Lake Margrethe

Crawford County, T26N, R4W, Sec. 8, 9, 10, 15, 16, 17, 21, 22
Manistee River Watershed. Last surveyed May 7-10, 2007

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Environment

Lake Margrethe is a 1,922 acre lake (Figure 1) in western Crawford County, three miles west of Grayling, MI. It is the largest lake in Crawford County. Lake Margrethe lies in the Manistee River watershed, having Portage Creek as an outlet. Portage Creek joins the Manistee River approximately seven miles downstream from where it flows out of Lake Margrethe. There is a lake level control structure on the Portage Creek outflow to control the lake level, which has been set by Circuit Court order. Lake Margrethe is a mesotrophic lake, with a maximum depth of 65 feet. The northern lobes of the lake (Figure 1) are relatively shallow, with the central portion of the lake holding the deeper water. The Lake Margrethe Property Owner's Association (LMPOA) is the primary citizen-based group for Lake Margrethe. LMPOA was incorporated in 1968 and has been very involved in Lake Margrethe management since then.

The country surrounding Lake Margrethe is hilly and mostly forested, with predominately sandy soils. Much of the eastern shore of the lake is owned by the State of Michigan as part of the Grayling Forest Management Unit within the Au Sable State Forest. The area to the west of Lake Margrethe is mostly conifer and tag alder swamp, locally known as the "Bear Swamp". There is a State Forest Campground with a paved boat launch located on the western shore of Lake Margrethe, near the Portage Creek outflow. Much of the western and southern shores of Lake Margrethe are owned by the National Guard as part of Camp Grayling, the nation's largest National Guard training facility. Camp Grayling encompasses about 147,000 acres. The eastern and northern shores of Lake Margrethe are mostly privately owned, and are heavily developed with a mix of seasonal cottages and permanent homes.

Lake Margrethe has had some problems with Eurasian Milfoil, prompting LMPOA to have some areas of the lake treated with 2, 4-D and Reward, under permit from the Michigan Department of Environmental Quality (MDEQ). Eurasian milfoil is an extremely aggressive exotic aquatic macrophyte that can crowd out native aquatic plants and cause problems for boaters, swimmers, anglers, and fish populations. Treatments have taken place in Lake Margrethe in a number of different years. Although a permit to treat with 2, 4-D was issued by MDEQ for the summer of 2007, no treatment was necessary as the Eurasian milfoil population was down from levels seen in previous years.

History

According to official records, Lake Margrethe was first stocked by MDOC (the Michigan Department of Conservation, the precursor to the Michigan Department of Natural Resources) with smallmouth bass in 1929 (Table 1). Largemouth bass were first stocked in 1930, and then between 1937 and 1945, Lake Margrethe was heavily stocked by MDOC with smallmouth bass, largemouth bass, walleye,

yellow perch, and bluegill. Sporadic stockings of walleye and northern pike occurred in the 1950s and 1960s.

Management of Lake Margrethe through the latter half of the 20th century and into the 21st century has primarily involved stocking walleye, northern pike (via a spawning marsh adjacent to the lake), tiger muskellunge, and northern muskellunge. Only northern muskellunge and walleye are currently stocked (Table 1). Other management activities on the lake in the past 50 years have included the installation of brush shelters for fish cover, and spawning habitat for smallmouth bass. A rock spawning reef was installed in 1957, in an attempt to provide walleye with spawning habitat. A manual removal of white suckers was done in 1992, as white suckers compete with juvenile walleye, yellow perch, and panfish, and can inhibit growth and reproduction in these species. In 1996, fifty log structures were added to the lake to provide smallmouth bass spawning habitat. The northern pike spawning marsh was last operated in 2000.

