

Twin Lake

Luce County, T45N, R10W, Sec. 10
Tahquamenon River Watershed, last surveyed 2009

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Environment

Twin Lake is located on the south side of M 28 about 4 1/2 miles southwest of Newberry in Luce County (Figure 1). The lake is 103 acres in size, and consists of two basins, the east being relatively shallow, and the west having depths up to 75 feet (Figure 2). The immediate shoreline is mostly rolling hills, with sand, gravel, and clay soils. Tag alder, cedar and spruce are the predominant vegetation type surrounding the lake. There is one inlet, a small creek on the west side, and many springs which contribute water to the lake. The West Branch of Teaspoon Creek provides an outlet, eventually leading to the Tahquamenon River and Lake Superior. The lake's substrate consists of sand, marl, and organic matter. Dominant vegetation in the lake consists of Scirpus, Potamogeton, and Chara. The water is clear to slightly green brown. In 1968, pH was 7.7 with a MO alkalinity of 128 mg/l CaCo₃ and alkalinity of 68.4 mg/l. In addition, an August, 2002 water chemistry survey found that dissolved oxygen disappeared below about 12 feet depth (MDNR unpublished data).

History

First surveys indicated a population in Twin Lake consisting of rock bass, bluegill, white suckers, largemouth bass, northern pike, golden shiners, and other minnows. Bluegill were stocked as early as 1938. The bathymetry of Twin Lake was mapped in 1953, and a public access site was developed in 1967.

A 1968 survey indicated that the depth/oxygen profile was suitable to support trout. Therefore, management direction moved toward providing a "two story fishery" by managing for trout in the deep western basin, and for a largemouth bass-panfish fishery in the shallower areas and the eastern basin. Rainbow trout and brown trout were subsequently stocked, and later surveys showed good growth and survival. However, survey data in 1980 showed that rough fish (brown bullhead and white sucker) and abundant small yellow perch were becoming a problem. For that reason, Fisheries personnel conducted manual removals of rough fish during 1985-86. Following the removals, Fisheries Division began stocking splake annually until 1999 (some rainbow trout and lake trout have also been stocked since 1986).

A survey conducted in fall of 1988 showed splake survival and growth to be satisfactory. Few yellow perch were present, indicating that previous manual removals were successful. However, the population dynamics of other species seemed to be out of balance. Bluegill were fairly numerous; but average size was small and growth was below state average. Largemouth bass, previously well established, showed an extensive decline in both number and size; only 27 were collected, representing 4% of the catch by number. Largemouth bass averaged 7.2 inches in length with none larger than 9 inches. A few rock bass, representing 4% of the catch by number, were also present. Finally, the white sucker population had increased, comprising 82% and 37% of the catch by weight and number, respectively.

Twin Lake was surveyed again in 1993. Although no splake were netted, angler reports indicated that a good splake fishery existed during the winter. Anglers, however, complained of the poor largemouth bass fishing. Only 35, 2-3 in bass were captured in the survey, with no bass larger than 7 in. Bluegill, pumpkinseed and perch were all growing about one inch slower than state average. The growth rate of the few bass captured appeared to be similar to the panfish at age I, but then much slower by age 2. The reason for the slower growth at age 2 is unknown at this time. However, angling efforts earlier in the summer produced good numbers of 8-12 inch bass, which implied abundant forage such as bluegills and golden shiners was available for larger bass. Thus, the evidence from angling that many largemouth bass were growing into the 12 inch size, combined with the fact that an 18-in minimum size limit had been in effect for several years, lead biologists to believe that there was excessive harvest of sub-legal largemouth bass.

The 1999 survey produced a larger sample size of largemouth bass, but still corroborated the previous assumptions of sublegal harvest. Largemouth bass of ages 1-3 remained about 6 inches in size, and only at age 4 did their average size increase to about 11 inches. Beginning at age 5, the growth curve leveled off such that bass at age 11 still averaged only about 17 inches. Despite sampling relatively old bass, none of the 60 bass caught were of legal size (18 in). Bluegill growth had slowed since 1993, with a mean growth index 1.7 in lower than the state average, while perch were still had a growth index of roughly 1 in lower than state average. The relative abundance of bluegills and yellow perch was low, possibly resulting from the multi-species competition with yearling splake for the same aquatic invertebrate forage base. For that reason, splake stocking was cancelled in 2000, as it was the most controllable competing species for the common forage base. The relatively low abundance of panfish possibly explained the flattened growth curve for bass in the older age groups. The 1999 survey effort also captured 18 northern pike, a first time documentation for Twin Lake, of which two were greater than legal size. Although 20 splake were captured, only one was from the previous years' stocking and the rest were recently-planted yearlings. This apparent lack of overwinter survival further vindicated the decision to cease the stocking program. Interestingly, an August 2002 water chemistry survey found very little oxygen below about 12 feet depth, making the remaining 65 feet in the west basin seasonally unusable by any fish species, and thus corroborating the decision to terminate the splake program.

