Duck Lake

Grand Traverse County
Betsie River Watershed

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Environment

Duck Lake (Fig. 1) is 1,930 acres in size and located approximately 15 miles southwest of Traverse City, near the Village of Interlochen in western Grand Traverse County, Michigan. The maximum depth of Duck Lake is about 98 feet, with the average depth being about 35 feet. Approximately one quarter of the lake is shallower than 15 feet. Substrates in Duck Lake consist mostly of sand, marl, and organic matter. The surrounding area is hilly and mostly forested, although some subdivisions are present as well. There are also some large wetland complexes nearby. The shoreline of Duck Lake is fairly developed with homes and cottages, although not as heavily developed as other nearby lakes like Long and Silver. Many private parcels on Duck Lake are larger in size and with more shoreline than lots on the other nearby lakes.

Interlochen State Park, a very popular campground, is located on the western shore, between Duck and Green Lakes. Interlochen State Park was the first state park in Michigan, dedicated by the Michigan legislature in 1917. The Interlochen Center for the Arts, a privately-owned camp and boarding school is located just north of the State Park, and is also between the two lakes. The only other publicly owned land on Duck Lake is some State-owned forest land near the southern tip of the lake. Public access to Duck Lake is available at Interlochen State Park, which hosts two boat launches.

Duck Lake is in the headwaters of the Betsie River watershed. Several small streams including Brigham, Horton, and Mason Creeks flow into Duck Lake. Brigham and Mason Creek are brook trout streams, while Horton Creek is warm and does not support trout. One other unnamed warm water stream flows into the northern part of Duck Lake after emerging from Bass Lake and flowing through Saunders Lake, Ellis Lake, and Tonawanda Lake. The outlet stream flows out of the northwestern shore of Duck Lake and flows into nearby Green Lake. The Betsie River begins as it flows out of Green Lake.

History

The first recorded fish stocking in Duck Lake was in 1905 when walleye fry were stocked (Table 1). Since then, Duck Lake has had a long and varied stocking history. Other species stocked in the early 1900s included smallmouth bass. From 1929 through 1938, intensive stocking of bluegill, largemouth bass, smallmouth bass, walleye, and yellow perch occurred. Lake trout were first stocked into Duck Lake in 1951. Since then, lake trout have been the most commonly stocked species. Other species stocked since then have included splake, rainbow trout, and brown trout. Lake trout and brown trout were stocked annually from 1990 through 2009. Since 2009, only lake trout have been stocked into Duck Lake.

The first fisheries survey of Duck Lake was conducted in 1950 by the Michigan Department of Conservation (MDOC; the precursor to today's Department of Natural Resources (DNR)). The

researchers used experimental gill nets and seines in the survey. Species caught in the 1950 survey included northern pike, yellow perch, smallmouth bass, largemouth bass, bluegill, longear sunfish, pumpkinseed sunfish, rock bass, longnose gar, white sucker, lake herring, rainbow smelt, mimic shiner, common shiner, bluntnose minnow, and logperch. Limnological investigations determined that oxygen was present even in the deepest portions of the lake, which likely led to lake trout stocking beginning in 1951.

DNR file correspondence from the 1950s indicates that anglers were regularly catching lake trout, some in excess of 10 lbs. Apparently the lake trout stocked in the early 1950s were marked with fin clips, and angler catches seemed to indicate that multiple year classes of the stocked lake trout were surviving and thriving.

Other fisheries surveys of Duck Lake were conducted by the MDOC and DNR in 1967, 1975, 1981 (Hay 1981), 1991 (Hay 1991), and 1997. The 1967, 1975, and 1981 surveys utilized only gill nets. The fish species composition of these surveys did not differ appreciably from the 1950 survey. Species caught that had not been observed in 1950 included bowfin, brown trout, bullhead (species not indicated), and redhorse (species not indicated). Lake trout and splake were first caught in the 1981 survey (Hay 1981). Fin clips indicated that the lake trout caught in the 1981 survey were survivors from the 1965 stocking effort. Age and growth analysis from the 1981 survey indicated that lake herring and yellow perch were growing slowly, while northern pike were growing well in excess of the State average.

