

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-29

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2003 Survey Report

**Lake Striker**

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July 31, 2004

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## EXECUTIVE SUMMARY

Lake Striker was surveyed in 2003-2004 with electrofishing, trap nets, gill nets, a structural habitat/aquatic vegetation survey, and an angler access survey. This report summarizes the results of these surveys and comparisons are made to historical data (1986-2003). Based on this information, a management plan was developed for the reservoir.

- **Reservoir description:** Lake Striker is located on Striker Creek, a tributary of the Angelina River in the Neches River basin. The Angelina-Nacogdoches County Water Control and Improvement District is the controlling authority. The reservoir was constructed for flood control and condenser cooling for a steam-electric generating station. At conservation pool (292 feet msl), Lake Striker is 1,920 surface acres in size, has a shoreline length of 53 miles, and a mean depth of 15 feet. Water level fluctuations average 2 feet annually. Angler and boat access is adequate. A courtesy dock accommodates handicap access, but is in need of repair. Habitat consists of aquatic vegetation, standing timber, and boat docks. The reservoir is relatively turbid and unproductive, with most of the surrounding land used for farming and timber production.
- **Prey species:** Primary prey species include gizzard shad, threadfin shad, and bluegill. Overall prey abundance appears to be inadequate and may be limiting sportfish abundance in the reservoir. Since 1996, data indicate that the majority of the gizzard shad population is comprised of adults too large to be utilized by predators. Although catch rates increased in 2003, most of this sample included fish > 9 inches in length. Threadfin shad are present but numbers are low. Catch rates in 2003 (7.0/hour) were similar to the historical reservoir average (3.2/hour). Bluegill is the most abundant prey species at the reservoir, but 2003 catch rates (65.0/hour) were lower than 1996 (106.7/hour), 1999 (259.0/hour), and historical reservoir averages (145.0/hour).
- **Catfishes:** Historically, channel catfish catch rates have averaged 7.1 fish/net night. Catch rates in 1996 (4.2/net night) and 1999 (0.8/net night) were relatively low and reflect a decline in channel catfish recruitment. In 2003, however, catch rates (8.8/net night) and size structure (fish ranged from 6 – 18 inches in length) indicate several years of increased survival of juvenile channel catfish. Currently, channel catfish are in good condition, as relative weights exceeded 89. A limited number of flathead catfish are also present.
- **White bass and hybrid striped bass:** White bass are present in the reservoir, but their population density remains low. The catch rate in 2003 (3.0/net night) was similar to the historical reservoir average (2.2/net night). Hybrid striped bass were stocked in 1998 and 1999 to provide an additional fishery, but none of these fish were collected in 1999 or 2003.

- **Black bass:** Historically, catch rates of spotted bass have been high (138.9/hour). In 1996, the catch rate (258.0/hour) exceeded this average and relative weights were desirable (> 100). However, catch rates were lower in 1999 (77.0/hour) and 2003 (66.0/hour) and relative weights reflected a decline in fish condition. Similar to trends of spotted bass abundance, largemouth bass catch rates also decreased in 2003 (24.0/hour) when compared to those in 1999 (80.0/hour) and 1996 (51.3/hour) and were lower than the reservoir average (64.2/hour). The apparent reduction of black bass recruitment rates is likely due to inadequate prey and insufficient cover (i.e. submerged aquatic vegetation).

Although no age-0 largemouth bass were submitted for genetic analysis in 2003, Florida largemouth bass stockings in 1995 and 1997 were successful, as percentages of pure Florida largemouth bass increased dramatically since 1995. However, the number of legal-sized fish ( $\geq 14$  inches) has remained low since 1996 (RSD-14 < 7). Growth rates of sub-legal fish are similar to ecological region averages, but data on larger fish is lacking. A 14-18 inch slot limit was used from 1993 to 1999 in conjunction with Florida largemouth bass stockings to improve the quality of this fishery. Parks and Seidensticker (1998) concluded that this regulation was ineffective and the statewide 14-inch minimum length limit was readopted September 1, 1999.

- **Crappie:** Although black crappies are present in the reservoir, white crappies comprise most of the trap net catch. Historical catch rates for both species have been low (reservoir average = 1.6/net night). An insufficient prey base likely limits crappie recruitment.

**Management strategies:** Based on current information, this reservoir should continue to be managed with current regulations. It appears that an inadequate prey base currently limits the abundance of black bass and crappie. Low prey density is a likely result of low primary production due to watershed characteristics and the relatively turbid nature of the reservoir. No additional fish stockings are suggested due to limited prey abundance.

## INTRODUCTION

This document is a summary of fisheries data collected from Lake Striker in 2003-2004; data from previous years are included for comparison. The purpose of this document is to provide fish population information and make any management recommendations needed to protect and enhance the sport fishery. While information on other fish species was collected, this report deals primarily with major sport fishes and important prey species. Management strategies are included to address existing problems or opportunities.

Harvest regulations for Lake Striker in 2003-2004.

| Species                 | Bag Limit      | Minimum - Maximum      |
|-------------------------|----------------|------------------------|
|                         |                | Length Limits (Inches) |
| Channel catfish         | 25             | 12 - None              |
| Flathead catfish        | 5              | 18 - None              |
| White bass              | 25             | 10 - None              |
| Hybrid striped bass     | 5              | 18 - None              |
| Spotted bass            | 5 <sup>a</sup> | None                   |
| Largemouth bass         | 5 <sup>a</sup> | 14 - None              |
| Black and white crappie | 25             | 10 - None              |

<sup>a</sup>Bag limit for spotted and largemouth bass is 5 in the aggregate.

## METHODS

- Fishes were collected by electrofishing (1.0 hour at 12 stations during November), trap netting (15 net nights during December), and gill netting (15 net nights during February). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing, and for trap nets and gill nets as the number of fish caught in one net set overnight (TPWD, Inland Fisheries Division, unpublished manual revised 2002).
- Sampling statistics (CPUE for various length categories), structural indices (Proportional Stock Density [PSD] and Relative Stock Density [RSD]), and relative weights (Wr) were calculated for target fishes according to Anderson and Neumann (1996).