Current Status

In 2009 an intensive survey was conducted using fyke, trap, gill, and mini-fyke nets, and a DC electrofishing boat (Figure 3). The effort and methodology was similar to the 1999 survey. The data generally verified conditions observed in 1999 (Table 1). The major differences noted were the higher relative abundance of bluegill, pumpkinseed, and yellow perch and the lower relative abundance of white suckers. Yellow perch catch increased from 5 in 1999 to 97 in 2009. Size range was good, with 22% of the catch acceptable to anglers at 7+ in. However, the catch of yellow perch still comprised only 2% of the total weight of all species. In contrast, bluegills comprised 78% of the catch by number and 38% of the catch by weight, compared with 31% and 5% in 1999. Only 4% of bluegills in 2009 were of acceptable size (6+ in). Pumpkinseeds comprised 3% of the catch by weight, compared with 1% in 2009, and 13% were of acceptable size (6+ in). White sucker catch fell from 207 in 1999 to 34 in 2009, while their percent composition by weight fell from 65% in 1999 to 19% in 2009.

Northern pike comprised 17% of the catch biomass, with 20% greater than legal size. Largemouth bass catch was up from 60 in 1999 to 129 in 2009, but again there were no fish of legal size (18 in). The average size of largemouth bass decreased from 13.1 inches in 1999 to 7.7 in, and they comprised 11% of the catch biomass compared with 15% in 1999. Two northern muskellunge, 28 and 35 in, were captured, the first time they had ever been documented by survey in Twin Lake. Both northern pike and northern muskellunge are plentiful in Dollarville Flooding, and it is likely that both species migrated up Teaspoon Creek to Twin Lake.

Growth rates for bluegill and rock bass were roughly two inches lower than state average, while largemouth bass, northern pike, pumpkinseed, and yellow perch populations were growing at one inch or less below state average (Table 2). The largemouth bass population showed the greatest increase in growth, improving from 1.8 inches below the state average in 1999 to 0.8 inches below in 2009 (Figure 2).

Zebra mussels were identified in the lake in 2005. It is unknown at this time, however, if their presence had yet impacted the limnology by 2009. Zebra mussels were inconspicuous in 2009 except at the courtesy pier, but it was interesting that acceptable dissolved oxygen levels were found at double the depth found in 2002. Limnological data for the 2009 survey (collected on August 20) showed acceptable dissolved oxygen concentrations down to 25 ft. At the time of collection the surface temperature was 80°F, dissolved oxygen was 11.2 mg/l, and the pH was 8.4. At a depth of 25 ft the temperature was 46°F, dissolved oxygen was 6.3 mg/l, and the pH was 7.8. At 30 ft, temperature was 42°F, with 3.5 mg/l dissolved oxygen and a pH of 7.8. The secchi disk depth was 13.5 ft.

Analysis and Discussion

Trophy regulations for largemouth bass (18-in minimum size) were still in effect for Twin Lake in 2009. Even so, growth data indicated that very few ever reached that size, so this regulation basically resulted in a catch-and-release fishery (Table 2). The growth comparison between 1999 and 2009 (Figure 4) implied that old, slow growing bass were working their way out of the population (ages 8 and 9) and being replaced with younger, faster growing fish. The graph implied good potential for resumed harvest of legal-size in largemouth in the near future. The regulation should be retained, not only for the largemouth bass population, but also to help control the panfish and yellow perch populations.

Until splake reach about 12 inches, their main diet consists of aquatic invertebrates similar to the panfish. The splake stocking rate averaged 3,900 annually from 1989 until 1994, and was then reduced to 3,000 annually until 1999. That slight reduction during the previous five years had not improved panfish growth rates in 1999. The 2009 survey was nine years after splake stocking ended, and splake were absent from the catch data in 2009. Although bluegill numbers increased from 186 in 1999 to 2,392 in 2009, their growth rate was little changed. Pumpkinseed, rock bass, and yellow perch populations also increased between 1999 and 2009, lending credence to the concept that previous splake stocking had been causing considerable forage stress to the panfish community. Even so, growth was still slow for the several panfish species, most likely due to their increasing abundance.