The 1991 survey was the first in which fyke nets were used in addition to gill nets (Hay 1991). This allowed for better surveying of shallow waters, leading to greater numbers of panfish and bass caught. The survey revealed good populations of smallmouth bass, bluegill, and pumpkinseed sunfish. These species showed average growth, with each being near the state average. Good numbers of yellow perch, rock bass, northern pike, splake and lake herring were also caught, along with lesser numbers of lake trout, brown trout, and rainbow smelt. One lake whitefish was caught in the 1981 survey, the first ever documented from Duck Lake. As in 1981, yellow perch were growing slowly. Northern pike, which had been growing rapidly in 1981, were now growing 1.3 inches slower than the State average. Lake herring were not aged in 1981.

In 1997, a general fisheries survey of the Duck Lake fish community was completed using fyke and inland gill nets. A total of 577 fish weighing 507.6 lbs were caught (Table 2). Bluegill, rock bass, lake herring, and pumpkinseed sunfish were the most numerous species caught. Other species present in good numbers included lake trout, largemouth bass, northern pike, smallmouth bass, and yellow bullhead. Smaller numbers of alewife, brown trout, bowfin, brown bullhead, white sucker, longnose gar, splake, and yellow perch were also caught. This was the first time that alewife had been documented in Duck Lake. As in the 1991 survey, one lake whitefish was caught. Also as in the 1991 survey, northern pike growth was poor in 1997 (Table 3). Lake herring were also growing slowly, at 2 inches slower than the State average. Lake trout growth however, was outstanding, as they were growing nearly seven inches faster than the State average. Twelve of the 20 lake trout caught in 1997 were from the 1992 year class. Other species from the 1997 survey showed growth that was near the State average.

From 1994-2011, a total of 65 exceptional fish caught from Duck Lake have been entered into the DNR Fisheries Division Master Angler program (Table 4). Of those 65 fish, the vast majority were rock bass. Other species, each represented by one entry, included bluegill, lake herring, longnose gar, northern pike, pumpkinseed sunfish, smallmouth bass and splake. The large number of Master Angler entries for Duck Lake speaks to the popularity of fishing on Duck Lake.

Current Status

The most recent comprehensive fisheries survey of Duck Lake was conducted by the DNR in the summer of 2008. The netting portion of the survey took place from June 19 through June 22. Survey gear used included one large-mesh fyke net (3 net-nights), three trap nets (9 net-nights), and three experimental graded-mesh inland gill nets (9 net-nights). The primary purpose of this survey was to assess the status of all fish populations in Duck Lake, with additional focus on the brown trout and lake trout populations.

During the 2008 June netting survey, a total of 921 fish were caught, representing 14 different species (Table 5). Rock bass were the most frequently collected species, with a total of 511 caught. They represented 55.4% of the total catch by number and ranged from 3 to over 12 inches in length. Other panfish species collected included bluegill (115 from 4-8 inches), green sunfish (3 at 3 inches), pumpkinseed sunfish (15 from 4-6 inches), and yellow perch (139 from 5-12 inches).

Game fish species caught in the 2008 June netting survey primarily included largemouth bass, smallmouth bass, and northern pike (Table 5). Totals of 35 largemouth and 33 smallmouth bass were caught, with the largemouth ranging up to 17 inches and the smallmouth up to 19 inches. The smallmouth bass averaged 15.4 inches, with 73% over 14 inches in length. The northern pike catch consisted of 16 individuals from 13 to 33 inches, averaging 24.6 inches. Other fish species caught in the 2008 survey included 1 brown trout (6 inches), 27 brown bullhead (7-14 inches), 1 longnose gar (34 inches), 2 sticklebacks (not identified to species, both were 2 inches), 21 white suckers (9-20 inches), and 4 yellow bullhead (9-11 inches). Noticeably absent from the 2008 survey were lake trout and lake herring.

Most species caught in the 2008 Duck Lake survey showed growth near the State of Michigan length at age average (Table 6). Largemouth and smallmouth bass in particular were growing well, with both species growing 1.1 inches faster than the State average. Not enough (fewer than five of any one age class) northern pike were collected to make statistical inferences regarding age and growth.

