

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

Striker Reservoir

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TABLE OF CONTENTS

| | |
|---|------|
| Survey and management summary | 2 |
| Introduction..... | 3 |
| Reservoir description..... | 3 |
| Management history..... | 3 |
| Methods..... | 4 |
| Results and discussion..... | 4 |
| Fisheries management plan..... | 6 |
| Literature cited..... | 7 |
| Figures and tables..... | 8-20 |
| Quarterly water level (Figure 1)..... | 8 |
| Reservoir characteristics (Table 1) | 8 |
| Harvest regulations (Table 2)..... | 9 |
| Stocking history (Table 3)..... | 10 |
| Habitat survey (Table 4)..... | 11 |
| Gizzard shad (Figure 2)..... | 12 |
| Bluegill (Figures 3) | 13 |
| Channel catfish (Figures 4)..... | 14 |
| White bass (Figure 5)..... | 15 |
| Spotted bass (Figure 6)..... | 16 |
| Largemouth bass (Figure 7)..... | 17 |
| White crappie (Figure 8)..... | 18 |
| Proposed sampling schedule (Table 11)..... | 19 |
| Appendix A | |
| Catch rates for all target species from all gear types..... | 20 |
| Appendix B | |
| Map of 2007-2008 sampling locations | 21 |

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Striker Reservoir were surveyed from June 2008 through May 2009 using fall electrofishing, gill netting, and trap netting. Vegetation and access surveys were also conducted in 2008. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Striker Reservoir is an impoundment of 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. Primary uses are flood control, condenser cooling for a steam-electric generating plant, and recreation. This reservoir has a surface area of 1,920 acres at conservation pool (292 feet msl), a shoreline length of 13.7 miles, and an average depth of 15 feet. Water level fluctuations average 1-3 feet annually. Boat access is available with a boat ramp present. Bank access is adequate.
- **Management history:** Important sport fish include channel catfish, spotted bass, largemouth bass, and white crappie. General statewide fishing regulations apply. A 14- to 18-inch slot length limit for largemouth bass was in effect from 1993 through 1999. Historically, primary production and subsequent prey abundance has been limited. Lack of vegetative habitat (1.3% of surface area) also has contributed to poor fish recruitment and survival. In 1998 and 1999, palmetto bass were stocked (153,238 fish total) in an attempt to provide an additional fishery with no success.
- **Fish community**
 - **Prey species:** Gizzard shad and threadfin shad were present in the reservoir, and overall abundance increased in 2008. Electrofishing catch of bluegill was low; no fish were over 6 inches in length. Other prey species included longear, redear, and spotted sunfish.
 - **Catfishes:** Channel catfish abundance and body condition were adequate.
 - **White bass:** White bass are present in limited abundance. Lack of sufficient prey may be hindering survival as evidenced with the poor palmetto bass stocking survival.
 - **Black basses:** Spotted bass is the prevalent black bass present. Abundance has declined since 1999. The population is characterized by smaller individuals. Condition of the fish present was good.

Historically, largemouth bass abundance has been low. Size structure has remained consistent and skewed toward smaller sizes. Largemouth bass were in moderate condition. The current largemouth bass water body record is 11.10 lbs set in March 2004.
 - **Crappies:** White crappie and black crappie were present in the reservoir. In 2008, white crappie were the predominate species sampled, and relative abundance increased significantly.
- **Management strategies:** Continue to manage all sport fish with general statewide limits. Explore potential factors limiting primary production and vegetative coverage. Conduct standard monitoring with trap nets, gill nets, and electrofisher in 2012-2013. Lack of vegetative habitat limits fish abundance and recruitment. Investigate water quality parameters and sediment to determine if lack of vegetation is due to chemical or physical constraints.

INTRODUCTION

This document is a summary of fisheries data collected from Striker Reservoir from June 2008 through May 2009. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2008-2009 data for comparison.

Reservoir Description

Striker Reservoir is a 1,920-acre impoundment constructed in 1957 on Striker Creek (Table 1). It is located in Rusk County approximately 30 miles northwest of Nacogdoches and is operated and controlled by the Angelina-Nacogdoches County Water Control and Improvement District. Primary water uses include flood control, condenser cooling for a steam-electric generating plant, and recreation. Secchi disc readings average 2.5 feet. Water fluctuations average 1.0-1.5 feet annually. Habitat at time of sampling consisted of standing timber, boat docks, riprap, and limited aquatic vegetation (primarily yellow water lily). The majority of the land surrounding the reservoir is used for agriculture, timber production, and residential development.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Driscoll 2003) included:

1. Investigate possibilities of implementing a lake fertilization program to improve the productivity of the reservoir.
Action: Reviewed scientific literature and collaborated with Dr. Claude Boyd with Auburn University, Alabama, to discuss the potential of a fertilization program given the known water quality parameters and turbidity problems. Dr. Boyd had reservations regarding feasibility of such a program given the size of the reservoir, expense of fertilizer, turbidity of the reservoir, and the water quality parameters (specifically the pH). Cost and logistics were impractical to treat an area the size of the reservoir. Brush piles were placed in the reservoir in 2007 and 2009 in an effort to provide some habitat for the fishery.
2. Encourage the marina owners and the controlling authority to improve and repair the courtesy dock.
Action: Marina owners and the controlling authority were contacted with the proposed recommendation and repairs have been made.

Harvest regulation history: Sport fishes in Striker Reservoir are currently managed with statewide regulations (Table 2). From 1994 to 1998, largemouth bass were managed with a 14- to 18-inch slot-length limit in an attempt to reduce the number of smaller fish and provide protection for larger fish. The slot limit was evaluated and the population structure had not improved, so statewide regulations were reimplemented.

Stocking history: Florida largemouth bass fingerlings were stocked in 1976, 1995, and 1997 (440,186 total) (Table 3). Palmetto bass were most recently stocked in 1998 and 1999 (73,238 total). Threadfin shad were successfully introduced in 1974 and 1976.