The fish community in 2009 was apparently diversified with the addition of northern pike and northern muskellunge. Their presence, along with the largemouth bass population, will likely result in increased predation on panfish populations, which may potentially result in improved panfish growth. Northern pike and muskellunge generally target soft-rayed forage that are larger than panfish, so their presence may also explain the recent decline in the white sucker population.

Management Direction

Twin Lake should no longer be managed as a "two story" fishery. The 2009 limnological data showed sufficient dissolved oxygen down to 30 ft with temperature cold enough for splake. However, the main argument against splake is competition with panfish for a common forage base. Splake should not be reintroduced into this lake. Emphasis should be directed toward largemouth bass and panfish. Northern pike and northern muskellunge should be considered a valuable segment of this lake's fish community structure, as they will more readily utilize the sucker population for forage. Increasing abundance and growth of largemouth bass may correlate with increasing abundance of panfish. If so, predator and prey species should reach a balance point in the near future.

References

Historical files are kept at the Newberry Operations Service Center, 5100 S. M-123, Newberry, MI 49868

Figure 1. Road map of the Twin Lake, Luce County area.

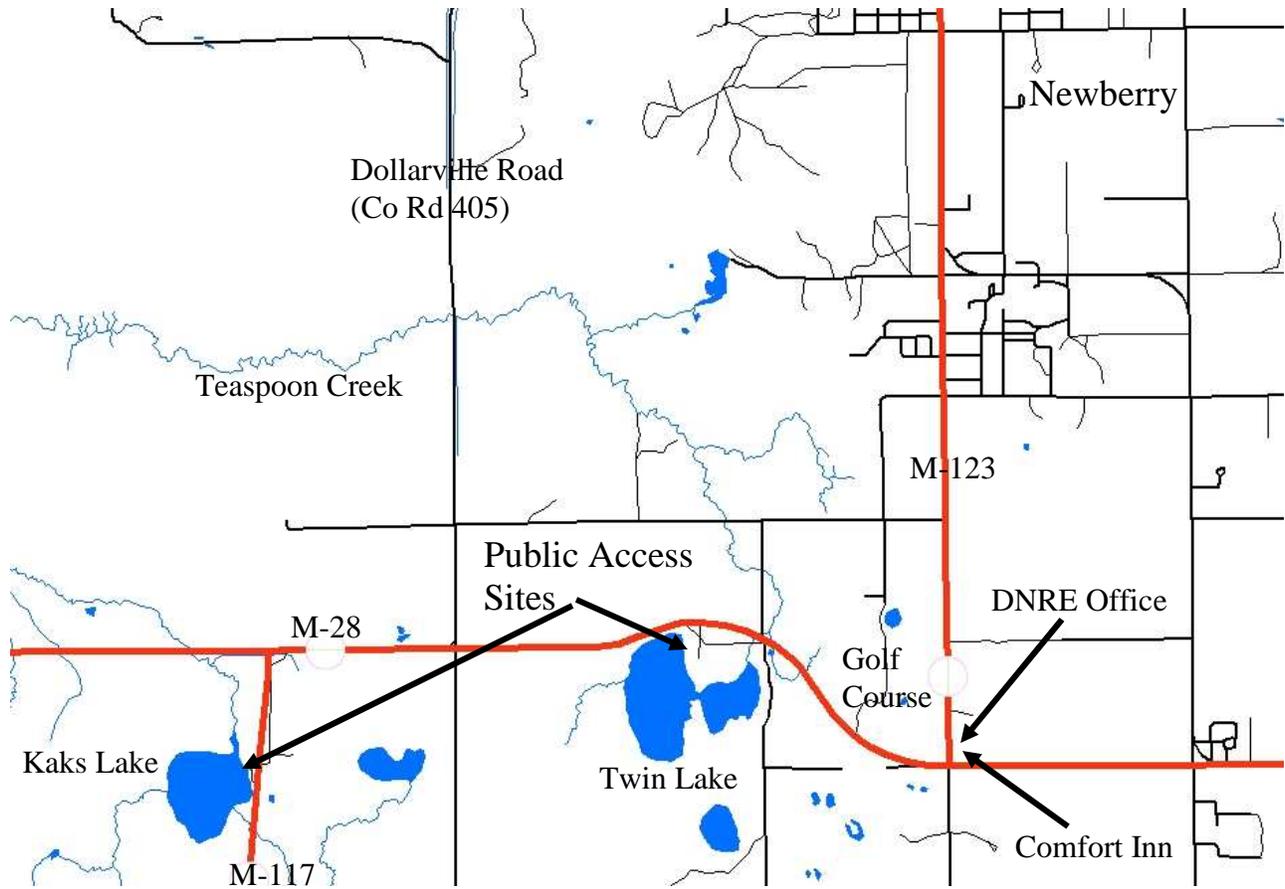


Figure 2. Contour map of Twin Lake, Luce County