Fish species that were not caught in the 2008 survey of Duck Lake but had been reported in previous surveys included alewife, bowfin, lake herring, lake trout, lake whitefish, longear sunfish, longnose gar, rainbow smelt, and redhorse.

Limnological sampling on Duck Lake was conducted by the DNR in 93 feet of water on August 28, 2008. On that day, Secchi depth was recorded as 16 feet, and the thermocline was relatively deep at 33 feet. The temperature profile showed oxygen concentrations of less than 3 ppm in water deeper than 81 feet. Shoreline data was also collected on Duck Lake by DNR Fisheries personnel on August 28, 2008 (Table 7). Data collected included the number of docks, submerged trees, and houses found per kilometer of shoreline, as well as how much of the shoreline is armored or hardened with a structure in order to prevent erosion. Duck Lake averaged 13.0 docks per kilometer (20.8 docks per mile), 21.4%

shoreline armoring, 175 submerged trees per kilometer (280 submerged trees per mile), and 15.4 houses per kilometer (24.6 houses per mile).

Analysis and Discussion

One of the reasons for conducting the 2008 survey of Duck Lake was to evaluate the brown trout stocking program, which had been underway since 1989 (Table 1). However, only six brown trout were caught in the three fisheries surveys conducted (1991, 1997, 2008) since that program began. That fact, combined with a lack of positive angler catch reports of brown trout in Duck Lake, led to the discontinuation of the brown trout stocking program. Brown trout were last stocked into Duck Lake in 2009.

The 2008 DNR fisheries survey showed that Duck Lake has generally healthy gamefish populations. Largemouth and smallmouth bass in particular were numerous and are keystone predators. In the 1997 survey, the average sizes and percentage exceeding the minimum legal size were much lower for both largemouth and smallmouth bass than in 2008. The 2008 survey showed that the bass populations of Duck Lake are well balanced, with good growth, multiple year classes represented in the catch, and many individuals exceeding the minimum legal-size limit of 14 inches. Duck Lake has a reputation for providing excellent bass fishing opportunities, and the 2008 survey confirmed that. The northern pike catch in the 2008 survey was fair, with eight of the sixteen caught exceeding the minimum legal length of 24 inches.

The lack of lake trout and lake herring in the catch of the 2008 survey of Duck Lake is concerning, considering that lake trout are annually stocked and these two species have been present in most previous surveys of Duck Lake. However, angler reports indicate that lake trout fishing has remained robust since the 2008 survey. Future fisheries surveys should make a concerted effort to sample these two species in particular.

The panfish populations in Duck Lake appear to be healthy, for the most part. Although the bluegill and pumpkinseed sunfish populations in Duck Lake are not overly large, they grow well and can attain "keeper" sizes. The rock bass population in Duck Lake is robust, including many individuals exceeding the minimum Master Angler length of 11 inches. The yellow perch population of Duck Lake is also healthy, averaging 8.1 inches in length, with individuals present up to 12 inches.

Duck Lake is more heavily developed with docks and dwellings than other lakes in Michigan (Table 7). Duck Lake had 13.0 docks per kilometer of shoreline, while the average large deep lake in Michigan had only 4.3 docks per kilometer (Wehrly et al. 2010). Duck Lake also had 15.4 dwellings per kilometer, compared to 9.2 dwellings per kilometer for other large deep lakes in Michigan. Duck Lake however, had much more woody debris (175 trees per kilometer) than other large lakes in Michigan (average = 8.4 trees per kilometer). Duck Lake also had slightly less shoreline armoring (21.4%) than other large, deep, inland lakes in Michigan (average = 24.2%). Dwelling and submerged wood densities indicate shoreline development has negatively affected habitat in Duck Lake when compared to undeveloped lakes in northern Michigan and Wisconsin.

Management Direction

Native species like bluegill, pumpkinseed sunfish, rock bass, northern pike, largemouth bass, and smallmouth bass should continue to thrive in Duck Lake without direct management efforts. However, no lake herring were caught in the 2008 survey. Lake herring are a state-threatened species. Future fisheries surveys should place extra emphasis on studying the lake herring population of Duck Lake.