Vegetation/habitat history: Striker Reservoir aquatic vegetation coverage is limited. Aquatic vegetation has remained virtually unchanged over the past 5 years with yellow water lily as the predominate species present (Table 4). The feasibility of conducting a fertilization program was assessed in 2006, but related costs and the amount of fertilizer needed were impractical.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations) during October 2008, trap netting in December 2008 (5 net nights at 5 stations), and gill netting in February 2009 (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for trap nets and gill nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2008).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of standing timber, boat docks, rocky shoreline, and yellow water lily (Table 4). Aquatic vegetation coverage was <2% of the reservoir surface area.

Prey species: Electrofishing catch rates of threadfin shad were 24.0/h in 2008 (Appendix A), which is considerably higher than observed in 2003 (7.0/h) and 1999 (0.0/h). The abundance of gizzard shad available as prey increased in 2008 (IOV=40) (Figure 2). Bluegill were the predominant prey species, but the electrofishing catch rate was low in 2008 (38.0/h) and much lower than in 2003 (65.0/h) and 1999 (259.0/h) (Figure 3). Other fish species available as prey included longear, redear, and spotted sunfish.

Channel catfish: Channel catfish abundance has increased since 1999 (4.0/nn). In 2009, the catch rate was 9.4/nn (Figure 4). Body condition was moderate with W_r values exceeding 80. The majority of fish sampled were <9 inches indicating successful recruitment and potentially high harvest rates of legal-size fish (\geq 12 inches).

White bass: White bass were present in the reservoir, but their population density remained low. The catch rate in 2008 (0.8/nn) was less than observed in 2004 (3.0/nn) and 2000 (2.8/nn) (Figure 5).

Black bass: Spotted bass were the predominate black bass species in the reservoir. However, abundance has steadily declined over the last four survey periods. In 1996, catch rates were 258.0/h. Catch rates declined to 77.0/h, 66.0/h, and 53.0/h in 1999, 2003, and 2008, respectively (Figure 6). Largemouth bass abundance is limited and comprised mostly of small individuals less than the minimum length limit of 14 inches. Catch rates of largemouth bass have declined from 80.0/h observed in 1999 to 38.0/h observed in 2008 (Figure 7). However, more fish were observed in 2008 than in 2003 when 24.0/h were sampled. Limited forage and insufficient aquatic vegetative cover are the likely factors affecting black bass recruitment and survival.

Crappies: White and black crappie were present in the reservoir (Figure 8; Appendix A), but only one black crappie was collected in 2009. Catch rates for white crappie have been low in past surveys with 0.0/nn and 1.8/nn observed in 1999 and 2003, respectively. However, in 2008 the catch rate increased considerably (15.4/nn) (Figure 8) and included an abundance of smaller fish in the 5- to 9-inch range, indicating an abundant 2008 year class. As a result, an abundance of white crappie is expected to remain for the next couple of years.

Fisheries management plan for Striker Reservoir, Texas

Prepared – July 2008

ISSUE 1: The fisheries resources are limited with little trophy fish potential. Local residents have expressed a desire for an additional fishery that may provide trophy potential. Fall electrofishing in 2008 indicated an increase in clupeid abundance.

MANAGEMENT STRATEGY

1. Stock blue catfish in 2009 and 2010 at a rate of 50 fish/acre. Monitor with standard gill net surveys in 2013 to evaluate the success of the stocking.

ISSUE 2: Aquatic vegetation coverage is limited but causative factors are not understood.

MANAGEMENT STRATEGY

1. In coordination with the controlling authority, place brush piles throughout the reservoir to provide habitat and increase angler catch efficiency.
2. Provide recommendation to the controlling authority that a potential draw down of the reservoir (3-5 feet) could possibly allow for semi-terrestrial aquatic vegetation to establish providing increased cover and structure available to fish populations.
3. Coordinate with the controlling authority to conduct aerial surveys of the watershed after rain events to identify potential turbidity sources.
4. Review historical water quality records maintained by the controlling authority to identify additional factors potentially limiting vegetative coverage. If necessary, conduct additional water quality monitoring.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes standard trap netting, gill netting, and fall electrofishing in 2012-2013 (Table 5).

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, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Driscoll, T. 2003. Statewide freshwater fisheries monitoring and management program survey report for Lake Striker, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-29, Austin.