General fisheries surveys on Lake Margrethe were conducted in 1947, 1954, 1961, 1962, 1971, 1979, 1987, 1988, 1993, 1994, 1995, and 2001. The 1993, 1994, and 1995 surveys were actually efforts aimed at catching adult northern pike to transplant into the rearing marsh, but other species captured were also recorded. Much of the survey effort on Lake Margrethe in the last 20 years has been for walleye management purposes. In the spring of 1993, a walleye mark/recapture study was conducted in an attempt to obtain a population estimate. The population estimate was 837 walleye, or a density of .44 walleye per surface acre. However, the effort was lacking in recaptures, and thus the estimate may not be entirely accurate. Serns Index surveys, which are fall boomshocking efforts directed at determining year class strength for young-of-the-year and yearling walleye (Serns 1982, Serns 1983, Ziegler and Schneider 2000) were conducted in 1990, 1992, 1994, 1997, 1998, 2002, and 2006 (Table 2). Prior to the 2007 general survey, the most recent general fisheries survey of Lake Margrethe was conducted in 2001 (Tonello and Phillips, 2004).

The most recent Serns Index survey of Lake Margrethe was done in the fall of 2006. In that survey, a total of 69 walleye from 5-17" in length were caught (Table 2). Of those, 58 were age-0, ranging from 5-7 inches in length. This catch results in a Serns Index of 3.668 walleye per surface acre, with estimated year class strength of 7042.8. According to Ziegler and Schneider (2000) this represents a "poor" year class. Lake Margrethe was stocked with 69,903 spring fingerling walleye in 2006. Eleven other walleye were also caught, with eight of those being age-3 (from the 2003 year class, a year in which no stocking took place) and three of them being age-4 (from the 2002 year class, when 56,670 spring fingerlings were stocked). The age-0 walleye from the 2006 survey were growing slightly below the state average, while the age-3 walleye had growth rates equal to the state average.

Since 1995, a total of thirteen fish have been entered in MDNR's Master Angler program from Lake Margrethe. Species entered include black bullhead (three entries), brown bullhead (three entries), and bluegill (three entries). White sucker, largemouth bass, smallmouth bass, and northern muskellunge each had one entry. The northern muskellunge was a particularly impressive specimen, 49.0 inches in length and weighing 35.31 lbs. This fish was caught in 2000, and it likely came from the 1990 stocking effort in which 151 northern muskellunge were stocked into Lake Margrethe.

Current Status

The most recent fisheries survey of Lake Margrethe took place between May 7th and May 10th, 2007. Gear utilized in the survey included large-mesh fyke nets, trap nets, and experimental graded-mesh inland gill nets. The purpose of the survey was to investigate the status of all fish populations in Lake Margrethe. Of particular interest were the walleye and northern muskellunge populations, since Lake Margrethe is stocked with those species. In the previous general survey of Lake Margrethe (Tonello 2004; conducted in 2001) small mesh fyke nets were used, which resulted in significant catches of younger fish, particularly yellow perch and bluegill. In the 2007 survey, the decision was made to specifically target adult fish, and therefore small mesh nets were not used. Because of this, the catches of bluegill and yellow perch in the 2007 survey were substantially lower than in the 2001 survey. Also, a number of minnow and forage species that were caught in the small mesh nets of the 2001 survey were not caught in the 2007 survey. However, the catches of adult gamefish in the 2007 survey were dramatically higher than in the 2001 survey.