Duck Lake is a rare resource in that it has deep, cold water that can harbor lake trout. For the last 50+ years, Duck Lake has had a reputation as a good lake trout fishing lake. However, the Duck Lake lake trout population is likely entirely dependent on stocking. Therefore, we should continue to stock lake trout annually at a rate of 6 yearlings per acre.

Any remaining riparian wetlands adjacent to Duck Lake should be protected as they are critical to the continued health of the lake's aquatic community. Future riparian development and wetland loss may result in deterioration of the water quality and aquatic 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 good water quality, especially for nutrients; preservation of natural shorelines, especially shore contours and vegetation; and preservation of bottom contours, vegetation, and wood structure within a lake. Guidelines for protecting fisheries habitat in inland lakes can be found in Fisheries Division Special Report 38 (O'Neal and Soulliere 2006).

References

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Figure 1. Duck Lake, Grand Traverse County, MI.

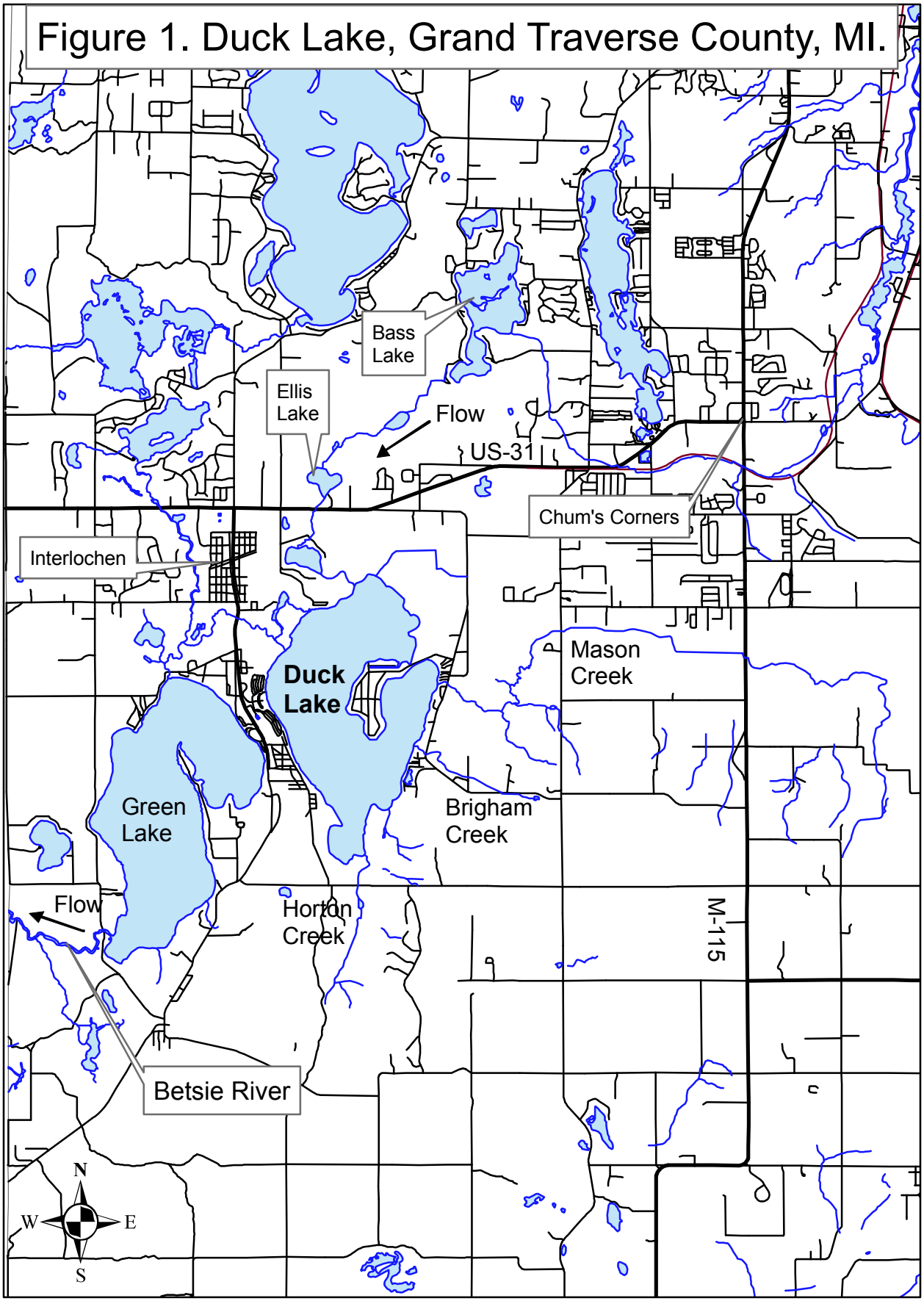

Table 1. Fish stocked in Duck Lake, Grand Traverse County, 1905-2011.

Year	Species	Number	Size/age	Strain
1905	walleye	125,000	fry	
1909	smallmouth bass	6,000	fry	
	walleye	100,000	fry	
1910	walleye	100,000	fry	
1929	bluegill	12,000	3-5 months	