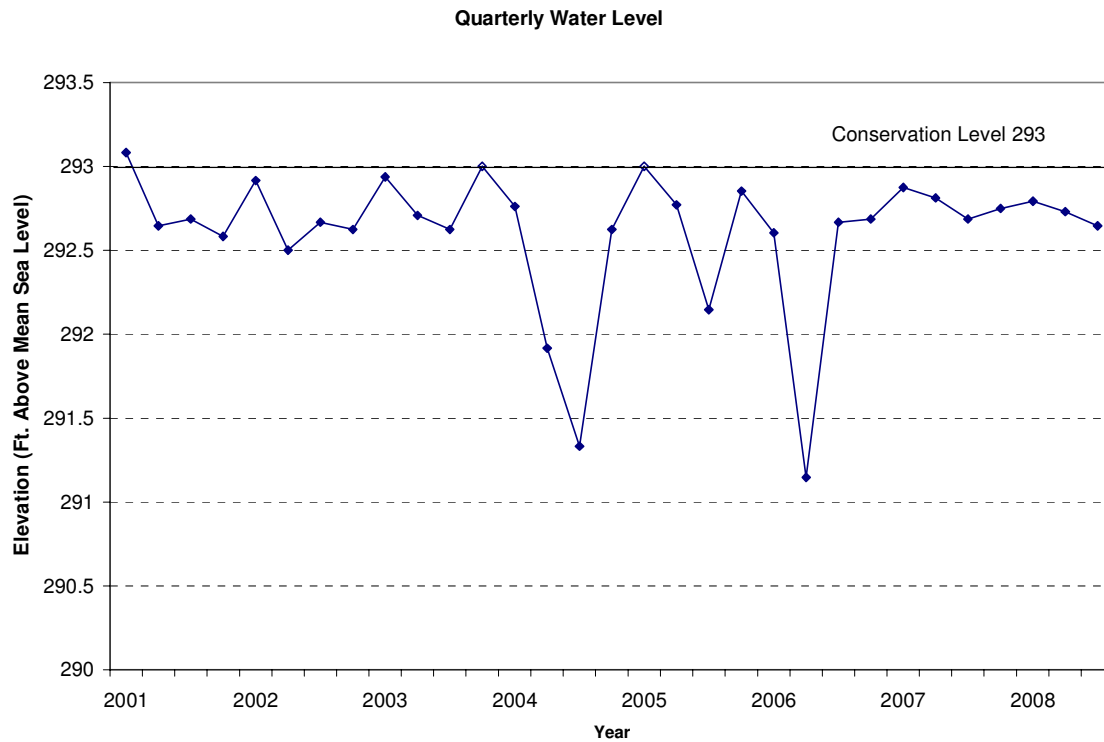


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Striker Reservoir, Texas.

Table 1. Characteristics of Striker Reservoir, Texas.

| Characteristic | Description |
|-----------------------------------|--|
| Year constructed | 1957 |
| Controlling authority | Angelina and Nacogdoches Counties Water Control and Improvement District |
| County | Rusk |
| Reservoir type | Secondary Stream |
| Shoreline Development Index (SDI) | 2.2 |
| Mean depth | 15 feet |
| Size | 1,920 acres |
| Secchi disc | 1-3 feet |
| Conductivity | 200 umhos/cm |

Table 2. Harvest regulations for Striker Reservoir, Texas.

| Species | Bag Limit | Minimum-Maximum Length (inches) |
|---|----------------------------|---------------------------------|
| Catfish: channel and blue catfish, their hybrids and subspecies | 25 (in any combination) | 12 - No Limit |
| Catfish, flathead | 5 | 18 - No Limit |
| Bass, white | 25 | 10 - No Limit |
| Bass, palmetto | 5 | 18 - No Limit |
| Bass: largemouth ^a | 5 | 14 – No Limit |
| Bass: spotted ^a | 5 | No Limit - No Limit |
| Crappie: white and black crappie, their hybrids and subspecies | 25 (in any combination) | 10 - No Limit |

^aBag limit for largemouth and spotted bass is 5 in the aggregate.

Table 3. Stocking history of Striker Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

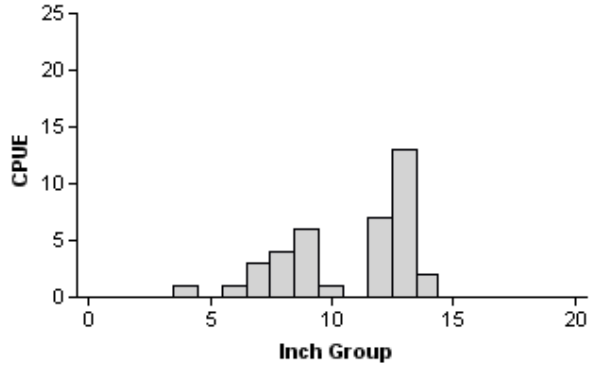
| Species | Year | Number | Life Stage | Mean TL (in) |
|---|-------------|---------------|-------------------|---------------------|
| Channel catfish | 1973 | 5,000 | AFGL | 7.9 |
| | Total | 5,000 | | |
| Florida largemouth bass | 1976 | 200,000 | FRY | 1.0 |
| | 1995 | 120,000 | FRY | 0.9 |
| | 1997 | 120,186 | FGL | 1.2 |
| | Total | 440,186 | | |
| Palmetto bass (striped X white bass hybrid) | 1979 | 80,000 | UNK | UNK |
| | 1998 | 49,023 | FGL | 1.3 |
| | 1999 | 24,215 | FGL | 1.5 |
| | Total | 153,238 | | |
| Red drum | 1975 | 18,435 | UNK | UNK |
| | Total | 18,435 | | |
| Threadfin shad | 1974 | 15,000 | AFGL | 2.9 |
| | 1976 | 30,000 | AFGL | 2.9 |
| | Total | 45,000 | | |

Table 4. Survey of littoral zone and physical habitat types, Striker Reservoir, Texas, 2008. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

| Shoreline habitat type | Shoreline Distance | | Surface Area | |
|-------------------------------------|--------------------|------------------|--------------|-----------------------------------|
| | Miles | Percent of total | Acres | Percent of reservoir surface area |
| Rocky shore | 1.1 | 7.7 | | |
| Standing timber | 6.8 | 49.5 | 672.0 | 35.0 |
| Boat docks | 3.1 | 22.7 | | |
| Indescript | 3.6 | 26.5 | | |
| Yellow water lily (native emergent) | | | 21.0 | 1.1 |
| Barnyard grass (native emergent) | | | 3.5 | <1.0 |
| Cattail (native emergent) | | | 1.5 | <1.0 |
| Hydrilla | | | <1.0 | <1.0 |

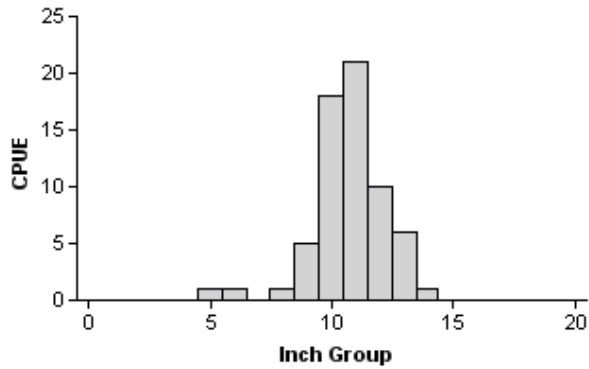
Gizzard Shad

1999



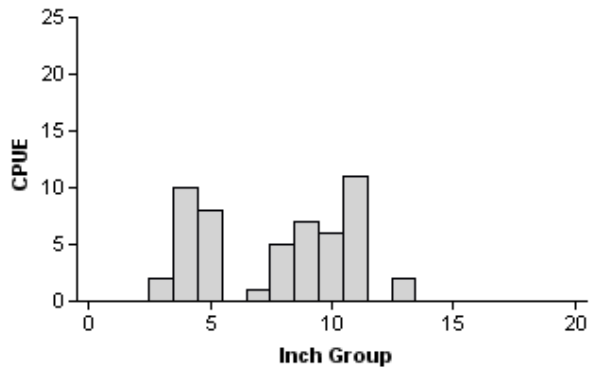
Effort = 1.0
 Total CPUE = 38.0 (34; 38)
 Stock CPUE = 36.0 (34; 36)
 PSD = 61 (12.3)
 IOV = 13.2 (6.2)

