State of Wisconsin

CORRESPONDENCE/MEMORANDUM

Date: December 11, 2000 **File Ref:** 3600

To: Bureau of Fisheries and Habitat Protection

From: Thomas (Skip) Sommerfeldt
Senior Fisheries Biologist, Park Falls

Subject: DRAFT
1999 Warmwater Management Evaluation - East Twin Lake, Ashland Co.
(T43N, R4W, sec. 22; WBIC - 2429000)
Upper Chippewa GMU

This report is submitted with the approval of Basin Supervisor (GMU Team Leader), Tom Aartila and Regional Fisheries Expert, Steve AveLallemant. The report was written and work supervised by Thomas (Skip) Sommerfeldt, Senior Fisheries Biologist under the Chequamegon and Nicolet National Forest contract fisheries program.

APPROVED BY:

_____ _____
Upper Chippewa Basin Supervisor, Tom Aartila Date

_____ _____
Fisheries Expert, Steve AveLallemant Date

_____ _____
Bureau of Fisheries and Habitat Protection Date

cc: Bureau of F & H Prot.
Park Falls DNR (Skip)
USFS S.O. - Sue R.
Mercer DNR (Jeff R.)

Local Warden USFS - Glidden

INTRODUCTION & METHODS

East Twin Lake is a 110-acre, shallow, stained, drainage lake in west-central Ashland County. A fishery survey in 1989 concluded that the lake contained an unbalanced fishery with abundant, slow-growing panfish populations, a low to moderate density of largemouth bass, and low numbers of larger (> 27"), slow-growing musky. A 4-year program of stocking 3" + largemouth bass fingerlings (1984-87) was considered partially successful in enhancing the bass population. The numbers of bass had increased over those found in previous surveys, the bass achieved good growth rates, and fair numbers reached quality size (> 12 inches). However, the bass population was still considered low and natural reproduction had yet to provide adequate recruitment to further build the population. This, in turn, had failed to impact the panfish populations and they remained abundant and slow-growing (bluegill were the predominant panfish, followed in abundance by pumpkinseed, black crappie, and then yellow perch). In addition, musky were present in the lake but the majority of fish were larger (> 27"), slow-growing individuals and it was believed that natural reproduction was not sustaining the population (musky management was discontinued following a 1982 survey).

The main management objectives from the 1989 survey report were to reduce panfish numbers and improve the quality of their populations. It was felt that lower panfish densities would improve natural reproduction and recruitment of the bass, which would work to help develop a balanced fishery. It was recommended that the supplemental stocking of large-size largemouth bass fingerlings be continued and that the minimum harvest size be increased to 15 inches, with a daily bag of 2. It was believed that these measures would further enhance the bass fishery and provide additional protection to the stocked bass. In addition, it was felt that bass alone were not an adequate predator on the panfish and that another predator was needed. Tiger musky were suggested as the additional predator to be stocked (see attached background information for additional details on the lake and 1989 survey).

Subsequently, East Twin Lake received the following plants of largemouth bass:

1991 - 1,100 fingerlings (x = 2.5")	1993 - 2,400 fingerlings (x = 1.7")
1994 - 1,100 fingerlings (x = 6.0")	1995- 1,500 fingerlings (x = 4")
1996 - 1,100 fingerlings (x = 4.5")	1998 - 1,100 fingerlings (x = 2")

The additional predator (tiger musky) was not introduced as the Northwest District fish staff specialist did not approve of the plan to stock a northern pike/muskellunge hybrid into an area where northern pike were not currently established. The introduction of another predator species was not pursued. A restrictive harvest regulation for largemouth bass was implemented in 1992 and consisted of an 18-inch minimum, 1 daily bag (the late, mid-June opener also began in 1992). In addition, a 28-inch minimum length limit for musky was instituted in May of 1996. The more liberal limit on musky was intended to help reduce muskellunge density in the lake, thereby lessening predation on largemouth bass and large panfish.

This report summarizes the initial changes in the fishery following implementation of the management activities listed above. To gather data on the fish populations, one-night electrofishing runs were conducted in the spring of 1992, 1994, and 1997; with a full fishery survey being completed in 1999. The 1999 survey mimicked the 1989 survey and utilized a spring electrofishing run, a summer fyke-net effort aimed at panfish (12 net-days); and a fall electrofishing run. In addition, angling and visual observations were made during the 1993 to 1999 field seasons.

RESULTS

The following conclusions and summations were made after analysis of the field data and observations of the lake and its fishery:

Largemouth Bass

While a population estimate was not conducted, the electrofishing catch-per-effort (CPE) data revealed a significant increase in largemouth abundance from 1989 to 1999 (Tables 1 & 2). Comparison of the late spring shocker runs indicated a 2.5-fold increase in abundance, and comparison of the fall shocker runs showed a 10-fold increase. The large increase was due mainly to fish in the 4 to 12 inch size range, with the number of quality-size bass (> 12") showing more modest increases (30% in spring, 90% in fall). Growth rates were similar to those found in 1989 and they remained near the statewide average (Figure 1). Growth did slow somewhat after age five, though bass still attained trophy size in the lake (19.9 inches after 10 years).

