

Van Etten Lake

Iosco County, T24N, R09E, many sections
Au Sable/Pine River watersheds, last surveyed 2018

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Environment

Van Etten Lake is 1,320 acres in size, and is located two miles north of Oscoda, in Iosco County, Michigan, in the east central Lower Peninsula (Figure 1). Its maximum depth is approximately 32 feet with 80% of the lake deeper than 10 feet (Figure 2). The Van Etten Lake watershed includes 179,319 acres, mostly in south central and southeastern portions of Alcona County. There are three tributaries entering the lake including two small streams, Dry Lake Creek from the west, Phelan Creek from the northeast, and a large drainage area, the Pine River Drainage from the north. Van Etten Creek discharges from the lake into the Au Sable River approximately two miles upstream of the mouth at Lake Huron. A lake level control maintains a Circuit Court ordered level that was originally established in 1944 at 589.2 feet above sea level. This order was later modified in 1947 and then again in 1954 to allow a winter draw down of three feet (586.2 feet above sea level). The dam on the outlet is a dual gate operated structure which allows some seasonal fish passage. There is a large island on the north end of the lake known as Loud Island.

The shoreline of Van Etten Lake is mostly developed and private. There is a state forest campground on the west shore as well as a Department of Natural Resources (DNR) managed public boat launch. The launch has a gravel surface and parking for six boat trailers. The bottom substrate of Van Etten Lake is primarily sand with muck in the deeper areas and on the north end. Aquatic vegetation is fairly abundant. The Township of Oscoda through a special assessment district has applied for permits for 14 chemical treatments of nuisance aquatic vegetation at Van Etten Lake over the last 25 years (Ryan Crouch, Michigan Environment, Great Lakes, and Energy, personal communication). Treatments are typically for small patches of vegetation on the north end, or treatments ranging from 31-58 acres in size for the more developed parts of the lake. A 100-acre treatment for nuisance algae was also done in 2016.

Standard State of Michigan fishing regulations apply for the waters of Van Etten Lake. The Michigan Department of Community Health also lists a number of fish consumption advisories for fish in Van Etten Lake related to PCB's, PFOS, and mercury (Table 1). Some of these chemicals have entered Van Etten Lake through groundwater leaching from a nearby military base and airfield. Details and definitions for these advisories can be found in the Fish Consumption Guide by the Michigan Department of Health.

History

Stocking records for Van Etten Lake date back to the 1930s, initiated by the Department of Conservation (DOC). During this the State of Michigan was experimenting with rearing various warm- and cool-water species and stocking at low rates in waterbodies across Michigan. Stocking was done regardless of the need to stock some of these species. Walleye fry and fingerlings were stocked from 1937-1939. Largemouth Bass fingerlings and yearlings were stocked in Van Etten Lake from 1939-

1943, and 1979. Yellow Perch of all sizes were stocked from 1937-1942, and 1979. Northern Pike yearlings and adults were stocked from 1937-1942. Shiner species and yearling sunfish were stocked in 1937 and 1939, respectively.

Initial observations of Van Etten Lake by the DOC were made in 1927 when they found a sandy bottom lake with a low dam at the outlet. Notes suggest that fish passage both upstream and downstream were not limited by the small structure. Species present in the lake included Yellow Perch, Rock Bass, Walleye, and migratory species from Lake Huron such as redhorse sucker species and Rainbow Trout. Recommendations from this period were to stock Walleye and Smallmouth Bass. Walleye stocking proceeded during the next decade.

Another examination of the lake and fish community was completed by the DOC in 1937. They noted Van Etten as a lake with a relatively high pH (8.4) but moderate or average alkalinity (136 ppm). It was described as a broad, shallow waterbody with a sandy bottom and a few deeper holes that reached over 30 feet. Species reported present included Yellow Perch, Pumpkinseed, Black Crappie, Rock Bass, Northern Pike, Walleye, and both Smallmouth and Largemouth bass. A variety of minnows, shiners, darters, and madtom were present along with Common Carp, White Sucker, redhorse sucker species, and bullhead species.

