/2020	26	61.5	0.08	16.38889
8/26/2020	28	57.9	0.07	14.38889
8/26/2020	30	56.6	0.09	13.66667
8/26/2020	32	55	0.06	12.77778
8/26/2020	34	53.8	0.07	12.11111
8/26/2020	36	52.9	0.07	11.61111
8/26/2020	38	52.6	0.07	11.44444
8/26/2020	40	51.7	0.06	10.94444
8/26/2020	42	51.7	0.06	10.94444
8/26/2020	44	51.5	0.07	10.83333
8/26/2020	46	51.1	0.09	10.61111
8/26/2020	48	50.8	0.08	10.44444
8/26/2020	50	50.5	0.08	10.27778
8/26/2020	52	50.1	0.05	10.05556
8/26/2020	54	49.9	0.12	9.944444
8/26/2020	56	49.7	0.09	9.833333
8/26/2020	58	49.6	0.11	9.777778
8/26/2020	60	49.4	0.1	9.666667
8/26/2020	62	49.4	0.1	9.666667
8/26/2020	64	49.4	0.06	9.666667
8/26/2020	66	49.3	0.07	9.611111
8/26/2020	68	49.3	0.11	9.611111
8/26/2020	70	49.2	0.13	9.555556
8/26/2020	72	49.1	0.14	9.5
8/26/2020	74	49.2	0.15	9.555556
8/26/2020	76	49	0.18	9.444444
8/26/2020	78	49	0.23	9.444444
8/26/2020	80	48.8	0.32	9.333333

AQUATIC NUISANCE CONTROL CHEMICAL EVALUATION TREATMENTS

A proposal for an evaluation treatment must include the following:

I. Proposal Title: Paw Paw Lake Sonar A.S. (Fluridone) Thermocline Treatment 2021

Paw Paw Lake, Berrien County, Watervliet & Coloma Townships, T3S, R17W, Sections:10,11,14,15,16,21

II. Problem Statement

State the management problem the evaluation protocol is designed to address and the hypotheses to be tested. Include the management objective(s) for this evaluation protocol.

Introduction/Problem:

Eurasian Watermilfoil is Michigan's number one submerged aquatic nuisance species. The vast majority of commercial applicator customers live on lakes, which require management of Eurasian Watermilfoil (EWM). Many of our management tools such as contact and systemic herbicides can provide seasonal or possibly two seasons of control at a considerable expense to the consumer. Each lake's ecosystem is different and therefore only certain management tools are appropriate due to many factors including the cumulative cover of EWM, hydraulic retention time, cost and approval by the Michigan Department of Environmental Quality. Over the past decade, manufacturers, applicators and state regulators have made progress in developing a *satisfactory* protocol for Sonar A.S. to help applicators manage EWM. Although the current protocol has worked on numerous lakes, there is potential to modify this approach to obtain the best results possible. Currently the 6 ppb bump 6 ppb protocol is what is used on every lake for Sonar A.S. treatments. The dosage amount of fluridone is calculated using the 10-foot depth contour as the approximate thermocline. However, many times the thermocline is much deeper (15 – 20 feet) therefore, product is lost and the target rate is not obtained. This evaluation treatment on Paw Paw Lake would use the thermocline depth at the time of treatment to calculate accurate fluridone amounts.

This evaluation is being proposed on Paw Paw Lake, Berrien County. Paw Paw Lake has a history of excessive Eurasian Watermilfoil (EWM) growth. An Aquatic Vegetation Assessment Site (AVAS) survey completed on September 22, 2020 as well as treatments required during 2020, confirmed that not only is Eurasian Watermilfoil dispersed throughout Paw Paw Lake's littoral zone, it is also found at a higher percent cumulative cover. On historical deep spring thermoclines, Paw Paw Lake presents itself as a good candidate to test this evaluation protocol.

Hypotheses to be tested:

There are several opportunities for the advancement of aquatic plant management that will be considered in these hypotheses:

- The proposed Sonar A.S. protocol will provide longer-term control of EWM (compared to standard Sonar A.S. 6 bump 6 ppb treatment) by obtaining the target concentration rate of 6 ppb.
- We will verify non-target effects of the Sonar A.S. protocol on the native plant community.
- We will apply the results of this Sonar A.S. application to other lakes in the future.

Management objectives:

Using the best available information, we have designed a treatment and monitoring protocol that will address the fore mentioned hypotheses. Sonar A.S. concentration will be closely monitored, aquatic vegetation surveys will be performed, water quality data will be collected and analyzed to determine the extent and duration of the treatment effects. This management protocol is identical to the standard 6 ppb bump 6ppb protocol with the addition of thermocline documentation.

III. Waterbody Background

Provide a description of the waterbody characteristics:

See attached Long form application and Evaluation Lake Management Plan

IV. Evaluation Protocol

Outline the evaluation protocol, including the chemical(s) proposed for use, the application rate, the location of treatment, the means of application, and the duration of the evaluation.

The duration of the evaluation will be for 3 years, 2021-2023, with the second and third years being used for follow-up surveys to determine the impacts and duration of the Sonar A.S. treatment

The systemic herbicide Sonar A.S. is proposed for use during the 2021 season. Sonar A.S. will be applied to entire lake at an amount calculated from temperature profiles obtained within a week of treatment, determining thermocline depth to achieve 6 ppb in the lake. The Sonar A.S. will be applied to the lake by submersed drop lines. FasTESTs will be utilized to closely monitor the treatments progress/results. Concentration monitoring with FasTests will allow us to achieve and maintain 6 ppb within Paw Paw Lake. The first treatment will be initiated approximately in late April/early May depending on the establishment a defined thermocline. A thermocline is the depth at which the temperature changes by more than one degree in a meter, separating the warm and cool water layers. If a bump-up treatment is required after the 14 day or 30 day FasTest results, the lake will be bumped back up to 6ppb. Bumping the concentration back to 6ppb will keep the lake at an appropriate kill threshold for EWM. If the bump-up treatment is performed after the 30 day FasTest then the remaining FasTest sampling locations/frequency will remain unchanged. This treatment will also utilize the thermocline to determine fluridone amount.

For FasTest schedule please see attached sampling schedule

V. Data Collection and Methods

Include a description of what data will be collected during and after the proposed chemical treatment, and the proposed methods for conducting all sampling (e.g., plant sampling, residue sampling, etc.), treatment and sampling schedules, and a map indicating the location of sampling sites. Data collection must be sufficient to support a rigorous assessment of the success or failure of the evaluation protocol.

For fluridone evaluations: pre-treatment PlanTEST™ data and post-treatment residue sampling are required.

During September 2020 an AVAS survey was conducted to determine the aquatic plant species composition and percent cover for each species. Follow up AVAS surveys will be conducted during August/September 2021, 2022, and 2023. The information collected pretreatment will be compared to post-treatment periods to determine changes within the aquatic plant community.

FasTESTs will be collected at 48 hrs, 14, 30 and 60 days post the initial treatment. A bump up treatment may be performed to establish a fluridone concentration of 6ppb in the lake. The amount of Sonar A.S. to be applied at the bump-up treatment will be based on the 14 day (if under 6ppb) or 30 day FasTest (if under 6ppb and no 14 day bump was performed) concentrations using current thermocline depth.

There will be 7 FasTEST sampling sites (See Attached Map). All sites will be located along the shoreline, evenly distributed around the lake at approximately five feet of water depth. The samples will be collected at the surface. All sites will be sampled according to the proposed timeline.

Aquatic Vegetation Surveys, AVAS, will be completed in the late summer of each year (2021, 2022 and 2023) of the proposed evaluation lake management plan to document changes in the aquatic plant community as a result of this management action.

Water quality data has been collected during pretreatment periods and will continue to be collected in early spring and late summer for nutrients, dissolved oxygen, secchi disk depth, alkalinity and other standard parameters according to the evaluation lake management plan. The goal is to use this information to determine whether changes in water quality occurred and if there may be a link between

the treatment and any changes in water quality parameters. Additional water quality data is also being collected by Spicer Group several times per year.

VI. Discussion

Please include the following information:

- *Explain why the past management practices used in this waterbody has not been successful and why the proposed protocol is expected to provide a successful outcome.*

Based on the management tools that are currently available to applicators in Michigan, the past management practices have been successful. Our goal is to improve our management abilities by researching and developing a new method. Sonar A.S. has the potential to provide long-term control, selectivity, and reduce consumer cost over several years. Long-term control is highly feasible as 6 ppb has been determined to be the kill rate threshold. Reaching and maintaining this concentration rate and initiating treatments in the spring prior to native species actively growing will maintain a high level of selectivity. Applying the fluridone at a more accurate lake volume (thermocline) will help account for the product that is lost by sinking down in the deeper epilimnion water, allowing more for plant uptake. This in turn should provide better long-term control of the EWM, extending the time for future treatments.

Many lake management programs seem to be in a cycle of significantly reducing EWM populations for the first year with Sonar A.S., then spot treating with conventional systemic herbicides until it is not cost efficient and/or not appropriate. Contact herbicides are then often used for short-term relief allowing EWM to expand, once again warranting the use of Sonar AS. This 3-year cycle is a reality for many lakes in Michigan with an EWM infestation. This cycle allows us to satisfy most lakefront homeowners because it is there only option; it's the only thing we have to provide. It would be irresponsible to not be proactive and research new options and methods that could provide longer control for this exotic species.

- *Provide a discussion of and citations for published scientific documentation to support that the proposed evaluation treatment will control the aquatic nuisance without causing unacceptable impacts on: 1.) non-target native aquatic vegetation: 2.) other aquatic or terrestrial life: or 3.) human health and safety.*
 - *In addition, for any proposed whole lake treatment, also provide scientific documentation to support that the proposed evaluation treatment will provide selective control of the aquatic nuisance.*

Scientific documentation includes citations from peer-reviewed scientific literature or any scientific paper published by a recognized resource or environmental management organization that includes research data obtained through a scientific process. Provide copies of the publications to EGLE, upon request.

- The use of fluridone as a management tool for Eurasian watermilfoil has become a common practice in Michigan and many other states. With the advancement of concentration specific responses, Netherland et al. (1997) showed that EWM could be controlled at concentrations as low as 5-7 ppb. Field studies following Netherlands research showed that not only was fluridone able to control EWM at these concentrations, but it was also very selective in doing so (Madsen et al. 2002). Bremigan et al (2005) documented no negative effects of whole lake fluridone treatments on several Michigan lakes. Since the establishment of the 6 ppb protocol PLM Lake & Land Management has successfully treated dozens of Michigan lakes. The success of Fluridone as a selective herbicide has been well documented within our organizations.

This evaluation is not an attempt to reevaluate fluridone as a management tool, but rather evaluate the long-term effectiveness of applying it at volumes based on current lake conditions. Given the selectivity and a proven active ingredient with the ability to apply the product based on current temperature profiles is much more accurate and has great promise to be more successful than existing protocols.

- *Provide a discussion of anticipated or possible water quality impacts.*

There are no anticipated negative water quality impacts. Bremigan et al. (2005) found no negative effects of Fluridone treatments on water quality parameters in Michigan Lakes. However, the negative impacts of Eurasian watermilfoil on water quality have been documented (Couch and Nelson 1985, Smith and Barko 1990, Madsen 1991).

- *If chemical concentration monitoring activities are included (e.g., FasTEST™, PlanTEST™, EffecTEST™, etc), provide justification that the numbers of samples are representative of the population.*
- *FasTEST: 7 Sites will be sampled on Paw Paw Lake at 48-60 hrs and 13-15 days' post initial treatment. If a bump-up treatment is performed after the 13-15-day FasTEST sampling than the 30-day and 60-day sampling will consist of only sites 1 & 3 (see attached map). If the bump-up treatment takes place after the 30-day FasTest sampling then the remainder of the dates (60 day) will include all 7 sites. The lake is 184 acres with no outflow. All sites are equally spaced around the shoreline of the lake and should give a good representation of the overall fluridone concentration.*
- *Describe suitable controls or other actions that will be taken to avoid or minimize impacts to non-target species, and contingency plans for mitigating any unexpected impacts.*

The amount of Sonar A.S. to be applied is based on precise calculations of area and water depth providing confidence that the concentrations will not exceed levels that cause unacceptable damage to non-target species. Concentrations of fluridone will be closely monitored and any additional treatments will be based on the maximum concentration attained and the ensuing decrease determined by FasTEST results. Toxicity research and our experience using fluridone reinforce the fact that non-target negative affects are highly unlikely.