Muskellunge

The musky population showed a small decline in abundance and an improved size structure from 1989 to 1999. CPE data from the electrofishing runs and the summer fyke-net effort were very similar but showed a slight decrease when compared over the sample years (Tables 1, 2, 3). In addition, the size structures were alike for the 1989 and 1999 surveys, but the latter sample year showed a few larger fish (37" to 40") than in 1989. A total of 11 musky were sampled in 1999, with a length range of 20.0 inches to 39.6 inches and 73% measuring greater than 32 inches. In 1989, 15 musky were collected, they ranged from 11.2 to 36.0 inches long and 47% were greater than 32 inches. Growth rates also showed a slight improvement from 1989 to 1999, though they were still below the statewide average (Figure 2). Natural reproduction and recruitment have been evident since 1989 and has been sufficient to maintain the low-density population in the lake (no musky stocking has occurred since 1982).

Panfish

The panfish fishery showed some significant changes from 1989 to 1999, in terms of species abundances, growth rates, and in size structure of their populations (Tables 1, 2, 3). Bluegill remained the predominant species and the population showed a modest increase in abundance since 1989 (as measured by electrofishing and fyke-net CPE). Pumpkinseed abundance showed a rather drastic decline -- going down by a factor of 2 to 5-fold depending upon the sample date/gear looked at. Black crappie and yellow perch showed increases in abundance, going up 2 to 3-fold over CPE's found in 1989.

Growth rates showed a general improvement over those found in 1989, even though abundance increased for 3 of the 4 main panfish species. Bluegill, pumpkinseed, and crappie experienced better growth, while perch remained similar to 1989 (Figures 3 - 6). In addition, more larger, older-aged individuals were sampled for all 4 species. As a result, size structures for all 4 species improved during the study period. While modal sizes were concentrated in the 4 to 5-inch sizes in 1989, the length frequencies showed good size distributions for the panfish in 1999. Overall, more quality-size panfish were available in 1999.

SUMMARY/DISCUSSION

Fingerling bass stocking, protective harvest regulations for bass, and management away from muskellunge (no stocking, liberal harvest reg) have been successful in increasing the largemouth bass population and improving the panfish fishery in East Twin Lake. The abundance of largemouth bass increased over 200% during the study period and were providing a solid predator base to keep the panfish under control. In turn, the bluegill, pumpkinseed, black crappie, and yellow perch have responded positively and were providing some quality fish to the angler. The musky population has declined slightly from 1989, but fish have achieved larger sizes and natural reproduction has provided some recruitment to the population.

The combination of management activities was believed to be the key to the improvement of the fishery in East Twin Lake. The stocking of large-size bass fingerlings helped to establish several strong year classes in the lake in the face of abundant, slow-growing panfish populations. The decline in musky numbers resulted in reduced predation on the bass and allowed more fish to grow/recruit to a larger size. Add in the protection from harvest with a larger size limit and later opener to reduce angling mortality, and the bass population showed a very positive response. The increased bass population then exerted greater predation on the panfish, resulting in an improved panfish fishery. In turn, this increased the abundance of larger food items for the musky (both bass and panfish), producing a better forage base, improved growth rates, and more larger fish. The end result being a fishery that was fairly well-balanced and providing some high quality angling opportunities. Personal observation indicated fishing pressure has responded accordingly and increased greatly over the last ten years. Where 1 or 2 boats were average for a given summer day in the early 1990's, 4 or 5 boats have been the norm on the lake by the late 1990's.

The response of the panfish populations was an interesting aspect of the present survey. While bluegill, crappie, and perch abundance increased, their growth rates also improved and more larger individuals were found. It was believed that the pumpkinseed were the main factor in this scenario. Pumkinseed seem more edge-oriented in their habitat preference and more aggressive in their temperament and feeding behavior. This likely increases their vulnerability to predation and would help explain their drop in abundance with the increased bass population. In turn, lower pumpkinseed numbers would allow the other panfish to increase -- via less competition, more food and space, and better growth. In addition, fewer musky in the 20 to 32-inch size may have reduced predation on the larger panfish and allowed more fish to live longer and grow to a larger size.

MANAGEMENT RECOMMENDATIONS

1. Continue to manage East Twin Lake as a panfish and trophy largemouth bass fishery. Retain the 18-inch, 1 daily bag and the later opener for largemouth bass as this has provided for a quality angling opportunity. The supplemental stocking of bass fingerlings should be discontinued as natural reproduction and recruitment have increased and should sustain the fishery. The current harvest regulation for panfish of a 25 daily bag was sufficient to maintain and enhance the populations.

2. Maintain the liberal 28-inch minimum length limit for muskellunge in East Twin Lake. The lake does not provide suitable habitat or forage for this trophy species and it is desirable to have

as low a density as possible. It's likely that the species will always maintain a presence in the lake -- but no efforts should be exerted toward increasing their numbers.