2003



Effort = 1.0
 Total CPUE = 64.0 (22; 64)
 Stock CPUE = 62.0 (23; 62)
 PSD = 61 (11.6)
 IOV = 3.1 (2.1)

2008



Effort = 1.0
 Total CPUE = 52.0 (22; 52)
 Stock CPUE = 32.0 (15; 32)
 PSD = 41 (8.9)
 IOV = 40.4 (15.3)

Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 1999, 2003, and 2008.

Bluegill

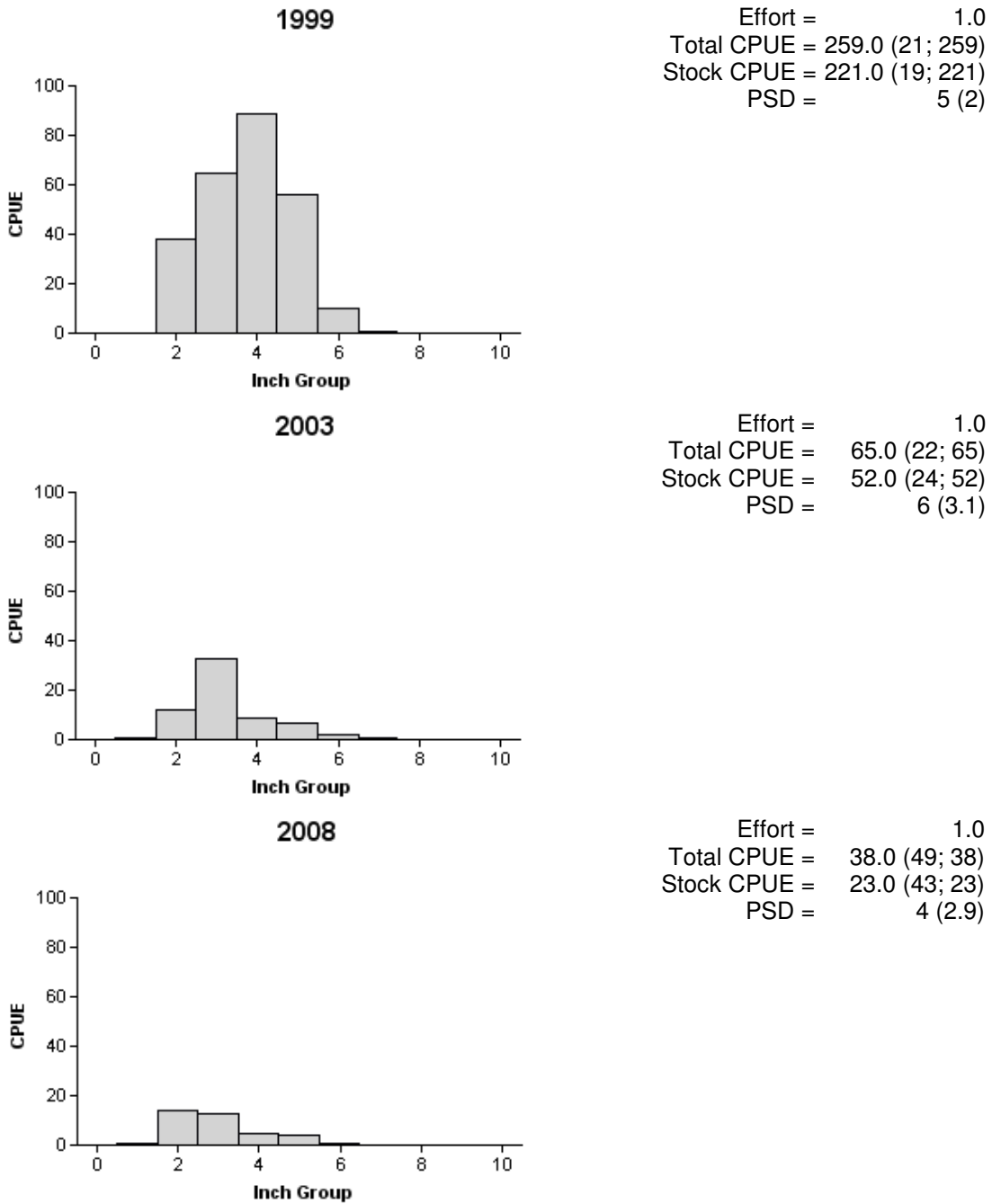


Figure 3. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 1999, 2003, and 2008.