VII. Reporting

Include a description of how the data will be analyzed, what type of report(s) will be submitted to EGLE, and a timeline for report submittal.

All FasTEST results will be forward to EGLE within ten days of receive data from SePRO. Water Quality and AVAS data will be provided to EGLE by November 1st of 2021, 2022, and 2023.

VIII. Project Team and Other Support

Identify people who will be conducting each portion of the evaluation protocol and describe their past experience in their area of participation. Also, include any treatment recommendations or support offered by the chemical or equipment manufacturer, distributor, and/or other stakeholders.

PLM Lake & Land Management Staff:

Jason Broekstra, *Vice President, Michigan Operations*, has over 20 years' experience in aquatic plant management. Jason has a bachelor's degree in Biology from Grand Valley State University. Jason is on the Board of Directors for the Midwest Aquatic Plant Management Society and is a certified pesticide applicator.

Jaimee Desjardins, *West MI Regional Manager*, earned a bachelor's degree in Environmental Studies from Michigan State University and has 20 years' experience in aquatic plant management. Jaimee is also a certified pesticide applicator.

Steve Hanson, *Eastern MI Regional Manager/Fisheries Manager*, earned a bachelor's degree in Fisheries and Wildlife and a master's degree in Fisheries from Michigan State University and has over 17 years' experience in aquatic plant management. Steve is also a certified pesticide applicator.

Andy Tomaszewski, *Southern Regional Manager*, holds a bachelor's degree in Resource Ecology from the University of Michigan and has 18 years' experience in aquatic plant management. Andy is also a certified pesticide applicator.

BreAnne Grabill, *Northern Regional Manager*, holds a bachelor's degree in Environmental Studies from the Michigan State University and has 17 years' experience in aquatic plant management. BreAnne is also a certified pesticide applicator.

SePRO Corporation Staff – (Support/Partner for Evaluation Project)

Reid Morehouse, *SePRO Corporation*, Reid Morehouse is currently the Midwest Aquatic Specialist for SePRO Corporation.

Dr. Mark Heilman, SePRO Corporation, Dr. Mark Heilman is currently the Aquatic Technology Leader for SePRO Corporation. Dr. Heilman received both his BS in Biology (1992) and his Ph.D. in Aquatic Ecology (1998) from the University of Notre Dame. After a post-doctoral instructorship at Rice University in Houston, TX, Dr. Heilman worked for two years as a project manager for ReMetrix LLC overseeing aquatic vegetation assessments for major aquatic plant management projects around the US. In 2002, Dr. Heilman took a research position with SePRO Corporation and continues in that role today with focus on new product development and technical solutions for control of invasive aquatic vegetation.

IX. Literature Cited

Include a list of citations for all literature cited in the evaluation protocol.

Bremigan, M.T., S.M. Hanson, P.A. Soranno, K.S. Cheruvilil and R.D. Valley. 2005. Aquatic Vegetation, Largemouth bass and Water Quality Responses to Low-Dose Fluridone Two Years Post Treatment. *Journal of Aquatic Plant Management* 43: 65-75

Madsen, J. D., K.D. Getsinger, R.M. Stewart and C.S. Owens. 2002. Whole lake Fluridone treatments for selective control of Eurasian watermilfoil: 2. Impacts on submersed plant communities. *Lakes and Reservoir Management*. 18: 191-200

Netherland, M.D., K.D. Getsinger and J.D. Skogerboe. 1997. Mesocosm Evaluation of the Species-Selective Potential of Fluridone. *Journal of Aquatic Plant Management*. 35: 41-50

Smith, C.S. and J.W. Barko. 1990. Ecology of Eurasian Watermilfoil. *J. Aquatic Plant Manage.* 28:55-64.

In addition, please submit the following information as Appendices:

- *Standard Long-Form Permit Application Form*
- *August/September pre-treatment aquatic vegetation survey conducted per EGLE's "Procedures for Aquatic Vegetation Surveys"*
- *For Whole-lake Applicants: Lake Management Plan*
- *For Partial-lake Applicants: Water Quality Data, if an LMP is not required (see LMP guidance for parameters and sampling schedule)*

This reply is being sent via email only.

We have estimated the low flow discharges requested in your email of December 11, 2020 (Process No's.4827, 5968, 7598, 8104, and 8112) as follows:

Tributary to Paw Paw River at Paw Paw Lake Outlet (North Watervliet Road), SW ¼ of the NE ¼ of Section 14, T3S, R17W, Watervliet Township, Berrien County, with a drainage area of 15.9 square miles. The monthly 50% exceedance, 95% exceedance, and mean flows in cfs are:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
50%	19	20	26	24	19	15	12	11	11	13	17	19
95%	11	11	14	14	12	9.3	7.7	7.5	7.1	8.1	9.6	11
Mean	22	23	28	26	21	17	13	12	13	16	18	21

If you have any questions, please contact Mr. Marlio Lesmez, Water Resources Division, Hydrologic Studies Unit, at 517-284-5580, or by e-mail at: lesmezm@michigan.gov.

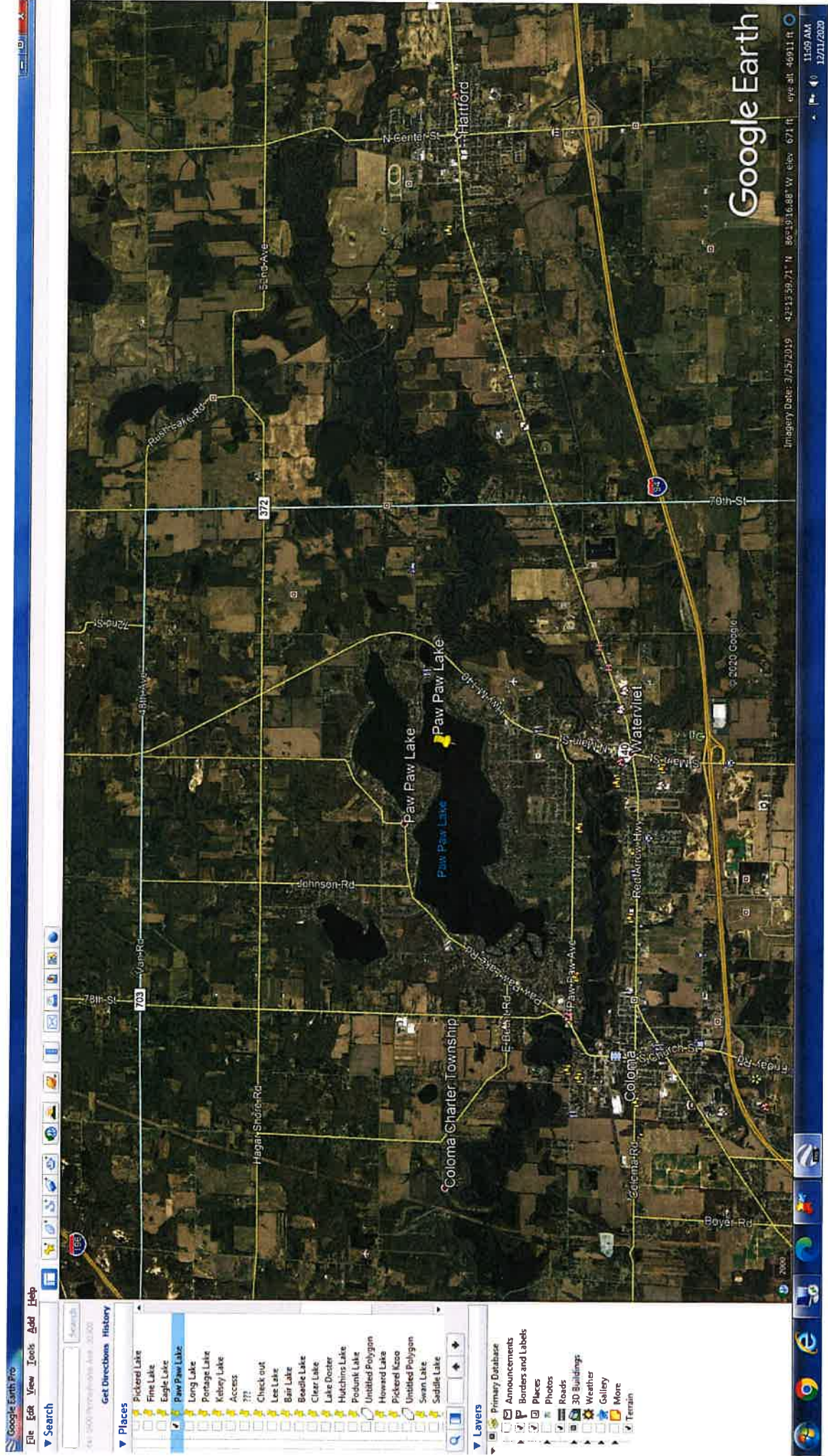
Sincerely,

Mario Fusco, Jr., M.S., P.E., Supervisor
Hydrologic Studies and Dam Safety Unit
Water Resources Division
517-256-4458

MWL

cc: , MDEQ (U-20-NE)

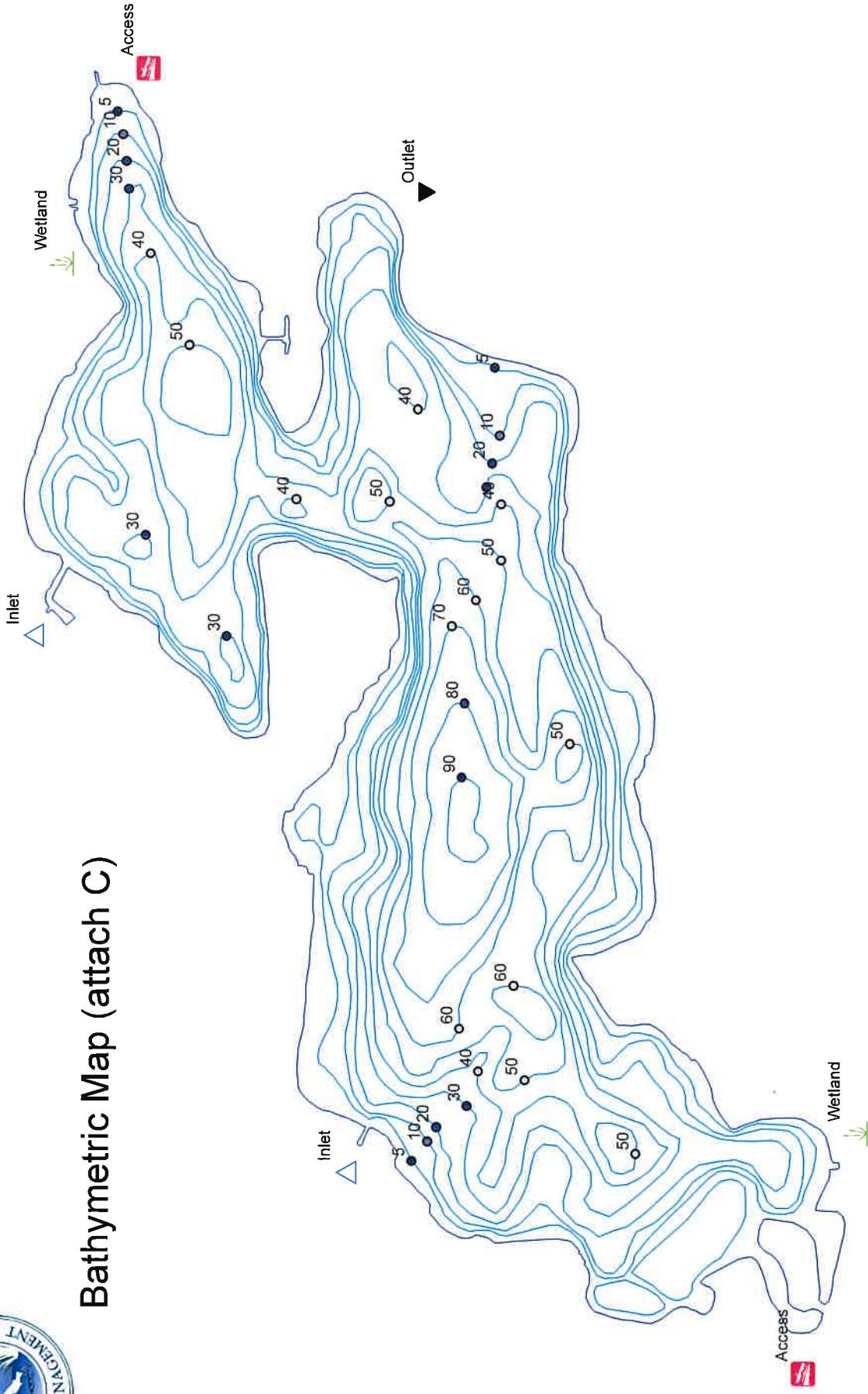
ATT: A



ATT: B



Bathymetric Map (attach C)