During the 2007 survey, a total of 1,970 fish were caught, representing 15 different species (Table 3). Rock bass were the most frequently collected species in the survey. A total of 845 rock bass from 5-12 inches were caught, representing 20.5% of the catch by weight and 43% of the catch by number. Yellow bullhead were also very abundant, with 396 individuals caught from 6-17 inches, representing 16.1% of the catch by weight. A total of 308 smallmouth bass were caught, from 7-19 inches and representing 27.2% of the catch by weight. One-hundred eleven brown bullhead from 3-16 inches in length were caught in the 2007 survey, representing 5.8% of the catch by weight. A total of 63 white sucker from 15-23 inches were captured in the 2007 survey, representing 8.5% of the catch by weight. Largemouth bass were represented by 50 individuals from 8-21 inches in length. Northern pike were also well represented in the 2007 survey, with 49 individuals from 16-37 inches caught, comprising 5.8% of the catch by weight. Thirteen northern muskellunge were also caught in the 2007 survey, ranging from 26-40 inches in length. Light numbers of panfish were caught in the 2007 survey, including 29 bluegill from 4-10 inches in length, 18 pumpkinseed sunfish from 4-9 inches in length, one nine inch black crappie, and seven yellow perch from 4-10 inches in length. Five brook trout from 8-9 inches, and two brown trout, 24 and 25 inches in length, were also caught in the 2007 survey. The brook and brown trout likely entered Lake Margrethe as migrants from Portage Creek, since no trout are stocked into Lake Margrethe.

Most species caught in the 2007 survey showed above-average growth (Table 4). Smallmouth bass aged 2-10 from the 2007 were growing 0.7 inches faster than the state of Michigan average length at age. Largemouth bass aged 4-6 from the 2007 survey were also growing 0.7 inches faster than the state average. Northern pike aged 2-4 from the 2007 survey were growing 1.0 inches faster than the state of Michigan average length at age. The northern muskellunge caught in the 2007 survey showed particularly impressive growth. Two year classes were represented in the catch (ages 3 and 5), and they exceeded the state average length at age by 2.2 inches. Pumpkinseed sunfish and rock bass were also growing faster than the state of Michigan average length at age. Pumpkinseed sunfish aged 4-5 were growing 1.2 inches faster than the state average, and rock bass aged 4-9 were growing 0.4 inches faster than the state average. Bluegill was the only panfish species growing slower than the state of Michigan average length at age. Age 5 bluegill were growing 1.1 inches slower than the state average. Walleye were the only other species from the 2007 survey growing slower than the state of Michigan average length at age (Table 4). Walleye from age classes 4, 5, 6, and 9 were growing 1.6 inches behind the state average. Walleye aged 2-9 and 12 were present, with the 1998, 2001, 2002, and 2003

year classes being well represented in the sample. Of those, the 2002 year class was the most prevalent. Walleye were stocked in that year, as well as in 1998 (Table 1).

Species which have been reported as caught in previous surveys but were not caught in 2007 included rainbow trout, tiger muskellunge, spottail shiner, common shiner, bluntnose minnow, northern redbelly dace, mimic shiner, sand shiner, central mudminnow, johnny darter, creek chub, logperch, green sunfish, yellow bullhead, longear sunfish, and redhorse (not identified to species). The only species caught in the 2007 survey which had not been seen in previous surveys was brown trout.

Analysis and Discussion

The 2007 MDNR fisheries survey showed that Lake Margrethe has generally healthy gamefish populations. Smallmouth bass, in particular are very numerous in Lake Margrethe. The smallmouth bass population is well balanced, with over 3/4 of the smallmouth bass in the catch exceeding the minimum legal size limit of 14 inches (Table 3). The catch per effort (CPE) for smallmouth bass in the 2007 Lake Margrethe survey was one of the highest ever recorded in a northern Michigan inland lake, at 15.4 smallmouth bass per trap/fyke net lift. The largemouth bass population in Lake Margrethe is also healthy, with nearly 3/4 of the 50 largemouth bass caught in the 2007 survey exceeding 14 inches in length.

The walleye population in Lake Margrethe also appears to be extremely healthy. Walleye were present from both stocking and non-stocking years, which confirms that some natural reproduction is taking place in most, if not all, years. However, the majority of the walleye aged from the 2007 survey were from stocking years. Therefore, the walleye fishery in Lake Margrethe appears to be largely dependent on stocked fish. Although walleye were growing slower than the state average, the population is well-balanced with individuals present from nine different year classes. Nearly 70% of the walleye caught in the 2007 survey were of legal size (over 15 inches). The somewhat slow growth exhibited by Lake Margrethe walleye should not be a cause for concern. Although the Lake Margrethe Serns surveys have resulted in "poor" year class estimates according to Ziegler and Schneider (2000), it is possible that the index doesn't exactly fit Lake Margrethe. A poor year class according to Ziegler and Schneider (2000) may actually be a very good year class on Lake Margrethe. Sufficient numbers of walleye are present to add diversity to the fishery.