Reports in the 1940s from Van Etten Lake are limited. The DOC issued a limited permit for a local fisherman to commercially net the lake with trap nets in 1948. The fisherman used 69 trap net nights to mostly catch Black Crappie, White Sucker, Walleye and Northern Pike. Other species collected in lower numbers were Yellow Perch, Pumpkinseed, Rock Bass, Cisco, Rainbow Trout, Brown Trout, Freshwater Drum, bass species, suckers and bullheads. It is not known from the limited file for this survey if fish were sold commercially or if the survey was a data gathering effort for the DOC.

Two fish survey efforts were made at Van Etten Lake in the 1950s by the DOC. Gill nets (500 ft) were set in 1952 in September. Few fish were collected except for Yellow Perch and Walleye. The perch catch was dominated by small specimens. Six gill net (length of nets?) lifts were used in August of 1957 which documented an abundance of Yellow Perch in the 5-10 inch size range. Other species collected were present in previous surveys but occurred in lower numbers in 1957. Also noted from 1957 was an angler caught Freshwater Eel, an obvious migrant from Lake Huron.

One fish community survey of Van Etten Lake was made by DOC in the 1960s. An unknown number of fyke and trap nets were used to survey the lake in May. Eighteen species of fish were collected in this survey totaling 1,966 fish. Black Crappie dominated the catch with most in the 6-8 inch size range. Yellow Perch and Pumpkinseed were also common in the catch and also dominated by 6-8 inch fish. Species not encountered before in Van Etten Lake survey efforts, and caught in low numbers, were Bluegill and White Bass. Predators such as Walleye, Northern Pike, Smallmouth and Largemouth bass were found in low densities. Growth rates of panfish were generally average to poor while predator growth rates were average to exceptional when all were compared to statewide averages.

The lake was characterized as having an abundant and stunted panfish population in the 1960s with low densities of predators. Efforts were undertaken in the mid-1960s to boost Northern Pike abundance by building two spawning marshes adjacent to the lake. These efforts were short lived and considered a failure. It did, however, show the early concern fisheries managers had for the stunted panfish community and low predator densities.

A more thorough fish community evaluation by made by the DNR in 1978. Managers used 6 gill net lifts and 8 trap net lifts to collect 17 species. New species documented included Golden Shiner, White Crappie, Gizzard Shad, and Channel Catfish. Panfish were again considered abundant, particularly both Black and White crappie, but most were in the 6-8 inch size range, as were the Yellow Perch. Channel Catfish, Northern Pike, and Walleye dominated the predator catch. These species were common, but not considered abundant. Large specimens of each species were present, which may have been attributable to the larger numbers of Gizzard Shad found in the lake that year, offering a high quality forage base.

Strong attempts were made to boost the predator population of Van Etten Lake beginning in the 1980s by the DNR. Spring fingerling Walleye stocking efforts began in 1980 and fall fingerling Tiger Muskellunge stocking was initiated in 1984. DNR used fyke nets and one gill net in October 1988 to assess recent stocking efforts (Table 2) of Walleye and Tiger Muskellunge. Twenty-four species were collected in the survey (Table 3). The catch was again dominated by panfish, mainly small Black Crappie and Yellow Perch (Table 4). Common predator fish collected were Walleye and Channel Catfish, along with lower numbers of Northern Pike, Smallmouth and Largemouth bass (Table 3). Both Walleye numbers and sizes were considered impressive with the majority of fish collected larger than 20 inches (Table 4) and represented by 8 age groups. Channel Catfish, also commonly collected, ranged from 14-28 inches with a large number of fish in the 17 inch size range (Table 4). Some species, including Walleye, Freshwater Drum, Channel Catfish, and Rainbow Trout were considered part time members of the Lake Huron fish community, and likely migrated to Van Etten Lake at one time. No Tiger Muskellunge were collected in the survey despite annual stocking from 1985 through 1988. Reasonable numbers (35/acre) of fingerling Walleye were stocked in Van Etten Lake in 1985 which is in the DNR recommended stocking range of 25-100/acre. Despite this, few age-3 Walleye were collected in the 1988 survey. Many other age groups of Walleye were surveyed, showing either strong natural recruitment in the lake, or movement of fish from Lake Huron/Au Sable River to Van Etten Lake. Recommendations following the survey were to discontinue the Tiger Muskellunge stocking program and to continue periodic stocking of Walleye.