3. Maintain the undeveloped and wild nature of the shoreline. Any type of work or development near the shoreline should follow the guidelines for riparian management zones as described in "Wisconsin's Forestry Best Management Practices for Water Quality" (PUB-FR-093 95).

4. Shoreline and littoral habitat were considered good. East Twin Lake had a good mix of shallow woody cover, aquatic vegetation, and bog/marsh edge and there was no immediate need for artificial habitat improvements.

5. Conduct periodic monitoring of the fishery in East Twin Lake and change management direction as needed. A fishery is always changing as year class failures and/or angler harvest can disrupt the balance and necessitate the need for additional management activities. A spring shocker run (late-May) every 2 to 3 years is recommended to keep abreast of the status of the fishery in East Twin Lake. The Chequamegon/Nicolet National Forest contract fisheries program will incorporate this run into its annual work plans.

BACKGROUND INFORMATION (from 1989 survey report)

East Twin Lake is a 110-acre drainage lake in west central Ashland County. Water in the lake was near neutral (pH = 7), soft (total alkalinity = 11 mg/L) and has a medium brown stain. The lake has a shoreline length of 1.88 miles, with 1.51 miles (80%) under U.S. Forest Service ownership. In addition, the Forest maintains a 12-unit campground and boat ramp on the northwest shore.

Past history of East Twin Lake has included management for musky, largemouth bass, and panfish since 1940. A fishery survey in 1982 found that musky stocking was not providing an adequate return. Recruitment to harvestable size was considered normal but growth to trophy size was not being realized. Thus, it was recommended to discontinue musky management and proceed with annual stocking of large-size largemouth bass fingerlings to enhance and strengthen the population. Following this, large bass fingerlings (3" +) were stocked for four years from 1984 through 1987. The annual quota ranged from 650 to 1295 fingerlings.

The 1989 survey was designed to evaluate the 4-year stocking program and provide additional management direction. It was conducted through the Chequamegon National Forest contract fisheries program. The survey utilized boomshocker runs in May and September and 15 fyke-net days in July of 1989 to evaluate the fishery.

The report concluded that the fishery in East Twin Lake was unbalanced as it contained abundant and slow-growing panfish populations and a low to moderate density of largemouth bass. Musky were present but most were larger (> 27 inches), slow-growing individuals and natural reproduction was not sustaining the population. The stunted panfish condition had not changed over the years, as the problem was noted in both the 1973 and 1982 surveys.

The 4-year stocking program for largemouth bass was considered partially successful as bass numbers increased over those found in previous surveys, the fish achieved good growth rates, and fair numbers reached quality size (> 12 inches). However, the bass population in 1989 was still

considered low and natural reproduction had yet to provide adequate recruitment to further build the population. As such, impacts to the panfishery had been minimal, and the populations remained high and growth slow. The situation compounded the bass recruitment problem as the abundant panfish directly preyed upon and/or competed for food with the small (young of the year) bass, which resulted in continued low recruitment. Thus, it was suggested that supplemental stocking of large-size fingerlings be continued to maintain and help build the bass population. The stocking rate was to be increased to maximize predation on small panfish. In addition, the minimum harvest size was to be raised to 15 inches and daily bag reduced to 2 bass to provide additional protection of the stocked bass and further enhance the fishery.

The main management objective for East Twin Lake from the 1989 survey was to reduce panfish numbers and improve quality. Lower panfish densities would improve bass reproduction and recruitment, and help develop a balanced fishery. In East Twin, it appeared that bass alone were not an adequate predator and an additional predator was needed. Musky had been stocked in the past but were ineffective in panfish control. Walleye, northern pike, and tiger musky were possible candidates that merited consideration. The species chosen would be stocked on an alternate year basis with largemouth bass, and at an increased rate to maximize predation on panfish.

Without going into great detail on the pros and cons of each species, it was felt that tiger musky had the potential as both a predator control on panfish and as a sport fish in East Twin Lake. The hybrid was reportedly fast growing and more panfish orientated in its food habits than the pure musky. The tiger was also a sterile hybrid and, as such, numbers could be controlled through stocking and any spread to other waters would have minimal impact. In addition, the lake had a history of musky management and tiger musky would be compatible with this past recreational use.

Management recommendations from the 1989 survey were to continue to manage East Twin Lake for largemouth bass and panfish, but initiate experimental stocking of hybrid (tiger) musky. Hybrids were to be stocked at 4 per acre (440 fish) and on an alternate year basis with largemouth bass. Large-size bass fingerlings (> 4") were to be stocked at the rate of 20 per acre (2,200 fish). Specific management goals for bass were to improve the spring electrofishing CPE to 50 bass/hour or greater and maintain the spring PSD_{12} at greater than 40%. Specific goals for the panfish (bluegill, pumpkinseed, and black crappie) were to reduce the combined spring electrofishing CPE to less than 300 fish per hour, and improve the pumpkinseed and bluegill PSD_6 to greater than 40% and the black crappie PSD_8 to greater than 30%. In addition, the status of the fishery was to be monitored every two years and these management efforts evaluated after 7 or 8 years.

