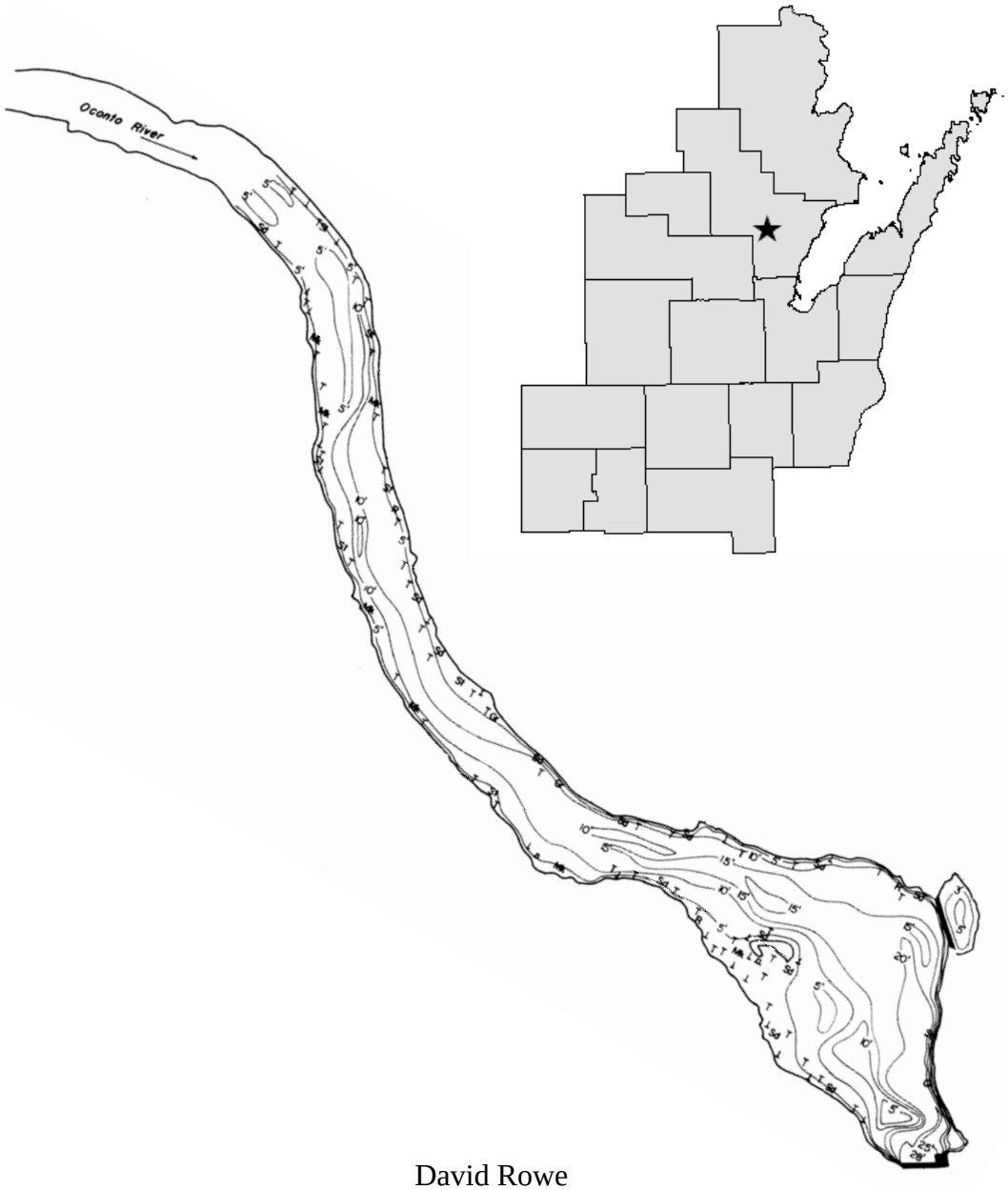
Oconto Falls Pond, Oconto County Wisconsin
Fisheries Survey Report, 2007

Waterbody Identification Code : 449300



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February 2009

Oconto Falls Pond, Oconto County Wisconsin
Fisheries Survey Report, 2007

Report Approval signatures

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SUMMARY

Lake and location
Oconto Falls Pond, Oconto County, T28N R19E Sec 26

Physical / chemical attributes
Surface acres: 167
Mean depth: 10
Maximum depth 28 feet
Lake type: drainage
Basic water chemistry: Slightly alkaline, stained lightly brown and low transparency
Littoral substrate: 60% sand, 35% muck, and 5 % exposed rock and gravel
Aquatic vegetation: Sparse, Eurasian water milfoil and curly leaf pondweed present
Other features: N.E.W. Hydro Inc. operates the Oconto Falls Hydroelectric Project that controls the water level and outlet flows as run of the river.

Purpose of surveys
Baseline lake survey Tier 1 assessment

Dates of fieldwork
Fyke netting survey conducted March 28 through April 5, 2007. Electrofishing survey conducted May 15 and May 17, 2007.

BACKGROUND

Oconto Falls Pond is a 167 acre impoundment just west of the City of Oconto Falls. This flowage is locally known Oconto Falls Pond, but is certainly large enough to be classified as a flowage or lake. The Oconto River enters the impoundment roughly two miles upstream of the dam in Oconto Falls which controls the water level. The deepest part of the flowage is 28 feet just above the dam, the average depth is 10 feet, and 19% of the lake is 3 feet or shallower. The littoral area is 60% sand, 35% muck, and 5% gravel and rock. There are 4.3 miles of shoreline of which 2.2 miles are undeveloped.

The lake has sparse macrophyte growth with a plant community comprised of vallisineria, coontail, and several potamogeton species. The presence of Eurasian water milfoil was reported in 2000 and curlyleaf pondweed was reported in 2007. Both of these plants are invasive exotics. Zebra mussels are also present. The upriver portions of the lake have a decent amount of coarse woody debris and fallen trees to provide fish habitat.

In 1995, the Federal Energy Regulatory Commission re-licensing of the Oconto Falls Hydroelectric Project operated by N.E.W. Hydro Inc. ended the practice of peaking the outflow of the impoundment which stabilized the lake's water level. The hydroelectric project is now operated at run-of-river mode and the pool elevation is maintained at 729 feet above sea level, ± 0.25 feet.