A survey of the lake was made in June 1995 with the purpose of evaluating the continuing Walleye stocking program. Sampling effort consisted of 34 net nights of experimental gill-nets and fyke-nets. Sixteen Walleye were collected in this effort, represented by 7 age groups. Growth of Walleye was considered good when compared to statewide length-at-age averages. Recommendations were made to continue the stocking program for this species. Also noted as abundant in the survey were White Bass with many fish in the 13-15 inch size range. Yellow Perch were also commonly collected, and notes indicated a "improved growth structure." Species such as Northern Pike, Largemouth Bass, Black Crappie, Rock Bass, and Channel Catfish were caught in lesser numbers, yet were considered to have "stable populations and providing a diverse fishery."

Walleye stocking evaluations continued at Van Etten Lake from the mid-1990s through 2008. These were done with fall nighttime electrofishing by DNR over shallow shoals in the following years: 1995, 1998, 2000, 2001, 2003, 2004, and 2008 (Table 5). These efforts were primarily used to assess year class strength of Walleye in stocked and non-stocked years. Large numbers of juvenile (age-0) Walleye were collected in the 1995, 1998, 2000, 2001, and 2003 surveys. Each of these years were years when DNR stocked fingerling Walleye in the spring, except for 2001. There was no way of

knowing the ratio of stocked to wild fish in most of these years, but the year classes were all strong. No Walleye were stocked in 2001 but a strong wild year class was present. Walleye that were stocked in Van Etten Lake in 2003 were marked with oxytetracycline (OTC) (Table 5). A subsample (30) of age-0 fish from that survey were analyzed for the OTC mark which indicated a stocked to wild fish ratio of 40%:60%. This indicated not only good survival of stocked fish, but ample amounts of natural reproduction in 2001 and 2003. Young Walleye assessments were also made in 2004 (non-stocking year) and 2008 (stocking year), but few if any juvenile Walleye were captured in those surveys. This indicated highly variable results between surveys and variable wild recruitment and stocked fish survival (Table 5). Yearling and adult Walleye were also captured in variable numbers during the fall indices of the 1990s and 2000s.

Current Status

The most recent general fish community survey was at Van Etten Lake in 2010. The survey was done by DNR under the statewide Status and Trends survey protocol where sampling effort is a product of lake acreage. Sampling effort in late-May consisted of 9 experimental gill-net lifts, 5 large-mesh trap-net lifts, 2 maxi-mini fyke-net lifts, and 4 large-mesh fyke-net lifts. An additional 30 minutes of nighttime electrofishing was also completed in mid-July of 2010.

A total of 1,573 fish were collected during the 2010 survey with a total estimated weight of more than 1,200 pounds (Table 6). Panfish comprised 55% of the total catch number, and 9% by weight. Yellow Perch were again the dominant panfish with 578 caught. Most of the perch, however, were less than 5 inches in length and few attained a quality size of 7 inches or larger (Table 7). Perch growth remains poor (Table 8) and no specimens older than age-7 were collected. Pumpkinseed were the second most captured panfish followed by Rock Bass. Pumpkinseed growth was considered good compared to statewide growth for this species yet only four age groups were collected (Table 8). Black Crappie were less abundant than in past surveys. They were represented by four age groups but also demonstrated that they can grow to a much more desirable size for anglers (Table 7). Growth of Black Crappie was considered excellent (Table 8) based on statewide growth rates for crappie.

Predator game fish, consisting of Walleye, Northern Pike, Channel Catfish, Smallmouth and Largemouth bass, comprised only 6% of the total catch by number, and 32% by weight (Table 6). These predators, although not abundant, exhibited good growth when compared to statewide averages and exhibit multiple age groups by species. This was particularly true for Northern Pike and Walleye (Table 8). Northern Pike sizes ranged from 12-39 inches (Table 7) with the majority of pike in the 23-25 inch size range. Very acceptable numbers of legal pike (24 inches and larger) were collected. Often, northern Michigan lakes have limited numbers of larger pike in them based on regional surveys. The survey documented nine age groups of pike and growth was considered excellent. Walleye were less abundant in the 2010 survey but this may reflect seasonality of Walleye abundance in the lake as a result of upstream/downstream migration from or to the Au Sable River. Despite abundance, Walleye growth was considered excellent and they were represented by 10 age groups of fish (Table 8). Many of the Walleye collected were 20-inches or larger (Table 7). Channel Catfish were still found to be common in Van Etten Lake and ranged in size from 22-30 inches. Both Smallmouth and Largemouth bass were collected in low numbers in the 2010 survey (Table 6).