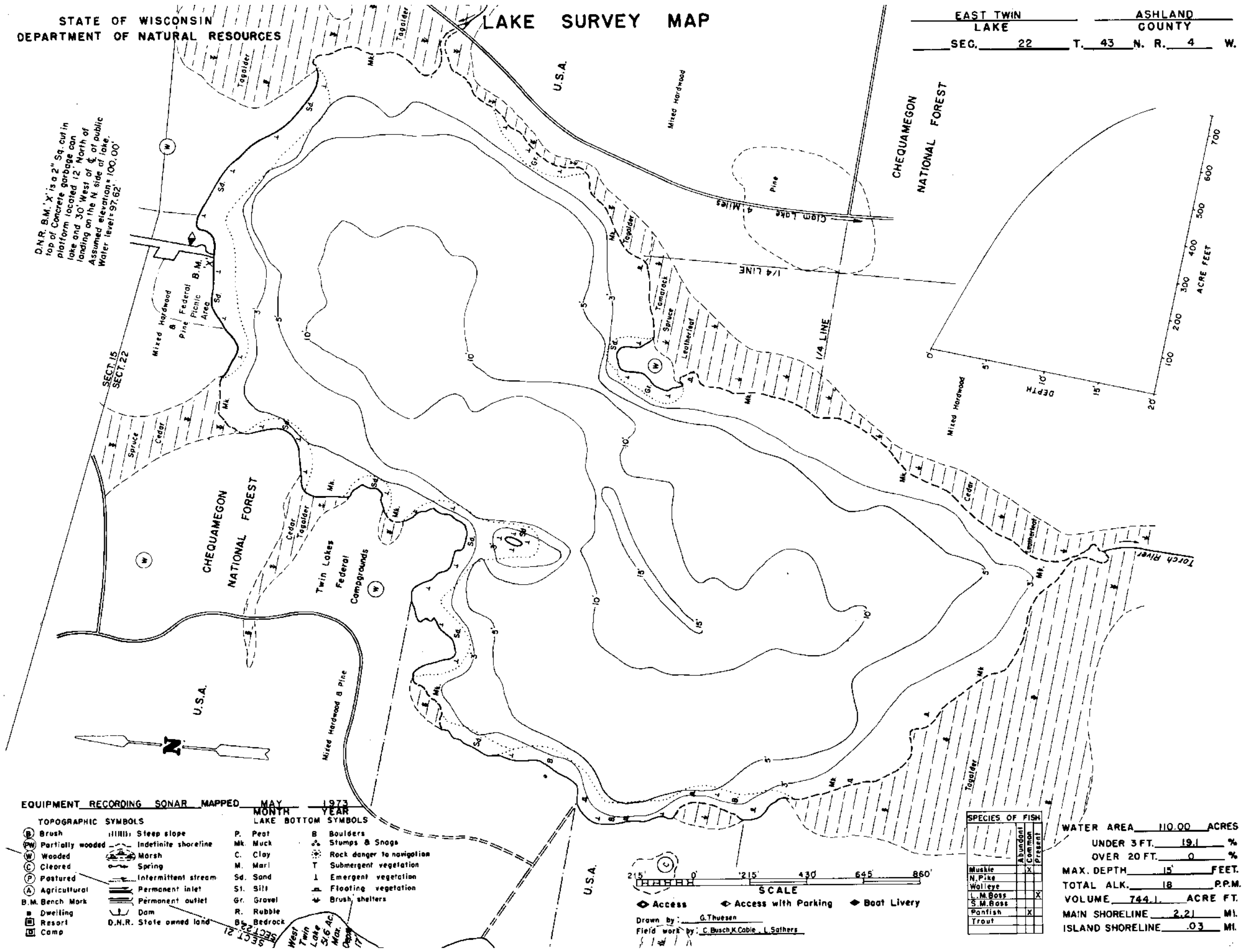
STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
LAKE SURVEY MAP
EAST TWIN LAKE
ASHLAND COUNTY
SEC. 22 T. 43 N. R. 4 W.
CHEQUAMEGON NATIONAL FOREST
U.S.A.
Twin Lakes Federal Campgrounds
Torch River
1/4 LINE
SECT.15
SECT.22
DEPTH
ACRE FEET
EQUIPMENT RECORDING SONAR MAPPED MAY 1973
MONTH YEAR
TOPOGRAPHIC SYMBOLS
LAKE BOTTOM SYMBOLS
SCALE
Access
Access with Parking
Boat Livery
Drawn by: G.Thuesen
Field work by: C.Busch,K.Coble, L.Sathers
SPECIES OF FISH
Muskie
N.Pike
Walleye
L.M.Bass
S.M.Bass
Panfish
Trout
WATER AREA 110.00 ACRES
UNDER 3 FT. 19.1 %
OVER 20 FT. 0 %
MAX. DEPTH 15' FEET.
TOTAL ALK. 18 P.P.M.
VOLUME 744.1 ACRE FT.
MAIN SHORELINE 2.21 MI.
ISLAND SHORELINE .03 MI.