- Otoliths were used to determine ages for largemouth bass. Mean lengths at age of capture were compared to ecological region averages using von Bertalanffy growth parameters from Prentice (1987).
- A survey of structural habitat/aquatic vegetation and angler access was conducted in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2002).

#### LITERATURE CITED

- 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, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- Parks, J. O., and E. P. Seidensticker. 1998. An evaluation of a 14-18 inch slot length limit in five Texas reservoirs. *Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies* 52(1998):75-86.
- Prentice, J. A. 1987. Length-weight relationships and average growth rates of fishes in Texas. Inland Fisheries Data Series No. 6. Texas Parks and Wildlife Department, Inland Fisheries Branch. Austin, Texas.

Physical and historical data for Lake Striker, Texas, 2003-2004.

Inland Fisheries water body code: 0701

IF District: 3D - Jasper

Controlling authority: Angelina-Nacogdoches County Water Control and Improvement District

Waterbody uses: Flood control, power plant cooling, and recreation

County (dam): Rusk

Latitude: 31° 39'

Longitude: 94° 51'

Nearest major metropolitan area and distance: Tyler - 50 miles

Reservoir description: Secondary stream

River system: Angelina

Mean depth (ft): 15.0

Maximum depth (ft): 35.0

Shoreline development index: 8.6

Watershed (mi<sup>2</sup>): 182

Secchi disc range (ft): 1-3

Conductivity (umhos/cm): 200

Size: 1,920 acres

Average annual fluctuation (ft): 2.0

Access:        Boat: Adequate - 2 ramps  
                   Bank: Adequate  
                   Handicap: Inadequate

## Survey History:

| Method         | Year   |
|----------------|--|
| Gill net       | 1970-1974, 1979-1981, 1988, 1991, 1993, 1996, 1999, 2004 |
| Electrofishing | 1988, 1991-1996, 1999, 2003                              |
| Trap net       | 1988, 1991, 1993, 1996, 1999, 2003                       |
| Creel survey   | 1993, 1995, 1996   |
| Habitat        | 1996, 2003   |
| Vegetation     | 1996, 2003   |

Survey of littoral zone and physical habitat types, Lake Striker, Texas, August 2003. A linear shoreline distance (miles) was recorded for each habitat type found. Acreages are listed for habitat types adjacent to shoreline.

| Shoreline habitat type     | Shoreline distance |                  | Acreage |
|----------------------------|--------------------|------------------|---------|
|                            | Miles              | Percent of total |         |
| Bulkhead                   | 4.5                | 8.6              |         |
| Dead timber/stumps         | 26.0               | 49.5             | 672.0   |
| Eroded bank                | 9.0                | 17.1             |         |
| Indescript                 | 13.9               | 26.5             |         |
| Rip rap                    | 3.5                | 6.7              |         |
| Boat docks                 | 11.9               | 22.7             |         |
| Overhanging brush          | 0.4                | 1.0              |         |
| Cut bank                   | 0.5                | 1.0              |         |
| Rocky shore                | 0.5                | 1.0              |         |
| Native emergent vegetation | 27.7               | 52.8             | 25.5    |
| Hydrilla                   |                    |                  | Trace   |

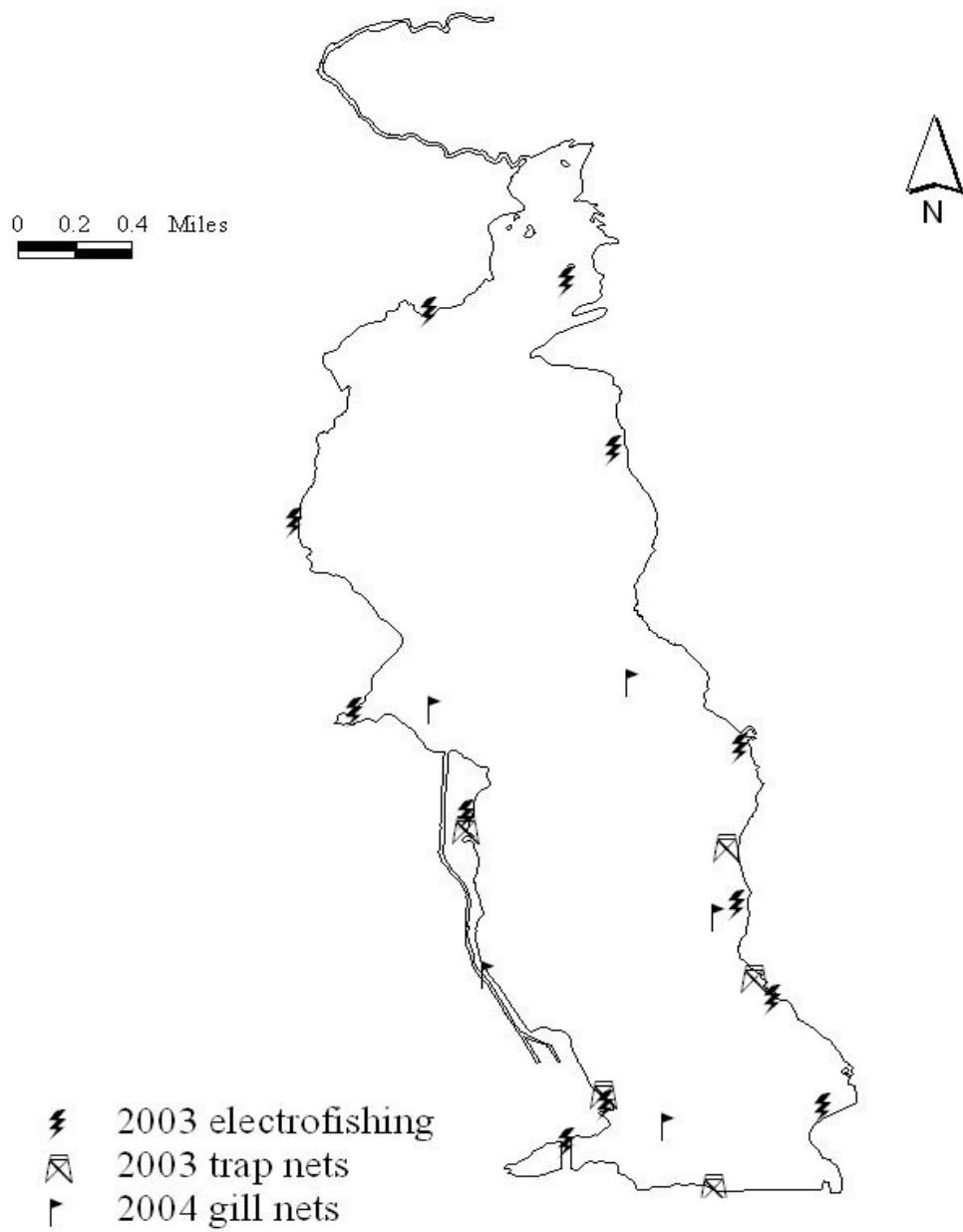
Survey of aquatic vegetation, Lake Striker, Texas, August 2003. Acreage of each species and percent of surface area coverage are presented.