The catch of 13 northern muskellunge in the 2007 survey is very encouraging. It confirms that the muskellunge stocking program, which began in 2002, has been successful. The muskellunge are growing very well and seem to be thriving in Lake Margrethe. The muskellunge caught in the 2007 survey were from the 2002 and 2004 year classes, both of which were stocking years. No muskellunge from non-stocking years were caught in the 2007 survey. Angler reports have begun to filter in regarding anglers going to Lake Margrethe specifically to target muskellunge. The northern muskellunge stocking program has established a viable fishery for northern muskellunge where none existed previously.

The northern pike population of Lake Margrethe also appears to be very healthy. Individuals from seven different year classes were present, and they were growing well. The presence of substantial numbers of young (age 2-4) northern pike in the survey confirm that they are continuing to reproduce

well, despite the fact that the northern pike spawning marsh has not been operated for a number of years.

Rock bass are the dominant panfish species in Lake Margrethe. They were very numerous in the 2007 survey, with a number of individuals exceeding the catch and release Master Angler threshold of 10 inches in length. Smaller numbers of bluegill and pumpkinseed sunfish were also present in the survey. While not overly numerous in Lake Margrethe, bluegill and pumpkinseed sunfish do offer good fishing opportunities at times. While the bluegill grow slower than the state average, they still attain sizes acceptable to anglers.

Both yellow and brown bullhead were very abundant in the 2007 survey. Most exceeded ten inches in length, and a good number also exceeded the minimum catch and release Master Angler threshold of 14 inches. Lake Margrethe provides a very good opportunity for bullhead fishing.

Perhaps the only downside to the 2007 Lake Margrethe fisheries survey was the lack of yellow perch in the sample. Only seven were caught, compared to 374 in the 2001 general survey. At times in the past, Lake Margrethe has provided a good yellow perch fishery.

Management Direction

The Lake Margrethe walleye fishery is dependent upon stocking. Therefore, 60,000 spring fingerling walleye (Muskegon River strain) should continue to be stocked into Lake Margrethe every third year, starting in 2009. Although some natural reproduction occurs in all or most years, it is not enough to support the fishery. Continued walleye stocking, along with supplemental natural reproduction, should continue to allow Lake Margrethe to be one of the better walleye fishing lakes in the northern lower peninsula of Michigan. Fall walleye electrofishing surveys should be conducted whenever possible both in stocking and non-stocking years, both to assess the survival of stocked fish, and to monitor natural reproduction.

The recently established Lake Margrethe northern muskellunge fishery is also entirely dependent upon stocking. No natural reproduction was documented in the 2007 survey. Therefore, fall fingerling northern muskellunge should also continue to be stocked into Lake Margrethe at a rate of 2/acre (4,000 fish) every other year, beginning in 2008.

The other fisheries of Lake Margrethe should continue to manage themselves. Native desirable species like smallmouth bass, largemouth bass, rock bass, and northern pike should continue to thrive in Lake Margrethe. Although panfish species such as bluegill and pumpkinseed sunfish will probably never be overly abundant in Lake Margrethe, they will provide periodic fishing opportunities. The yellow perch population of Lake Margrethe is currently an uncertainty, but at times in the past Lake Margrethe has offered good fishing opportunities for yellow perch. Another netting survey should be conducted on Lake Margrethe within the next 5-10 years. The goals of the survey should be to examine the general fish populations of Lake Margrethe, and also to assess the adult walleye and northern muskellunge populations. The survey should also assess whether or not the northern muskellunge have begun to naturally reproduce.