Table 1. Comparison of Spring Electrofishing Catch Statistics

1999 to 1989 -- East Twin Lake, Ashland Co.

	LMB	Musky	Bluegill	Pumpkinseed	Y Perch	B Crappie
May 27, 1999						
(0.9/0.2 hr.)						
CPE	**69/hr**	**3.3/hr**	**640/hr**	**185/hr**	**175/hr**	**165/hr**
Size/PSDx	**30%**	**2 of 3**	**24%**	**78%**	**10%**	**36%**
	(14 of 47 >12"/6"	(>32")	(>6")	(>6")	(>7")	(>8")
May 30, 1989						
(0.9/0.2 hrs.)						
CPE	**27/hr**	**3.3/hr**	**590/hr**	**350/hr**	**130/hr**	**56/hr**
Size/PSDx	**48%**	**0 of 3**	**11%**	**28%**	**0%**	**47%**
	(11 of 23>12"/6")	(>32")	(>6")	(>6")	(>7")	(>8")
Abundance Trend	**Inc.**	**Same**	**Same**	**Dec.**	**Same?**	**Inc.**
Size/Growth Trend	**Same**	**Pos.**	**Pos.**	**Pos.**	**Pos.**	**Same**

Table 2. Comparison of Fall Electrofishing Catch Statistics

1999 to 1989 -- East Twin Lake, Ashland Co.

	LMB	Musky	Bluegill	Pumpkinseed	Y Perch	B Crappie
Sept. 29, 1999						
(1.0/0.2 hr.)						
CPE	**92/hr**	**4.0/hr**	**635/hr**	**40/hr**	**160/hr**	**140/hr**
Size/PSDx	**22%**	**2 of 4**	**9%**	**0%**	**6%**	**11%**
	(17 of 79 >12"/6"	(>32")	(>6")	(>6")	(>7")	(>8")
Sept. 26, 1989						
(1.3/0.2 hrs.)						
CPE	**9/hr**	**4.6/hr**	**200/hr**	**220/hr**	**70/hr**	**35/hr**
Size/PSDx	**75%**	**4 of 6**	**5%**	**7%**	**0**	**29%**
	(9 of 12 >12"/6")	(>32")	(>6")	(>6")	(>7")	(>8")
Abundance Trend	**Inc.**	**Same**	**Inc.**	**Dec.**	**Inc.**	**Inc**
Size/Growth Trend	**Pos.?**	**Same**	**Same?**	**Same?**	**Same**	**Same?**

Table 3. Comparison of Summer Fyke-Net Surveys

1999 to 1989 -- East Twin Lake, Ashland Co.

	LMB	Musky	Bluegill	Pumpkinseed	Y Perch	B Crappie
July 6-9, 1999						
(12 net-days)						
CPE	**10.6/lift**	**0.3/lift**	**99/lift**	**13/lift**	**4/lift**	**67/lift**
Size/PSDx	**9%**	**4 of 4**	**13%**	**44%**	**21%**	**19%**
	(7 of 81 >12"/6")	(>32")	(>6")	(>6")	(>7")	(>8")
July 10-13, 1989						
(15 net-days)						
CPE	**1.1/lift**	**0.4/lift**	**69/lift**	**57/lift**	**1.1/lift**	**29/lift**
Size/PSDx	**0%**	**3 of 6**	**0%**	**9%**	**44%**	**8%**
	(0 of 14>12"/6")	(>32")	(>6")	(>6")	(>7")	(>8")
Abundance Trend	**Inc.**	**Same**	**Inc.**	**Dec.**	**Inc?**	**Inc.**
Size/Growth Trend	**Pos.**	**Pos.**	**Pos.**	**Pos.**	**Same?**	**Pos.**

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Figure 1. Largemouth Bass Growth Rates
East Twin Lake, Ashland Co.