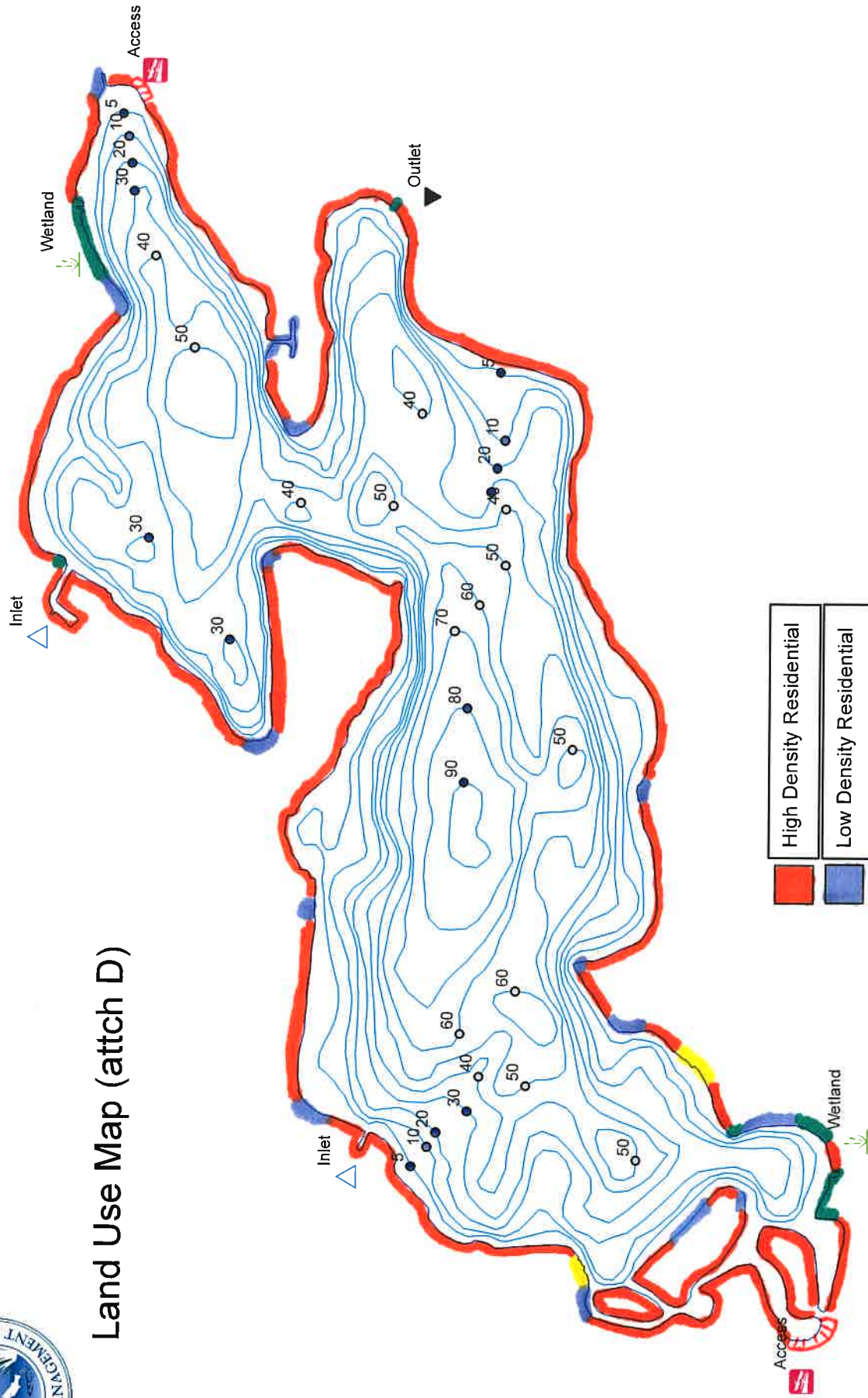








Paw Paw Lake
Surface Acres: 922
County: Berrien
Township: Coloma and Watervliet
T3S, R17-W,
Secs 10, 11, 14, 15, 16, 21





Land Use Map (attch D)



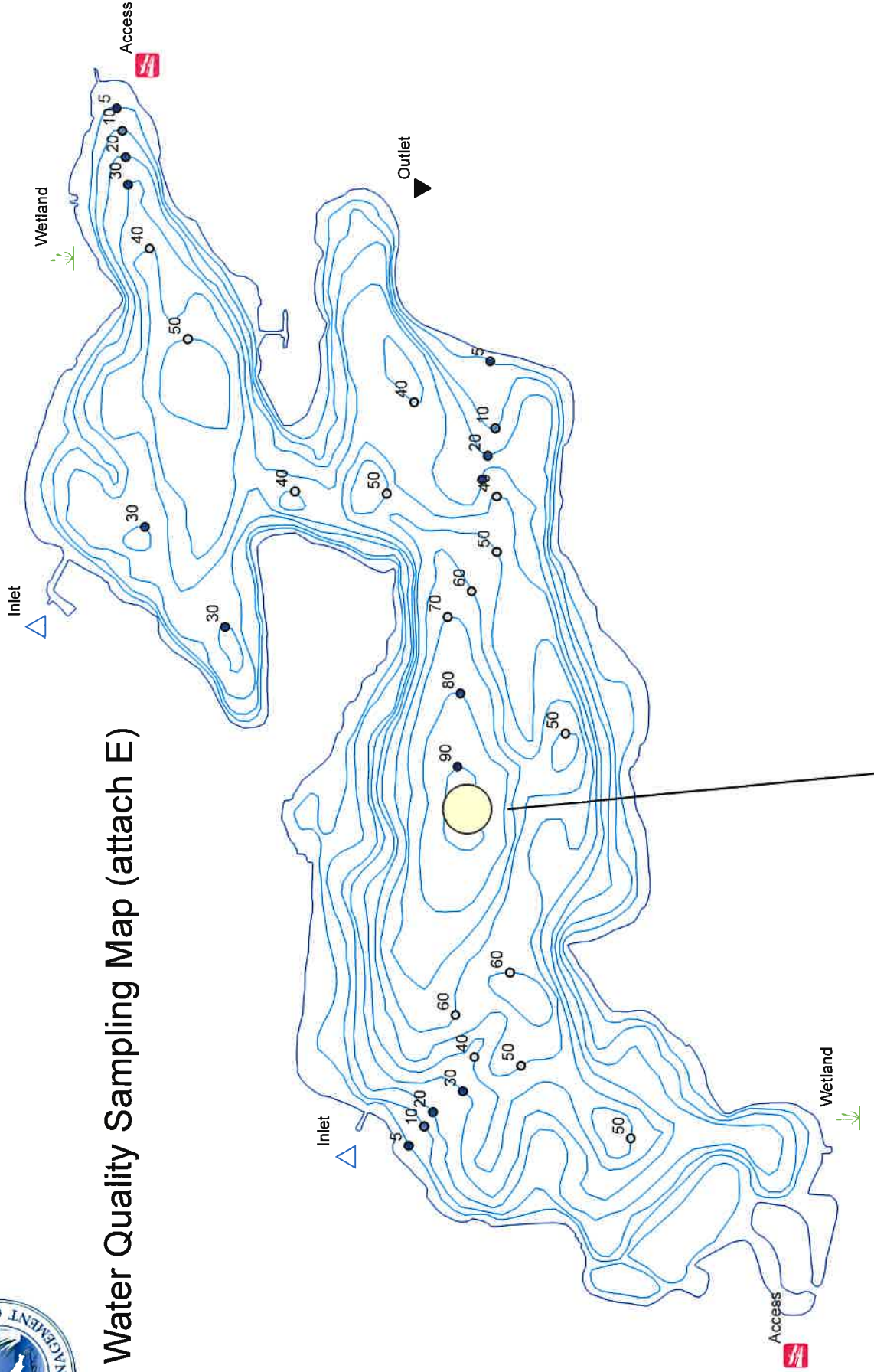
	High Density Residential
	Low Density Residential
	Commerical/Industry
	Agriculture
	Parks
	Undeveloped

Paw Paw Lake
 Surface Acres: 922
 County: Berrien
 Township: Coloma and Watervliet
 T3S, R17-W,
 Secs 10, 11, 14, 15, 16, 21





Water Quality Sampling Map (attach E)



WQ Sampling Site

Paw Paw Lake
Surface Acres: 922
County: Berrien
Township: Coloma and Watervliet
T3S, R17-W,
Secs 10, 11, 14, 15, 16, 21



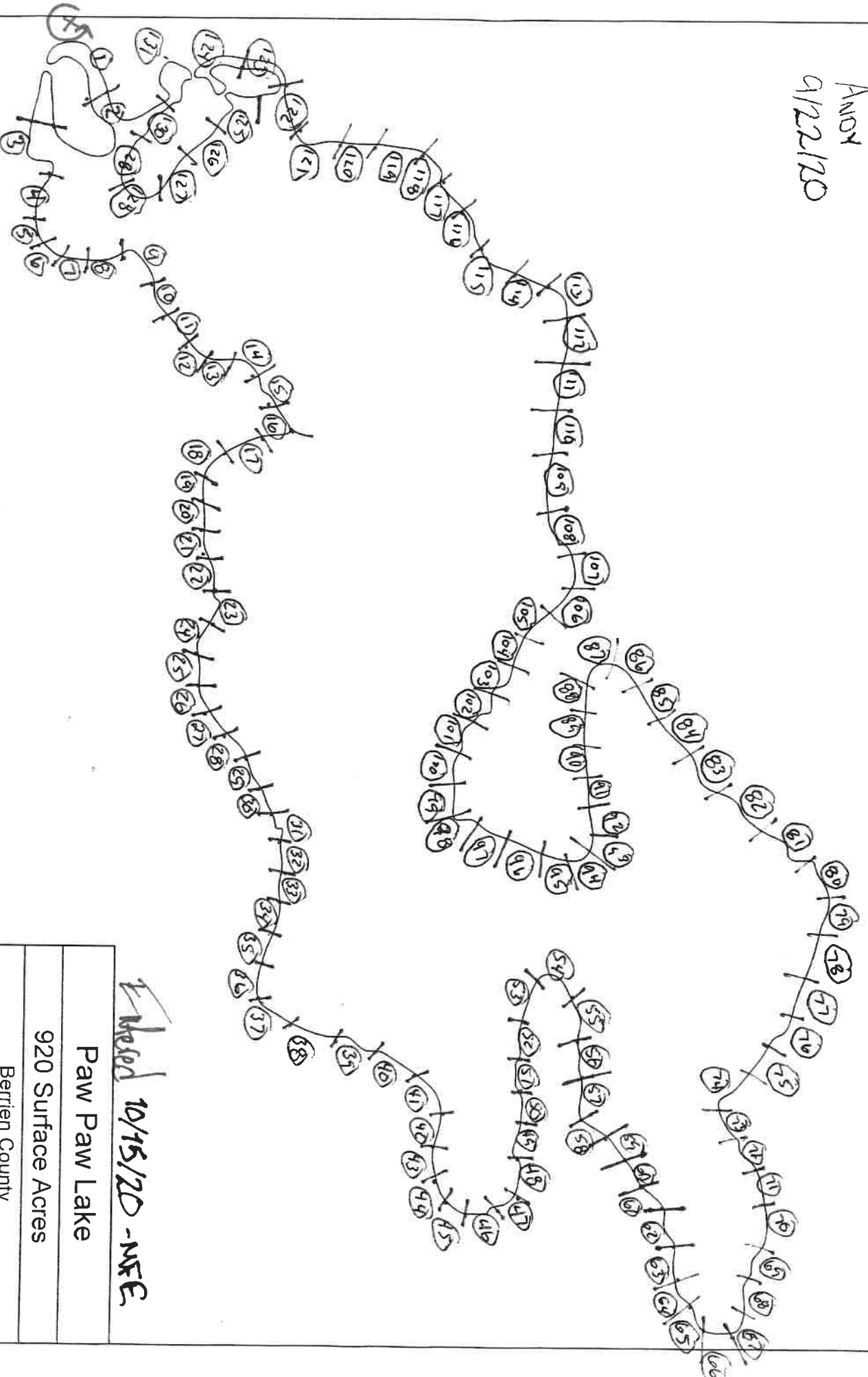
Standard Aquatic Vegetation Summary Sheet