Non-game species including Bowfin, sucker species, bullhead species, Common Carp, and Freshwater Drum made up a significant 36% of the total catch number and 57% by weight (Table 6). All these species had been collected in past surveys of Van Etten Lake with the exception of Bowfin.

In addition to the fish survey, DNR measured the temperature and dissolved oxygen of Van Etten Lake in mid-August (Figure 4). The lake showed some thermal stratification with water temperature ranging from 78 Fahrenheit at the surface to 75 Fahrenheit near the bottom in 24-feet of water. In addition, dissolved oxygen levels suitable for most fish were not found below 15-feet. The water pH ranged from 7.5-8.2.

Walleye stocking continued at Van Etten Lake following the 2010 survey and were stocked aggressively as spring fingerlings in 2012, 2014, 2016, and 2018 (Table 2). Fall juvenile and adult Walleye assessments were made with fall nighttime electrofishing in both 2016 and 2018 (Table 5). Age-0 Walleye were collected in good numbers in both fall surveys, shown by high catch rates. The origin (stocked or wild) of these juveniles could not be assessed since stocked fingerlings were not marked with oxytetracycline in either stocking year. Good numbers of adult Walleye were collected in both years, particularly in 2016. Often, adult Walleye are not collected in large numbers in these fall assessments, but they were at Van Etten Lake. Cohort analysis of adults from both surveys demonstrated a number of fish from non-stocked years, and enough to likely support a fishery without stocking.

Analysis and Discussion

The Van Etten Lake fish community and limnology can be characterized as having the following: 1) A slow growing but abundant panfish community consisting primarily of Yellow Perch, Black Crappie, Rock Bass, and Pumpkinseed. The Yellow Perch are prolific in Van Etten Lake but growth is slow and few survive to larger sizes. The Black Crappie population is relatively abundant and can occasionally produce quality catches. Other panfish species are dominated by smaller size groups with few individuals growing to desirable sizes. The aquatic vegetation of the lake is fairly prolific. It provides the base of the food chain but also may prevent efficient thinning of prey fishes from predators. Despite this, the vegetation is important to the primary productivity of the lake; 2) A predator population consisting of Walleye, Northern Pike, Channel Catfish, and Smallmouth and Largemouth Bass. Walleye are relatively common and can be found in large sizes and older ages in Van Etten Lake. It is likely that many of these fish originate from the lower Au Sable River and Lake Huron and migrate to Van Etten Lake seasonally when able to pass through the open gates of the dam during high flow events. It is likely that the Walleye population would be able to sustain itself without stocking. This (seasonal migration) may also be the case for Channel Catfish which are efficient predators and may help thin the stunted panfish population of Van Etten Lake. Despite the lack of oxygenated cool water in the summer in Van Etten Lake, Northern Pike seem to thrive. Good numbers of legal fish are available to anglers and they can attain large sizes which are attractive to anglers. Black bass, including Smallmouth and Largemouth, are both found in Van Etten Lake but in low abundance. This is likely a result of the lake not offering optimal habitat for either species; 3) an abundant non-game fish community of sucker species, bullhead species, Freshwater Drum, and Bowfin. Some of these species, particularly drum and suckers, also likely migrate into the lake from lower waterbodies seasonally; 4) a lake chemistry profile which is typical for warm water species and lacking dissolved oxygen suitable to fish below certain depths in the summer.

The fish community of Van Etten Lake is atypical for a northern Michigan waterbody, particularly when compared to inland lakes in the region. Certain species such as Channel Catfish and Freshwater Drum are simply not found in inland lakes in northern Michigan. Most other northern Michigan lakes

do not have periodic inhabitants from the Great Lakes. There are certain morphological limitations to this lake that limit what species may or may not proliferate and create a fishery. Perhaps partly due to fish consumption advisories on large predators such as Walleye, there is likely a significant amount of catch and release occurring. These large predators can thin the overly abundant panfish (particularly Yellow Perch) and help allow these fish to attain attractive sizes for anglers.