| Species              | Total acres | % coverage |
|----------------------|-------------|------------|
| <i>Nymphaea</i> spp. | 15.5        | 0.8        |
| Common reed          | 10          | 0.5        |
| Coontail             | Trace       |            |
| Hydrilla             | Trace       |            |
| Grand total          | 25.5        | 1.3        |

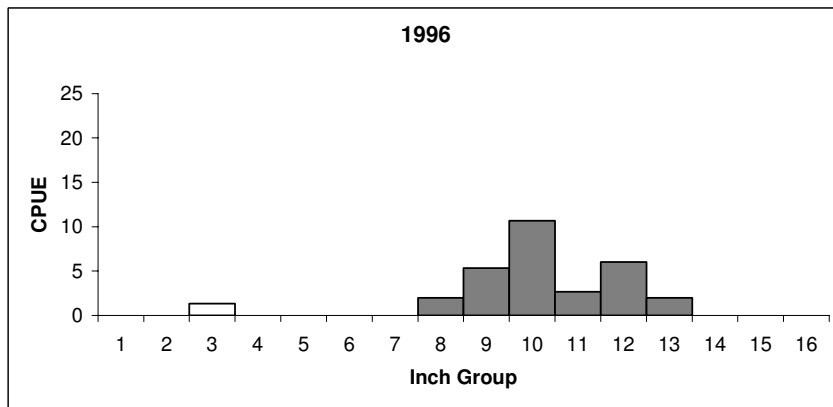


Stocking history at Lake Striker, Texas. Size categories are: FRY < 1 inch; FGL = 1-3 inches; ADL = adults.

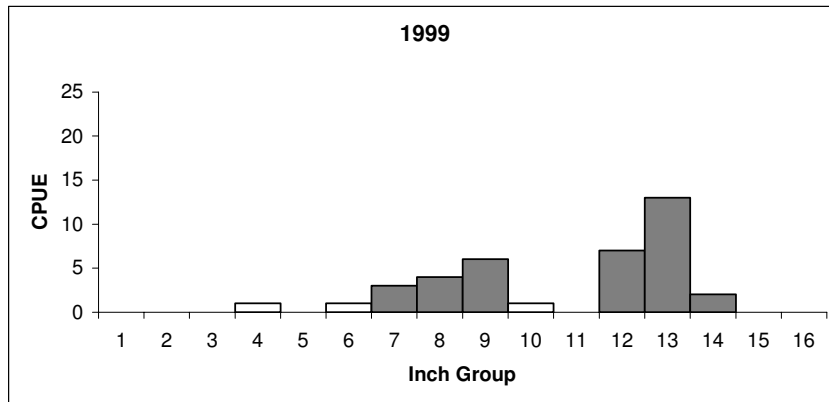
| Species                   | Year  | Number  | Size |
|---------------------------|-------|---------|------|
| Channel catfish           | 1973  | 5,000   | FGL  |
|                           | Total | 5,000   |      |
| Striped bass X white bass | 1979  | 80,000  | FGL  |
|                           | 1998  | 49,023  | FGL  |
|                           | 1999  | 24,215  | FGL  |
|                           | Total | 153,238 |      |
| Florida largemouth bass   | 1976  | 200,000 | FGL  |
|                           | 1995  | 120,000 | FRY  |
|                           | 1997  | 120,186 | FGL  |
|                           | Total | 440,186 |      |
| Red drum                  | 1975  | 18,435  | FGL  |
|                           | Total | 18,435  |      |
| Threadfin shad            | 1974  | 15,000  | ADL  |
|                           | 1976  | 30,000  | ADL  |
|                           | Total | 45,000  |      |



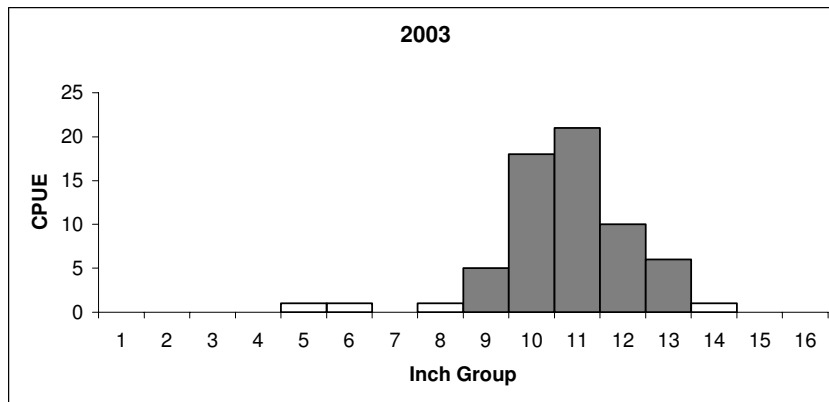
Location of random sampling sites, Lake Striker, Texas, 2003-2004.