Code No	Plant Name	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
		A	B	C	D	A x 1	B x 10	C x 40	D x 80	9	10	11
1	Eurasian watermilfoil	25	41	49	3	25	410	1960	240	2635	131	20.11
2	Curly leaf pondweed	0	0	0	0	0	0	0	0			
3	Chara	15	53	3	0	15	530	120	0	665	131	5.08
4	Thinleaf pondweed	12	5	0	0	12	50	0	0	62	131	0.47
5	Flatstem pondweed	5	0	0	0	5	0	0	0	5	131	0.04
6	Robbins pondweed	2	2	0	0	2	20	0	0	22	131	0.17
7	Variable pondweed	5	18	1	0	5	180	40	0	225	131	1.72
8	White stem pondweed	0	1	0	0	0	10	0	0	10	131	0.08
9	Richardsons pondweed	0	0	0	0	0	0	0	0			
10	Illinois pondweed	2	13	1	0	2	130	40	0	172	131	1.31
11	Large leaf pondweed	7	27	2	1	7	270	80	80	437	131	3.34
12	American pondweed	0	0	0	0	0	0	0	0			
13	Floating leaf pondweed	0	0	0	0	0	0	0	0			
14	Water stargrass	18	15	0	0	18	150	0	0	168	131	1.28
15	Wild celery	4	16	100	2	4	160	4000	160	4324	131	33.01
16	Sagittaria (submersed)	0	0	1	0	0	0	40	0	40	131	0.31
17	Northern watermilfoil	0	0	0	0	0	0	0	0			
18	Green watermilfoil	0	0	0	0	0	0	0	0			
19	Variable leaf watermilfoil	0	0	0	0	0	0	0	0			
20	Coontail	21	17	23	1	21	170	920	80	1191	131	9.09
21	Elodea	2	0	0	0	2	0	0	0	2	131	0.02
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	1	52	65	2	1	520	2600	160	3281	131	25.05
26	Brittle naiad	0	0	0	0	0	0	0	0			
27	Sago Pondweed	0	0	0	0	0	0	0	0			
28	Cabomba	0	0	0	0	0	0	0	0			
29	Starry stonewort	3	4	1	0	3	40	40	0	83	131	0.63
30	Water Lily	8	9	6	0	8	90	240	0	338	131	2.58
31	Spatterdock	4	6	12	0	4	60	480	0	544	131	4.15
32	Water shield	1	0	0	0	1	0	0	0	1	131	0.01
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	4	3	0	0	4	30	0	0	34	131	0.26
37	Pickereelweed	0	0	0	0	0	0	0	0			
38	Arrow arum	0	0	0	0	0	0	0	0			
39	Cattail	2	1	0	0	2	10	0	0	12	131	0.09
40	Buirush	0	0	0	0	0	0	0	0			
41	Iris	0	0	0	0	0	0	0	0			
42	Swamp loosestrife	0	4	0	0	0	40	0	0	40	131	0.31
43	Purple loosestrife	0	0	0	0	0	0	0	0			
44	Phragmites	0	0	0	0	0	0	0	0			
45		0	0	0	0	0	0	0	0			
46	Slender spikerush	0	0	0	0	0	0	0	0			
47	Smartweed	0	0	0	0	0	0	0	0			
48	Water marigold	0	0	0	0	0	0	0	0			
49	American lotus	0	0	0	0	0	0	0	0			
50		0	0	0	0		0	0	0			

Total cumulative cover

109.09

ANON
9/22/20



Revised 10/15/20 - MFC

Paw Paw Lake

920 Surface Acres

Berrien County
Coloma and Watervliet Townships
T3S, R17 W

ATT F, PT 2

Lake: Paw Paw
 County: Berrien

Surveyor: Andy

Date: 9/22/20

Standard Aquatic Vegetation Assessment Site Field Data Sheet																		
	Plant Name	Site	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site	
		1	2	3	4	5	6	7	8		9	10	11	12	13	14	15	16
1	Eurasian watermilfoil	B	B	C	B	C	C	B		1	B	C	C	B	B	A	A	C
2	Curly leaf pondweed									2								
3	Chara								B	3		B	B	C		D	D	B
4	Thinleaf pondweed									4	A							
5	Flatstem pondweed									5								
6	Robbins pondweed									6								
7	Variable pondweed	B	B							7	B	B		B	B			D
8	White stem pondweed									8								
9	Richardsons pondweed									9								
10	Illinois pondweed	B	B							10								A
11	Large leaf pondweed						A	C		11			A	B	B		D	B
12	American pondweed									12								
13	Floating leaf pondweed									13								
14	Water stargrass								B	14						A	A	
15	Wild celery	C	C	C		C		B	C	15	C	C	C	C	C	B	D	C
16	Sagittaria (submersed)									16								
17	Northern watermilfoil									17								
18	Green watermilfoil									18								
19	Two-leaved watermilfoil									19								
20	Coontail	B	C	A	C	C	C	C		20				A	A			
21	Elodea									21								
22	Bladderwort									22								
23	Mini Bladderwort									23								
24	Buttercup									24								
25	Naiad	C	C	C		B		B	C	25	C	C	C	C	C	D	B	D
26	Brittle naiad									26								
27	Sago Pondweed									27								
28	Cabomba									28								
29	Starry Stonewort									29								
30	Water Lily	B	B	B	C	C	C	C		30			B					
31	Spatterdock		B	A	C	C	C	C		31			B					
32	Water shield									32								
33	Lemna minor									33								
34	Greater duckweed									34								
35	Watermeal									35								
36	Arrowhead						B	B		36								
37	Pickeralweed									37								
38	Arrow arum									38								
39	Cattail	A								39								
40	Bulrush									40								
41	Iris									41								
42	Swamp loosestrife			B		B	B	B		42								
43	Purple loosestrife									43								
44	Phragmites									44								
45	Variable leaf milfoil									45								
46	Slender spikerush									46								
47	Smartweed									47								
48	Water Marigold									48								
49	American Lotus									49								
50										50								

Lake:
County:

Surveyor:
Date:

Standard Aquatic Vegetation Assessment Site Field Data Sheet

	Plant Name	Site	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site
		17	18	19	20	21	22	23	24		25	26	27	28	29	30	31
1	Eurasian watermilfoil	C	C	C	C	C	B	C	C	1	C	C	C	C	C	C	C
2	Curly leaf pondweed									2							
3	Chara	B	B	B	B	B		B		3	B	B	B	B		B	B
4	Thinleaf pondweed									4		B					
5	Flatstem pondweed									5							
6	Robbins pondweed									6							
7	Variable pondweed		A							7						A	A
8	White stem pondweed						(B)			8							
9	Richardsons pondweed									9							
10	Illinois pondweed									10							
11	Large leaf pondweed	B	B			B				11	B		B		B	D	B
12	American pondweed									12							
13	Floating leaf pondweed									13							
14	Water stargrass		A	B		B				14							
15	Wild celery	D	C	C	C	C	C	C	C	15	C	C	C	C	C	C	C
16	Sagittaria (submersed)									16							
17	Northern watermilfoil									17							
18	Green watermilfoil									18							
19	Two-leaved watermilfoil									19							
20	Coontail		C	C	C	C		C	C	20	C				B	A	B
21	Elodea									21							
22	Bladderwort									22							
23	Mini Bladderwort									23							
24	Buttercup									24							
25	Naiad	C	C	C	C	C	B	B	B	25	B	B	D	B	D	B	B
26	Brittle naiad									26							
27	Sago Pondweed									27							
28	Cabomba									28							
29	Starry Stonewort									29							
30	Water Lily		C							30							
31	Spatterdock		C							31							
32	Water shield									32							
33	Lemna minor									33							
34	Greater duckweed									34							
35	Watermeal									35							
36	Arrowhead									36							
37	Pickerelweed									37							
38	Arrow arum									38							
39	Cattail									39							
40	Bulrush									40							
41	Iris									41							
42	Swamp loosestrife									42							
43	Purple loosestrife									43							
44	Phragmites									44							
45	Variable leaf milfoil									45							
46	Slender spikerush									46							
47	Smartweed									47							
48	Water Marigold									48							
49	American Lotus									49							
50										50							

Lake:
County:

Surveyor:
Date:

Standard Aquatic Vegetation Assessment Site Field Data Sheet

	Plant Name	Site	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site	Site
		33	34	35	36	37	38	39	40		41	42	43	44	45	46	47	48
1	Eurasian watermilfoil	A	A	C	C	C	C	C	B	1	A	A	B	C	B	C	C	D
2	Curly leaf pondweed									2								
3	Chara	A	A	B	B	A	B	D	B	3								B
4	Thinleaf pondweed									4								
5	Flatstem pondweed									5								
6	Robbins pondweed									6								
7	Variable pondweed	A						B	B	7			B					
8	White stem pondweed									8								
9	Richardsons pondweed									9								
10	Illinois pondweed							B	B	10			B					
11	Large leaf pondweed									11			A	B	D	B	B	
12	American pondweed									12								
13	Floating leaf pondweed									13								
14	Water stargrass	A	A			A				14			A					
15	Wild celery	C	C	C	C	C	C	C	C	15	B	B	B	C	C	C	B	C
16	Sagittaria (submersed)									16								
17	Northern watermilfoil									17								
18	Green watermilfoil									18								
19	Two-leaved watermilfoil									19								
20	Coontail		A							20								
21	Elodea									21								
22	Bladderwort									22								
23	Mini Bladderwort									23								
24	Buttercup									24								
25	Naiad	B		B	B	B	B	B	B	25	C	C	C	C	B	D	B	D
26	Brittle naiad									26								
27	Sago Pondweed									27								
28	Cabomba									28								
29	Starry Stonewort									29								
30	Water Lily									30								
31	Spatterdock									31								
32	Water shield									32								
33	Lemna minor									33								
34	Greater duckweed									34								
35	Watermeal									35								
36	Arrowhead									36								
37	Pickerelweed									37								
38	Arrow arum									38								
39	Cattail									39								
40	Bulrush									40								
41	Iris									41								
42	Swamp loosestrife									42								
43	Purple loosestrife									43								
44	Phragmites									44								
45	Variable leaf milfoil									45								
46	Slender spikerush									46								
47	Smartweed									47								
48	Water Marigold									48								
49	American Lotus									49								
50										50								

Lake:
County:

Surveyor:
Date:

Standard Aquatic Vegetation Assessment Site Field Data Sheet

	Plant Name	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site	Site	
		49	50	51	52	53	54	55		56	57	58	59	60	61	62	63	64
1	Eurasian watermilfoil	A		B	D	B	B	A	B	1	C	C	B	B	B	D	B	C
2	Curly leaf pondweed									2								
3	Chara	B	B	B	B	B				3							D	
4	Thinleaf pondweed							A		4								
5	Flatstem pondweed									5	B							
6	Robbins pondweed									6								
7	Variable pondweed									7								B
8	White stem pondweed									8								
9	Richardsons pondweed									9								
10	Illinois pondweed									10								
11	Large leaf pondweed	B	A							11			D		B			
12	American pondweed									12								
13	Floating leaf pondweed									13								
14	Water stargrass					B			B	14	B							A
15	Wild celery	C	C	C	C	C	C	C	C	15	C	B	C	C	C	C	C	C
16	Sagittaria (submersed)									16								
17	Northern watermilfoil									17								
18	Green watermilfoil									18								
19	Two-leaved watermilfoil									19								
20	Coontail							A		20		B	C	B	B		A	C
21	Elodea									21								
22	Bladderwort									22								
23	Mini Bladderwort									23								
24	Buttercup									24								
25	Naiad	C	C	C	C	C	C	C	B	25	B	C	C	C	C	B	B	D
26	Brittle naiad									26								
27	Sago Pondweed									27								
28	Cabomba									28								
29	Starry Stonewort									29		A						A
30	Water Lily									30								C
31	Spatterdock									31								C
32	Water shield									32								
33	Lemna minor									33								
34	Greater duckweed									34								
35	Watermeal									35								
36	Arrowhead									36								
37	Pickeralweed									37								
38	Arrow arum									38								
39	Cattail									39					B			
40	Bulrush									40								
41	Iris									41								
42	Swamp loosestrife									42								
43	Purple loosestrife									43								
44	Phragmites									44								
45	Variable leaf milfoil									45								
46	Slender spikerush									46								
47	Smartweed									47								
48	Water Marigold									48								
49	American Lotus									49								
50										50								

Lake:
County:

Surveyor:
Date:

Standard Aquatic Vegetation Assessment Site Field Data Sheet

	Plant Name	Site	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site	Site
		65	66	67	68	69	70	71	72		73	74	75	76	77	78	79	80
1	Eurasian watermilfoil	B	B	A	C	C	B	B	B	1	B	B	B	C	C	C	C	C
2	Curly leaf pondweed									2								
3	Chara		A	B	B	A				3	B	B						
4	Thinleaf pondweed									4	A	A		A			B	
5	Flatstem pondweed	A								5								
6	Robbins pondweed	A								6	A	B						B
7	Variable pondweed									7								
8	White stem pondweed									8								
9	Richardsons pondweed									9								
10	Illinois pondweed									10							A	
11	Large leaf pondweed		B	B	B	B				11				B	B	B	A	A
12	American pondweed									12								
13	Floating leaf pondweed									13								
14	Water stargrass		D							14	A		A		A	B	A	B
15	Wild celery	C		C	C	C				15	B	C	C	C	C	C	C	C
16	Sagittaria (submersed)									16								
17	Northern watermilfoil									17								
18	Green watermilfoil									18								
19	Two-leaved watermilfoil									19								
20	Coontail	A	C	C	B	B	C	C	C	20	D				B	B	D	C
21	Elodea				A	A				21								
22	Bladderwort									22								
23	Mini Bladderwort									23								
24	Buttercup									24								
25	Naiad	B	C	C	C	C				25	C	C	C	C	C	C	C	C
26	Brittle naiad									26								
27	Sago Pondweed									27								
28	Cabomba									28								
29	Starry Stonewort		A							29								
30	Water Lily		A						A	30	B			A		A	B	
31	Spatterdock	B	A					C	C	31						C	C	
32	Water shield		A							32								
33	Lemna minor									33								
34	Greater duckweed									34								
35	Watermeal									35								
36	Arrowhead									36								B
37	Pickeralweed									37								
38	Arrow arum									38								
39	Cattail	A								39								
40	Bulrush									40								
41	Iris									41								
42	Swamp loosestrife									42								
43	Purple loosestrife									43								
44	Phragmites									44								
45	Variable leaf milfoil									45								
46	Slender spikerush									46								
47	Smartweed									47								
48	Water Marigold									48								
49	American Lotus									49								
50										50								

Lake:
County:

Surveyor:
Date:

Standard Aquatic Vegetation Assessment Site Field Data Sheet

	Plant Name	Site	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site
		81	82	83	84	85	86	87	88		89	90	91	92	93	94	95
1	Eurasian watermilfoil	B	B	B	A	A	C	B	A	1	A	B	A			A	A
2	Curly leaf pondweed									2							
3	Chara	A	A	A				A	A	3			A	A	B	B	D
4	Thinleaf pondweed	A				A	A			4	A	A					
5	Flatstem pondweed									5							
6	Robbins pondweed									6							
7	Variable pondweed									7							
8	White stem pondweed									8							
9	Richardsons pondweed									9							
10	Illinois pondweed							B	B	10		B					
11	Large leaf pondweed					A				11							
12	American pondweed									12							
13	Floating leaf pondweed									13							
14	Water stargrass	A		A						14							A
15	Wild celery	B	C	B	B	B	B	C	C	15	C	C	B	B	B	C	C
16	Sagittaria (submersed)									16							
17	Northern watermilfoil									17							
18	Green watermilfoil									18							
19	Two-leaved watermilfoil									19							
20	Coontail	C		A	A	A	A	B		20	A		A				
21	Elodea									21							
22	Bladderwort									22							
23	Mini Bladderwort									23							
24	Buttercup									24							
25	Naiad	C	C	C	A	B	C	C	C	25	C	B	C	B	B	C	C
26	Brittle naiad									26							
27	Sago Pondweed									27							
28	Cabomba									28							
29	Starry Stonewort									29							
30	Water Lily				A	A	B	B		30							
31	Spatterdock	C	B					B		31							
32	Water shield									32							
33	Lemna minor									33							
34	Greater duckweed									34							
35	Watermeal									35							
36	Arrowhead	A		A						36							
37	Pickerelweed									37							
38	Arrow arum									38							
39	Cattail									39							
40	Bulrush									40							
41	Iris									41							
42	Swamp loosestrife									42							
43	Purple loosestrife									43							
44	Phragmites									44							
45	Variable leaf milfoil									45							
46	Slender spikerush									46							
47	Smartweed									47							
48	Water Marigold									48							
49	American Lotus									49							
50										50							

Lake:
County:

Surveyor:
Date:



Standard Aquatic Vegetation Assessment Site Field Data Sheet

	Plant Name	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site	Site
		97	98	99	100	101	102	103	104		105	106	107	108	109	110	111
1	Eurasian watermilfoil						A	B		1	A	B	C	C	C	B	D
2	Curly leaf pondweed									2							
3	Chara	A	B	B		B				3	B	B	B	B	B	D	B
4	Thinleaf pondweed									4				A			B
5	Flatstem pondweed					A				5				A			
6	Robbins pondweed									6							
7	Variable pondweed									7	B	B	D				B
8	White stem pondweed									8							B
9	Richardsons pondweed									9							
10	Illinois pondweed									10	D	D	D				B
11	Large leaf pondweed									11							
12	American pondweed									12							
13	Floating leaf pondweed									13							
14	Water stargrass									14		B	A			B	B
15	Wild celery	B	A	A		A	A	C	C	15	C	C	C	C	C	C	C
16	Sagittaria (submersed)									16							
17	Northern watermilfoil									17							
18	Green watermilfoil									18							
19	Two-leaved watermilfoil									19							
20	Coontail							B		20	B	B	A	C	A		B
21	Elodea									21							
22	Bladderwort									22							
23	Mini Bladderwort									23							
24	Buttercup									24							
25	Naiad	B	B	B	D	D	A	B		25	B	B	B	B	C	C	B
26	Brittle naiad									26							
27	Sago Pondweed									27							
28	Cabomba									28							
29	Starry Stonewort				B	B	B	C		29			B				
30	Water Lily									30							
31	Spatterdock									31							
32	Water shield									32							
33	Lemna minor									33							
34	Greater duckweed									34							
35	Watermeal									35							
36	Arrowhead									36							
37	Pickerelweed									37							
38	Arrow arum									38							
39	Cattail									39							
40	Bulrush									40							A
41	Iris									41							
42	Swamp loosestrife									42							
43	Purple loosestrife									43							
44	Phragmites									44							
45	Variable leaf milfoil									45							
46	Slender spikerush									46							
47	Smartweed									47							
48	Water Marigold									48							
49	American Lotus									49							
50										50							

Lake:
County:

Surveyor:
Date:

Standard Aquatic Vegetation Assessment Site Field Data Sheet

	Plant Name	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
		113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	
1	Eurasian watermilfoil	C	C	B		A	B	C	B	1	A	A	A	B		B	C	C
2	Curly leaf pondweed									2								
3	Chara	A	B	B	C	C				3						B	B	B
4	Thinleaf pondweed									4	B		A				B	
5	Flatstem pondweed									5	A							
6	Robbins pondweed									6								
7	Variable pondweed								C	7	A	B						B
8	White stem pondweed									8								
9	Richardsons pondweed									9								
10	Illinois pondweed									10	C	B						
11	Large leaf pondweed				C					11							B	B
12	American pondweed									12								
13	Floating leaf pondweed									13								
14	Water stargrass		A				B	B		14						B	B	
15	Wild celery	C	C	C	C	B	C	C	C	15	C	C	C	C	C	C	C	C
16	Sagittaria (submersed)									16								
17	Northern watermilfoil									17								
18	Green watermilfoil									18								
19	Two-leaved watermilfoil									19								
20	Coontail								A	A	20			B		C	C	
21	Elodea									21								
22	Bladderwort									22								
23	Mini Bladderwort									23								
24	Buttercup									24								
25	Naiad	B	C	C	C	C	C	C	C	25	C	C	B	B	B	C	C	
26	Brittle naiad									26								
27	Sago Pondweed									27								
28	Cabomba									28								
29	Starry Stonewort									29								
30	Water Lily									30								B
31	Spatterdock									31		A	A					B
32	Water shield									32								
33	Lemna minor									33								
34	Greater duckweed									34								
35	Watermeal									35								
36	Arrowhead									36								
37	Pickerelweed									37								
38	Arrow arum									38								
39	Cattail									39								
40	Bulrush									40								
41	Iris									41								
42	Swamp loosestrife									42								
43	Purple loosestrife									43								
44	Phragmites									44								
45	Variable leaf milfoil									45								
46	Slender spikerush									46								
47	Smartweed									47								
48	Water Marigold									48								
49	American Lotus									49								
50										50								

Lake:
County:

Surveyor:
Date:

Standard Aquatic Vegetation Assessment Site Field Data Sheet																	
	Plant Name	Site	Site	Site	Site	Site	Site	Site	Site		Site	Site	Site	Site	Site	Site	Site
		129	130	131	132	133	134	135	136		137	138	139	140	141	142	143
1	Eurasian watermilfoil	A	A	A													1
2	Curly leaf pondweed																2
3	Chara		B	B													3
4	Thinleaf pondweed			B													4
5	Flatstem pondweed																5
6	Robbins pondweed																6
7	Variable pondweed																7
8	White stem pondweed																8
9	Richardsons pondweed																9
10	Illinois pondweed																10
11	Large leaf pondweed																11
12	American pondweed																12
13	Floating leaf pondweed																13
14	Water stargrass																14
15	Wild celery	C	C	C													15
16	Sagittaria (submersed)																16
17	Northern watermilfoil																17
18	Green watermilfoil																18
19	Two-leaved watermilfoil																19
20	Coontail	A		A													20
21	Elodea																21
22	Bladderwort																22
23	Mini Bladderwort																23
24	Buttercup																24
25	Naiad		B	C													25
26	Brittle naiad																26
27	Sago Pondweed																27
28	Cabomba																28
29	Starry Stonewort																29
30	Water Lily	A		A													30
31	Spatterdock																31
32	Water shield																32
33	Lemna minor																33
34	Greater duckweed																34
35	Watermeal																35
36	Arrowhead	A		A													36
37	Pickerelweed																37
38	Arrow arum																38
39	Cattail																39
40	Bulrush																40
41	Iris																41
42	Swamp loosestrife																42
43	Purple loosestrife																43
44	Phragmites																44
45	Variable leaf milfoil																45
46	Slender spikerush																46
47	Smartweed																47
48	Water Marigold																48
49	American Lotus																49
50																	50



November 5, 2020

Matt Diana
Plainwell Operation Service Center
621 North 10th St
Plainwell, MI 49080
269-685-6851
GundermanB@michigan.gov

Re: Paw Paw Lake

Dear Mr. Diana

As part of Michigan Department of Environmental Quality requirements, the following information is requested regarding:

Paw Paw Lake, 922 surface acres
Berrien County
Coloma and Watervliet Township
T3S, R17/W Sec 19,29,30

Critical Fish Spawning Areas – Please describe the general fish spawning habitat of the lake. If a lake map is needed for specific spawning locations please contact: Andy Tomaszewski of PLM Lake & Land Management, (800) 382-4434 or andyt@plmcorp.net

The shoreline of Paw Paw Lake is highly developed. As a result natural shoreline and wetland habitat is limited. The small wetland in the SW cove near the launch likely supports much of the northern pike spawning. All shallow shoals where boat traffic is impeded will likely support panfish spawning. Any early vegetation is critical to supporting yellow perch populations.

