Little Wolf Lake
Montmorency, T29N R01E Sec. 35
Big Creek Watershed (Au Sable River), last surveyed 2015

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Environment

Little Wolf Lake is a 93-acre lake located on the southern border of Montmorency County and the northern border of Oscoda County, Michigan (Figures 1 and 2). The lake is part of the Au Sable River watershed which flows into the northern Lake Huron Basin. The geography of the lake is described as having a steep, low bluff which extends around most of the lake ranging from 10-40 feet in height. The surface elevation of Little Wolf Lake is 1210 feet above sea level. The soils around Little Wolf Lake are characterized as mineral in nature and consist of Grayling sand, gravelly phase (MSU 1975). The source of lake water is groundwater, making lake levels dependent upon region-wide precipitation influences especially snow fall and melting rates. There are no direct inlets or outlets to the lake, and because of the defined bluff encircling most of the lake the contributing watershed is fairly small (581 acres). Surrounding vegetation includes various pines, oaks, maples, and aspen trees. Along the shoreline, there are areas with brush and ground cover including ferns, grasses, low willows and cattails. Most recently, there is concern that the invasive Phragmites (Phragmites australis) has been established along the shoreline and it is known to outcompete native vegetation and lower the local plant biodiversity.

The lake is orientated in an ENE to WSW direction with a maximum length of 2,870 feet (Figures 1-4). The mean depth of the lake is approximately 10 feet and the lake has a total shoreline length of 8,480 feet with a shoreline development score of 1.229 (MSU 1975). The total estimated volume of the lake is 283,400,000 gallons (1,072,555 cubic meters).

The lake is characterized by two separate basins connected by a narrow, shallow area (referred to as the "narrows") that is approximately 250 feet wide (Google Earth version 7.1.8 accessed May 2017; Figures 1-4). This area can have an emergent sand bar under normal low water level conditions. The western basin is relatively deeper with a maximum depth of 40 feet compared to the eastern basin where the maximum recorded depth is 15 feet (Figure 4). Because of its depth, the western basin comprises approximately 67% of the lake volume. The shallower eastern basin has more aquatic vegetation and also has a natural shoreline on the southern shore because it is owned by the State of Michigan and is a Michigan Department of Natural Resources State Forest Campground. Although there is public access to the lake via the State Forest Campground, there is no public boat ramp access on Little Wolf Lake.

The landowners have established a Little Wolf Lake Association and it is consists of up to 85 distinct lake lots. There is a local watercraft control regulation that limits boats to no wake conditions from 6:30pm to 10:00am and at all times in the narrows. There is a pike management weir in the western basin at the mouth of the major marsh embayment, which is described in detail later in the report. The pike weir was in operation for a few years but was later abandoned because of low water levels and a general understanding that the pike population was not in danger and appeared to be adequate given the lake size and productivity.

History

Little Wolf Lake has a history of wide fluctuations in water levels, associated water quality and vegetation growth, environmental disturbance, and substantial responses in fish populations. Beginning in the late 1950s with respect to water levels, there were several complaints from property owners of Little Wolf Lake regarding the sandbar in the middle of the narrows. A request was made in 1959 by the Little Wolf Lake Property Owners Association for DNR assistance in dredging the channel . Upon visiting the channel, the DNR advised that the channel was still wide enough to allow two boats to pass through at one time. It was determined that there was no action needed at that time, but the narrows have been dredged periodically throughout history to allow for ease of boat passage.

Little Wolf Lake has also had a history of heavy winter kills, first documented following the 1955-56 and 1958-59 winters. In 1956, Largemouth Bass represented a higher percentage of the total kill compared to Bluegills, Bullheads and Common White Suckers. In 1956, it was reported that the ice had frozen on the east basin of the lake to approximately 22 inches. The thick ice and duration of the winter was determined to be the cause of the heavy winter kill that year. Additionally, the same conditions on the lake were thought to cause the heavy winter kill in 1959.