Eurasian milfoil in Lake Margrethe will likely continue to require treatment, at least in some years. However, we recommend the use of milfoil weevils in addition to (and potentially instead of) repeated chemical treatments. Milfoil weevils have been shown to do an effective job of controlling Eurasian milfoil under the right conditions. We suspect that Lake Margrethe would be conducive to the successful use of weevils for controlling Eurasian milfoil. This would negate the need for the spraying of chemicals for controlling Eurasian milfoil.

Any remaining riparian wetlands adjacent to Lake Margrethe should be protected as they are critical to the continued health of the lake's fish community. Unwise riparian development and wetland loss in the future will result in deterioration of the water quality and fisheries habitat. Healthy biological communities in inland lakes require suitable natural habitat. Human development within the lake watershed, along the shoreline, and in the lake proper has a tendency to change and diminish natural habitat. Appropriate watershed management is necessary to sustain healthy biological communities, including fish, invertebrates, amphibians, reptiles, birds and aquatic mammals. Generally for lakes this includes maintenance of water quality, especially for nutrients; preservation of natural shorelines, especially shore contours and vegetation; and preservation of bottom contours, vegetation, and wood debris within the lake. Guidelines for protecting fisheries habitat in inland lakes can be found in Fisheries Division Special Report 38 (O'Neal and Soulliere 2006).

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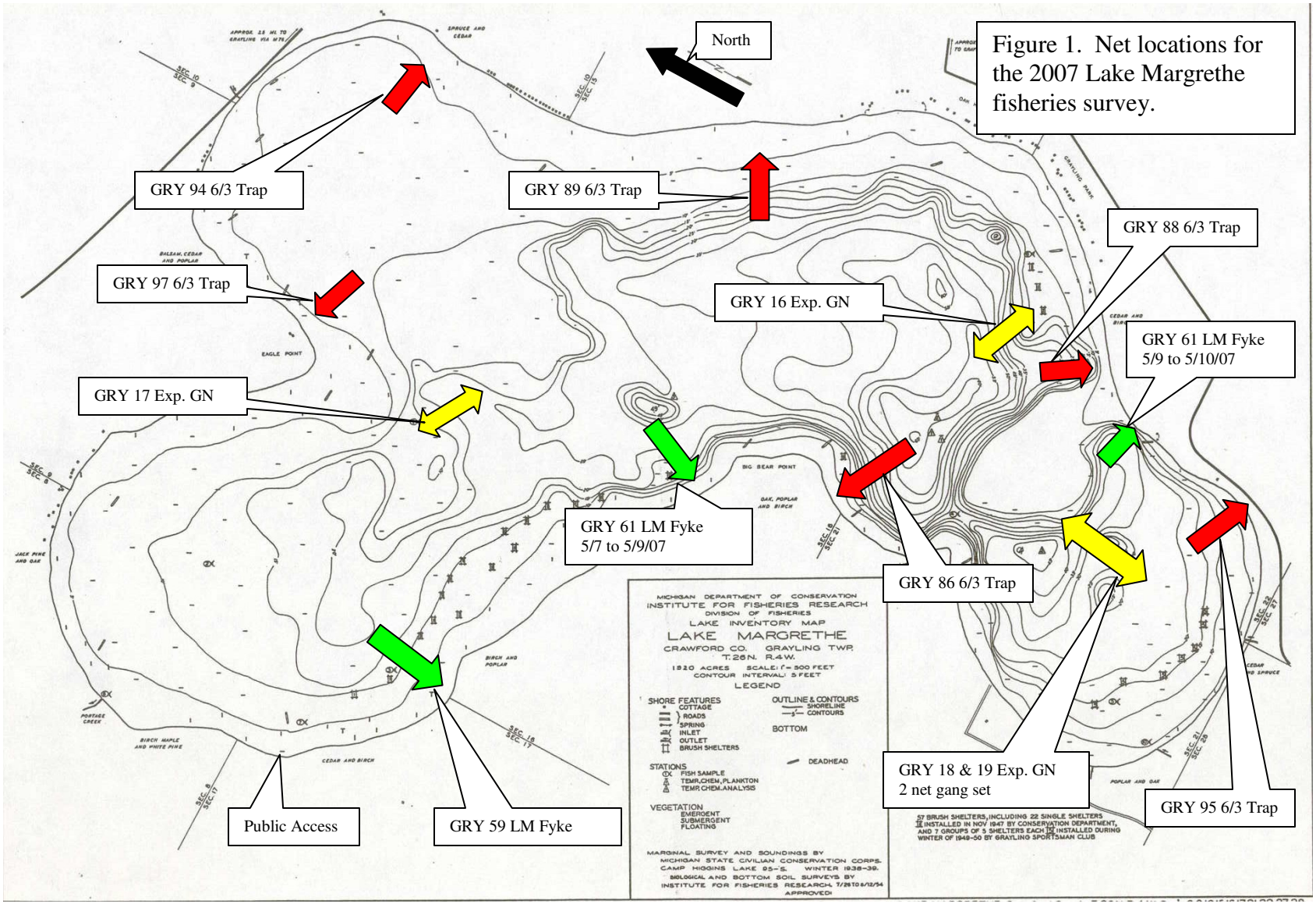