The lake supports an active fishery with plenty of use in both the open water and ice fishing seasons. There are three public access locations. The City of Oconto Falls operates two boat landings: one in the city park and the other at the northeast corner of the dam. There is also a more primitive landing off of Messenger Road on the north side of the lake in Section 22. Past attempts at stocking walleye did not provide a significant walleye fishery and was discontinued in 1966. In 1995, WDNR stocked 3,000 fingerling largemouth bass. The last comprehensive survey was conducted in 1989 including spring fyke netting and spring electrofishing.

METHODS

Data collection

Six standard 3 foot hoop fyke nets with ¾" bar, 1.5" stretch mesh were fished from March 28 through April 4, 2007, and lifted periodically for a total effort of 48 net nights. All fish captured were identified to species and counted each day. Total length of gamefish and a sub-sample of panfish were measured to the nearest 0.1 inch. Scales or dorsal spines were collected from a sub-sample of fish stratified within 0.5 inch bins.
A WDNR standard direct current electrofishing boat was used to sample 3.3 miles of shoreline on the evenings of May 15 and May 17, 2007. Only bass were collected, measured to the nearest 0.1 inch, and inspected for a fin clip. Scales or dorsal spines were collected from a sub-sample of fish stratified within 0.5 inch bins.
Ages were assigned to fish after scales and spines were aged using standard WDNR procedures. An age length key was created to assign ages to un-aged fish based on proportional representation of the known age fish subsample, within the 0.5 inch length bins.

Data analysis

Total catch and catch per gear type was calculated for all species. Age and length frequency distributions and mean length at age analyses were performed for black crappie, bluegill, largemouth bass, smallmouth bass, and northern pike. Proportional Stock Density (PSD) and Relative Stock Density of preferred length fish (RSD-preferred, Anderson and Neumann 1996) were calculated for the same species. Stock length, quality length, and preferred length values were as proposed by Gabelhouse, respectively (1984). Catch data was combined for both gear types for largemouth and smallmouth bass. Age-frequency distribution was calculated after ages were allocated to all fish in the sample. Mean length at age was calculated as mean length at time of capture. Mean lengths of known-age fish were plotted against statewide and Oconto County averages as well as mean length at age from the 1989 survey of Oconto Falls Pond. Total mortality was estimated using a catch curve analysis (Ricker 1975) for populations where the

assumptions of constant recruitment and mortality appeared valid, including bluegill, smallmouth bass, and northern pike.

RESULTS AND DISCUSSION

A total of 2,883 fish of 17 different species were collected. Catch per gear type are shown for each species sampled (Table 3). Bluegill was the most abundant species. Black crappie, pumpkinseed, northern pike, largemouth bass, and smallmouth bass were common. Rock bass, yellow perch, bullhead, common carp, and white sucker were sampled in low numbers. Comparisons indicate a dramatic decrease in the abundance of bullheads and increase in the abundance of largemouth bass and panfish since 1989, likely because of improvements in water quality and water level stability.
Flow data for the Oconto River upstream of the impoundment was compiled from the USGS gauging station at the County Hwy BB crossing. Data represents mean monthly flows from 1999 through 2007 (Figure 1).

Black Crappie

A total of 134 black crappie were sampled. The catch rate was 2.6 per net night compared to a catch rate of 1.5 per net night in 1998 (Table 3). The average length was 8.2 inches with a range from 4.1 to 15.2 inches. The length frequency distribution shows good size structure with an improvement from 1989 and a greater percentage of fish between 8.5 and 12 inches (Figure 2). 83% of fish were greater than 8 inches (PSD), and 21% of the fish were greater than 10 inches (RSD-preferred). That value corresponds with strong year classes of 5 and 6 year old fish (Figure 3). There also appears to be a good year class of 2 year old fish. Crappie populations often exhibit variable year class strength, and this is evident in the age frequency distribution of Oconto Falls Pond (Figure 3). The mean length at age shows these fish are comparable to other populations in Oconto County and slightly below the statewide average (Figure 4). However, when compared with the 1989 sample; the 2007 fish appear to be growing much slower. This change is likely a compensatory response because of more consistent recruitment since

the water level of the impoundment has been stabilized, resulting in increased abundance and competition for food resources.

Bluegill

There were a total of 1706 bluegills sampled. The catch rate was 34.9 per net night compared to a catch rate of 1.6 per net night in 1998 (Table 3). Average length was 5.2 inches with a range from 2.9 to 8.6 inches. The size structure was fair to poor with only 29% of the fish greater than 6 inches (PSD) and 3% of fish greater than 8 inches (RSD-preferred) (Figure 5). In 1989, the PSD was 22%, and the size structure was similar to 2007. There appears to be consistent recruitment with a better than average year class of 5 year olds (Figure 6). The total annual mortality was estimated at 46% (r^2=0.85). The growth rate appears better than average when compared to Oconto County and statewide averages (Figure 7). In 1989, there were relatively fewer fish, and the total annual mortality was estimated at 57%. The mean length at age from 1989 was greater at all ages. The current bluegill population appears to be growing a little slower; but this is likely because of better recruitment and a greater abundance of bluegills in 2007. It is likely that harvest is still substantial but because of increased recruitment, annual mortality has decreased and size structure has improved somewhat despite a slower growth rate. The increase in bluegill recruitment is again likely attributable to improved water quality and water level stability of the impoundment.

Largemouth Bass

There were a total of 90 largemouth bass sampled. The catch rate was 1.7 per net night compared to a catch rate of 0.4 per net night in 1998 (Table 3). Average length was 14 inches with a range from 6.5 to 20.5 inches. The size structure was good to excellent with 86% of the fish greater than 12 inches (PSD) and 65% of fish greater than 15 inches (RSD-preferred) (Figure 8). The size structure has improved greatly since 1989. This factor is probably a result of the 14-inch length minimum and an increase in angler preference for catch and release bass fishing. There appears to be constant recruitment, but with weaker year classes from 2003 and 2004 (Figure 9). The abundance of larger fish with reduced recruitment in more recent years may be a sign that there is something

impacting natural reproduction. This change is likely because of the annual variation in the flow of the river. In years where there are high flows during the largemouth bass spawning season, only the lower end of the impoundment would be available for spawning. When comparing largemouth bass year class strength to the Oconto River flow values (Figure 1), there is some evidence that high water during early summer may impact natural reproduction. The growth rate appears similar to the Oconto County and statewide averages (Figure 10). Growth appears to be slower than in 1989, but again this is likely in response to the more abundant population.