Following the early reports of winter kills, there were complaints made to the state in 1959 regarding poor fishing in the lake. It was determined that the poor fishing was probably the result of heavy winter kills that year. According to the Institute of Fisheries Research records, in the fall of 1960, a netting and seining survey was conducted based on the reports of the heavy winterkills and low Bluegill numbers (Table 1). In September 1961, the lake was treated with rotenone to remove the stunted perch population (Table 1). At the same time, 100 adult Bluegill and 1,000 adult Rainbow Trout were stocked in the lake (Table 2). In October of 1961, there was a survey conducted in the pike spawning marsh due to reports of low pike spawning (Table 1).

In 1961, construction plans were developed to improve access to the Northern Pike spawning marsh. At that time, there were homeowners willing to lease their land to the DNR to build an access and water retention structure. The channel was dug in 1961, and was 400' long, 30' wide, and 8' deep located in the western basin marsh and records indicate that it was completed by 1962. No complaints were recorded regarding the marsh control structure, however, it did not appear to improve spawning or recruitment for Northern Pike.

In the fall of 1962, a seining survey was conducted to check the species composition of the lake after the treatment in 1961 (Table 1). Following the survey, in December of 1962, there was a large scale stocking effort conducted including 2,000 sub-legal (SL) Largemouth Bass, 500 fall fingerling (FF) Smallmouth Bass, 139 adult Bluegill, 20 adult Northern Pike, and 100,000 Northern Pike Fry (Table 2). In the fall of 1963, a small trap net survey was completed to determine the success of the plantings from 1962 (Table 1).

In 1964, reports of swimmer's itch were received by the DNR and in the summer of that year copper sulfate was used to control snails in the lake. Following the treatment, a property owner report that the copper sulfate from the treatment eroded holes into the bottom of their boats. After the treatment, lake records were requested multiple times by residents to determine the history of the lake and the status of the fish populations. There were fewer complaints recorded during the late 1960's and manager notes

suggested the rotenone treatment was thought to have been successful. There were reports of good Rainbow Trout fishing until 1963. It also appeared that the stocked Bass and Bluegill had reproduced, again supporting the general viewpoint that the initial rotenone treatment had been positive (Tables 1 and 2).

In spring 1974, the state received a letter from the Little Wolf Lake Property Owners Association proposing zoning ordinances around the lake. In August of 1974, the state received another letter from the law office of Olson and Dettmer, who were hired by the Property Owners Association, in response to the proposed real estate development project on the lake. The association then requested information regarding the history of the water quality of Little Wolf Lake to determine if the real estate development would damage the water quality of the lake. In response to general concerns about the water quality implications of the pending development project, Michigan State University conducted an Environmental Study and the findings were available in a 1975 report (MSU 1975) recommending against additional development on Little Wolf Lake. In addition, the state conducted a general netting survey to check the species composition of the lake since the treatment in 1961 (Table 1).

Following the 1975 water quality study and fisheries survey, another rotenone treatment was proposed based on the perceived poor quality of the fishing in the lake (Table 1). A written roll call vote was taken at a Little Wolf Lake Property Owners Association meeting to decide if the property owners wanted the rotenone treatment applied and copies were sent to the state to be included in the lake records. The treatment was approved but it was determined that the property owners were responsible for picking up the dead fish. The treatment was scheduled to occur with a thinning/partial treatment followed by a whole lake treatment. However, the partial thinning was determined to be unsuccessful after the trial period in October, 1975. The rotenone treatment findings suggested that scaling up to a whole-lake treatment would sacrifice too many large species of fish in order to kill an adequate number of stunted Bluegill.

In September 1977, a trap and gill net survey was completed to check the species composition after the partial rotenone treatment in 1975 (Table 1). In 1979, there was discussion by the Little Wolf Lake Property Owners Association of re-opening the spawning marsh structure in the west basin of the lake. In 1980, it was decided to add an 8' wall to the current marsh control structure and to stock Northern Pike fry in May of 1981. The request from the lake association was for the state to stock Northern Pike fry each spring if this trial was successful. According to the Institute of Fisheries Research, the pike marsh control structure operation was completed in 1984 (Table 1).