Figure 1. Net locations for the 2007 Lake Margrethe fisheries survey.

Table 1. MDNR/MDOC Lake Margrethe Fish Stockings, 1929-Present.

Year	Species		Number	Age	Strain	
1929	Smallmouth bass		600	5 months		
1930	Largemouth bass		230	2 months		
1937	Bluegill		28,000	3-4 months		
	Largemouth bass		1,000	5 months		
	Walleye		120,000	fry		
1938	Bluegill		10,000	5 months		
	Largemouth bass		2,000	4 months		
	Walleye		100,000	fry		
1939	Bluegill		40,000	5 months		
	Smallmouth bass		3,100	4 months		
	Smallmouth bass		196	adult		
	Walleye		160,000	fry		
	Yellow perch		25,000	7 months		
1940	Bluegill		59,000	3 months		
	Largemouth bass		1,000	4 months		
	Smallmouth bass		1,000	3 months		
	Smallmouth bass		150	adult		
	Walleye		64,000	fry		
	Yellow perch		10,000	7 months		
1941	Bluegill		504	yearling		
	Bluegill		100	adult		
	Largemouth bass		100	yearling		
	Largemouth bass		1,000	4 months		
	Smallmouth bass		1,000	4 months		
	Yellow perch		20,000	7 months		
1942	Bluegill		40,000	3 1/2 months		
	Largemouth bass		2,000	4 months		
	Walleye		40,000	fry		
1943	Bluegill		1,000	yearling		
	Smallmouth bass		3,000	4 months		
1944	Bluegill		25,000	4 months		
	Largemouth bass		2,000	4 months		
	Smallmouth bass		2,000	4 months		
1945	Bluegill		4,000	15 months		
	Largemouth bass		3,000	3 months		
1957	Walleye		20,000	fall fingerling		
1962	Northern pike		49	legal		
	Walleye		16,100	fingerlings		
1963	Northern pike		60	legal		
1964	Northern pike		83	legal		

Table 1. MDNR/MDOC Lake Margrethe Fish Stockings, 1929-Present.