Smallmouth Bass

There were a total of 70 smallmouth bass sampled. The electrofishing catch rate was 19.6 per hour compared to a catch rate of 23.8 per hour in 1989 (Table 3). Average length was 12.5 inches with a range from 5.3 to 17.3 inches. The size structure is good to excellent with 75% of the fish greater than 12 inches (PSD) and 43% of fish greater than 15 inches (RSD-preferred) (Figure 11). Size structure has improved greatly since 1989. This factor is likely a result of the 14-inch length minimum and an increase in angler preference for catch and release bass fishing. There appears to be constant recruitment with a strong year class from 2000 (Figure 12), which corresponds with stable river flows in that year (Figure 1). The catch curve estimation of total mortality is 14.9% (r^2=0.47), suggesting low harvest. The growth rate is consistent with the Oconto County average and slightly less than the statewide average (Figure 13). Although the relative abundance of the population is similar to 1989, the growth rate is slightly slower. Smallmouth bass reproduction was not as negatively impacted by the impoundment fluctuations compared to more lentic species. This occurrence may have resulted in greater inter-specific competition for food with the now more abundant largemouth bass, crappie, and bluegill populations.

Northern Pike

There were a total of 257 northern pike sampled. The catch rate was 5.1 per net night compared to a catch rate of 6.2 per net night in 1998 (Table 3). Average length was 19.7 inches with a range from 9.5 to 38.9 inches. The size structure was fair to poor with 27%

of the fish greater than 21 inches (PSD) and 3.6% of fish greater than 28 inches (RSD-preferred, Figure 14). The 2007 length distribution compared to 1989 shows a decrease in the proportion of fish between 20 and 24 inches. This change is likely because of high harvest pressure once fish reach a length acceptable to anglers for harvest. The age frequency distribution suggests constant recruitment (Figure 15). The total annual mortality is estimated at 54% (r^2=0.88). This rate is less than 61% reported in 1989 but is still high and likely attributable to angler harvest. The sex ratio of males to females in the sample is 2:1. This ratio is a common pattern and may suggest either an angler preference to harvest faster growing females or a bias toward netting males. The growth rate appears comparable to the Oconto County and the statewide averages (Figure 16).

CONCLUSIONS AND RECOMMENDATIONS

Overall, the fishery of Oconto Falls Pond appears to be in good condition, with very good populations of largemouth and smallmouth bass. In comparison to the 1989 survey, there are greater numbers of bass and panfish, with generally larger bass and crappies. The bluegill and northern pike populations appear to be impacted by harvest with the northern pike harvest likely reducing the number of females and reducing the average size. The regulation of the hydro-electric facilities and the subsequent stabilization of the water level appear to have had a dramatic effect on improving the fishery. Additional fisheries habitat improvements such as shoreline restoration and the addition of coarse woody structure may increase fish recruitment and growth rates.

The current regulations seem to be appropriate. If there was interest in changing the management for northern pike from a consumptive opportunity (5 fish daily bag and no size limit) to managing for better size structure, a 26 inch minimum size limit with a daily bag limit of 2, could be implemented. However, there is currently no evidence of a stunted or slow growing population.

Public access to Oconto Falls Pond is adequate. There is also shore access fishing located in the City of Oconto Falls. I would recommend no improvements to the current landing facilities.

REFERENCES

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Gabelhouse, D. W., Jr. 1984. A length-categorization system to assess fish stocks. North American Journal of Fisheries Management 4:273-285.

Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada Bulletin 191.

TABLES AND FIGURES

TABLE 1.— Current fishing regulations for Oconto Falls Pond.

Species	Open Season	Daily limit	Minimum length
Largemouth and Smallmouth Bass	first Saturday in May – first Sunday in March	5 in total	14 inches
Northern Pike	first Saturday in May – first Sunday in March	5 in total	none
Panfish (bluegill, pumpkinseed, yellow perch, white and black crappie)	Open all year	25 in total	None
Catfish	Open all year	25 in total	none

TABLE 2.— Net locations for six fyke nets fished on Oconto Falls Pond from March 28th until April 5th 2007.

Net Number	Latitude	Longitude
1	44.88104	88.15075
1a	44.87935	88.15959
2	44.87916	88.15461
3	44.88109	88.16661
4	44.88391	88.17445
5	44.88830	88.18604
6	44.88783	88.19045

TABLE 3.— Catch summary for fyke netting and electrofishing samples from Oconto Falls Pond, 2007. Six fyke nets were fished for a total of 48 net nights from April 2nd through April 17th. The electrofishing sample was collected on May 15th and 17th, for a total of 3.0 hours of effort. Only

largemouth and smallmouth bass were collected during electrofishing. The 1989 samples are from a total of 59 net nights and one evening of electrofishing, with 5 hours of effort

Species	Fyke netting 2007		Fyke netting 1989		Electrofishing 2007		Electrofishing 1989	
	Total Catch	Mean Catch per net night	Total Catch	Mean Catch per net night	Total Catch	Catch per hour	Total Catch	Catch per hour
Black Crappie	134	2.6	89	1.5	-	-	-	-
Bluegill	1706	34.9	92	1.6	-	-	-	-
Bowfin	2	0.4	-	-	-	-	-	-
Brook Trout	1	0.02	-	-	-	-	-	-
Bullhead Spp.	85	1.3	746	12.6	-	-	-	-
Common Carp	24	0.6	9	0.2	-	-	-	-
Golden Shiner	18	0.4	-	-	-	-	-	-
Green Sunfish	1	0.02	-	-	-	-	-	-
Largemouth Bass	80	1.7	22	0.4	10	3.3	3	0.6
Northern Pike	257	5.1	369	6.2	-	-	6	1.2
Pumpkinseed	335	6.4	126	2.1	-	-	-	-
Rock Bass	98	2.2	182	3.1	-	-	-	-
Smallmouth Bass	11	0.25	1	0.01	59	19.6	119	23.8
White Sucker	48	1.1	96	1.6	-	-	-	-
Yellow Perch	8	0.2	18	0.3	-	-	-	-