Instead of stocking Northern Pike, management then shifted to alternating-year stocking of 250 fall fingerling Tiger Muskellunge starting in 1981 through 1987 and 450 FF Tiger Muskullenge in 1989 by MDNR (Table 2). In 1986, there was a general netting survey conducted to check the musky population in the lake (Table 1). Concurrent with the Tiger Muskellunge stocking program, special harvest regulations were initiated to substantially restrict the size of fish harvested, in an attempt to build the overall populations of other sport fish. The special size regulations included a minimum harvestable size of 16 inches for Large and Smallmouth Bass, releasing all Bluegill and Pumpkinseed Sunfish; releasing all 8 to 11 inch Yellow Perch, a minimum harvest size of 18 inches for Walleye, a minimum harvest size of 25 inches for Northern Pike, and a minimum harvest size of 30' for Tiger Muskellunge (Michigan Department of Natural Resources, 1982). There were several angler complaints, starting in 1983, in response to the 1982 special regulations. Some lake residents

requested that the restrictions be lifted. There were also requests for evaluation of the special regulations, and for information regarding whether or not fish populations in the lake were responding to the special regulations.

In 1984, there were complaints by property owners of large scale algae blooms and they requested that something be done to clean the water. It was suspected that shoreline development was impacting water quality and recommendations from managers were provided to the lake association, suggesting "wise land practices" and cautious use of fertilizers when applied close to shore to minimize algal blooms. In 1986, there was general netting survey conducted to check the musky population in the lake (Table 1). Based on that survey and complaints from anglers, the special regulations /size restrictions were allowed to expire in December of 1987 (Table 1).

In 1990, the Little Wolf Lake Property Owners Association submitted a grant application to build another control structure at the old Pike spawning marsh to more effectively flood the marsh. The DNR informed the association that the marsh was not successful in the past, and would probably not be successful again due to low water levels and a history of wide-scale water level fluctuations. The association agreed and requested that MDNR consider stocking Northern Pike should water levels continue to decline. During the 1997 fishing season, from April to September, a volunteer-based creel survey was conducted in response to complaints from the anglers and lake association (Table 1). In 1998, it was determined that stocking Northern Pike was not a good long-term option. Following the creel survey, fisheries managers and property owners encouraged catch-and-release fishing only to help the population increase, but no special regulations were enacted.

No complaints were recorded by the state during the early 2000's. The lake association began privately stocking the lake (with permission from the state) in June of 2005 and has continued to conduct stocking up to the present, albeit with varying numbers and species of fish.. In 2005, private stocking included 200 Yearling Black Crappie, 350 Yearling Bluegill, 133,333 adult Fathead Minnows, and 350 Spring Fingerling Walleye. In 2012, private stocking included 715 adult Bluegill and 2,500 Fathead Minnows (Table 2). In 2013, an additional 1,024 adult Bluegill and 2,400 adult Fathead Minnows were planted on a private permit. In 2014, private stockings included 100 adult Yellow Perch, 2,400 adult Fathead Minnows, 350 FF Bluegill, and 100 FF Walleye (Table 2). The last recorded stocking was in 2016 when 300 adult Bluegill and 200 FF Walleye were planted on a private permit.

In 2013, complaints were made that Bluegill numbers were low, and that decreased numbers of frogs, dragon flies, and crayfish were being observed. Property owners also reported fewer minnows and lower water quality as observed by large number of air bubbles coming up from the water presumably from decomposition of organic matter. Residents were also concerned that the bubbles could be from hydraulic fracking or from local oil and gas mining. Residents reported catching Largemouth Bass with external sores, and there were complaints between 2013 and 2014 about the overall quality of fishing in the lake based on the size of Bluegills caught and low catch rates of fish in general. In 2015, MDNR conducted a general discretionary survey of the fish populations to address angler concerns.