Fish Communities – Please provide a list of fish species present in Gravel Lake from any fish surveys that have been completed by the MDNR.

Fisheries management on Paw Paw Lake has focused on producing a walleye fishery. DNR had stocked spring fingerling walleye in Paw Paw Lake for some time, with little success at creating a fishery. Stocking was reinstated in 2016 using fall fingerling walleye.

The most recent fisheries survey on Paw Paw Lake was a creel conducted in 2005. Anglers harvested an estimated 7,008 (2SE 2,538) fish during the survey period (Table 2). Total catch (fish harvested and released fish) was 34, 353 (2SE 9,491) fish. There were 12 species of fish observed and recorded by the creel clerk that comprised the fishery of Paw Paw Lake. Fishing pressure, as defined by the number of angler hours, was highest in June (3,950 h), but the most angler trips were made during July (1,891 T). Anglers made 7, 532 trips to Paw Paw Lake and fished a total of 17, 236 hours (2.3 hours per trip). Total catch per hour was 2.0 fish. Bluegill was the most important species recorded in the creel comprising 83% of the harvest and 94% of the released fish. Other notable species were black crappie, yellow perch, and pumpkinseed. Walleye spring fingerlings have been stocked in Paw Paw Lake every year from 1998 to 2004 (except 2002). A total of 448, 726 spring fingerlings at an average rate of 81 fish per acre have been stocked in the lake during this time. The harvest rate of walleye was very low (<0.001 fish/h) during this creel survey period.

The last general fish survey was conducted on Paw Paw Lake in 1984. Multiple surveys have been conducted since but focused on fall walleye Serns estimates of stocking success. Bluegill, black crappie, northern pike, pumpkinseed, largemouth bass, walleye and yellow perch make up the sport fishery. Alewife are also present in high numbers. Although nonnative, alewife are prone to fish kills. Some care should be utilized in offshore algae or whole lake treatments. Spotted gar (special concern) are also present in Paw Paw Lake.

Plant Communities – Please provide a list or description of any plant communities that may be of local concern associated with the lake.

Native vegetation is important for fish spawning, refugia, and habitat and treatments should attempt to limit the impacts to native vegetation densities and coverage when possible. Any removal of aquatic vegetation should preserve 60 to 80% of the native aquatic plants in a water body (see attached policy 02.02.014). In addition, it is important to maintain vegetation in a minimum of 20% of the littoral zone. Water lilies and bulrush are critical species of vegetation that treatments should avoid. Copper should not be applied on spawning fish or in habitats where spawning fish are likely present as recruitment failure will likely result.

DNR Employee (Name) *Matt Diana*

Title *Fisheries Biologist* Date *12/28/2020*

Please complete and return information as soon as possible. If you have any questions, please contact me.

Thank you,

Andy Tomaszewski
Southern MI Regional Manager
PLM Lake & Land Management Corp.
andyt@plmcorp.net
800.382.4434 ext. 2002

PLM Lake & Land Management
PO Box 132
Caledonia, Michigan 49316
Fax 616.891.0371

Att G+H



November 5, 2020

Ken Kesson,
Crane Pond State Game Area Field Office
60887 M-40
Jones, MI 49061

Re: Paw Paw Lake

Dear Mr. Kesson,

As part of Michigan Department of Environmental Quality requirements, the following information is requested regarding:

Paw Paw Lake, 922 surface acres
Berrien County
Coloma and Watervliet Township
T3S, R17/W Sec 19,29,30

Wildlife Communities – Please provide a description of the wildlife community from wildlife surveys performed in the area of the lake.

Special Habitats – Please provide a description and location of any special habitat associated with the lake.

Plant Communities – Please provide a list or description of any plant communities that may be of local concern associated with the lake.

DNR Employee (Name) _____

Title _____ Date _____

Please complete and return information as soon as possible. If you have any questions, please contact me.

Thank you,

Andy Tomaszewski
Southern MI Regional Manager
PLM Lake & Land Management Corp.
andyt@plmcorp.net
800.382.4434 ext. 2002

PLM Lake & Land Management
PO Box 132
Caledonia, Michigan 49316
fax 616.891.0371

ATT G+H - NO RESPONSE

(For Office Use Only)

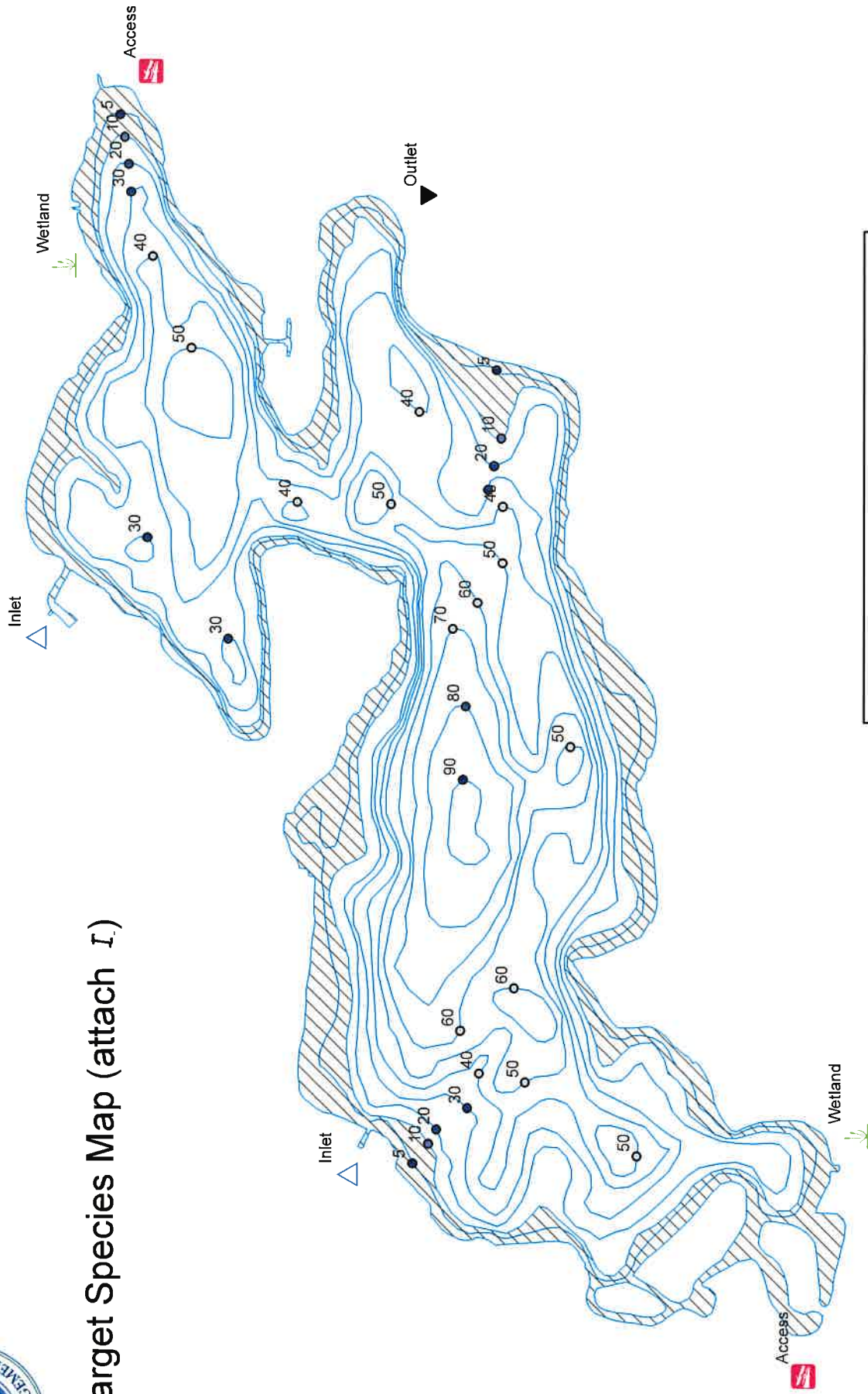
Date Mailed _____

Response Date _____ (4 to 6 weeks)

No Response _____



Target Species Map (attach 1.)



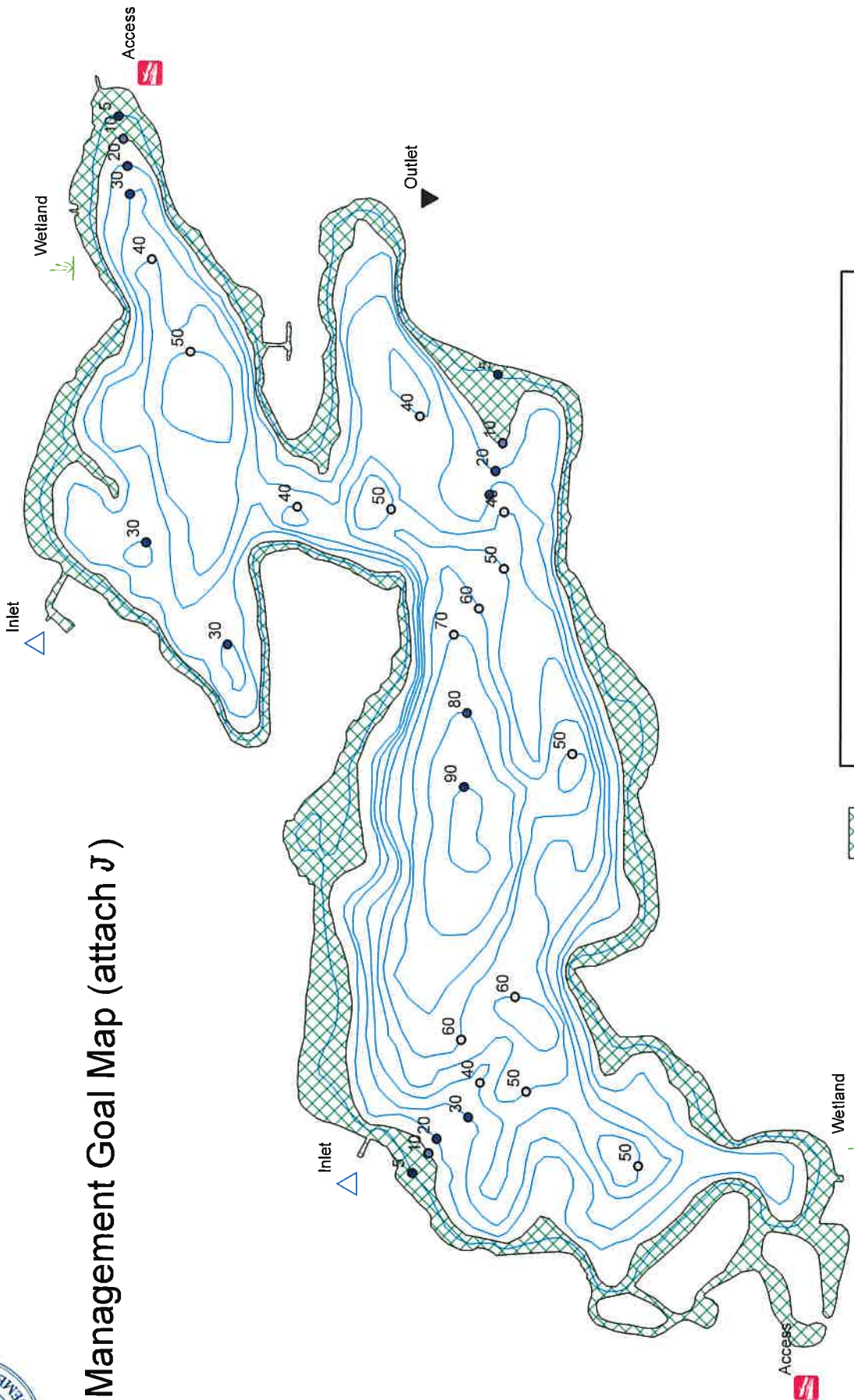
Paw Paw Lake
Surface Acres: 922
County: Berrien
Township: Coloma and Watervliet
T3S, R17-W,
Secs 10, 11, 14, 15, 16, 21

Area of Eurasian watermilfoil growth





Management Goal Map (attach J)



Promoting mixed communities of non native plants (at non nuisance levels) while controlling exotic species within this area.