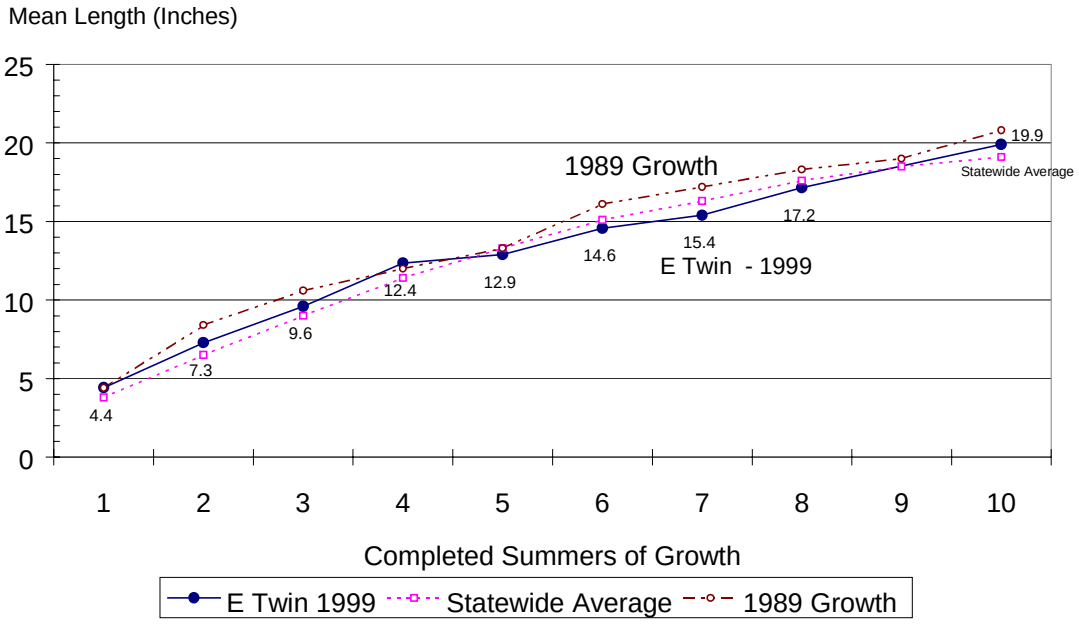


Figure 2. Muskellunge Growth Rates
East Twin Lake, Ashland Co.

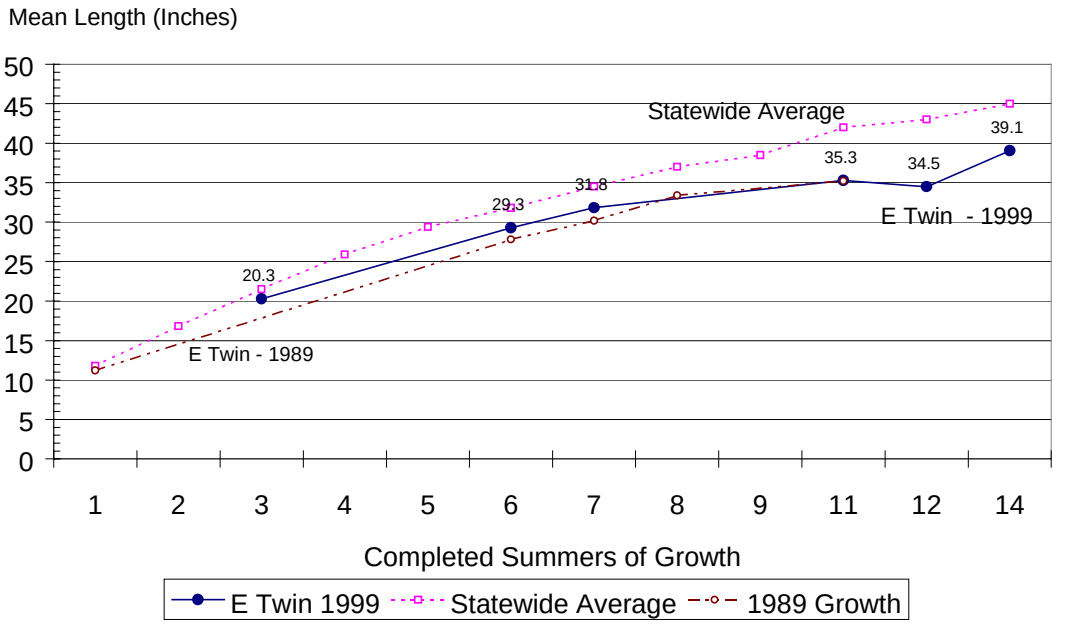


Figure 3. Bluegill Growth - East Twin Lake, Ashland Co.