T45N, R10W, Sec. 10, 11
Size 103 acres

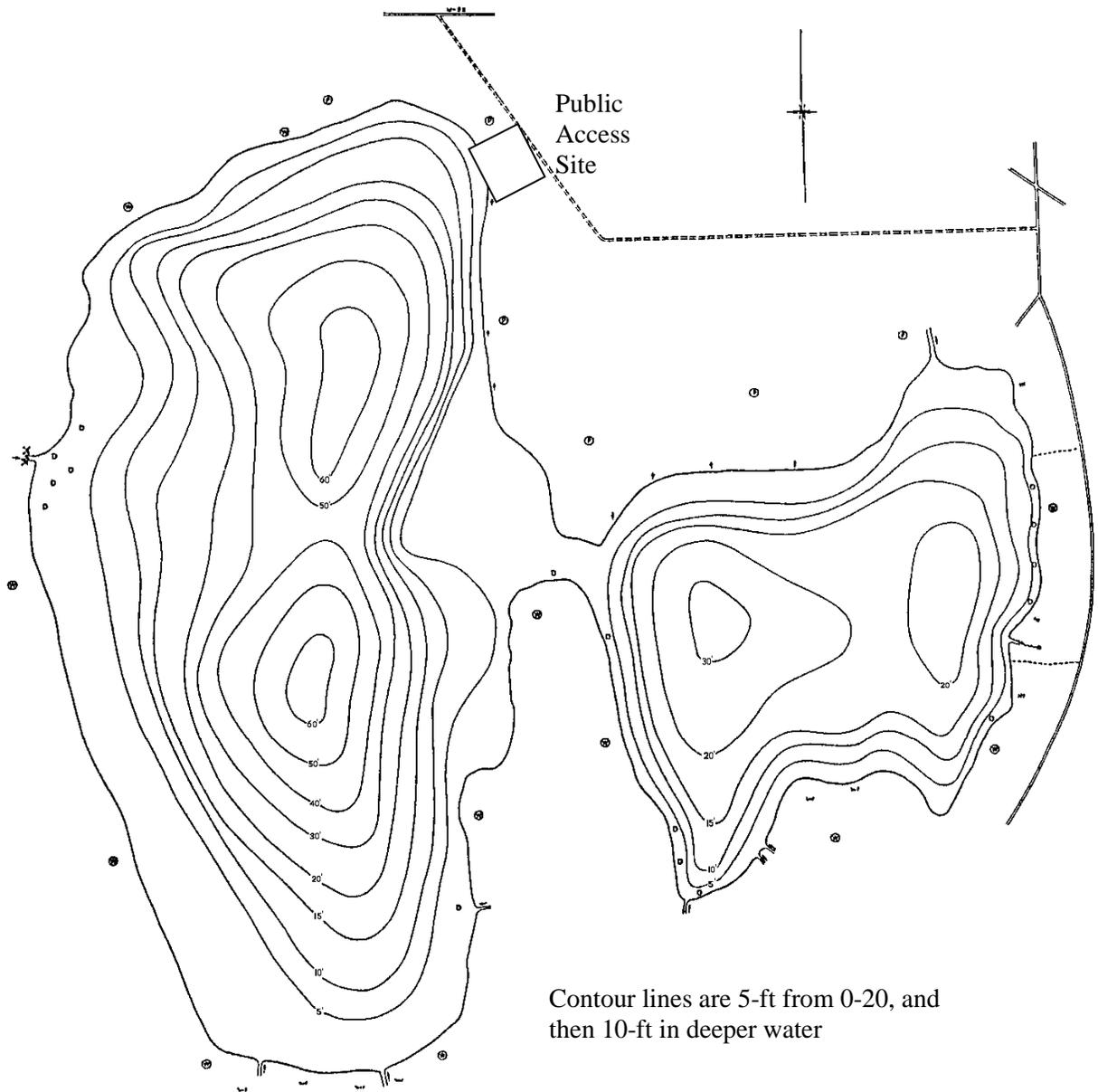


Figure 3. Aerial photograph showing sampling locations for intensive survey in Twin Lake, Luce County using fyke, trap, and gillnets, maxi-mini fyke nets, and boomshocking, June 22-26, 2009



Figure 4. Largemouth Bass Growth Rates from surveys in 1999 and 2009, compared with state average, for Twin Lake, Luce County

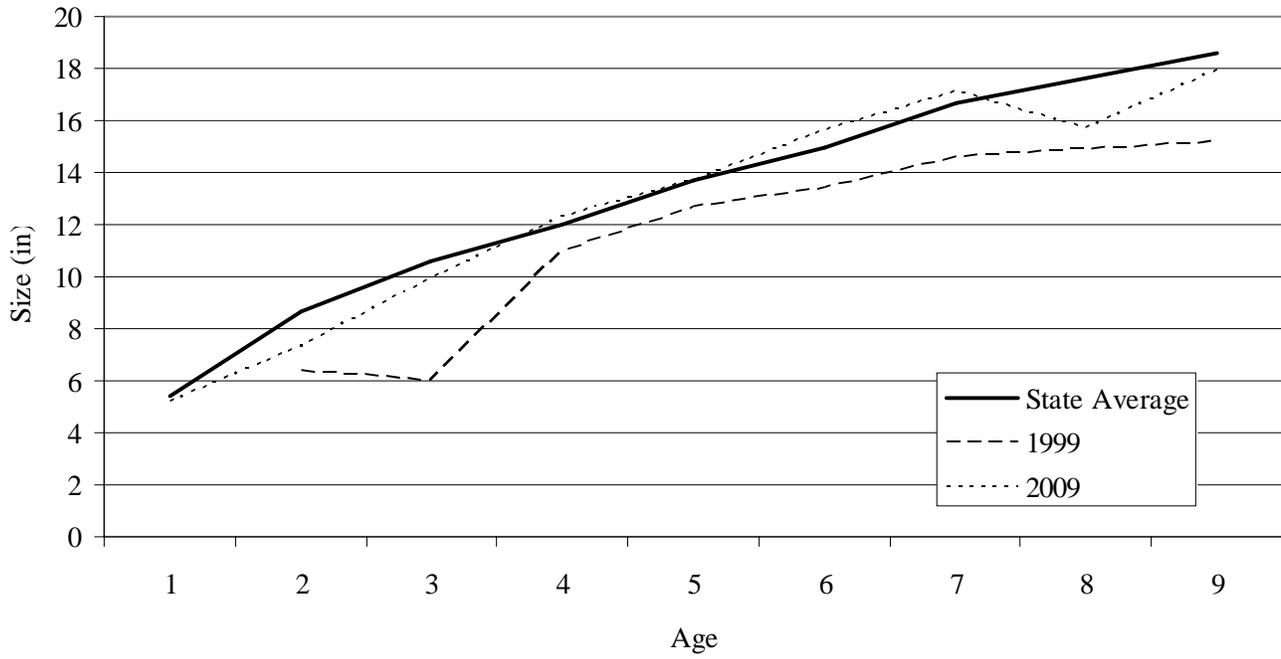


Table 1. Number, weight, and length indices of species collected from Twin Lake with trap, fyke, and gillnets, maxi-mini fyke nets, and boomshocking, June 22-26, 2009. Percent by number column does not add to 100% because survey calculations included number of crayfish and painted turtles.