Paw Paw Lake
 Surface Acres: 922
 County: Berrien
 Township: Coloma and Watervliet
 T3S, R17-W,
 Secs 10, 11, 14, 15, 16, 21





Attachment K

History of Waterbody Management: Paw Paw Lake

Chemical Control – The 2012 season will be the first year that PLm Lake & Land Management will be performing treatments on Paw Paw Lake. Prior to this treatments for milfoil have been conducted by another applicator. Treatments were conducted on an individual basis and it has been reported that there was between 40 and 50 % participation. Individual treatments have been conducted since at least 2007. Sonar was used on Paw Paw Lake in 2012 and provided good control. Spot treatment have been conducted in 2013-2016 using contact and systemic products. In 2017, Fluridone was again applied to Paw Paw Lake with good success. Management 2018-2020 has focused on spot treatment of EWM, CLPW, Nuisance Thinleaf pondweed (early-mid summer) and small scale treatment of SSW.

Mechanical Control –

Mechanical harvesting has not been used as a control method on Paw PawLake.

Biological Control –

Biological Techniques have not been used as a control method on Paw PawLake.

Lake Level Manipulation – N/A

Other – Aeration has been used in the NE lobe of the lake since ~2014. Aeration system was not operated in 2013 and has since been removed. New initiatives are being undertaken for the 2021 season to improve several drains that enter the lake and reduce sediment and nutrient loads entering the lake.

Fish Stocking w/in past 10 years – Schedule attached YES NO (If yes, please see Attachment K Part 2)



Fish Stocking Database (<http://www.michigan.gov/dnr>) Michigan DNR

County:

Berrien ▼

Water Body:

Paw Paw Lake ▼

Species:

All ▼

Start Month:

January ▼

Start Year:

2001 ▼

End Month:

January ▼

End Year:

2020 ▼

Order By:

- Location
- Species
- Stock Date

Submit

Reset

Export

Filter in any column.

County	Water Body	Sitename	Species	Date	Number	Operation	Avg. Length
--------	------------	----------	---------	------	--------	-----------	-------------

ATT K, PT 2

County	Water Body	Sitename	Species	Date	Number	Operation	Avg. Length
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	10/23/13	2,175	Private Plant (under permit)	5.79
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	06/12/01	86,845	Marsh & Rearing Pond Release	0.94
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	06/17/03	39,255	State Plant	1.23
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	06/18/03	26,826	State Plant	1.15
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	06/01/04	65,360	State Plant	1.3

County	Water Body	Sitename	Species	Date	Number	Operation	Avg. Length
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	10/06/16	720	State Plant	6.37
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	10/12/16	1,147	State Plant	5.74
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	10/13/16	1,501	State Plant	5.89
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	10/09/17	840	State Plant	5.14
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	10/01/19	760	State Plant	4.57

County	Water Body	Sitename	Species	Date	Number	Operation	Avg. Length
Berrien	Paw Paw Lake EAST PAS (03S 17W 14)	EAST PAS	Walleye	10/04/19	301	State Plant	4.39

Rows: 11

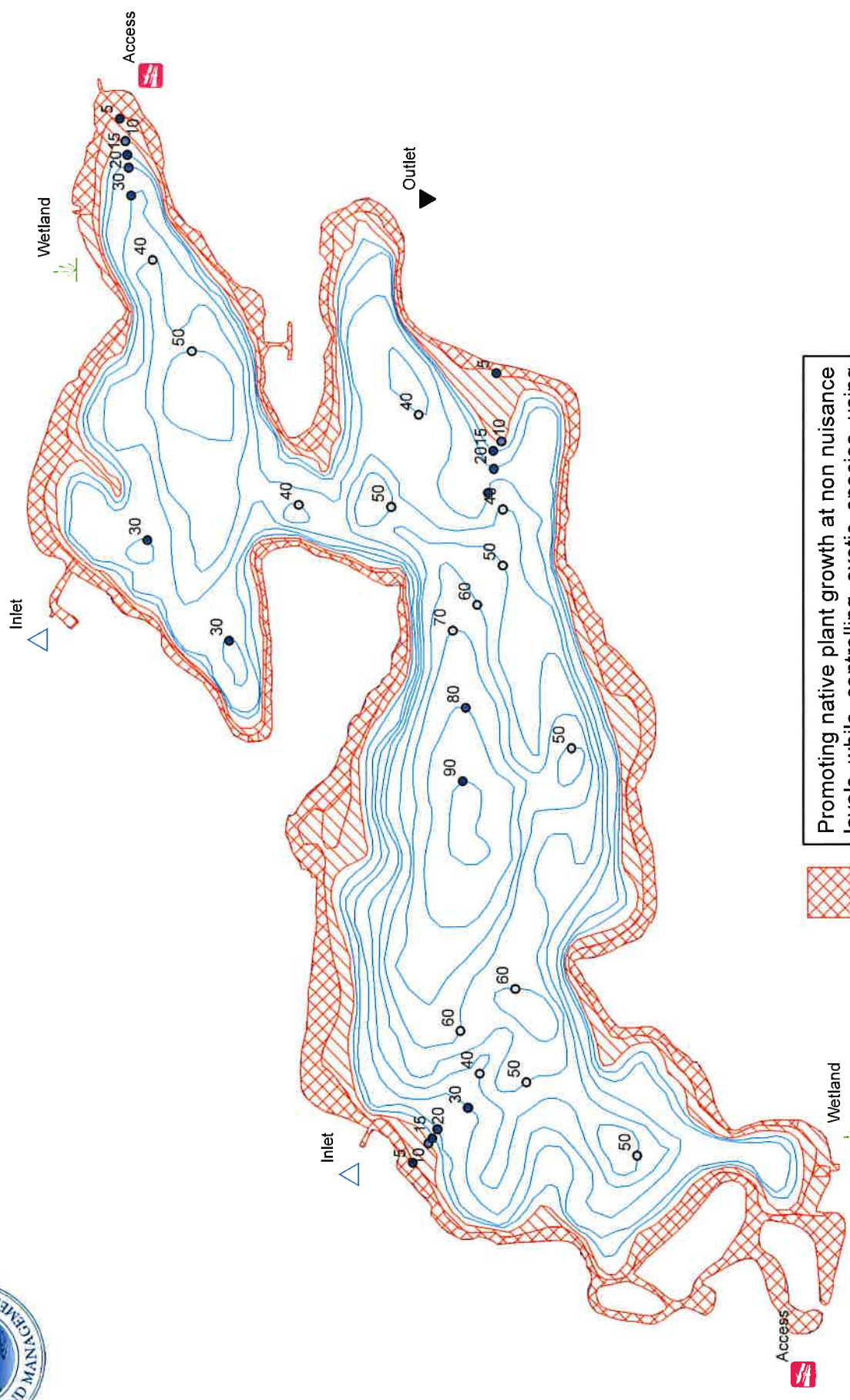
[Michigan.gov \(https://www.michigan.gov/\)](https://www.michigan.gov/) [DNR Home \(https://www.michigan.gov/dnr\)](https://www.michigan.gov/dnr)

[Contact DNR \(http://www.michigan.gov/contactdnr\)](http://www.michigan.gov/contactdnr) [Policies \(http://www.michigan.gov/policies\)](http://www.michigan.gov/policies)


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Annual Vegetation Management Map (attach L)



Paw Paw Lake
 Surface Acres: 922
 County: Berrien
 Township: Coloma and Watervliet
 T3S, R17-W,
 Secs 10, 11, 14, 15, 16, 21

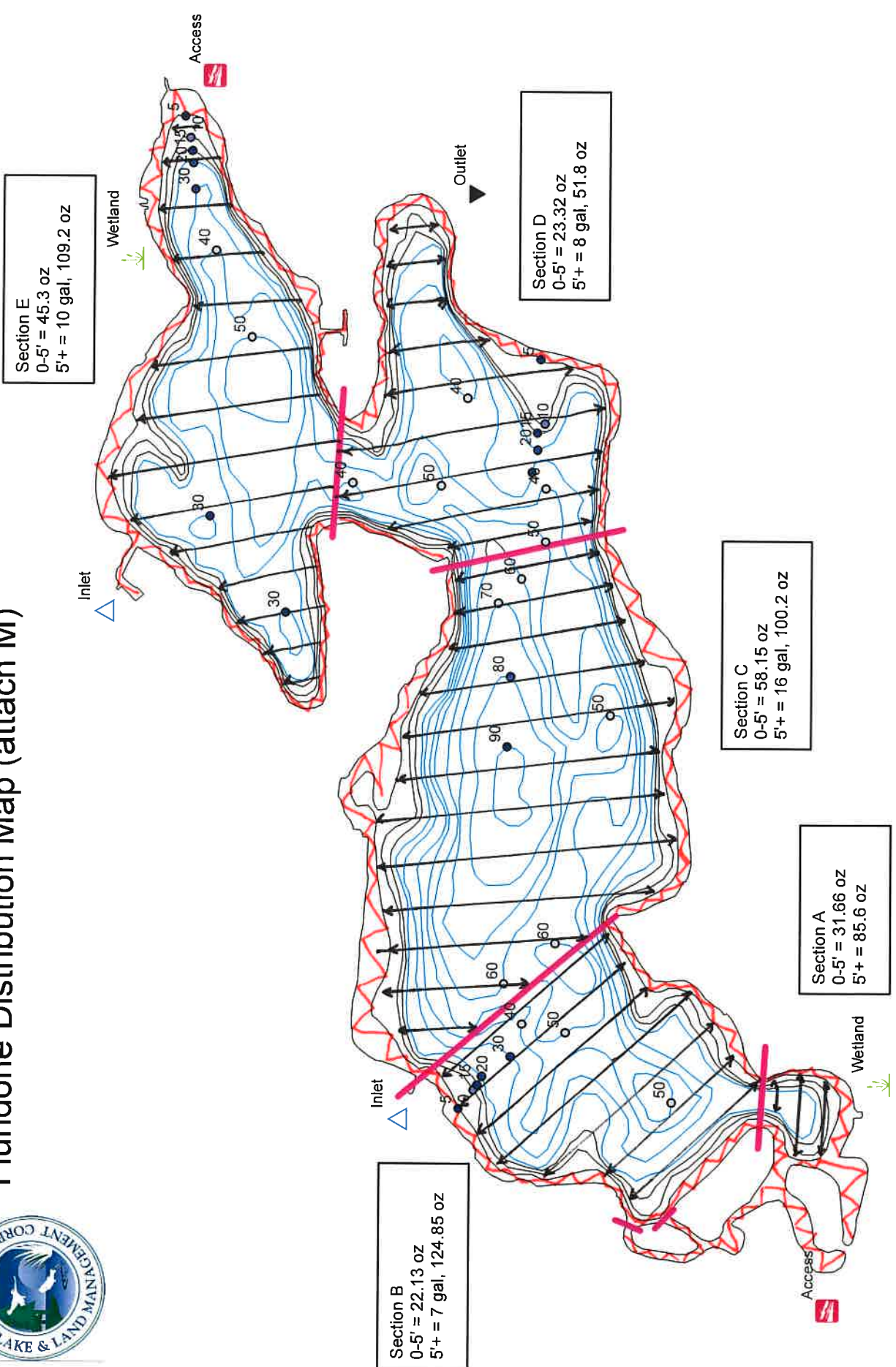

 Promoting native plant growth at non nuisance levels while controlling exotic species using contact and/or systemic herbicides