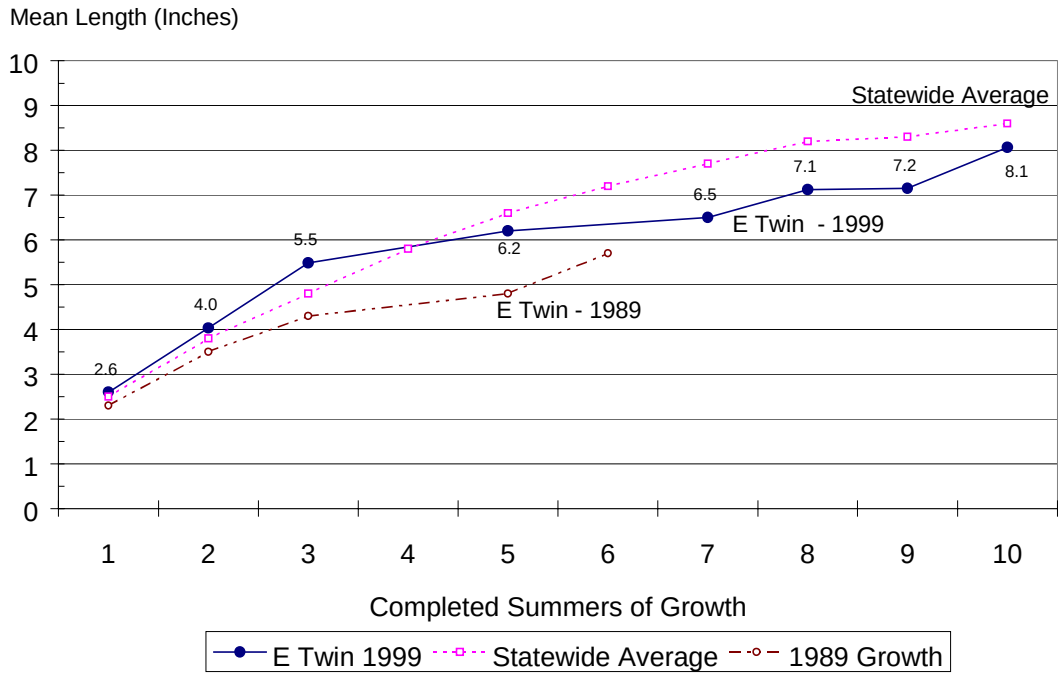


Figure 4. Black Crappie Growth Rates East Twin Lake, Ashland Co.

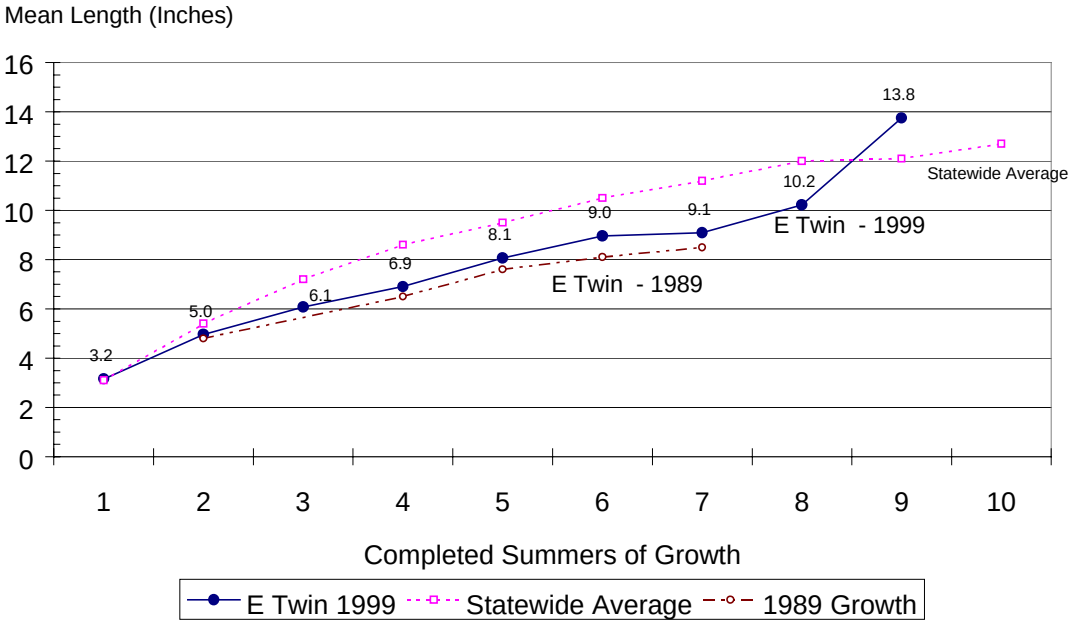


Figure 5. Yellow Perch Growth Rates
East Twin Lake, Ashland Co.