Year	Species		Number	Age	Strain	
1970	Walleye		50,000	fry		
1971	Walleye		5,000	fingerlings		
1972	Walleye		300,000	fry		
	Walleye		1,500	fingerlings		
1973	Northern pike		1,526	fingerlings		
1974	Northern pike		770	fingerlings		
1975	Northern pike		78	spring fingerlings		
	Walleye		5,381	spring fingerlings		
1976	Tiger muskellunge		4,078	fall fingerling		
1977	Tiger muskellunge		4,031	fall fingerling		
1978	Tiger muskellunge		4,000	fall fingerling		
1979	Tiger muskellunge		4,000	spring fingerlings		
	Walleye		2,476	fall fingerling		
	Yellow perch		464	fall fingerling		
	Yellow perch		143	adult		
1980	Northern pike		1,032	fall fingerling		
	Tiger muskellunge		4,000	fall fingerling		
	Walleye		1,788	fall fingerling		
1981	Northern pike		4,572	fall fingerling		
	Tiger muskellunge		4,000	fall fingerling		
	Walleye		150	yearling		
1982	Northern pike		1,812	fall fingerling		
	Tiger muskellunge		11,700	fall fingerling		
	Walleye		581	yearling		
1983	Northern pike		2,776	Spring fingerlings		
	Tiger muskellunge		2,000	Fall fingerlings		
1984	Northern pike		2,776	Spring fingerlings		
	Tiger muskellunge		2,000	Fall fingerlings		
1985	Northern pike		1,320	Spring fingerlings		
	Tiger muskellunge		4,000	Fall fingerlings		
	Walleye		123,072	Spring fingerlings	Muskegon	
1986	Northern pike		5,000	Spring fingerlings		
	Tiger muskellunge		5,000	Fall fingerlings		
	Walleye		37,150	Spring fingerlings	Muskegon	
1987	Tiger muskellunge		4,800	Fall fingerlings		
	Walleye		12	Adults		
1988	Tiger muskellunge		3,400	Fall fingerlings		
	Walleye		60,732	Spring fingerlings		
1989	Northern pike		7,000	Spring fingerlings		
	Tiger muskellunge		8,000	Fall fingerlings		

Table 1. MDNR/MDOC Lake Margrethe Fish Stockings, 1929-Present.						
Year	**Species**		**Number**	**Age**	**Strain**	
1990	Northern muskellunge		151	Fall fingerlings		
	Northern pike		10,540	Spring fingerlings		
	Tiger muskellunge		6,837	Fall fingerlings		
	Walleye		15,561	Fall fingerlings		
	Walleye		55,545	Fall fingerlings	Muskegon	
1991	Tiger muskellunge		8,000	Fall fingerlings		
1992	Walleye		3.25mil	Fry	Muskegon	
1993	Northern pike		10,000	Spring fingerlings		
	Walleye		397	Adults	Muskegon	
	Walleye		360,000	Fry	Bay De Noc	
1994	Northern pike		1,000	Spring fingerlings		
	Walleye		64,252	Spring fingerlings	Muskegon	
1995	Northern pike		5,000	Spring fingerlings		
1996	Northern pike		5,000	Spring fingerlings		
1997	Northern pike		5,000	Spring fingerlings		
1998	Walleye		89,785	Spring fingerlings	Muskegon	
	Walleye		7,306	Spring fingerlings	Tittabawassee	
	Northern pike		5,000	Spring fingerlings		
1999	Walleye		21,610	Fall fingerlings	Muskegon	
	Northern pike		5,000	Spring fingerlings		
2000	Northern pike		5,000	Spring fingerlings		
2002	Walleye		56,670	Spring fingerlings	Muskegon	
	Northern muskellunge		2,011	Fall fingerlings		
2004	Northern muskellunge		5,893	Fall fingerlings		
2005	Northern muskellunge		5,000	Fall fingerlings		
2006	Walleye		69,903	Spring fingerlings	Muskegon	