**Gizzard Shad**

Effort = 1.5  
 Total CPUE = 30.0  
 Stock CPUE = 28.7  
 PSD = 37



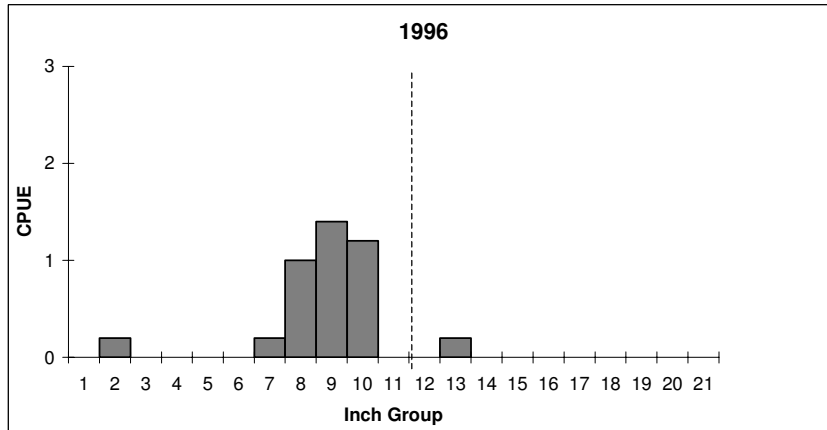
Effort = 1.0  
 Total CPUE = 38.0  
 Stock CPUE = 36.0  
 PSD = 61



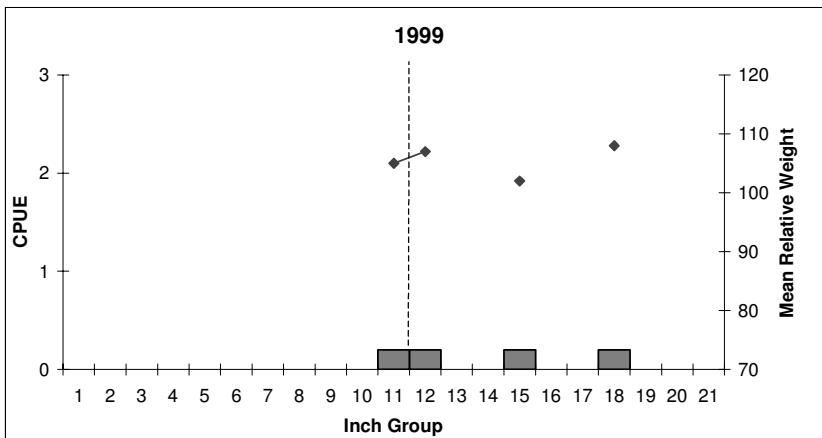
Effort = 1.0  
 Total CPUE = 64.0  
 Stock CPUE = 62.0  
 PSD = 61

The number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lake Striker, Texas.

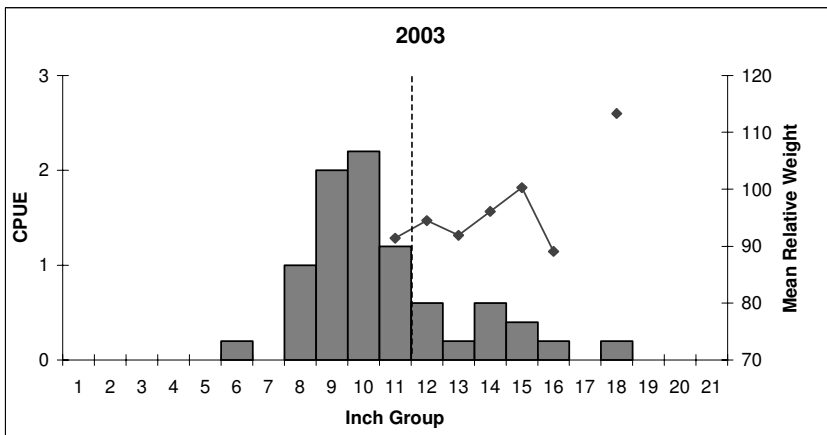
### Channel Catfish



Effort = 5  
 Total CPUE = 4.2  
 Stock CPUE = 0.2  
 PSD = 0

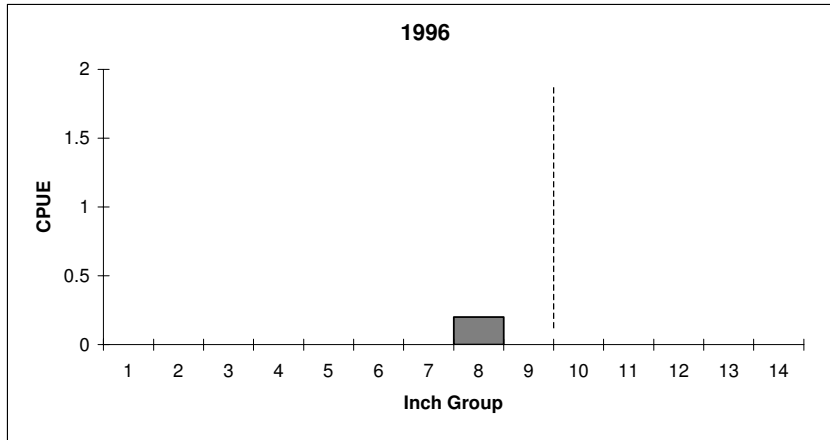


Effort = 5  
 Total CPUE = 0.8  
 Stock CPUE = 0.8  
 PSD = 25

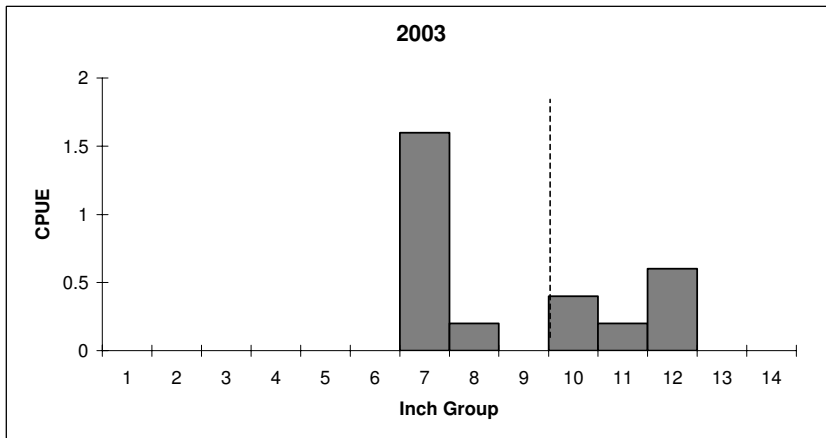


Effort = 5  
 Total CPUE = 8.8  
 Stock CPUE = 3.4  
 PSD = 12

The number of channel catfish caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net surveys, Lake Striker, Texas. Broken vertical lines denote minimum length limit. No relative weights were available in 1996.