Current Status

The most recent fisheries survey of Little Wolf Lake was conducted in May, 2015, with nets being lifted on May 11 and May 12. Fish sampling was conducted using large-mesh trap nets (3 lifts), large-mesh fyke nets (9 lifts), small-mesh fyke nets (4 lifts), inland gill nets (6 lifts), and minnow seines (3

pulls). Across all gears, a total of 328 fish were sampled representing 13 different species (Table 3). In all gears combined, Rock Bass dominated the catch totaling 34.5% of the composition by number. Yellow Perch were the second most abundant fish species making up 27.4% of the fish population. Bluegill and Northern Pike were 11.3% and 8.5% of the species composition by number, respectfully. Collectively, Rock Bass, Yellow Perch, Bluegill and Northern Pike comprised 81.7% of the catch, by number, across all gears. The remaining nine species were individually less than 5% of the catch and collectively only 18.3% of the total catch by number. It is highly likely that the very low catches of Largemouth (6 fish; 1.8% of the catch) and Smallmouth (3 fish; 0.9% of the catch) bass were a a by-product of the timing of the survey. Netting occurred during the bass spawning period, when movement and catchability for bass are typically reduced.

Analysis and Discussion

With regards to the four most abundant species, the relative abundance of each species varied in the different gears. For example, Northern Pike were most abundant in the inland gill nets at catch-per-effort (CPE; number per net lift) of 2.8±1.8 (Mean±SD). Comparing the relative abundance in previous surveys using inland gill nets, Northern Pike were reported to have a CPE of 4.38 in 1964, 3.88 in 1974, and 0.63 in 1977. Therefore, the CPE of Northern Pike in 2015 is well within the range for the lake and adequate based on the size and available forage in Little Wolf Lake.

In contrast, Rock Bass were most abundant in the large mesh fyke nets with a CPE of 10.6±4.8. The high relative abundance of Rock Bass is likely a relatively new trend as the previous surveys did not report high catches. Bluegill and Yellow Perch were most abundant in the small mesh fyke nets with a CPE of 1.5±1.0 for Bluegill and 1.5±1.7 for Yellow Perch. Previous surveys did not report CPE from small mesh fyke nets, however, it appears as though the densities are likely lower because CPE was low for both Bluegill and Yellow Perch in the gill nets and trap nets as well. In the past surveys, Bluegill CPE ranged from 1.- to 2.5 in the gill nets and 0.82 to 6.18 in trap nets (1974 and 1977 surveys). Similarly, Yellow Perch CPE ranged from 1.88 to 7.88 in the gill nets and 0.94 to 3.56 in trap nets (1974 and 1977 surveys). Bluegill were not captured in either trap nets or gill nets during the 2015 survey, and Yellow Perch were captured in gill nets with a CPE of 1.7, but were not captured in trap nets. The remaining species caught in the 2015 survey varied substantially across gears or were too low in abundance to estimate a CPE.

Because of the low sample sizes for Largemouth and Smallmouth Bass, analyses of age and growth were only conducted for Bluegill, Northern Pike, and Yellow Perch (Table 4). The average length-at-age estimates showed growth rates below the state averages for the species and ages analyzed (Table 4). However, the growing season for northern lakes is shorter and Little Wolf Lake is likely less productive, based on nutrient inputs and water quality, than lakes used to calculate the statewide averages. Therefore, even though the growth rates for Bluegill, Northern Pike, and Yellow Perch are below state averages, it doesn't appear to be outside of acceptable ranges for similar lakes in the northern Lower Peninsula of Michigan. These results were similar to the findings reported from the 1977 survey of Little Wolf Lake; Bluegills and Yellow Perch averaged 6.0 and 6.3 inches, respectfully, and were found to be growing slower than the statewide average in that survey as well (Tables 4 and 5).

Of particular interest was the first reported catch of eight adult Walleye, which was 2.4% of the total catch. The Walleye captured in the 2015 survey were very similar in size, ranging from 20 to 24

inches with an average size of 22 inches. Based on the size and ages of these walleye, they were likely from the initial stocking event. The estimated growth and apparent survival for the initial stocking suggests that the environmental conditions are favorable for Walleye populations in Little Wolf Lake. However, there was no evidence of natural reproduction of the stocked fish based on the absence of any small Walleye in any of the gears, especially the seine or small-mesh fyke nets. Therefore, the survey results suggest that if a Walleye fishery was a management goal for this lake, then increased numbers of Walleye would need to be stocked but good growth and survival would be expected.