	largemouth bass	1,000	2 months	
1930	bluegill	6,000	unknown	
	walleye	200,000	fry	
1931	bluegill	6,000	5 months	
	smallmouth bass	750	4 months	
1932	bluegill	1,000	unknown	
	largemouth bass	500	unknown	
1933	bluegill	3,000	6 months	
	largemouth bass	1,000	6 months	
	walleye	200,000	fry	
1934	bluegill	12,000	unknown	
	largemouth bass	1,000	unknown	
	yellow perch	5,000	unknown	
1935	bluegill	5,000	unknown	
	walleye	170,000	fry	
	yellow perch	25,000	unknown	
1936	bluegill	150	yearlings	
	largemouth bass	150	yearlings	
	largemouth bass	1,000	fingerlings	
	shiners	27,000	unknown	
	walleye	300,000	fry	
	yellow perch	3,250	unknown	
1937	bluegill	20,000	unknown	
	largemouth bass	400	fingerlings	
	walleye	240,000	fry	
	yellow perch	10,000	unknown	
1938	bluegill	20,000	unknown	
	largemouth bass	2,000	unknown	
	walleye	200,000	fry	
1951	lake trout	3,300	yearlings	
1952	lake trout	5,000	sub-legal	
1953	lake trout	3,000	yearlings	
1954	lake trout	5,000	yearlings	
1955	lake trout	5,000	yearlings	
1956	lake trout	5,000	yearlings	
1957	lake trout	5,000	yearlings	
1961	lake trout	5,000	yearlings	
1964	lake trout	3,000	legal	
1965	brook trout	10,000	sub-legal	
	lake trout	34,100	sub-legal	
	lake trout	1,900	legal	
1966	splake	50,000	spring fingerlings	
1969	rainbow trout	23,318	yearlings	
1970	brown trout	700	adults	
	brown trout	20,000	yearlings	

Table 1 continued. Fish stocked in Duck Lake, Grand Traverse County, 1905-2011.