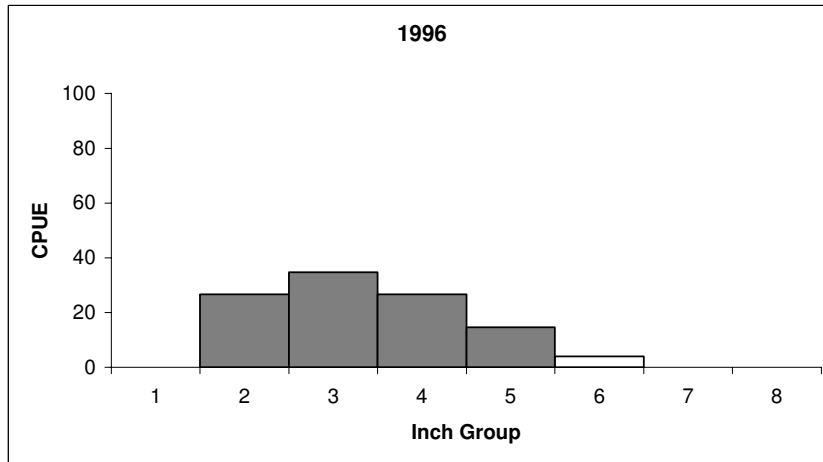
**White Bass**

Effort = 5  
 Total CPUE = 0.2  
 Stock CPUE = 0.2  
 PSD = 0

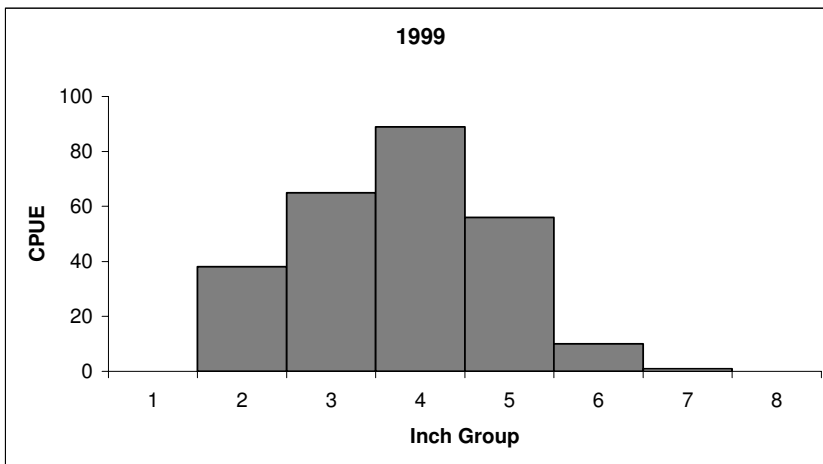


Effort = 5  
 Total CPUE = 3.0  
 Stock CPUE = 3.0  
 PSD = 40

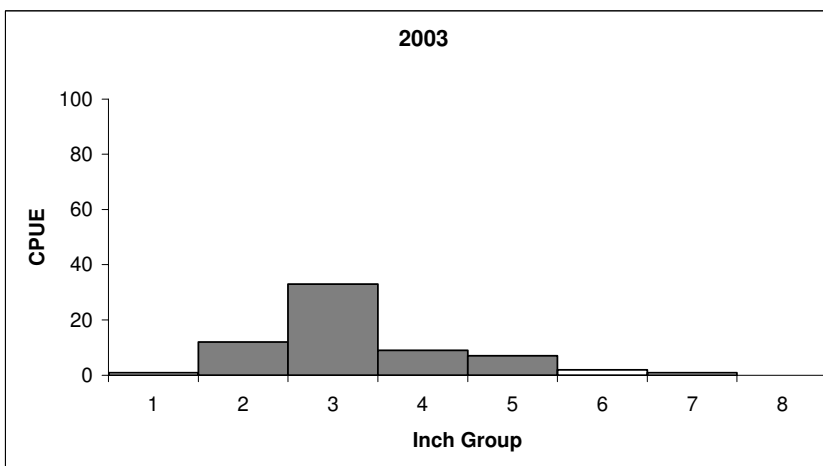
The number of white bass caught per net night (CPUE, bars) and population indices for spring gill net surveys, Lake Striker, Texas. Broken vertical lines denote minimum length limit. No white bass were collected in 1999.