Management Direction

The history of management actions in Little Wolf Lake represents a long case-history of common problems that inland lakes in Michigan faced with shoreline development, fishing and boating activity increasing, natural mortality events (i.e., winter kills), and water level fluctuations. Little Wolf Lake, however, has had a substantial amount of experimental management, including fish removals with rotenone, various stocking events by both state and private entities, habitat modifications, and even a special harvest regulation(s) in an attempt to build fish populations. Often the management actions followed property owner or angler complaints regarding changes in the lake or poor quality of fishing conditions.

Unfortunately, many of the past management actions either lacked the appropriate evaluations or were determined to be ineffective in attaining the desired goal. Based on the water quality analysis in 1975 and the management actions taken over time in response to complaints, it appears as though Little Wolf Lake has both been impacted by management actions, but more importantly, the lake has a natural cycle that includes wide variations in environmental conditions which are likely the driver in fish population changes.

Under high water level conditions, it is reasonable to surmise from the historical records that Northern Pike populations experience increased recruitment, subsequently driving down the abundance of prey and panfish populations. These may also be the times when Bluegill, Pumpkinseed, and Yellow Perch experience higher growth rates, with lower densities of small fish,. In lower water level years, the Northern Pike populations probably experience substantially reduced recruitment, leading to potentially higher abundance of the Bluegill, Pumpkinseed, and Yellow Perch populations and potentially stunted growth of those species.

In addition to the variation in water levels, other environmental factors, such as winter severity, can have wide-scale impacts on the fish populations in Little Wolf Lake. Based on the degree of property owner and angler complaints, it is also apparent that the lake, for its relatively small size, experiences a high level of recreational fishing effort. Increased fishing effort may influence the severity of the natural cycles in the fish populations in Little Wolf Lake.

The most recent survey indicates that new changes were occurring in Little Wolf Lake fish populations. For example, the high catch rate of Rock Bass was notable and might suggest a new shift in environmental conditions favoring their recruitment, or a preference against these in the fishery (e.g., lack of harvest mortality), or a combination of these two factors. Moreover, the relatively good growth and survival of Walleye, given the low stocking rates, suggest that addition of an alternate predator may provide more stability in the variations in fish stocks while providing additional fishing opportunities, especially during the cyclical variations in the dominant predator, Northern Pike.

However, it should also be recognized that additional Walleye stocking will involve other risks to the lake population. First, it is not apparent that the Walleye have adequate spawning habitat in Little Wolf Lake; it will likely require constant supplemental stockings to support a fishery. Second, stocking of Walleye will promote new fishing opportunities that may increase fishing effort on this relatively small inland lake. From a regional perspective, there are other Walleye lakes in close proximity (West Twin Lake, East Twin Lake, Big Creek Impoundment).

Last, the long history of management actions in response to property owner or angler complaints has led to reactionary approaches that likely decreased the quality of the fishery in Little Wolf Lake. For its size and location, Little Wolf Lake is unique in the frequency and magnitude of fisheries management responses to real or perceived variations in fish populations. Moreover, the current management action to stock the lake periodically with various species, has shifted from the responsibility of the state to the private property owners. Although this shift in responsibility can give local stakeholders more ownership of the management actions, it may also repeat the same history of ineffective actions, waste of resources, and potential harm to the long-term quality of the fishery. To avoid this pitfall, it is recommended that if the private stockings are to continue, that the lake association work with fisheries professionals to follow goals on future management actions in concert with measurable ways to course correct if the actions are deemed unproductive or damaging. Management recommendations are provided below. These recommendations should be considered within the lake's natural environmental fluctuations, which can play a substantial role in regulating the cyclical changes in fish populations of Little Wolf Lake.

Overall management direction:
1. Maintain statewide fishing regulations. Bag limits and minimum size limits are appropriate for this lake.

2. Northern Pike should remain the dominant predator in this lake. Fisheries Division will not include Walleye stocking in our management plan for this lake.