Management Direction

1. The standard State of Michigan fishing regulations (bag limits and size limits) for game fish are appropriate.
2. Walleye stocking was discontinued at Van Etten Lake following the 2018 stocking event. Wild Walleye are abundant enough in the lake as evidenced by the number of adult fish caught over the years from non-stocking years. In addition, fall juvenile assessments from the past have documented wild production in both stocked and non-stocked years.
3. Spot treatments of aquatic vegetation at Van Etten Lake have been ongoing by private contractors for nearly 25 years. Efforts should be made by the State of Michigan EGLE to survey the current aquatic vegetation community of the lake to gather a comprehensive list and distribution of plants in the lake, both for native and invasive species. Leaching of certain chemicals from the local military base through groundwater is already occurring. Adding unnecessary additional chemicals to Van Etten Lake does not seem prudent.
4. Continued monitoring of the contaminant levels in Van Etten Lake fish should occur to allow anglers to make informed choices when considering whether or not to consume the fish they catch.
5. Anglers of Van Etten Lake should share their catch information with fisheries managers. This allows for better management of the lake, both today and in the future.

References

Figure 1.-General location of Van Etten Lake, Iosco County in the Michigan's northern Lower Peninsula.

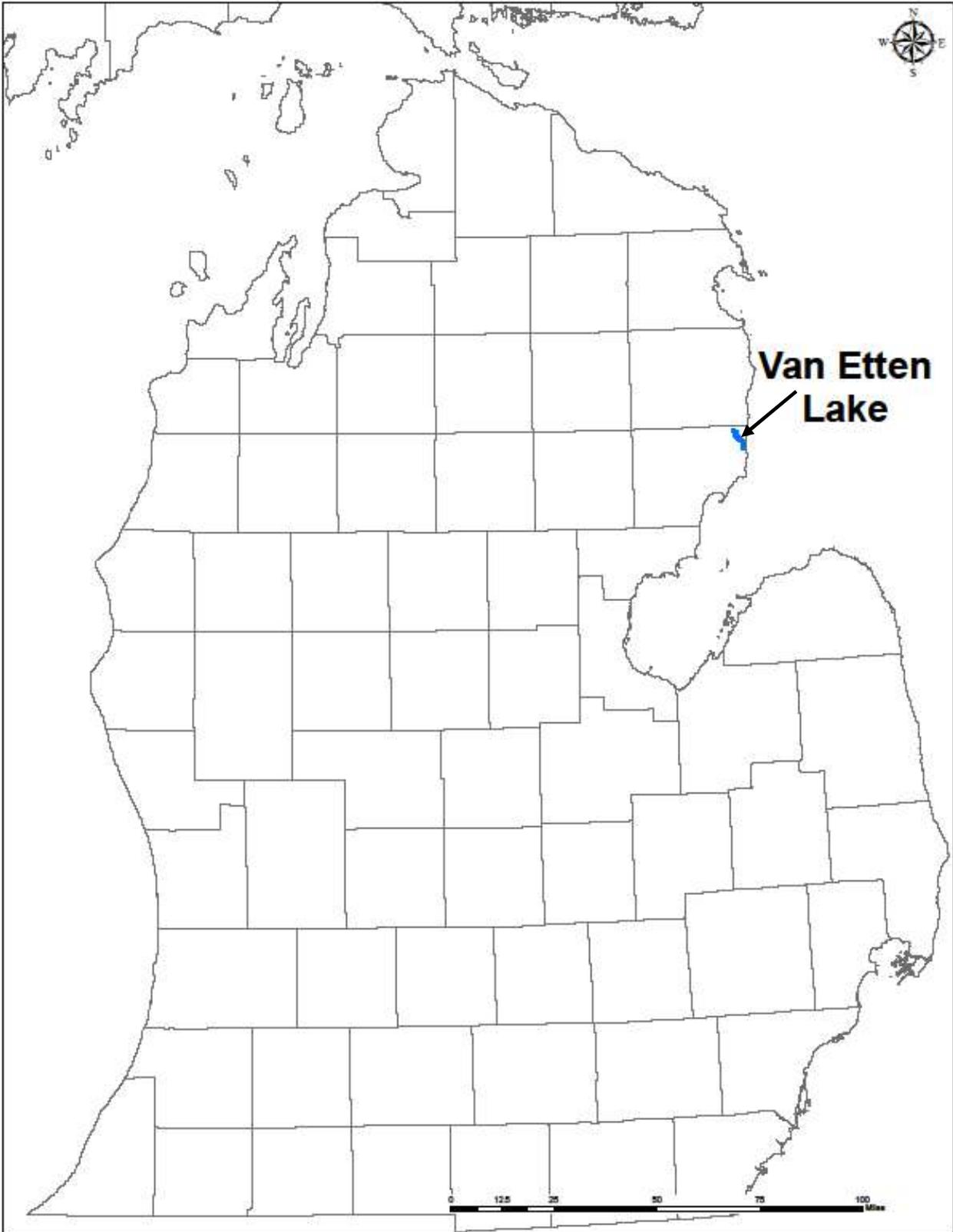


Table 1.-Fish consumption guidelines for Van Etten Lake as defined by the Michigan Department of Community Health. Definitions for table can be found at their website.

Type of Fish	Chemicals of Concern	Size of Fish (in)	MI Servings per Month
Catfish	PCBs	Any	Limited
Suckers	PFOS and Mercury	Under 14"	8
Suckers	Mercury	14-20"	4
Suckers	Mercury	Over 20"	2
Walleye	Mercury	Any	1

Table 2.-Recent stocking history of fish for Van Etten Lake by the Michigan Department of Natural Resources. OTC is oxytetracycline.