**Bluegill**

Effort = 1.5  
 Total CPUE = 106.7  
 Stock CPUE = 80.0  
 PSD = 5

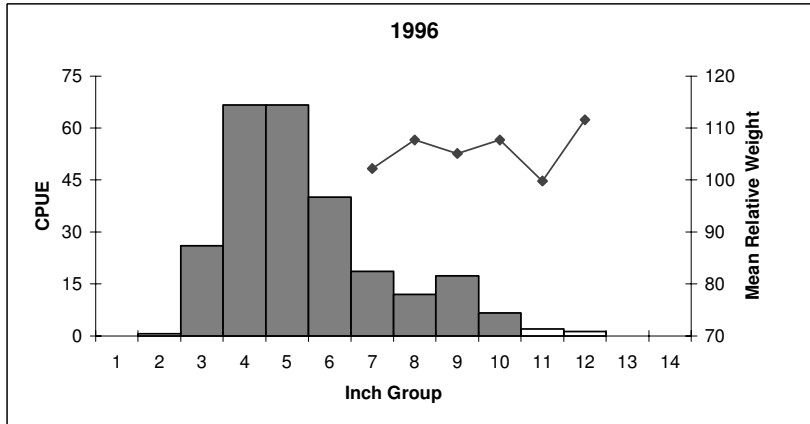


Effort = 1.0  
 Total CPUE = 259.0  
 Stock CPUE = 221.0  
 PSD = 5

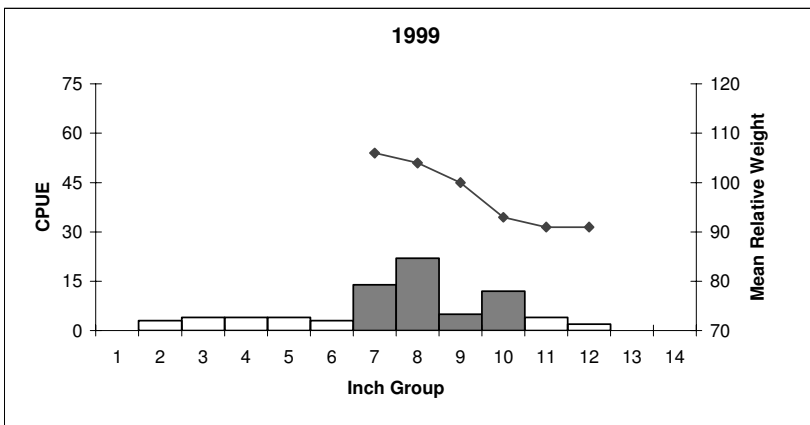


Effort = 1.0  
 Total CPUE = 65.0  
 Stock CPUE = 52.0  
 PSD = 6

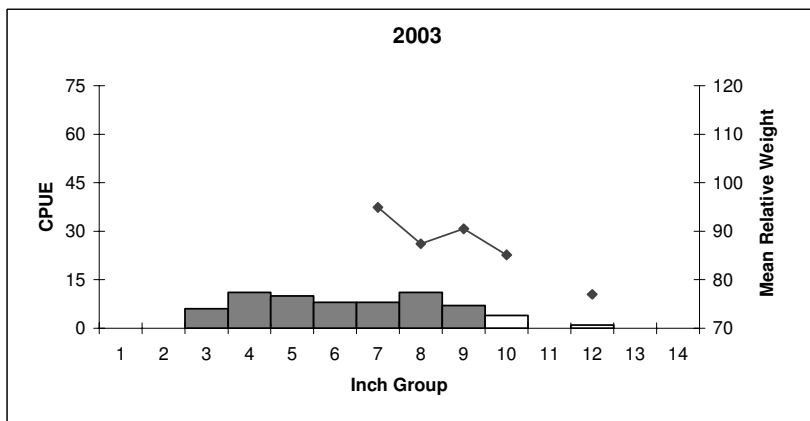
The number of bluegill caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lake Striker, Texas.

**Spotted Bass**

Effort = 1.5  
 Total CPUE = 258.0  
 Stock CPUE = 58.0  
 PSD = 6

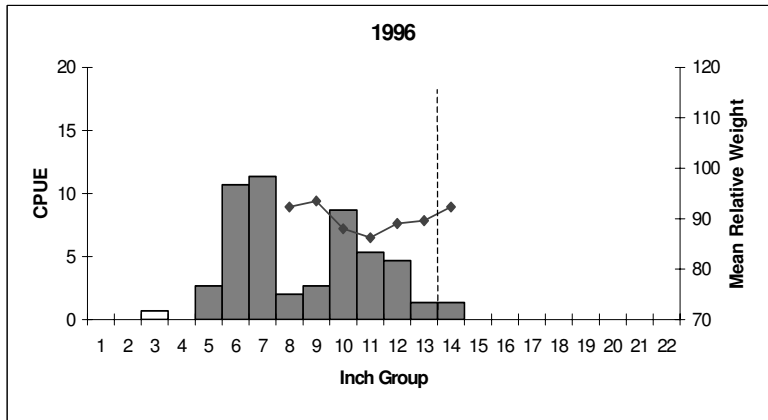


Effort = 1.0  
 Total CPUE = 77.0  
 Stock CPUE = 59.0  
 PSD = 10

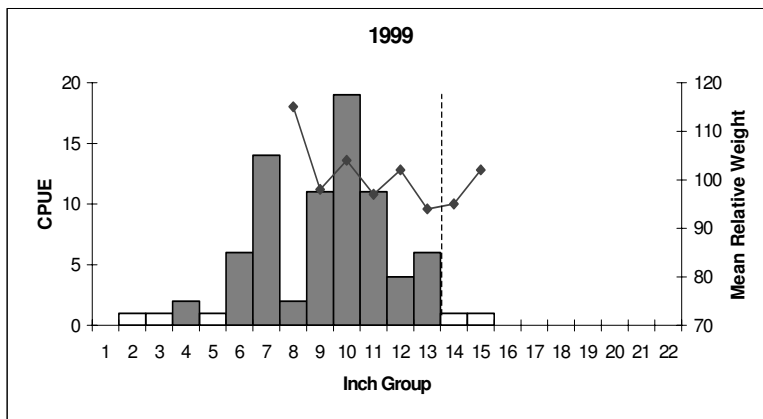


Effort = 1.0  
 Total CPUE = 66.0  
 Stock CPUE = 31.0  
 PSD = 3

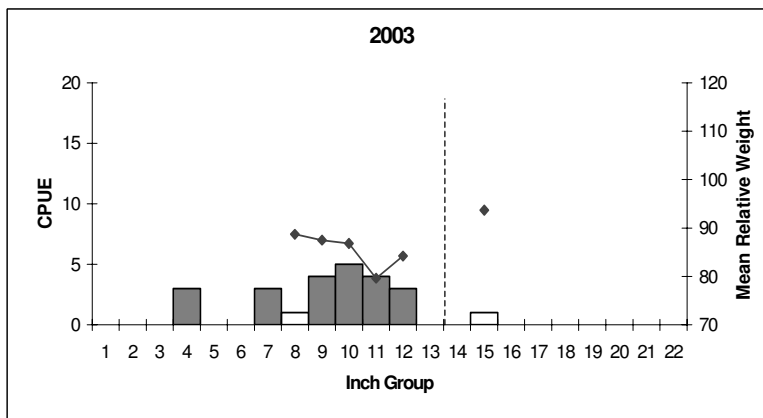
The number of spotted bass caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Lake Striker, Texas.