3. Bluegill and Yellow Perch abundance and growth, along with other preyfish densities, are a function of cyclical predator densities. Stocking to influence prey fish fluctuations should only be done on a limited basis, and Fisheries Division advises stakeholders to pursue alternative management strategies (e.g., shoreline habitat improvements) for protection of prey fishes.

4. Riparian landowners should maintain a buffer strip of natural vegetation adjacent to the lake, and not remove woody structure from the lake. The buffer provides important water quality benefits, and the woody structure is important fish habitat for a variety of species and life stages.

References

Michigan Department of Natural Resources, 1982. Michigan Fishing Guide. Michigan Department of Natural Resources, Lansing.

Michigan State University, 1975. Little Wolf Lake environmental study. Student Water Publications Club. East Lansing.

Figure 1. Location of Little Wolf Lake in Michigan (lake noted by the red dot).

Figure 2. Aerial view of Little Wolf Lake, Montmorency and Oscoda counties, from satellite images (Source Google Earth).

Figure 3. Hydrographic map of Little Wolf Lake, Montmorency and Oscoda counties.

Table 1. History of management activities for Little Wolf Lake, Montmorency and Oscoda Counties, 1960 - 2015.

Year	Month	Management Activity	Reason for the Activity
1960	August/September	Netting and seining survey	Winterkill (1968-1969) and low Bluegill numbers
1961	September	Treat to remove stunted perch population	Small treatment to remove abundant small perch
1961	October	Survey pike marsh	Concern about Northern Pike spawning
1962	July	Construct access to pike marsh	Concern about Northern Pike spawning
1962	September	Seining survey	Check species composition since treatment
1963	October	Small trap net survey	Determine success of plantings after 1961 treatment
1964	Spring	Copper sulfate treatment	Control snails to treat swimmers itch
1974	Unknown	Netting survey	Check species composition since 1961 treatment
1975	November	Environmental Study	General concerns about water quality
1975	October	Treatment	Large scale rotenone survey
1977	September	Trap and gill net survey	Check species composition since treatment
1981	May	General netting survey	Check species composition since treatment
1982	Spring	Special size regulation was initiated	Special regulation to build the populations of sport fish
1984	Unknown	Construct access to pike marsh	Control structure completed for Northern Pike spawning
1986	Unknown	General netting survey	Check Muskellunge population
1987	December	Allow special regulation to expire	Special regulation was not effective
1997	April to September	Creel survey	Response from anglers and lake association
2015	May	General netting survey	Response from anglers and lake association

Table 2. Fish stocked in Little Wolf Lake, Montmorency and Oscoda Counties, 1961 - 2016.

Year	Month	Species	Number	Life Stage	Strain	Distribution / Source	Info Source	Notes
1961	September	Bluegill	100	Adult	Unknown	Unknown	Notes in Historic File	Lake transfer
		Rainbow Trout	1,000	Adult	Unknown	Unknown	Notes in Historic File	None
1962	December	Largemouth Bass	2,000	Adult	Unknown	Unknown	Notes in Historic File	Sublegal Adults
		Smallmouth Bass	500	Fall Fingerling	Unknown	Unknown	Notes in Historic File	None
		Bluegill	100	Adult	Unknown	Unknown	Notes in Historic File	Transfer - Sublegal Adults
		Bluegill	39	Adult	Unknown	Unknown	Notes in Historic File	Legal Adults
		Northern Pike	20	Adult	Unknown	Unknown	Notes in Historic File	Sublegal Adults
		Northern Pike	100,000	Fry	Unknown	Unknown	Notes in Historic File	None
1981	July	Tiger Musky	250	Fall Fingerling	Hybrid	Thompson State Fish Hatchery	FSIS Database/ Online Database	None
1983	August	Tiger Musky	250	Fall Fingerling	Hybrid	Platte River State Fish Hatchery	FSIS Database/ Online Database	None
1985	September	Tiger Musky	250	Fall Fingerling	Hybrid	Wolf Lake State Fish Hatchery	FSIS Database/ Online Database	None
1987	October	Tiger Musky	250	Fall Fingerling	Hybrid	Wolf Lake State Fish Hatchery	FSIS Database/ Online Database	None
1989	September	Tiger Musky	450	Fall Fingerling	Hybrid	Wolf Lake State Fish Hatchery	FSIS Database/ Online Database	None
2005	June	Black Crappie	200	Yearling	Unknown	Private Rearing Facility	FSIS Database/ Online Database	None
		Bluegill	350	Yearling	Unknown	Private Rearing Facility	FSIS Database/ Online Database	None
		Fathead Minnow	133,333	Adult	Unknown	Private Rearing Facility	FSIS Database/ Online Database	None
		Walleye	350	Spring Fingerling	Unknown	Private Rearing Facility	FSIS Database/ Online Database	None
2012	October	Bluegill	715	Adult	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
		Fathead Minnow	2,500	Adult	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	10 pounds at avg 250 per pound
2013	November	Bluegill	1,024	Adult	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
		Fathead Minnow	2,400	Adult	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
2014	November	Yellow Perch	100	Adult	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
		Fathead Minnow	2,400	Adult	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
		Bluegill	350	Fall Fingerling	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
		Walleye	100	Fall Fingerling	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
2016	October	Bluegill	300	Adult	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None
		Walleye	200	Fall Fingerling	Unknown	Imlay City Fish Farm, Inc.	FSIS Database/ Online Database	None