1970	rainbow trout	1,345	adults	
1976	splake	14,004	yearlings	
1977	splake	30,000	yearlings	
1978	lake trout	25,000	yearlings	
1981	splake	15,000	yearlings	
1982	lake trout	10,000	yearlings	Marquette
1983	lake trout	5,000	yearlings	Marquette
1985	lake trout	4,000	yearlings	
1987	splake	7,000	yearlings	
1988	splake	6,200	yearlings	
1989	brown trout	5,000	yearlings	Plymouth Rock
	splake	10,000	fall fingerlings	
1990	brown trout	7,000	yearlings	Soda Lake
	lake trout	6,800	yearlings	Marquette
1991	lake trout	6,900	yearlings	Lake Superior
1992	brown trout	6,900	yearlings	Wild Rose
	lake trout	7,000	yearlings	Lake Superior
1993	brown trout	6,900	yearlings	Wild Rose
	lake trout	7,000	yearlings	Marquette
1994	brown trout	6,998	yearlings	Saint Croix
	lake trout	6,100	yearlings	Marquette
1995	brown trout	7,000	yearlings	Soda Lake
1996	brown trout	6,527	yearlings	Wild Rose
	lake trout	7,000	yearlings	Marquette
1997	brown trout	6,990	yearlings	Wild Rose
	lake trout	5,090	yearlings	Marquette
1998	brown trout	6,800	yearlings	Seeforellen
	lake trout	6,900	yearlings	Marquette
1999	brown trout	7,000	yearlings	Seeforellen
	lake trout	8,000	yearlings	Marquette
2000	brown trout	7,950	yearlings	Seeforellen
	lake trout	10,600	yearlings	Marquette
2001	brown trout	7,150	yearlings	Seeforellen
	lake trout	8,000	yearlings	Marquette
2002	brown trout	7,070	yearlings	Gilchrist Creek
	brown trout	520	yearlings	Wild Rose
	lake trout	7,240	yearlings	Marquette
2003	brown trout	7,100	yearlings	Wild Rose
	lake trout	8,000	yearlings	Marquette
2004	brown trout	7,100	yearlings	Wild Rose
	lake trout	11,000	yearlings	Marquette
2005	brown trout	8,000	yearlings	Wild Rose
	lake trout	10,000	yearlings	Marquette
2006	brown trout	8,600	yearlings	Wild Rose
	lake trout	12,000	yearlings	Marquette
	lake trout	1,000	adults	Lake Superior
2007	brown trout	6,400	yearlings	Wild Rose
	lake trout	7,000	yearlings	Marquette
2008	brown trout	8,100	yearlings	Wild Rose
	lake trout	6,000	yearlings	Lewis Lake
2009	brown trout	9,500	yearlings	Wild Rose

Table 1 continued. Fish stocked in Duck Lake, Grand Traverse County, 1905-2011.

2009	lake trout	7,500	yearlings	Seneca Lake
2010	lake trout	11,400	yearlings	Lake Superior
2011	lake trout	11,200	yearlings	Lake Superior

Table 2. Number, weight, and length of fish collected from Duck Lake with large mesh fyke nets and inland gillnets on June 18-22, 1997.

Species	Number	Percent by number	Weight (Pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
alewife	1	0.2	0.2	0.0	8-8	8.5	
bluegill	145	25.1	22.1	4.4	3-10	5.9	32 (6")
brown trout	3	0.5	11.8	2.3	8-29	15.8	100 (8")
bowfin	1	0.2	4.6	0.9	23-23	23.5	
brown bullhead	5	0.9	4.0	0.8	10-12	11.9	100 (7")
lake herring	51	8.8	12.6	2.5	7-16	9.3	
lake trout	20	3.5	133.6	26.3	16-30	26.2	100 (8")
lake whitefish	1	0.2	2.6	0.5	19-19	19.5	
largemouth bass	39	6.8	36.9	7.3	8-15	12.1	13 (14")
longnose gar	9	1.6	29.8	5.9	30-34	32.7	
northern pike	21	3.6	67.3	13.3	21-26	24.3	62 (24")
pumpkinseed sunfish	59	10.2	11.8	2.3	5-8	6.2	61 (6")
rock bass	148	25.6	51.0	10.0	4-11	7.1	66 (6")
smallmouth bass	27	4.7	37.6	7.4	8-19	12.6	41 (14")
splake	3	0.5	27.4	5.4	26-29	27.8	100 (8")
white sucker	11	1.9	36.6	7.2	8-22	19.8	
yellow perch	8	1.4	0.7	0.1	5-6	6.0	0 (7")
yellow bullhead	25	4.3	17.0	3.3	8-13	11.2	
Total	577	100	507.6	100			

[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 3. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Duck Lake with fyke nets and inland gill nets, June 18-22, 1997. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age										
Species	I	II	III	IV	V	VI	VII	VIII	IX	X	Mean Growth Index
Bluegill		3.0 (1)	5.4 (6)	5.7 (23)	7.9 (3)	8.25 (4)	7.9 (1)		10.0 (2)		-0.2
Brown trout		9.1 (2)			29.0 (1)						
Lake trout			17.9 (2)	20.9 (2)	27.7 (13)	28.6 (3)					+6.9
Lake herring		7.7 (1)	8.3 (6)	12.8 (2)		13.9 (2)					-2.0
Largemouth bass			11.0 (12)	11.7 (12)	12.7 (5)	13.3 (4)	14.7 (2)	15.7 (1)			-0.3
Northern pike					23.5 (8)	24.2 (3)	24.8 (6)	26.3 (2)	24.6 (1)		-3.9
Pumpkinseed sunfish			5.3 (1)	6.0 (19)	7.2 (1)	7.8 (3)					+0.2
Rock bass			5.4 (7)	6.5 (25)	8.9 (3)	9.5 (12)	10.1 (3)	10.7 (3)	11.1 (8)	11.1 (1)	+0.8
Smallmouth bass		9.0 (12)	10.2 (4)		14.8 (1)	17.2 (3)	17.6 (3)	18.2 (3)	19.3 (1)		+0.2
Splake					28.6 (2)	26.5 (1)					
Yellow perch				6.0 (3)	5.8 (3)	6.4 (2)					