**Largemouth Bass**

Effort = 1.5  
 Total CPUE = 51.3  
 Stock CPUE = 26.0  
 PSD = 28  
 RSD-14 = 5  
 % FLMB = 35.0



Effort = 1.0  
 Total CPUE = 80.0  
 Stock CPUE = 55.0  
 PSD = 22  
 RSD-14 = 4  
 % FLMB = 59.4



Effort = 1.0  
 Total CPUE = 24.0  
 Stock CPUE = 18.0  
 PSD = 22  
 RSD-14 = 6  
 % FLMB = N/A

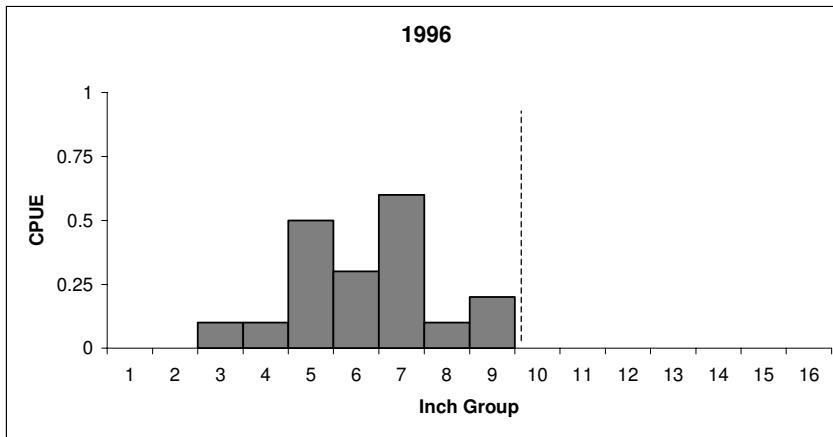
The number of largemouth bass caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Lake Striker, Texas. % FLMB = percent of Florida largemouth bass alleles present in a subsample of age-0 fish. Broken vertical lines denote minimum length limit.



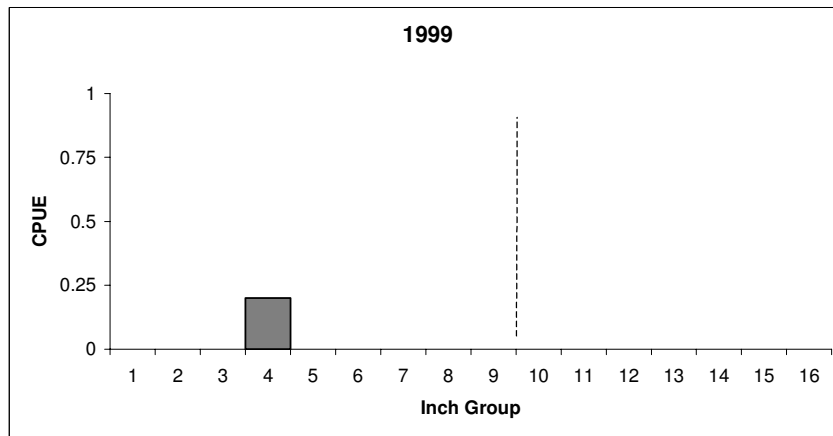
Mean length (inches) at age of capture for largemouth bass (sexes combined) collected by electrofishing, Lake Striker, Texas, October 1996 and 1999; November 2003. Sample sizes are in parentheses.

| Year                  | Age (years) |           |           |          |      |          |
|-----------------------|-------------|-----------|-----------|----------|------|----------|
|                       | 0           | 1         | 2         | 3        | 4    | 5        |
| 1996                  | 7.5 (5)     | 10.8 (12) | 12.8 (12) | 14.5 (1) |      |          |
| 1999                  | 7.2 (6)     | 10.1 (11) | 12.3 (10) | 13.5 (6) |      |          |
| 2003                  | 5.9 (6)     | 10.2 (12) | 12.4 (5)  |          |      | 11.9 (1) |
| Averages <sup>a</sup> | 5.6         | 10.0      | 12.7      | 14.4     | 15.5 | 16.3     |

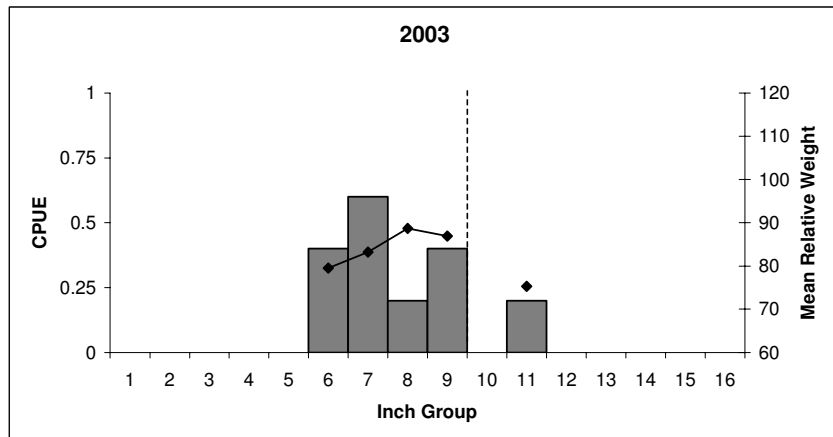
<sup>a</sup>Ecological region 1 averages from Prentice (1987); lengths derived for October 15.

**White Crappie**

Effort = 10  
 Total CPUE = 1.9  
 Stock CPUE = 1.7  
 PSD = 18  
 RSD-10 = 0



Effort = 5  
 Total CPUE = 0.2  
 Stock CPUE = 0.0  
 PSD = 0  
 RSD-10 = 0



Effort = 5  
 Total CPUE = 1.8  
 Stock CPUE = 1.8  
 PSD = 50  
 RSD-10 = 20

The number of white crappie caught per net night (CPUE, bars), mean relative weight (lines), and population indices for fall trap net surveys, Lake Striker, Texas. Broken vertical line denotes minimum length limit.

**Fisheries Management Plan**  
**Lake Striker, Texas**  
Prepared - July 2004

**ISSUE 1**            With the exception of channel catfish, overall numbers of sport fish are low and are probably a result of poor recruitment. Low recruitment rates are likely due to a limited prey base, resulting from low primary production due to watershed characteristics and the relatively turbid nature of the reservoir.