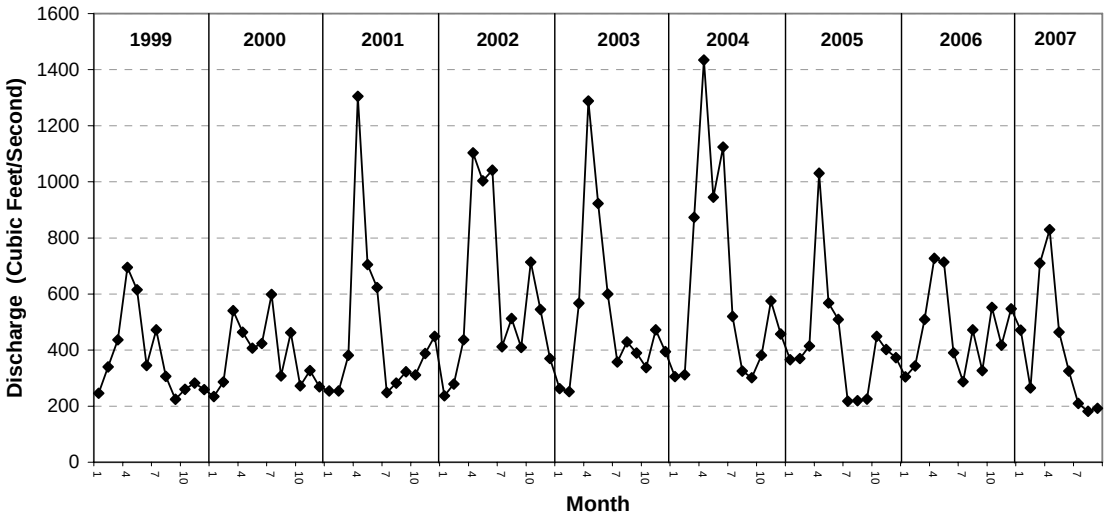

FIGURE 1.— Monthly discharge of the Oconto River measured at the USGS gauging station at the County Hwy BB Bridge crossing from 1999-2007. Discharge is measured in cubic feet per second.

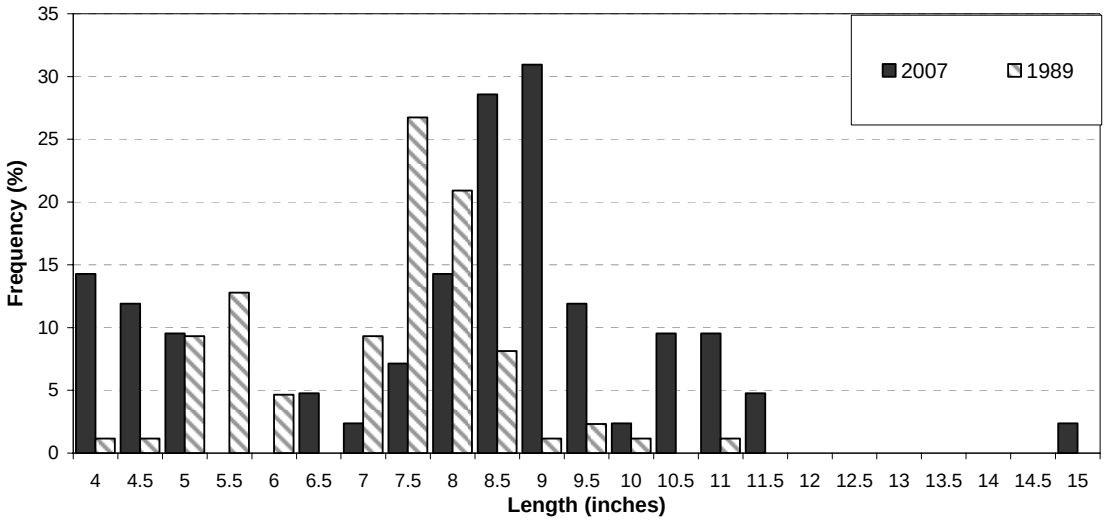

FIGURE 2.— Black crappie length frequency distributions from 2007 and 1989 samples.

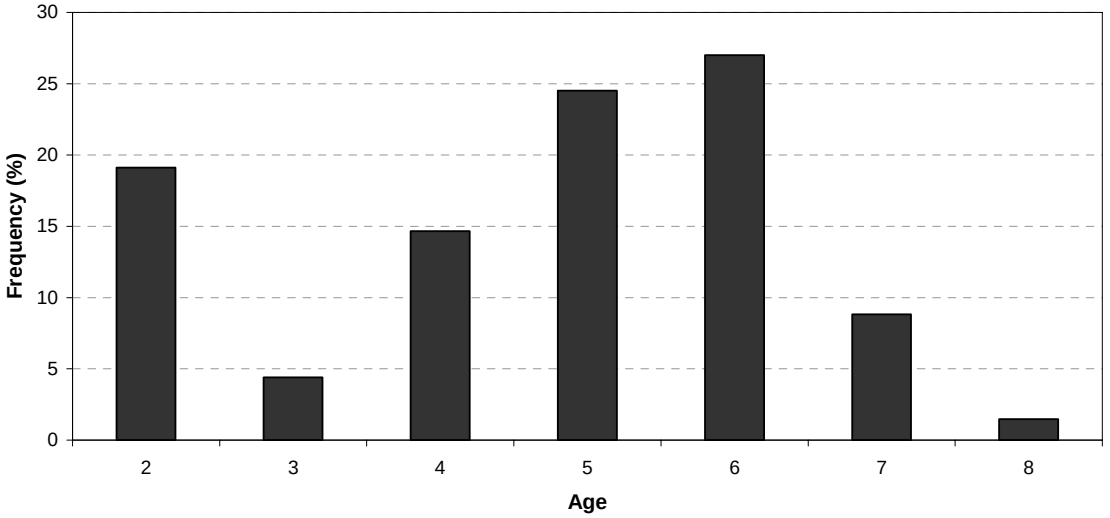

FIGURE 3.— Black crappie age frequency distribution.