Table 4. Michigan DNR Master Angler awards issued for fish caught from Duck Lake, Grand Traverse County, 1994-2011.

Species	Number of Master Angler awards issued
Bluegill	1
Lake herring	1
Longnose gar	1
Northern pike	1
Pumpkinseed sunfish	1
Rock bass	58
Smallmouth bass	1
Splake	1
Total:	65

Table 5. Number, weight, and length of fish collected from Duck Lake with large mesh fyke nets, trap nets, and inland gillnets on June 18-22, 2008.

Species	Number	Percent by number	Weight (Pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
bluegill	115	12.5	16.7	3.7	4-8	5.8	37 (6")
brown trout	1	0.1	0.1	0.0	6-6	6.5	0 (8")
brown bullhead	27	2.9	15.3	3.4	7-14	10.3	100 (7")
green sunfish	2	0.2	0.1	0.0	3-3	3.5	
largemouth bass	35	3.8	60.7	13.4	11-17	14.7	60 (14")
longnose gar	1	0.1	3.9	0.9	34-34	34.5	
northern pike	16	1.7	60.1	13.3	13-33	24.6	50 (24")
pumpkinseed sunfish	15	1.6	2.0	0.4	4-6	5.4	20 (6")
rock bass	511	55.5	133.9	29.6	3-12	6.6	57 (6")
smallmouth bass	33	3.6	70.9	15.7	7-19	15.4	73 (14")
stickleback	1	0.1	0.0	0.0	2-2	2.5	
white sucker	21	2.3	51.9	11.5	9-20	17.9	
yellow bullhead	4	0.4	2.2	0.5	9-11	10.5	
yellow perch	139	15.1	34.7	7.7	5-12	8.1	70 (7")
Total	921	100	452.5	100			

[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 6. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Duck Lake with trap nets, fyke nets, and inland gill nets, June 18-22, 2008. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age											
Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	Mean Growth Index
Bluegill			4.9 (14)	5.5 (8)	6.1 (7)	6.8 (16)	8.2 (3)	8.4 (1)				-0.4
Largemouth bass				13.1 (9)	14.0 (11)	15.6 (7)	16.3 (3)	16.4 (3)	17.3 (3)	17.4 (1)		+1.1
Northern pike	13.9 (1)	20.3 (1)	21.0 (3)	23.3 (3)	24.4 (2)	29.2 (4)	27.6 (1)	33.7 (1)				
Pumpkinseed sunfish			5.1 (7)	5.3 (7)	6.3 (1)	6.3 (1)						-0.1
Rock bass			5.0 (15)	6.0 (23)	7.1 (17)	9.2 (14)	10.3 (4)	10.5 (8)	11.1 (6)	11.4 (3)	12.0 (2)	+0.7
Smallmouth bass		7.7 (3)	11.4 (1)	14.2 (12)	14.7 (1)	16.8 (1)	17.5 (5)	18.0 (3)	18.5 (7)			+1.1
Yellow perch				7.0 (6)	7.5 (29)	8.9 (13)	10.2 (7)	10.6 (2)	11.4 (2)	12.3 (2)		-0.5

Table 7. Shoreline data for Duck Lake, Grand Traverse County. Sampling was conducted by DNR Fisheries personnel on August 28, 2008.

	Total docks per km	Percent shoreline armoring	Submerged trees per km	Dwellings per km
Duck Lake	13.0	21.4	175.0	15.4