**MANAGEMENT STRATEGY**

1. In conjunction with the controlling authority, investigate possibilities of implementing a lake fertilization program at Lake Striker. Such a program may hold promise for improving primary production and prey fish populations.
2. Continue standardized monitoring of sport and prey fish populations on a 4-year rotation basis. Reevaluate this fishery again in 2007-2008.

**ISSUE 2**            Although the boat ramp and the associated parking lot are in good condition, the courtesy dock is a safety hazard (walkway is under water and planks are missing) and is not handicap-accessible.

**MANAGEMENT STRATEGY**

1. Contact marina owners and the controlling authority and recommend courtesy dock repair.

## APPENDIX 1

Number (N) and catch per unit effort (CPUE) of species collected from all gear types, Lake Striker, Texas, 2003-2004. Gill net and trap net CPUE is the number of fish per net night, while electrofishing CPUE is the number of fish per hour. Only data from targeted species were recorded during trap net and electrofishing surveys.

| Species          | <u>Gill net</u> |      | <u>Trap net</u> |      | <u>Fall electrofishing</u> |      |
|------------------|-----------------|------|-----------------|------|----------------------------|------|
|                  | N               | CPUE | N               | CPUE | N                          | CPUE |
| Gizzard shad     | 18              | 3.6  |                 |      | 64                         | 64.0 |
| Threadfin shad   |                 |      |                 |      | 7                          | 7.0  |
| Spotted sucker   | 22              | 4.4  |                 |      |                            |      |
| Channel catfish  | 44              | 8.8  |                 |      |                            |      |
| Flathead catfish | 1               | 0.2  |                 |      |                            |      |
| White bass       | 15              | 3.0  |                 |      |                            |      |
| Warmouth         |                 |      |                 |      | 11                         | 11.0 |
| Bluegill         |                 |      |                 |      | 65                         | 65.0 |
| Longear sunfish  |                 |      |                 |      | 51                         | 51.0 |
| Redear sunfish   | 2               | 0.4  |                 |      | 13                         | 13.0 |
| Spotted bass     | 7               | 1.4  |                 |      | 66                         | 66.0 |
| Largemouth bass  |                 |      |                 |      | 24                         | 24.0 |
| White crappie    | 5               | 1.0  | 9               | 1.8  |                            |      |
| Black crappie    | 1               | 0.2  | 1               | 0.2  |                            |      |

## APPENDIX 2

Results of electrophoretic analysis of largemouth bass collected by electrofishing from Lake Striker, Texas, 1995, 1996, and 1999. N = sample size; % FLMB = percent Florida largemouth bass alleles; % PURE = percent pure Florida largemouth bass.

| Year | N  | Genotype |    |    |          | % FLMB | % PURE |
|------|----|----------|----|----|----------|--------|--------|
|      |    | Florida  | F1 | FX | Northern |        |        |
| 1995 | 16 | 1        | 5  | 4  | 6        | 31.3   | 6.3    |
| 1996 | 30 | 3        | 11 | 8  | 8        | 35.0   | 10.0   |
| 1999 | 24 | 8        | 2  | 12 | 2        | 59.4   | 33.3   |

## APPENDIX 3

Angler access survey information from Lake Striker, Texas, 2003.

| Boat ramp      | Latitude/<br>Longitude | Use<br>fee? | Boat<br>lanes | Parking<br>capacity | ADA<br>accommodations? | Bank<br>fishing? | Improvements                                     |
|----------------|------------------------|-------------|---------------|---------------------|------------------------|------------------|--|
| Jubilee Marina | 31.564<br>/-94.588     | Yes         | 1             | 20                  | No                     | Yes              | Repair dock to<br>accommodate<br>handicap access |

#### APPENDIX 4 Catch Rate Histories

Number of target species caught per hour during electrofishing surveys, Lake Striker, Texas, 1989 – 2003.

| Species                  | 1989  | 1991  | 1992  | 1993  | 1994  | 1995 | 1996  | 1999  | 2003 | Average |
|--------------------------|-------|-------|-------|-------|-------|------|-------|-------|------|---------|
| Gizzard shad             | 24.7  | 26.7  | 25.3  | 32.0  |       |      | 30.0  | 38.0  | 64.0 | 34.4    |
| Threadfin shad           | 3.3   | 4.0   | 0.0   | 0.7   |       |      | 7.3   | 0.0   | 7.0  | 3.2     |
| Bluegill                 | 158.7 | 152.7 | 130.0 | 89.7  |       |      | 160.0 | 259.0 | 65.0 | 145.0   |
| Spotted bass             | 108.7 | 111.3 | 132.7 | 171.3 | 252.0 | 72.7 | 258.0 | 77.0  | 66.0 | 138.9   |
| Largemouth bass          | 127.3 | 70.7  | 55.3  | 56.0  | 70.0  | 43.3 | 51.3  | 80.0  | 24.0 | 64.2    |
| Largemouth bass (spring) |       |       |       |       |       | 46.0 | 53.0  |       |      |         |

Number of target species caught per net-night during trap net surveys, Lake Striker, Texas, 1988 – 2003.

| Species       | 1988 | 1991 | 1993 | 1996 | 1999 | 2003 | Average |
|---------------|------|------|------|------|------|------|---------|
| White crappie | 1.6  | 1.8  | 1.5  | 1.9  | 0.2  | 1.8  | 1.5     |
| Black crappie | 0.4  | 0.2  | 0.0  | 0.0  | 0.0  | 0.2  | 0.1     |

Number of target species caught per net-night during gill net surveys, Lake Striker, Texas, 1989 – 2003.

| Species         | 1988 | 1991 | 1993 | 1996 | 1999 | 2003 | Average |
|-----------------|------|------|------|------|------|------|---------|
| Channel catfish | 18.5 | 5.2  | 5.2  | 4.2  | 0.8  | 8.8  | 7.1     |
| White bass      | 7.3  | 0.6  | 0.0  | 0.2  | 0.0  | 5.0  | 2.2     |