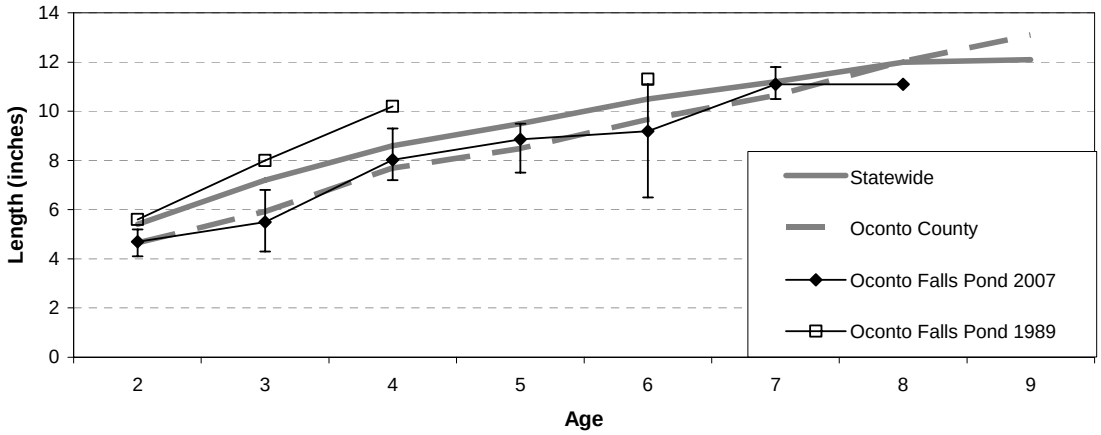

FIGURE 4.— Black Crappie mean length at age. Error bars on the 2007 values represent the range of sizes in the sample.

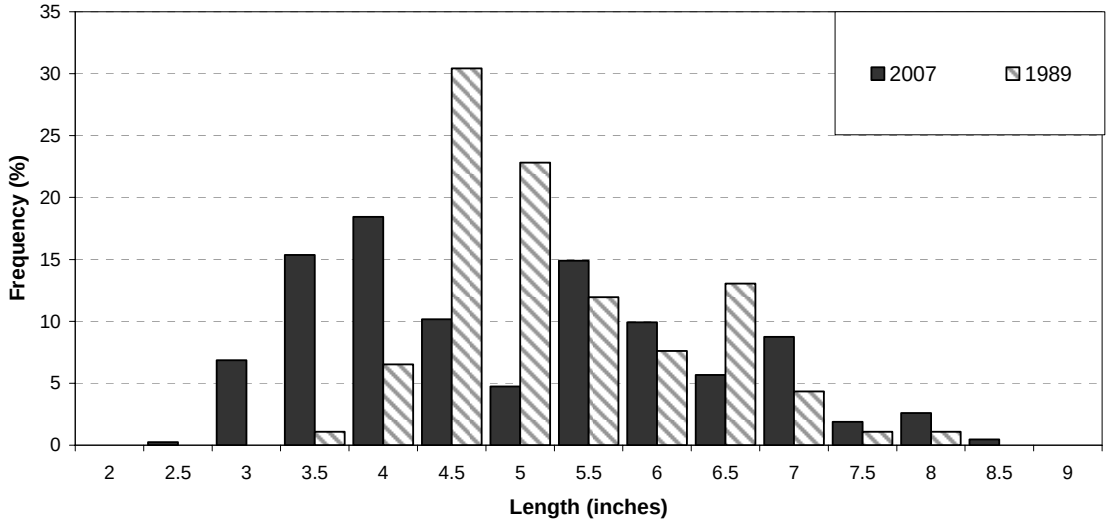

FIGURE 5.— Bluegill length frequency distributions from 2007 and 1989 samples

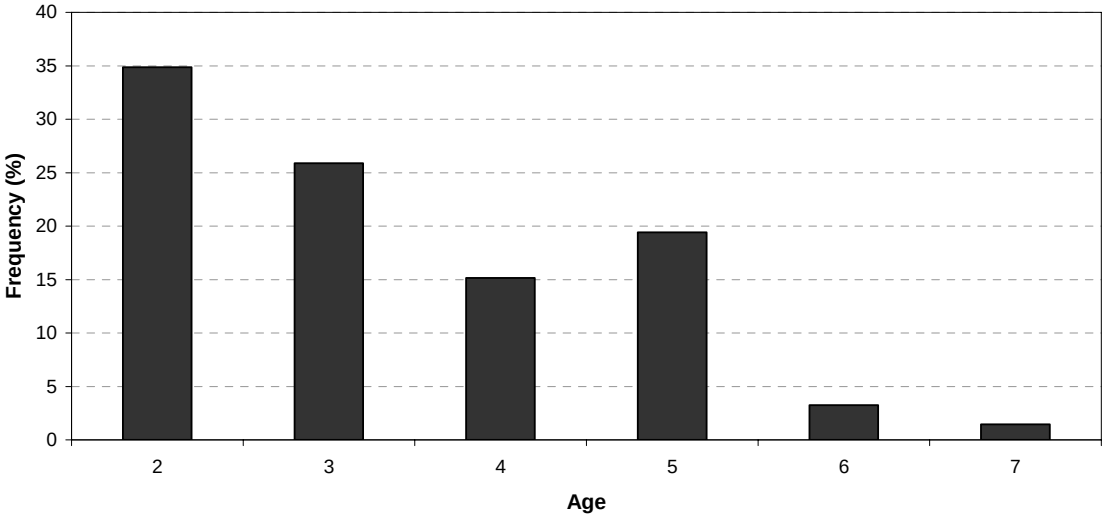

FIGURE 6.— Bluegill age frequency distribution.