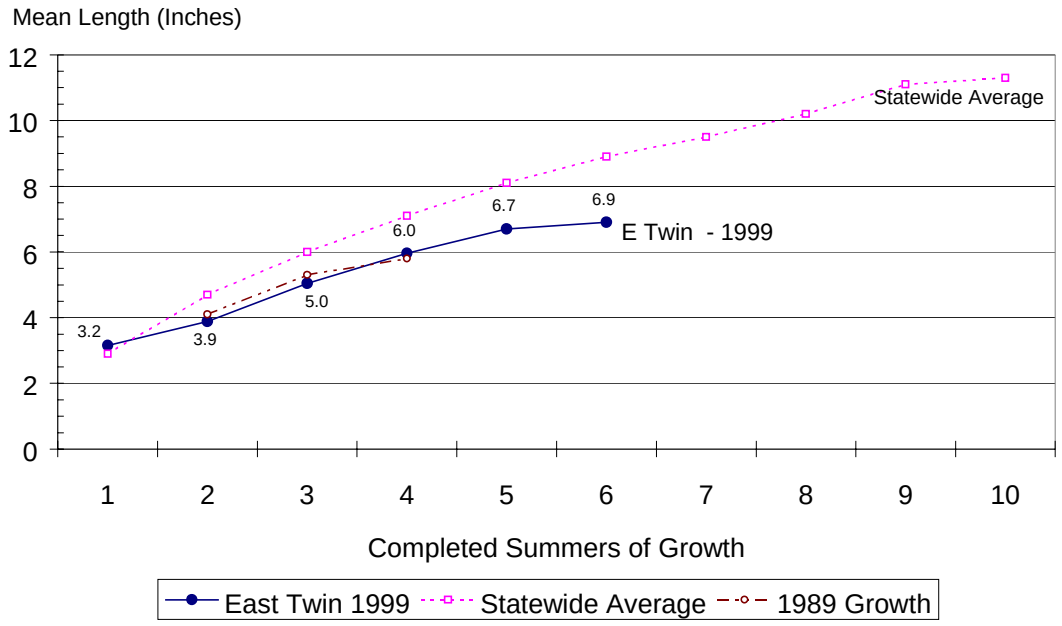
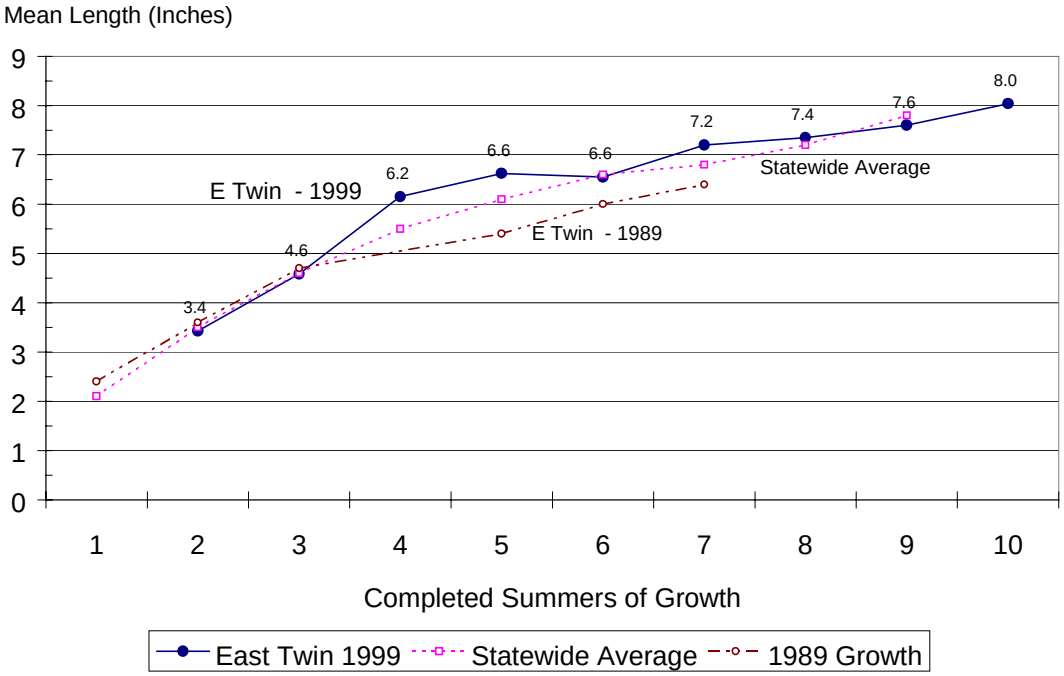


Figure 6. Pumpkinseed Growth - E. Twin Lake, Ashland Co.



East Twin Lake Ashland Co.
1999

Fish Survey Totals

Species	Spring Netting	Spring BS	Summer Netting	Fall BS	Totals
Largemouth Bass Mode; Length range		62 7.2, 3.1 - 19.9	127 4.7, 8.7;	92 9.2, 14.2; 2.5 - 17.2	**281**
Northern Pike Mode; Length range		3	4	4	**11**
Walleye Length range					
Musky Length range		3 20.0 - 33.9	4 33.0 - 39.6	4 29.0 - 35.4	**11**
Smallmouth Bass Length range					
Sucker Length range			1 10.7		**1**
Bluegill Mode; Length range		128 4.1; 1.5 - 8.2	1193 4.3; 3.2- 7.5	127 3.3, 5.4; 1.3 - 8.2	**1448**
Black Crappie Mode; Length range		33 7.5; 3.0 - 10.1	799 3.8, 7.3; - 14.6	28 5.1; 2.6 - 10.8	**860**
Pumpkinseed Mode; Length range		37 3.6- 8.3	153 4.6; 3.1 - 8.0	8 3.1 - 8.0	**198**
Yellow Perch Mode; Length range		35 3.6; 3.1 - 7.9	42	32 2.2 - 7.2	**109**
Rock Bass Length range			2 6.7 - 7.0	P	**2**
Hybrid Sunfish Length range					
Golden shiner		c - a	c	c-a	
Bullhead			7 black/1 brn		
Creek chub					
Bluntnose minnow					
Mudminnow					
Sculpin					
tadpole madtom					
Crayfish			P		