Channel Catfish

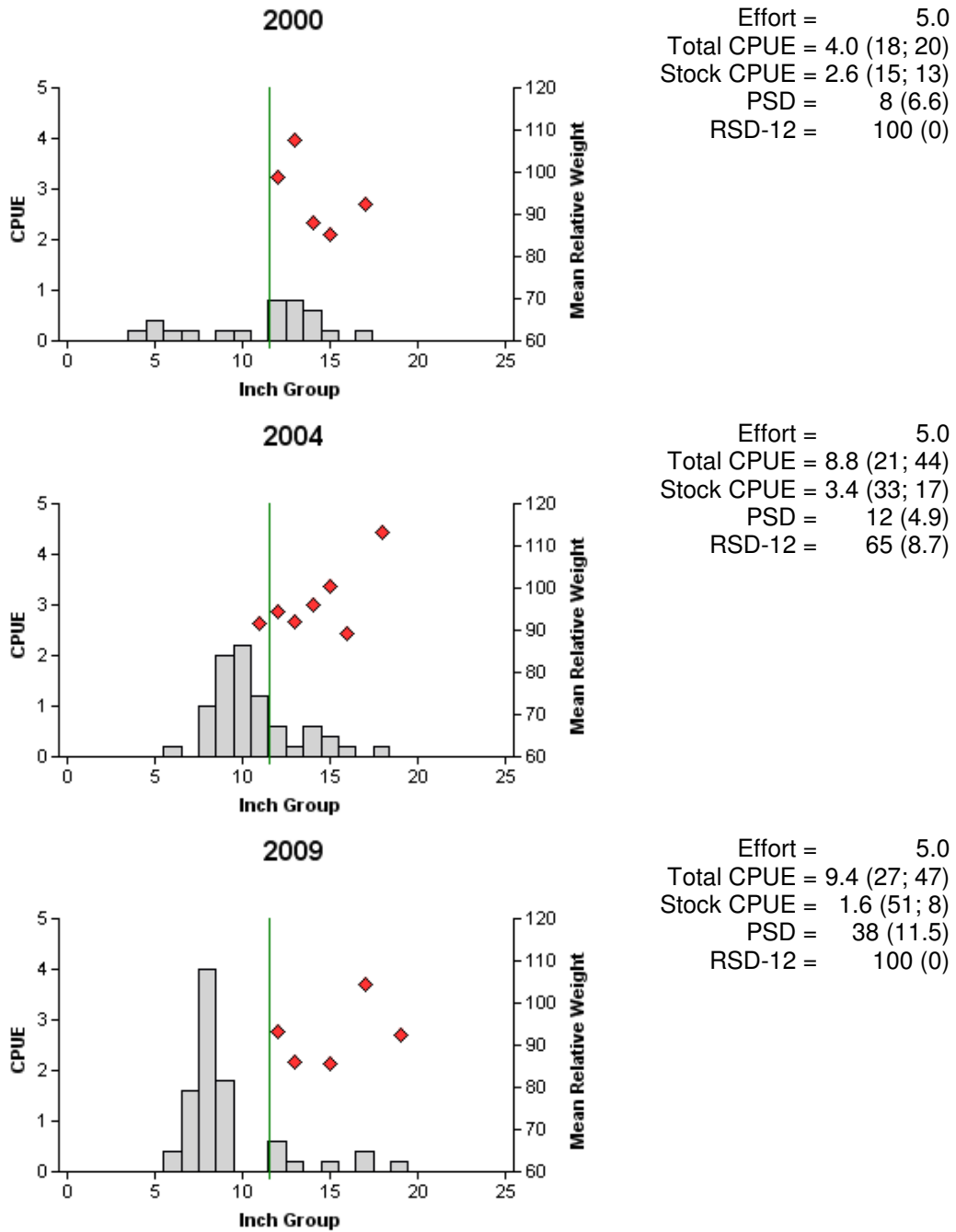


Figure 4. Number of channel catfish caught per net night (CPUE, bars) mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Striker Reservoir, Texas, 2000, 2004, and 2009. Vertical lines indicate minimum length limit.