 Controlling exotic plant species using systemic and low dose contact herbicides where appropriate. Also using copper based products for Starry stonewort





Fluridone Distribution Map (attach M)



Paw Paw Lake
Surface Acres: 922
County: Berrien
Township: Coloma and Watervliet
T3S, R17-W,
Secs 10, 11, 14, 15, 16, 21



Lake Volume and Fluridone Calculation

Maximum Depth **90** feet

Contour	Area	Area between Contour and Next Contour	Average Depth	Volume (acre-ft)
0	922	138.3	2.5	345.75
5	783.7	88.36	7.5	662.7
10	695.3	55.76	12.5	697
15	639.6	55.58	17.5	972.65
20	584	144.5	25	3612.5
30	439.5	129.2	35	4522
40	310.3	107.8	45	4851
50	202.5	87.5	55	4812.5
60	115	47.2	65	3068
70	67.8	34.04	75	2553
80	33.76	28.09	85	
90	5.67	5.67	95	
Total				26097.10

Sonar Dose Rate Calculations

Lake Volume (0-15 ft)	11299.15 acre-ft
Fluridone Amount	6 ppb
	184.40 qts = 46.10 gals

Fluridone Section Calculations

Section A Calculation for product amounts (Acft *2.72*(ppb/1000) = qts)

Depth	Acres	0.99 qts	0.25 gal	31.66 oz
0' - 5' =	24.25			
5' - 10' =	3.76	0.46 qts	0.12 gal	14.73 oz
10' - 15' + =	2.88	0.59 qts	0.15 gal	18.80 oz
15'+	6.65	1.63 qts	0.41 gal	52.09 oz
		3.67 qts	= 0.92 gal	= 117.28 oz

Section B Calculation for product amounts (Acft *2.72*(ppb/1000) = qts)

Depth	Acres	0.69 qts	0.17 gal	22.13 oz
0' - 5' =	16.95			
5' - 10' =	16.55	2.03 qts	0.51 gal	64.82 oz
10' - 15' + =	12.59	2.57 qts	0.64 gal	82.19 oz
15'+	111.55	27.31 qts	6.83 gal	873.84 oz
		32.59 qts	= 8.15 gal	= 1042.98 oz

Section C Calculation for product amounts (Acft *2.72*(ppb/1000) = qts)

Depth	Acres	1.82 qts	0.45 gal	58.15 oz
0' - 5' =	44.54			
5' - 10' =	28.85	3.53 qts	0.88 gal	113.00 oz
10' - 15' + =	12.82	2.62 qts	0.65 gal	83.69 oz
15'+	249.13	60.99 qts	15.25 gal	1951.58 oz
		68.95 qts	= 17.24 gal	= 2206.42 oz

Section D Calculation for product amounts (Acft *2.72*(ppb/1000) = qts)

Depth	Acres	0.73 qts	0.18 gal	23.32 oz
0' - 5' =	17.86			
5' - 10' =	19.93	2.44 qts	0.61 gal	78.06 oz
10' - 15' + =	11.06	2.26 qts	0.56 gal	72.20 oz
15'+	118.15	28.92 qts	7.23 gal	925.54 oz
		34.35 qts	= 8.59 gal	= 1099.12 oz

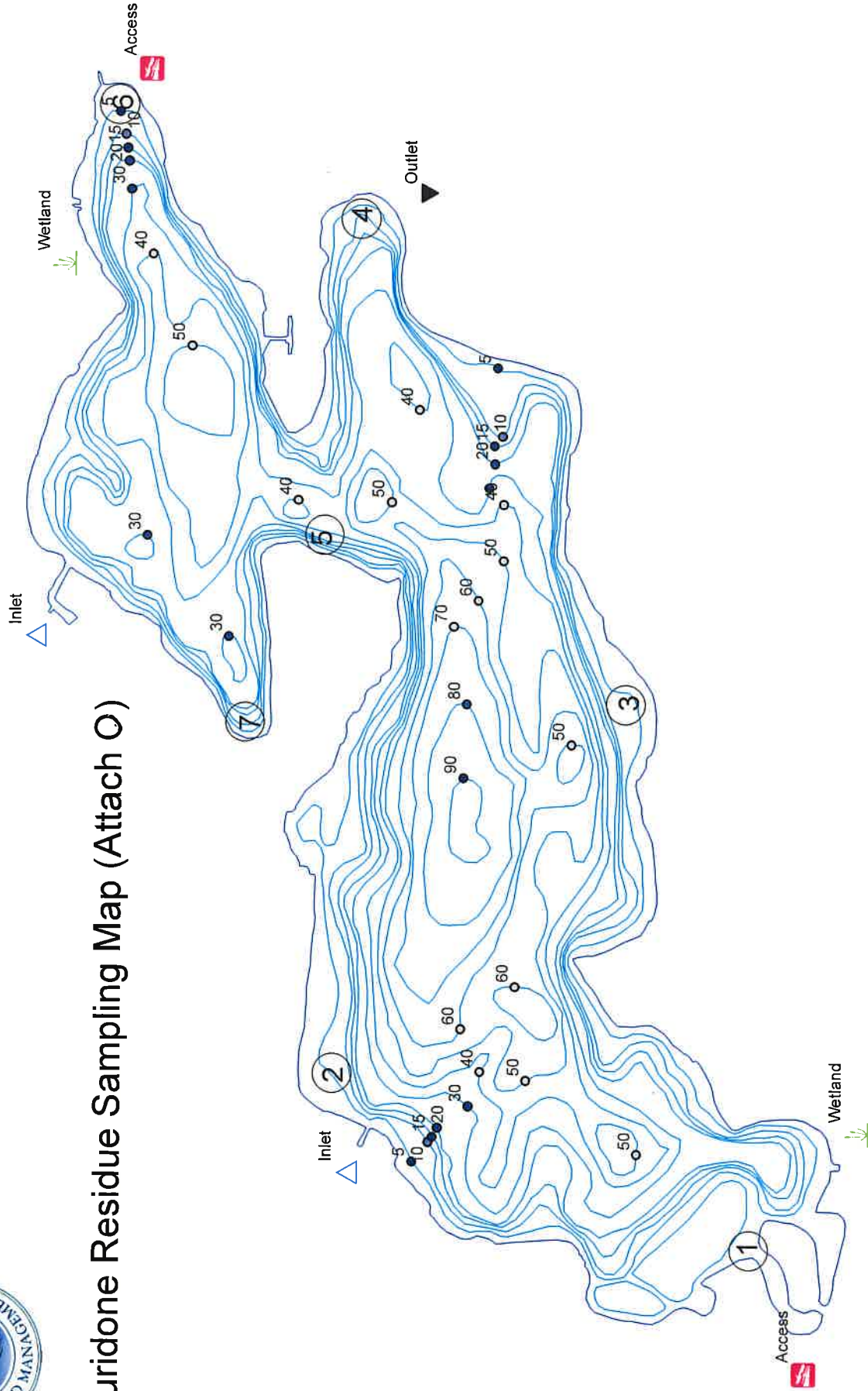
Section E Calculation for product amounts (Acft *2.72*(ppb/1000) = qts)

Depth	Acres	1.42 qts	0.35 gal	45.30 oz
0' - 5' =	34.7			
5' - 10' =	19.27	2.36 qts	0.59 gal	75.48 oz
10' - 15' + =	16.23	3.31 qts	0.83 gal	105.95 oz
15'+	154.18	37.74 qts	9.44 gal	1207.78 oz
		44.83 qts	= 11.21 gal	= 1434.51 oz

Total 184.38 qts = 46.10 gal = 5900.32 oz



Fluridone Residue Sampling Map (Attach O)



Paw Paw Lake
Surface Acres: 922
County: Berrien
Township: Coloma and Watervliet
T3S, R17-W,
Secs 10, 11, 14, 15, 16, 21





October 7, 2020

Joe Stepich
5780 North Watervliet Rd
Watervliet, MI 49098

PLM Lake & Land Management will provide a lake management program for the control of exotic weeds and/or algae in **Paw Paw Lake** for the **2021 season**.

Aquatic Vegetation Control Plan for Paw Paw Lake – 2020 Treatment Summary and 2021 Recommendations.

The 2020 season was a successful year in regards to exotic plant control on Paw Paw Lake. Based on conditions in 2019, treatment timing was adjusted to address possible early/mid-June plant growth with the intent of having plants controlled prior to July 4. This strategy was successful and we were able to address Eurasian watermilfoil, Curlyleaf pondweed and Thinleaf pondweed in a single treatment. Treatments for the remainder of the season were fairly small in scale. At the end of the year, Eurasian watermilfoil re-growth was starting to occur. Based on the abundance and distribution in Paw Paw Lake, we are recommending the use of Sonar A.S. for 2021.

The pricing for Sonar has been adjusted based on new protocols. Historically, Sonar dosage rates have been estimated using a hypothetical 10-foot thermocline depth. This method does not account for variations in thermocline depth and runs the risk of not achieving an effective dosage rate due to dilution of the herbicide. PLM has utilized a new protocol using the "evaluation treatment" permit application that allows for the use of the actual thermocline depth to calculate dose. With this method, the thermocline is measured a few days before application. Based on the depth, the amount of Sonar required is determined. This method increased the chances of obtaining a 6 ppb concentration and a more effective treatment. During the last Sonar A.S. treatment, FastEST results (Sonar concentration measurements) were much lower than we would have hoped. The evaluation method will allow us to get closer to the 6 ppb target concentration.

Whole Lake Treatments – Sonar A.S. (fluridone)

Whole lake treatments using Sonar A.S. (fluridone) can provide excellent, long term (2-3 seasons) control of Eurasian watermilfoil. Sonar A.S. also has the ability to provide selective control of Eurasian watermilfoil. Sonar A.S. treatments consist of two treatments conducted in late April and early May. It is applied at a low rate of 6 ppb (parts per billion) to selectively control Eurasian watermilfoil. The initial application is conducted once the lake has stratified and is applied at 6 ppb. Following the initial application, the concentrations are monitored (FastESTS) at various time periods. Based on the Sonar concentrations at 14 days after treatment, a "bump up" treatment is conducted to bring Sonar levels back up to 6 ppb. Since Sonar A.S. is applied to the entire lake, all Eurasian watermilfoil is controlled lake wide. Sonar A.S. is slow acting and control is usually achieved over a 45-60 day period. This treatment strategy is best suited for lakes that have a high density and wide distribution of Eurasian watermilfoil. The use of other herbicides are not permitted by MDEQ the year Sonar is applied. Sonar A.S. applications can only be conducted every three years.

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Much of the discussion regarding the use of Sonar has been verbal. Almost monthly zoom meetings have taken place. The possibility of Sonar use was discussed in the spring based on observations the previous seasons. Discussions had occurred with the board in the fall and the recommendation for Sonar was made. This lake group is experienced in the use of Sonar as part of their long term management program and approved the recommendation.