Species	Number	Percent by number	Weight (lbs.)	Percent by weight	Length range (in.)*	Average length	Percent legal size**
Bluegill	2,392	77.5	149.3	38.2	1 – 9	4.4	4
Brown bullhead	12	0.4	7.9	2.0	6 – 14	10.8	92
Creek chub	2	0.1	0.1	0.0	3 – 5	4.5	---***
Common shiner	1	0.0	0.0	0.0	3	3.5	---
White sucker	34	1.1	75.4	19.3	12 – 20	17.6	---
Golden shiner	4	0.1	0.2	0.1	4 – 6	5.5	---
Largemouth bass	129	4.2	43.6	11.2	3 – 17	7.7	0****
Central mudminnow	8	0.3	0.1	0.0	2 – 3	2.6	---
N. muskellunge	2	0.1	17.8	4.5	28 – 35	32.0	0
Northern pike	30	1.0	65.2	16.7	15 – 26	21.1	20
Pumpkinseed	130	4.2	12.5	3.2	2 – 7	4.7	13
Rock bass	123	4.0	9.3	2.4	1 – 8	4.5	7
Yellow perch	97	3.1	9.5	2.4	1 – 10	5.8	22
Total		96.3		100.0			

* Note some fish were measured to 0.1 inch, others to inch group: eg., "5"=5.0 to 5.9 inches; "12"=

12.0 to 12.9 inches; etc.

** Percent legal size or acceptable size for angling harvest.

*** “---“ signifies a species for which there is no minimum legal/acceptable harvest size.

**** Twin Lake has an 18 in minimum size regulation for largemouth bass

Table 2. Weighted mean length and age composition for six species of fish sampled from Twin Lake with trap, fyke, and gillnets, maxi-mini fyke nets, and boomshocking, June 22-26, 2009.

Species/Age	Number aged	Length range (in.)	State average len. (in.)	Weighted mean len. (in.)	Weighted age freq. (%)	Mean growth index*
Bluegill						-2.1
Age III	4	3.0 – 3.8	5.3	3.4	13	
Age IV	7	3.2 – 4.7	6.2	3.9	23	
Age V	16	4.5 – 4.9	6.9	4.8	26	
Age VI	17	4.6 – 6.1	7.4	5.1	36	
Age VII	10	6.1 – 7.7	8.0	6.4	2	
Age VIII	1	7.4	8.4	7.4	0	
Age IX	4	6.3 – 9.5	8.7	7.0	1	
Largemouth Bass						-0.8
Age I	22	4.5 – 5.9	5.4	5.2	28	
Age II	29	6.0 – 9.1	8.7	7.3	49	
Age III	17	8.5 – 11.8	10.6	9.9	14	
Age IV	3	12.0 – 13.1	12.0	12.3	2	
Age V	3	13.0 – 14.2	13.7	13.7	2	
Age VI	2	15.3 – 15.9	15.0	15.6	2	
Age VII	1	17.1	16.7	17.1	1	
Age VIII	1	15.7	17.6	15.7	1	
Age IX	1	17.9	18.6	17.9	1	
Northern pike						-1.0
Age II	8	15.3 – 18.4	19.0	16.7	27	
Age III	12	19.1 – 23.4	21.8	21.4	37	
Age IV	8	20.1 – 26.9	24.2	24.0	27	
Age V	3	22.7 – 24.2	26.1	23.2	10	
Pumpkinseed						-1.0
Age III	11	3.1 – 4.8	5.2	3.8	23	
Age IV	11	4.1 – 5.8	5.8	4.5	47	
Age V	6	5.1 – 5.9	6.3	5.4	13	
Age VI	6	5.4 – 6.9	6.8	5.9	8	
Age VII	8	6.2 – 7.3	7.2	6.7	7	
Age VIII	2	6.2 – 6.9	---	6.6	2	
Age IX	1	7.6	---	7.6	1	
Rock bass						-1.9
Age II	1	3.3	4.3	3.3	2	
Age III	10	3.2 – 4.03	5.4	3.7	24	
Age IV	10	3.9 – 4.8	6.4	4.4	62	
Age V	4	5.2 – 5.7	7.2	5.4	4	
Age VI	1	5.5	8.1	5.5	1	
Age VII	4	6.0 – 7.2	8.8	6.6	3	
Age VIII	2	7.1 – 7.9	9.4	7.5	2	
Age IX	1	8.1		8.1	1	
Age X	1	8.7		8.7	1	
Age XI						
Yellow Perch						-0.7
Age II	7	4.1 – 6.3	5.7	4.8	23	
Age III	19	5.3 – 7.2	6.8	6.1	48	
Age IV	11	6.2 – 8.9	7.8	7.2	18	
Age V	4	7.4 – 9.3	8.7	8.0	5	
Age VI	4	7.7 – 10.7	9.7	8.6	5	

* Mean growth index is the average deviation from the state average length at age.