Table 2. Comparison of Lake Margrethe Serns Index survey data.				
	# walleye captured	Catch Rate (# walleye/mile of shoreline sampled)	Year Class strength estimate	Serns Index (# walleye/surface acre)
1990				
Age 0	5	1.25	561.6	0.293
Age1	0	0	0	0
1992				
Age 0	12	3.00	1347.8	0.702
Age1	1	0.25	93.1	0.049
1994				
Age 0	29	54.25	24373.4	12.695
Age1	22	6.00	2234.9	1.164
1997				
Age 0	1	0.29	128.4	0.067
Age1	2	0.57	212.8	0.111
1998				
Age 0	102	29.14	13093.3	6.819
Age1	1	0.29	106.4	0.055
2002				
Age 0	68	19.43	8728.9	4.546
Age1	22	6.29	2341.3	1.219
2006				
Age 0	58	15.68	7042.8	3.668
Age1	0			

Table 3. Number, weight and length (inches) of fish collected from Lake Margrethe with large mesh fyke nets, trap nets, and inland gillnets, May 7-10, 2007.

Species	Number	Percent by number	Weight (Pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
Black crappie	1	0.0	0.5	0.0	9-9	9.5	100 (7")
Brook trout	5	0.3	1.3	0.1	8-9	8.9	100 (8")
Bluegill	29	1.5	5.4	0.2	4-10	6.1	31 (6")
Brown trout	2	0.1	13.6	0.6	24-25	25.0	100 (8")
Brown bullhead	111	5.6	130.8	5.8	3-16	13.5	98 (8")
White sucker	63	3.2	192	8.5	15-23	19.7	
Largemouth bass	50	2.5	89.6	4.0	8-21	14.7	72 (14")
Northern muskellunge	13	0.7	120.4	5.3	26-40	31.8	0 (42")
Northern pike	49	2.5	130.7	5.8	16-37	22.2	27 (24")
Pumpkinseed sunfish	18	0.9	7.8	0.3	4-9	7.7	89 (6")
Rock bass	845	42.9	461.9	20.5	5-12	8.8	98 (6")
Smallmouth bass	308	15.6	611.2	27.1	7-19	15.3	78 (14")
Walleye	74	3.8	125.9	5.6	12-26	16.8	69 (15")
Yellow perch	7	0.4	1.6	0.1	4-10	54.8	71 (7")
Yellow bullhead	396	20.1	362.7	16.1	6-17	12.5	100 (8")
Total	1,970	100.0	2255.1	100.0			

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

[2]Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

Table 4. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Lake Margrethe with large mesh fyke nets, trap nets, and inland gill nets, May 7-10, 2007. Number of fish aged is given in parenthesis.

Species	Age II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Mean Growth Index
Black crappie				9.7 (1)								
Brook trout	8.15 (2)	9.4 (3)										
Bluegill			5.9 (1)	5.7 (19)	5.8 (3)	9.4 (1)	9.5 (1)	10.0 (1)				-1.1
Brown trout			24.0 (1)	25.1 (1)								
Largemouth bass	9.2 (1)	11.5 (1)	13.1 (2)	14.3 (17)	15.3 (12)	16.8 (7)	17.3 (1)				21.3 (1)	+0.7
Northern muskellunge		27.6 (8)		38.2 (5)								+2.2
Northern pike	19.1 (15)	21.0 (16)	25.2 (9)	24.3 (2)	24.8 (1)	33.0 (1)	37.0 (1)					+1.0
Pumpkinseed		4.7 (1)	4.7 (1)	7.0 (6)	8.1 (5)	8.3 (3)	9.0 (1)	9.3 (1)				+1.2
Rock bass			5.9 (6)	7.0 (23)	8.5 (12)	9.1 (12)	10.2 (8)	10.5 (6)	10.9 (4)	11.5 (1)		+0.4
Smallmouth bass	8.6 (13)	11.4 (24)	13.8 (18)	15.0 (17)	15.6 (8)	16.9 (13)	17.9 (17)	18.7 (7)	19.3 (5)			+0.7
Walleye	12.4 (2)	14.0 (1)	14.3 (10)	15.9 (23)	17.5 (11)	17.3 (3)	23.1 (4)	21.0 (6)			23.6 (2)	-1.6
Yellow perch		6.4 (2)	8.3 (1)	7.8 (3)								