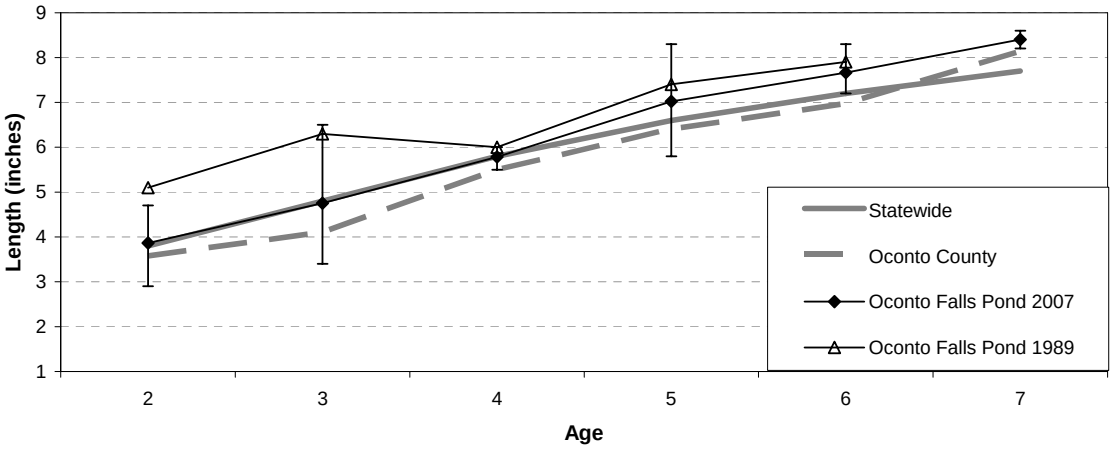

FIGURE 7.— Bluegill mean length at age. Error bars on the 2007 values represent the range of sizes in the sample.

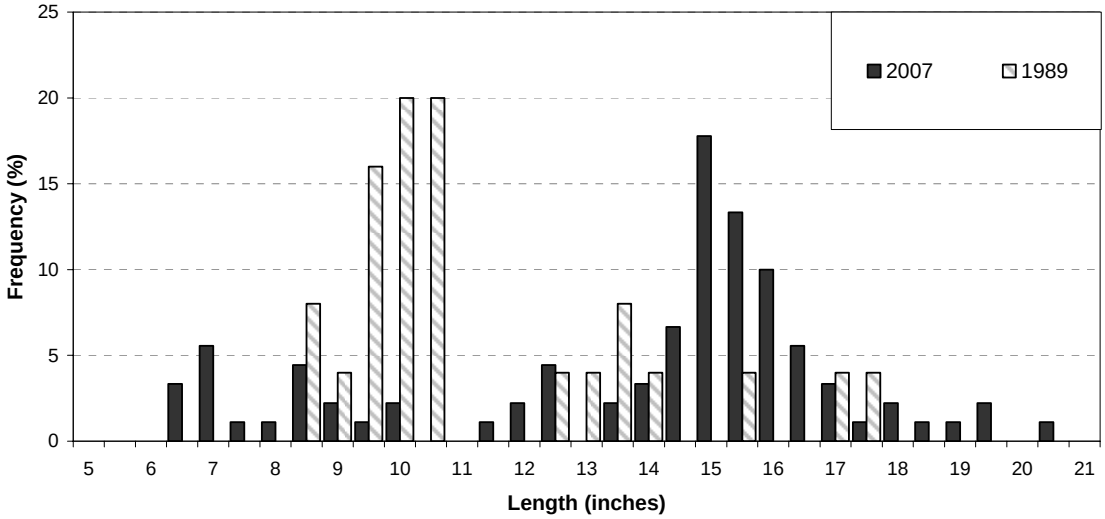

FIGURE 8.— Largemouth bass length frequency distributions from 2007 and 1989 samples.

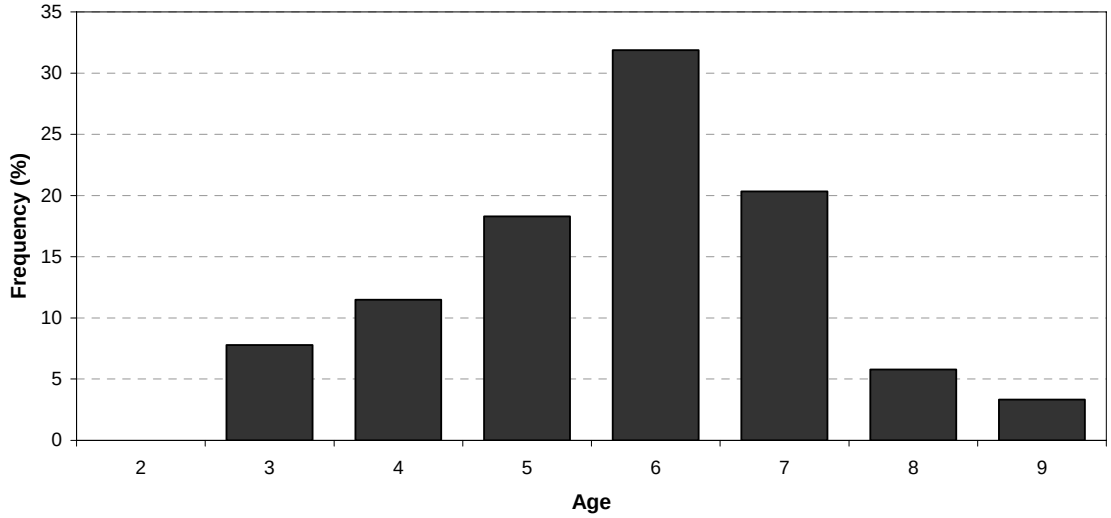

FIGURE 9.— Largemouth bass age frequency distribution.