Table 3. Catch composition in all gears combined for Little Wolf Lake, Montmorency and Oscoda Counties, from the May 2015 survey.

Common Name	Number	Composition by Number	Average Length (in.*)	Length Range (in.*)
Black Crappie	1	0.3%	15	
Bluegill	37	11.3%	5.2	1-7
Bluntnose Minnow	14	4.3%	2.8	1-3
Brown Bullhead	15	4.6%	13.4	10-14
Creek Chub	3	0.9%	3	3
White Sucker	1	0.3%	23	
Largemouth Bass	6	1.8%	16.2	14-17
Northern Pike	28	8.5%	24	20-27
Pumpkinseed	9	2.7%	7.5	4-10
Rock Bass	113	34.5%	6.3	2-11
Smallmouth Bass	3	0.9%	4.5	2-7
Walleye	8	2.4%	22	20-24
Yellow Perch	90	27.4%	2.4	1-7
All Species Total	328			

Table 4. Size and age structure for Bluegill, Northern Pike, and Yellow Perch captured in the 2015 survey of Little Wolf Lake, Montmorency and Oscoda Counties.

Species	Age	Number	Age Frequency	Length Range (in.)	Average (in.)	State Average Length (in.)
Bluegill	2	9	25.71%	2.8-4.4	3.39	3.8
	3	4	11.43%	4-6.9	4.73	5.0
	4	5	14.29%	4.5-7.4	5.52	5.9
	5	15	42.86%	5.1-6.9	6.12	6.7
	6	2	5.71%	5.2-6.2	5.7	7.3
Northern Pike	5	5	17.86%	22.2-25.6	24.2	25.5
	6	20	71.43%	20.9-27.3	23.7	27.3
	7	3	10.71%	23.6-25	24.1	29.3
Yellow Perch	0	19	55.88%	1.4-2.7	1.98	--
	3	1	2.94%	5.8	5.8	6.5
	4	3	8.82%	5.9-6.8	6.33	7.5
	5	9	26.47%	5.8-7.0	6.62	8.5
	6	2	5.88%	6.7-7.0	6.85	9.4

Table 5. Length-frequency of game fish captured during the May 2015 survey of Little Wolf Lake, Montmorency.

Inch Group	Bluegill	Largemouth Bass	Northern Pike	Pumpkinseed Sunfish	Rock Bass	Small-mouth Bass	Walleye	Yellow Perch
1	1							67
2	2				4	1		8
3	4				2	1		
4	8			2	16			
5	8				33			3
6	13			2	34			9
7	1			1	7	1		3
8				1	7			
9				2	2			
10				1	2			
11					6			
12								
13								
14		1						
15		1						
16		3						
17		1						
18								
19								
20			1				2	
21			3				3	
22			5				1	
23			3				1	
24			8				1	
25			4					
26			3					
27			1					