White Bass

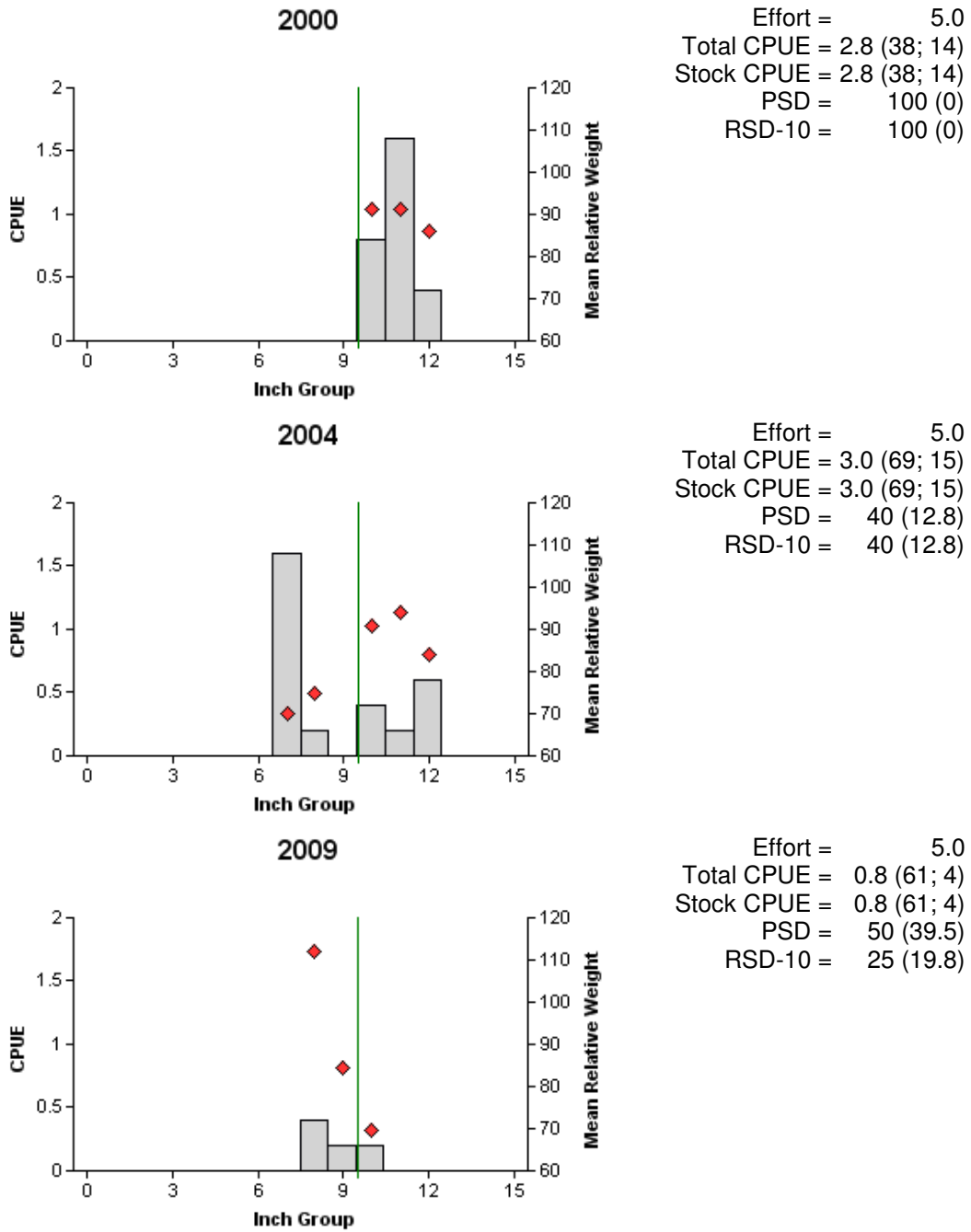


Figure 5. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Striker Reservoir, Texas, 2000, 2004, and 2009. Vertical lines indicate minimum length limit.

Spotted Bass

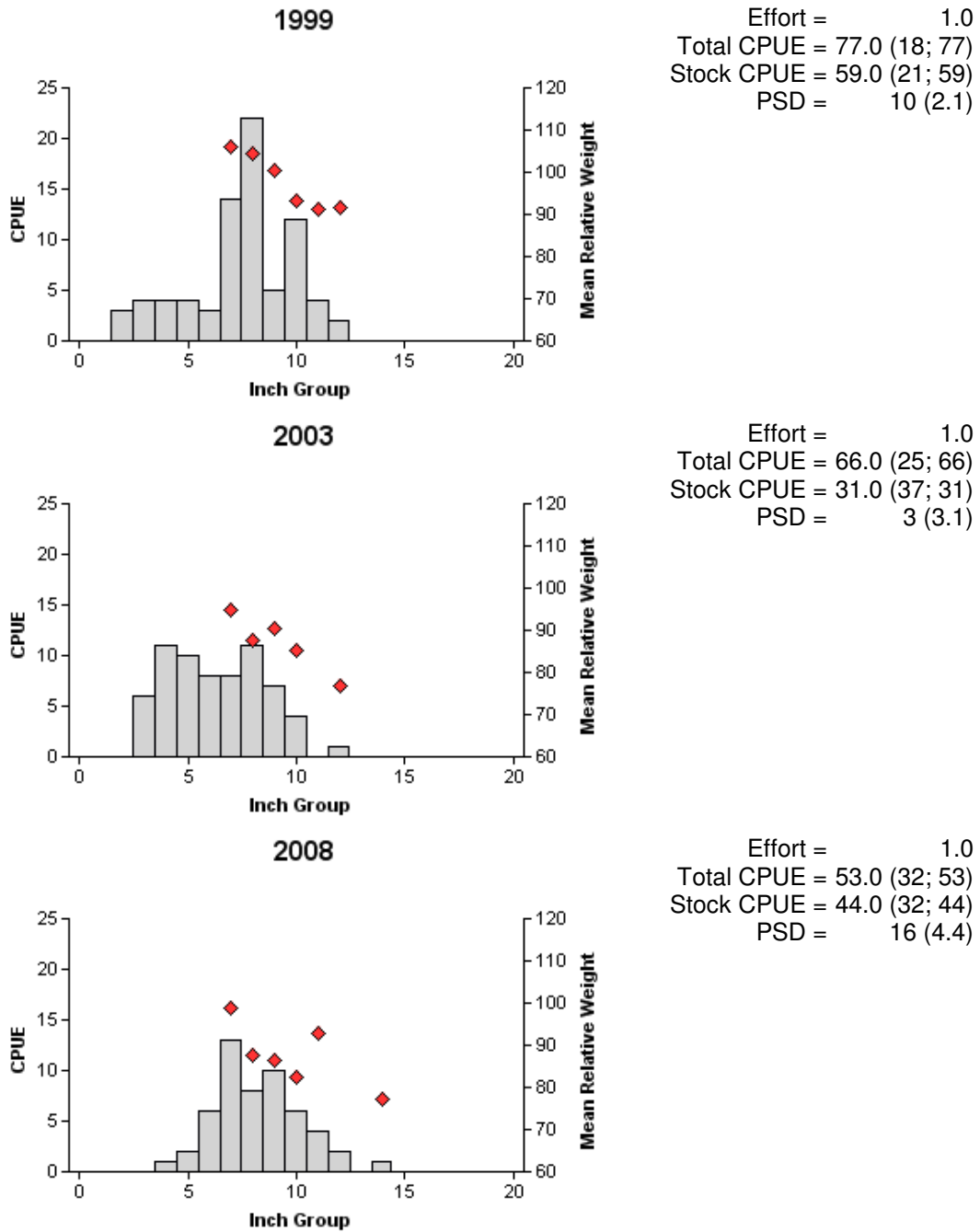


Figure 6. Number of spotted bass caught per hour (CPUE, bars) mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 1999, 2003, and 2008.