Year	Species	Strain	Stage	No. Stocked	Mark
1980	Walleye	--	Spring fingerling	3,570	--
1985	Walleye	Muskegon	Spring fingerling	46,152	--
1989	Walleye	Muskegon	Spring fingerling	32,238	--
1991	Walleye	Ohio	Spring fingerling	41,078	--
1995	Walleye	Tittabawassee	Spring fingerling	100,721	--
1998	Walleye	Tittabawassee	Spring fingerling	61,710	OTC
2000	Walleye	Tittabawassee	Spring fingerling	84,942	OTC
2003	Walleye	Tittabawassee	Spring fingerling	75,187	OTC
2005	Walleye	Tittabawassee	Spring fingerling	81,621	OTC
2006	Walleye	Tittabawassee	Spring fingerling	68,157	OTC
2008	Walleye	Muskegon	Spring fingerling	83,763	--
2009	Walleye	Muskegon	Spring fingerling	81,281	--
2010	Walleye	Muskegon	Spring fingerling	80,326	--
2012	Walleye	Muskegon	Spring fingerling	82,507	--
2014	Walleye	Muskegon	Spring fingerling	82,769	--
2016	Walleye	Muskegon	Spring fingerling	73,347	--
2018	Walleye	Muskegon	Spring fingerling	109,445	--
1984	Tiger Muskellunge	--	Fall fingerling	1,900	--
1985	Tiger Muskellunge	--	Fall fingerling	3,500	--
1986	Tiger Muskellunge	--	Fall fingerling	5,000	--
1987	Tiger Muskellunge	--	Fall fingerling	2,800	--
1988	Tiger Muskellunge	--	Fall fingerling	5,000	--
1989	Tiger Muskellunge	--	Fall fingerling	10,000	--

Table 3.-Fish collected from Van Etten Lake in October 1988 by DNR with fyke nets and a gill net.

Species	Total Catch	Percent by number	Length range (in)
Black Crappie	629	45	1-12
Yellow Perch	448	32	3-9
Smallmouth Bass	60	4	2-16
Channel Catfish	54	3	14-27
Walleye	50	3	8-27
Rock Bass	31	2	2-10
Redhorse sucker sp.	22	1	19-24
Bluegill	20	1	3-4
Pumpkinseed	16	1	1-5
Largemouth Bass	13	<1	4-6
White Sucker	13	<1	4-17
Freshwater Drum	7	<1	4-22
Northern Pike	5	<1	10-33
White Bass	3	<1	14-16
Yellow Bullhead	3	<1	4-10
Golden Shiner	2	<1	3
Common Carp	2	<1	22-24
Logperch	2	<1	3
Rainbow Trout	1	<1	22
Green Sunfish	1	<1	2
Brown Bullhead	1	<1	13
Spottail Shiner	1	<1	3
Bluntnose Minnow	1	<1	3
Common Shiner	1	<1	7
Total	1,386		

Table 4.-Length-frequency of certain game fish collected at Van Etten Lake with sampling gear in October 1988.