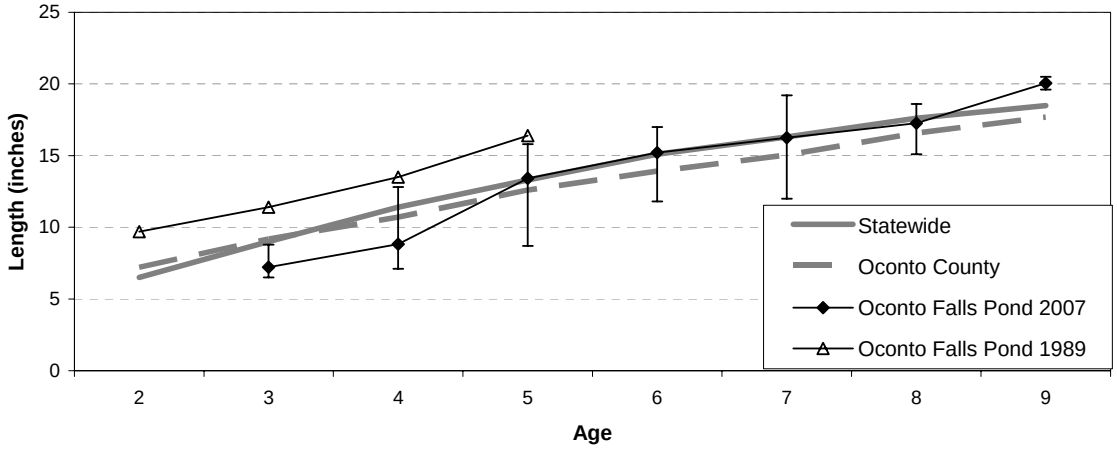

FIGURE 10.— Largemouth bass mean length at age. Error bars on the 2007 values represent the range of sizes in the sample.

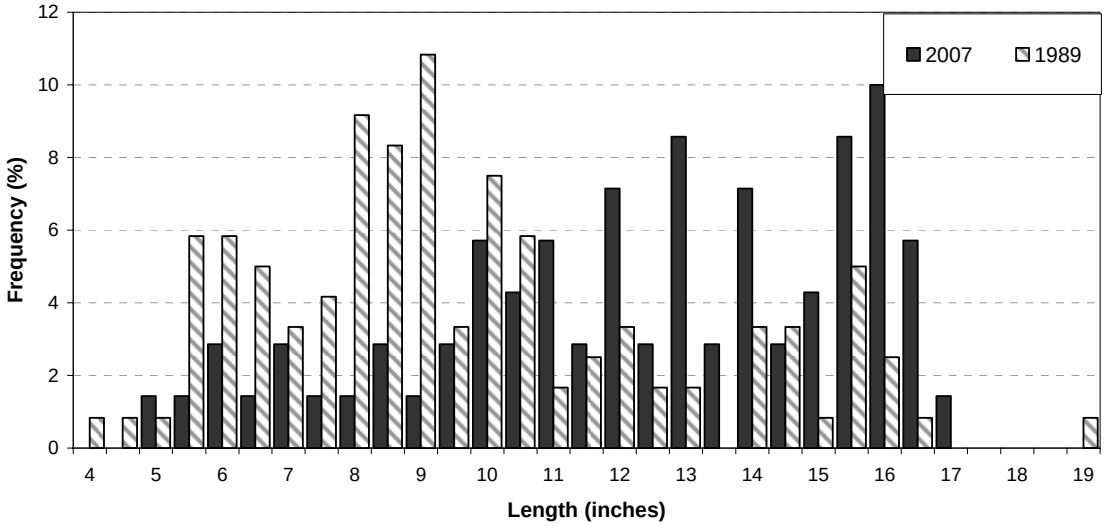

FIGURE 11.— Smallmouth bass length frequency distributions from 2007 and 1989 samples

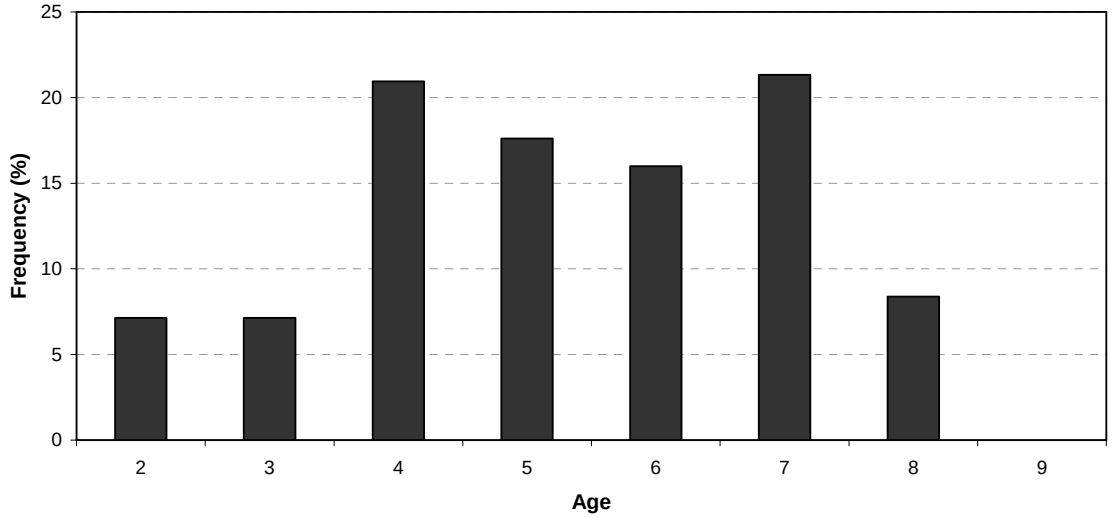

FIGURE 12.— Smallmouth bass age frequency distribution.

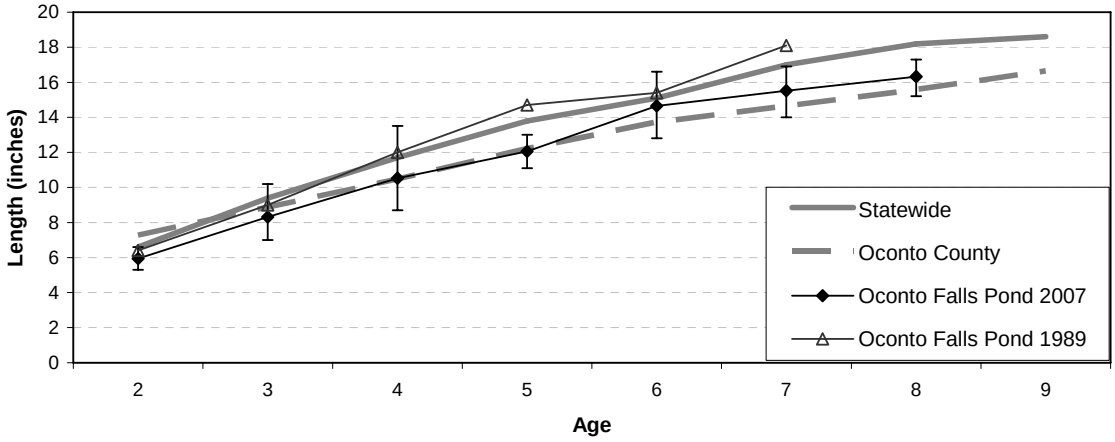

FIGURE 13.— Smallmouth bass mean length at age. Error bars on the 2007 values represent the range of sizes in the sample.