Largemouth Bass

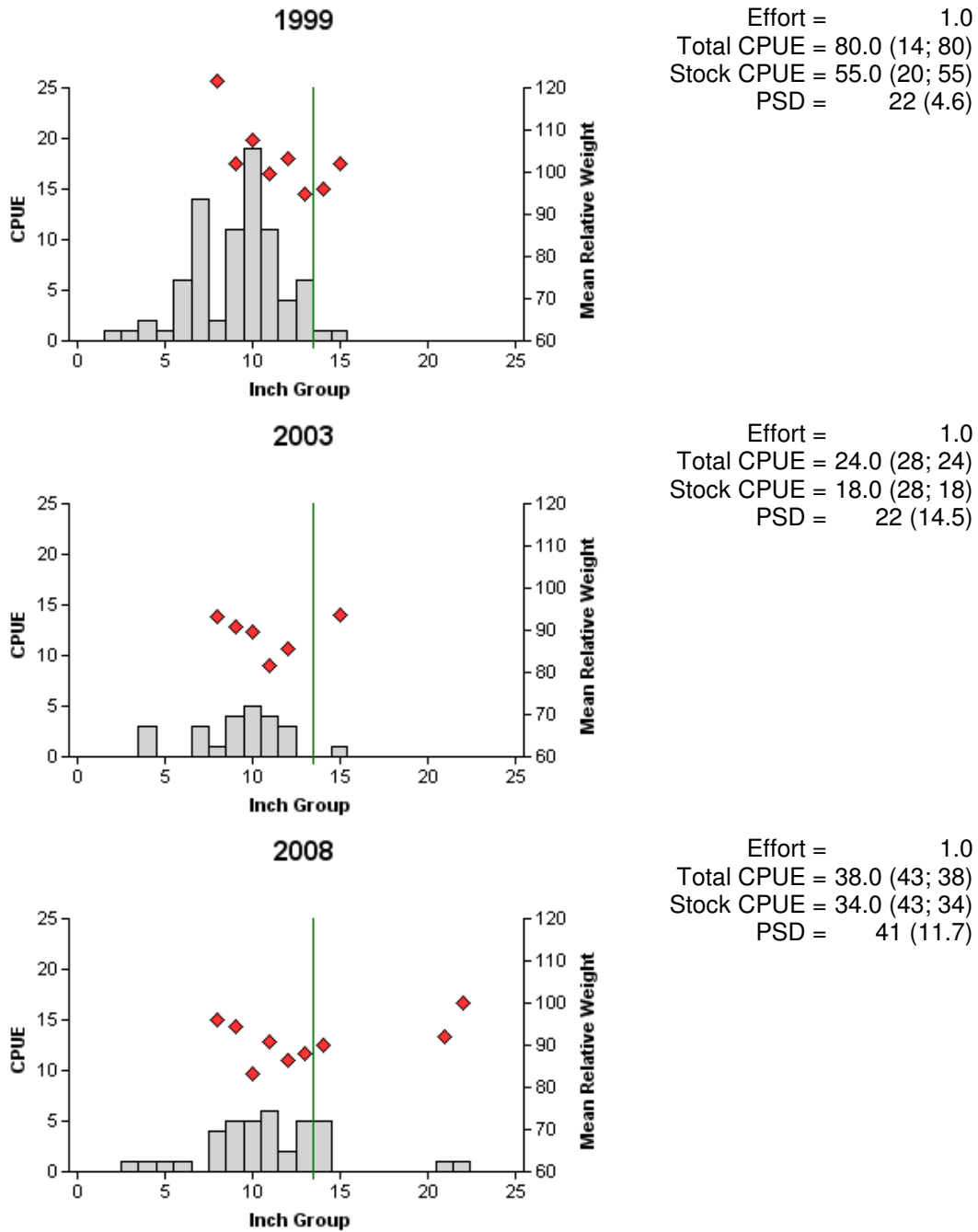


Figure 7. Number of largemouth bass caught per hour (CPUE, bars) mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Striker Reservoir, Texas, 1999, 2003, and 2008. Vertical lines indicate minimum length limit.