Length group (in)	Black Crappie	Yellow Perch	Channel Catfish	Walleye	Northern Pike	Smallmouth Bass
<5	595	284				54
5	21	3				1
6	10	46				
7	2	88				
8		25		1		
9		2		2		1
10					1	1
11						1
12	1			1		
13						
14			1	3		1
15			6			
16			4	2		1
17			20	1		
18			8	1		
19			1	2		
20			5	3		
21			1	6		
22			3	8		
23			1	8		
24			1	1		
25			1	3		
26			1	5	2	
27				3		
28			1			
29						
30						
31					1	
32						
33					1	

Table 5.-Fall Walleye nighttime electrofishing assessments at Van Etten Lake. Percent stocked determined in years when fingerling Walleye were stocked marked with oxytetracycline. Sample size of age-0 fish tested is in parentheses.

Year	Date	Water Temp (F)	Hours shocked	Miles shocked	Age-0 Walleye	No. Age-0 per hour	Age-1+ Walleye	Percent stocked (n)
1995	9/27	60	2.00	2.80	357	178.5	1	--
1998	9/28	62	2.00	3.00	79	39.5	13	--
2000	9/18	65	2.00	3.60	246	123.0	26	--
2001	10/8	54	2.00	3.10	144	72.0	34	0
2003	9/29	--	2.00	2.80	133	66.5	5	40 (30)
2004	10/4	60	2.15	3.58	6	2.8	31	--
2008	9/22	66	2.00	3.81	0	0	0	--
2016	9/27	58	2.92	6.07	170	58.2	49	--
2018	10/18	50	2.22	4.00	56	25.2	14	--

Table 6.-Fish collected from Van Etten Lake during the spring and summer Status and Trends survey by the DNR in 2010. Weight of fish was not measured directly but was estimated from Michigan length-weight relationships for species.

Species	Catch	Percent by number	Weight (lbs)	Percent by weight	Length range (in)
Yellow Perch	578	36.7	41.1	3.3	1.8 – 13.2
Brown Bullhead	458	29.1	350.7	28.2	6.0 – 13.9
Pumpkinseed	134	8.5	21.7	1.7	2.3 – 7.9
Rock Bass	103	6.5	24.0	1.9	1.5 – 10.1
Black Crappie	45	2.9	25.1	2.0	7.7 – 12.6
Northern Pike	45	2.9	190.4	15.4	12.5 – 39.0
White Sucker	37	2.4	68.0	5.5	6.0 – 25.9
Freshwater Drum	27	1.7	125.5	10.1	19.0 – 28.7
Walleye	22	1.4	70.0	5.7	10.6 – 25.8
Yellow Bullhead	22	1.4	16.8	1.4	8.7 – 13.9
Channel Catfish	18	1.1	129.3	10.4	22.4 – 30.3
Silver Redhorse	16	1.0	51.9	4.2	13.8 – 25.3
Bowfin	15	1.0	74.7	6.0	17.7 – 29.6
Bluegill	14	0.9	2.8	0.2	2.6 – 8.6
Logperch	14	0.9	0.2	0.0	3.6
Largemouth Bass	12	0.8	5.2	0.4	4.6 – 17.3
Smallmouth Bass	8	0.5	12.7	1.0	5.7 – 20.5
Common Carp	3	0.2	27.4	2.2	22.7 – 30.3
Common Shiner	1	0.1	0.1	0.0	6.5
Golden Shiner	1	0.1	0.0	0.0	3.5
Total	1,573		1,237.5		

Table 7.-Length-frequency of certain game fish collected at Van Etten Lake during the spring and summer Status and Trends 2010 survey.