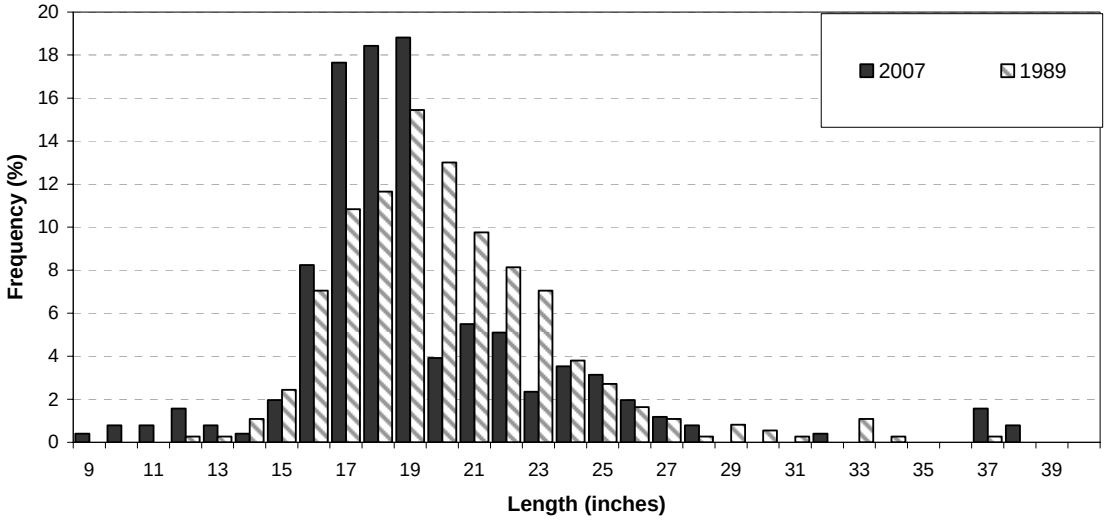

FIGURE 14.— Northern pike length frequency distributions from 2007 and 1989 samples

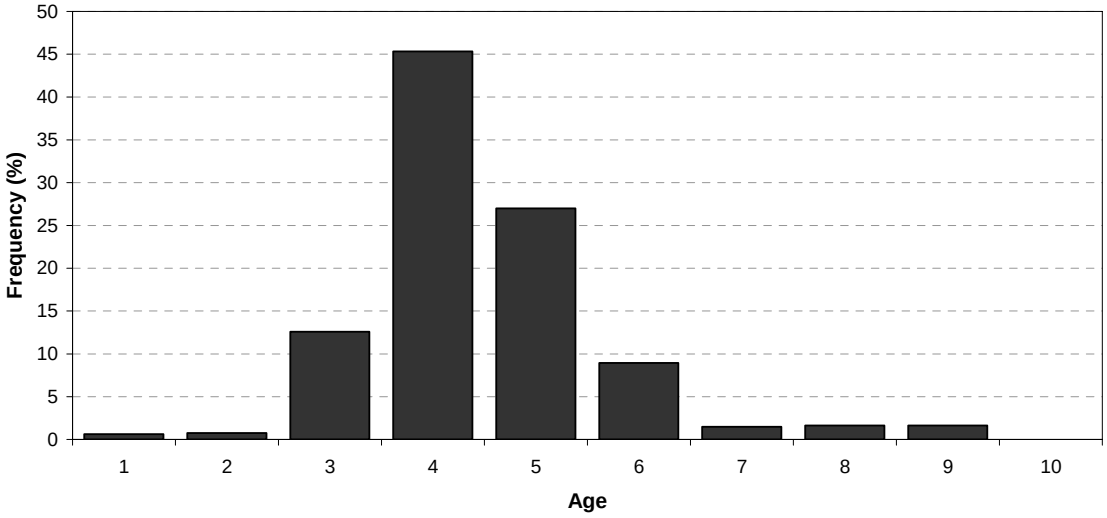

FIGURE 15.— Northern pike age frequency distribution.

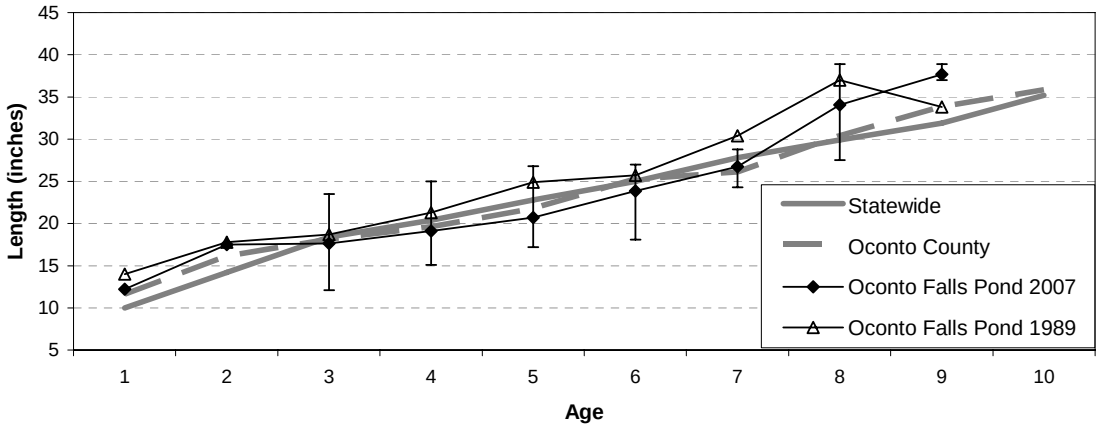

FIGURE 16.— Northern pike mean length at age. Error bars on the 2007 values represent the range of sizes in the sample.