White Crappie

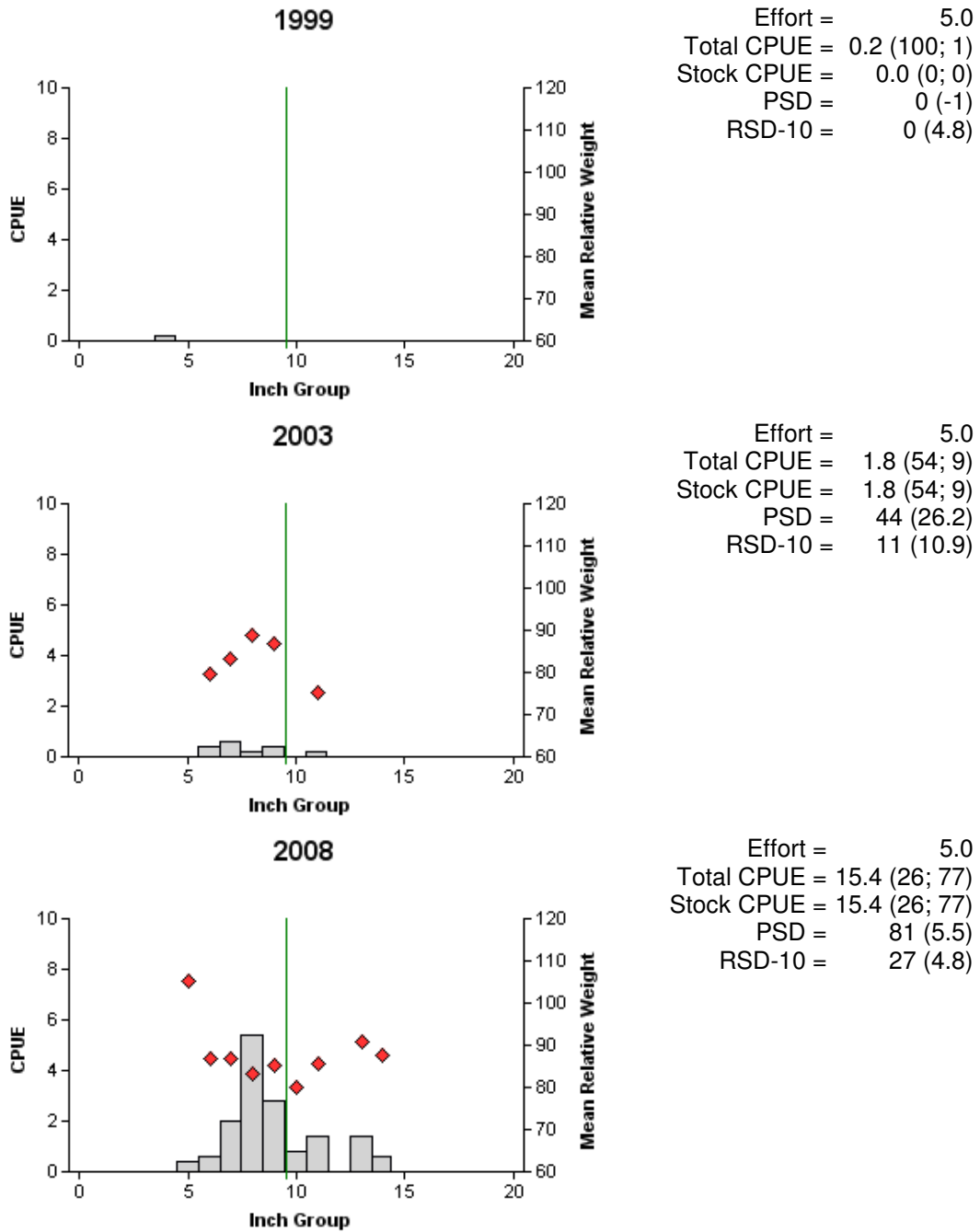


Figure 8. Number of white crappie caught per net night (CPUE, bars) mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Striker Reservoir, Texas, 1999, 2003, and 2008. Vertical lines indicate minimum length limit.

Table 5. Proposed sampling schedule for Striker Reservoir, Texas. Gill netting surveys are conducted in the spring, while standard electrofishing and trap net surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

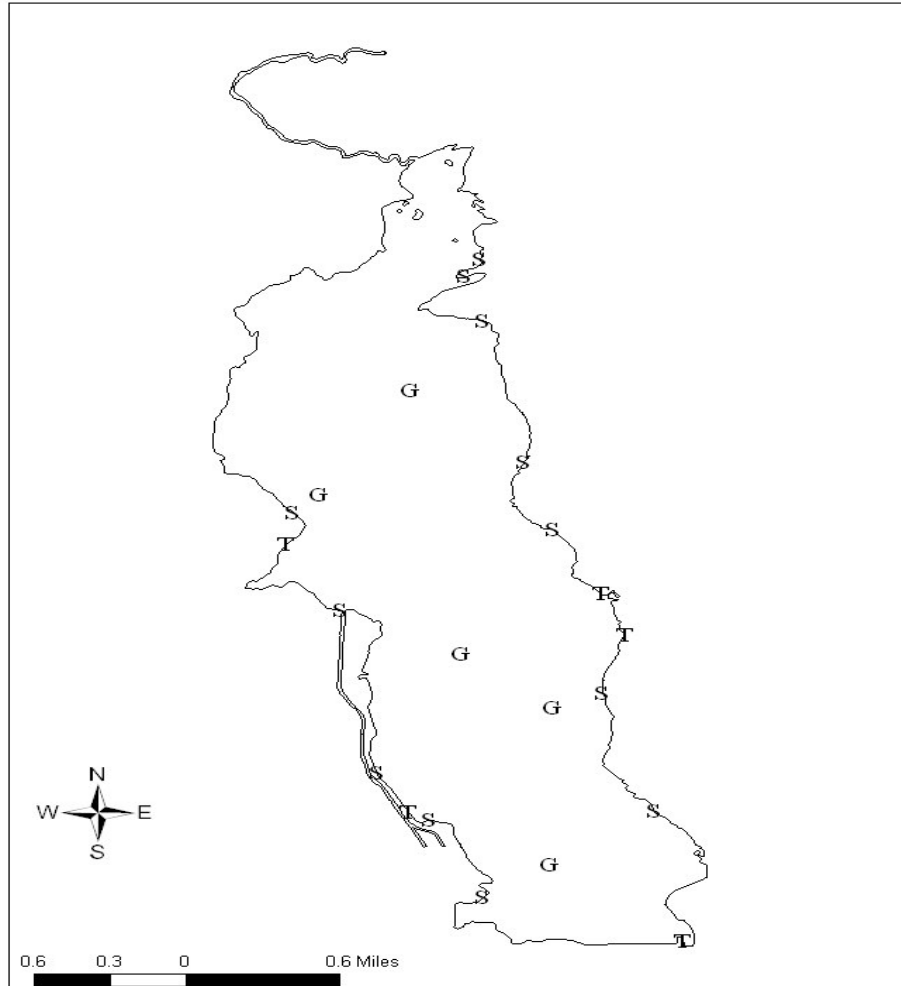
| Survey Year | Electrofisher | Gill Net | Trap Net | Access Point Survey | Vegetation Survey | Report |
|-------------|---------------|----------|----------|---------------------|-------------------|--------|
| 2009-2010 | | | | | | |
| 2010-2011 | | | | | | |
| 2011-2012 | | | | | | |
| 2012-2013 | S | S | S | S | S | S |

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Striker Reservoir, Texas, 2008-2009.

| Species | Gill Netting | | Trap Netting | | Electrofishing | |
|-------------------|--------------|------|--------------|------|----------------|------|
| | N | CPUE | N | CPUE | N | CPUE |
| Gizzard shad | | | | | 52 | 52.0 |
| Threadfin shad | | | | | 24 | 24.0 |
| Channel catfish | 47 | 9.4 | | | | |
| Flathead catfish | 2 | 0.4 | | | | |
| White bass | 5 | 0.8 | | | | |
| Redbreast sunfish | | | | | 5 | 5.0 |
| Bluegill | | | | | 38 | 38.0 |
| Longear sunfish | | | | | 30 | 30.0 |
| Redear sunfish | | | | | 12 | 12.0 |
| Spotted sunfish | | | | | 2 | 2.0 |
| Spotted bass | | | | | 53 | 53.0 |
| Largemouth bass | | | | | 38 | 38.0 |
| White crappie | | | 77 | 15.4 | | |
| Black crappie | | | 1 | 0.2 | | |

APPENDIX B



Location of sampling sites, Striker Reservoir, Texas, 2008-2009. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and S, respectively. Water level was near full pool at time of sampling.