Length group (in)	Black Crappie	Yellow Perch	Channel Catfish	Walleye	Northern Pike	Smallmouth Bass
<5		217				
5		231				1
6		107				
7	4	12				
8	11	5				
9	6	3				1
10	17	1		1		
11	5	1				2
12	2				2	
13		1			1	1
14						1
15						
16						
17				2	1	
18				1		1
19				5	2	
20				2	2	1
21				3	1	
22			1	2	1	
23			1	2	8	
24			1	2	7	
25			1	2	4	
26			2		3	
27			3		1	
28			4		2	
29			4		1	
30			1		2	
31						
32						
33					3	
34					2	
35					1	
36						
37						
38						
39					1	

Table 8.-Comparison of mean length (inches) at age for various game fishes of Van Etten Lake from 1962 to 2010. Number in parentheses represents number aged. The growth index is the growth for each species at Van Etten Lake in 2010 compared to the statewide average for that species.

Species	Age group	May 1962	Oct. 1988	May 2010	Growth Index (in)
Black Crappie	0	--	3.8 (18)	--	+1.5
	I	--	6.7 (32)	--	
	II	--	--	--	
	III	6.9 (15)	--	8.3 (17)	
	IV	8.9 (3)	--	10.0 (16)	
	V	10.7 (3)	12.5 (1)	11.5 (5)	
	VI	--	--	11.6 (2)	
	VII	12.0 (3)	--	--	
Pumpkinseed	I	--	5.2(4)	2.4 (2)	+0.8
	II	--	6.1 (3)	3.5 (4)	
	III	5.2 (1)	--	5.5 (29)	
	IV	--	--	6.6 (16)	
	V	6.9 (21)	--	--	
Yellow Perch	0	--	3.9 (17)	2.0 (5)	-0.4
	I	--	6.6 (20)	4.4 (9)	
	II	--	8.1 (9)	4.9 (3)	
	III	6.3 (18)	8.5 (8)	5.8 (21)	
	IV	7.0 (17)	--	5.9 (10)	
	V	8.9 (2)	--	8.1 (7)	
	VI	9.6 (2)	--	8.3 (1)	
	VII	10.4 (3)	--	11.7 (3)	

Table 8.-Continued.

Species	Age group	May 1962	Oct. 1988	May 2010	Growth Index (in)
Northern Pike	I	14.1 (1)	--	12.8 (3)	+2.2
	II	--	26.3 (2)	19.8 (6)	
	III	22.5 (3)	32.5 (2)	23.9 (13)	
	IV	24.7 (4)	--	25.0 (7)	
	V	30.5 (4)	--	27.4 (7)	
	VI	33.0 (1)	--	31.4 (4)	
	VII	--	--	39.0 (1)	
	VIII	--	--	29.9 (2)	
	IX	--	--	34.3(2)	
Smallmouth	0	--	3.8 (28)	--	--
Bass	I	--	7.3 (2)	5.7 (1)	
	II	--	10.8 (2)	--	
	III	10.2 (7)	--	11.2 (4)	
	IV	15.0 (2)	14.0 (1)	14.3 (1)	
	V	--	16.2 (1)	--	
	VI	16.2 (2)	--	--	
	VII	16.9 (1)	--	18.3 (1)	
	VIII	18.0 (2)	--	20.5 (1)	
Walleye	0	--	8.9 (3)	--	+1.5
	I	--	13.9 (4)	--	
	II	--	16.5 (2)	10.6 (1)	
	III	--	18.0 (2)	--	
	IV	--	20.8 (2)	19.2 (1)	

Table 8.-Continued.

Species	Age group	May 1962	Oct. 1988	May 2010	Growth Index (in)
Walleye	V	--	21.3 (11)	19.1 (5)	
	VI	--	23.7 (12)	20.7 (3)	
	VII	--	24.3 (10)	21.1 (2)	
	VIII	21.9 (1)	27.1 (4)	23.3 (1)	
	IX	23.0 (2)	--	23.7 (2)	
	X	27.2 (2)	--	24.8 (2)	
	XI	--	--	24.5 (1)	
	XII	28.4 (1)	--	25.8 (1)	

Figure 3.-Temperature and dissolved oxygen profile for Van Etten Lake on August 12, 2010.

