

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-31

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

Lake Conroe

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SURVEY AND MANAGEMENT SUMMARY

The Lake Conroe fish community was surveyed from June 2005 through May 2006 using electrofishing, gill nets, and trap nets. A habitat and vegetation survey was conducted in August 2005. Angler use and harvest information was collected using a roving-creel survey which was conducted from June 2004 to May 2005. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Lake Conroe is a 20,118-acre reservoir on the West Fork of the San Jacinto River, Texas, built to provide water for municipal and industrial purposes. The reservoir was constructed in 1973 by the San Jacinto River Authority, the Water Development Board, and the City of Houston. The Sam Houston National Forest borders most of the upper third of Lake Conroe, and considerable private and commercial real estate development surround the lower two-thirds of the reservoir. Shoreline habitat consists primarily of bulkheads and boat docks in the lower reservoir and non-descript shoreline with overhanging brush in the upper reservoir. Native aquatic plants occur in the reservoir along with the exotic species hydrilla, water hyacinth, and giant salvinia.
- **Management History:** Important sport fishes in Lake Conroe include largemouth bass, various species of sunfish (bluegill, redear sunfish, spotted sunfish, and longear sunfish), white bass, palmetto bass, blue catfish, channel catfish, white crappie, and black crappie. An infestation of hydrilla covering about 50% of the reservoir at its peak in 1980 produced diverse sunfish and high-density largemouth bass populations but also seriously limited reservoir access and recreational use (Klussman et al. 1988). Between 1980 and 1982, 270,000 diploid grass carp were introduced into Lake Conroe resulting in near total removal of all aquatic macrophytes. After the removal of macrophytes, the reservoir's largemouth bass and sunfish populations declined. Crappie populations also declined to the point that the crappie fishery was poor. In the 1990's, the Lake Conroe fisheries rebounded, presumably because of nutrient enrichment from wastewater discharge, fertilizer runoff, and lateral line seepage. At that time, regulation changes were implemented protecting crappie to 10 inches and largemouth bass to 16 inches. The Lake Conroe Restocking Association (LCRA) began stocking advanced sized crappie (4 to 5 inch) and advanced sized Florida largemouth bass (2 to 4 inch). This grass roots organization works closely with TPWD to purchase advanced fingerlings not produced in the TPWD hatchery system. Since 1995, native vegetation restoration and a return of hydrilla have increased largemouth bass and sunfish recruitment. The challenge now is to control exotic vegetation without destroying the native aquatic plant community.
- **Fish Community**
 - **Prey species:** The predominant prey fish species at Lake Conroe is threadfin shad. Gizzard shad and various species of sunfishes, minnows, and silversides make up the remainder of the prey base. The size distribution of gizzard shad and sunfishes provides sufficient numbers of available prey for largemouth bass.
 - **Catfishes:** Catfishes, as a group, are the most highly sought after by anglers. Channel catfish are the most abundant catfish species in Lake Conroe. Blue catfish and flathead catfish are also present. The blue catfish population has been expanding for the past several years and makes up a higher proportion of the population than it did ten years ago when they were scarce in standard gill net monitoring surveys.
 - **Temperate basses:** White bass are native to the San Jacinto River drainage and have historically been abundant in Lake Conroe ever since the reservoir was impounded. Gill net catch rates declined temporarily after the palmetto bass were re-introduced in 1995 but have now recovered somewhat. Striped bass were stocked once in 1994 and

persisted in the population until about 1999 when they disappeared from gill net surveys (Henson and Webb, 2000). In 1995, palmetto bass were introduced to take advantage of the abundant available forage and provide anglers with an additional sport fishing opportunity.

- **Largemouth bass:** The largemouth bass is the most sought after species in Lake Conroe, and the population provides ample angling opportunities. Size structure data indicates good numbers of bass being spawned and recruiting into the fishery as well as good numbers of fish growing past the 16-inch minimum length limit. Bass up to 22 inches were captured in the 2005 electrofishing survey. Lake Conroe has produced a number of trophy largemouth bass since the introduction of Florida strain largemouth bass into the population, including three fish that were entered into the 2005-2006 ShareLunker Program. The current lake record largemouth bass was caught in 1997 and weighed 14.91 pounds.
- **Black and white crappie:** Through the stocking efforts of the LCRA, a stable population of black and white crappie has been maintained. Though trap net catch rates for crappie have declined since 2001, angler catches of crappie are good in the spring and fall. Creel data from 2004-2005 indicate that angling effort directed at crappie, as well as the directed angler catch rate, is about half that recorded in 2000-2001. However, the number of crappie harvested by anglers has not changed. White crappie attain large sizes in Lake Conroe with fish in the 2 to 3 pound class commonly caught by anglers.
- **Management Strategies:** The fisheries at Lake Conroe will continue to be managed with current length and bag limits. We will continue to work with San Jacinto River Authority, the Lake Conroe Association (LCA), and other interested groups to address the ongoing problem of exotic noxious vegetation at Lake Conroe. We will also continue to monitor native plant abundance to ensure that these beneficial populations are maintained and continue to expand in desirable areas. We will work to educate anglers and property owners regarding the benefits of native plants and the detrimental effects of introducing exotic plants. Palmetto bass stockings will continue annually, and Florida largemouth bass will be stocked as population genetics warrant. Largemouth bass will be sampled annually by electrofishing, and the morone populations will be sampled biennially with gill nets. The crappie population will be monitored biennially with trap nets. All other fish populations will be sampled every four years.

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INTRODUCTION

This document is a summary of fisheries data collected from Lake Conroe in 2005-2006. The purpose of this 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 is presented with the 2005-2006 data for comparison.

Reservoir Description

Lake Conroe is a 20,118-acre reservoir located on the west fork of the San Jacinto River in Montgomery and Walker Counties, Texas, lying within the Piney Woods Vegetation Area. Soil types are Conroe, Wicksburg-Susquehanna, and Ferris-Houston Black-Kipling Associations. The San Jacinto River Authority, the Water Development Board, and the City of Houston constructed Lake Conroe in 1973 to supply water for municipal and industrial purposes. The Sam Houston National Forest borders most of the upper third of Lake Conroe, and considerable private and commercial real estate development surround the lower two-thirds of the reservoir. Water level at Lake Conroe has been generally stable with a typical 1-2 foot drop in water level during the summer. The exceptions have been in 2001 when drought conditions caused summer water level to fall 3 feet below pool and in 2005-2006 when damage to the dam caused by Hurricane Rita required the water level to be held at 4 feet below pool for about 6 months (Figure 1.) Littoral habitat at Lake Conroe is provided by standing timber in the upper third of the reservoir; rock rip-rap along the dam, the FM 1097 bridge, and the FM 1375 bridge; and vegetation including submersed, emergent, and floating-leaved native vegetation as well as hydrilla.

Boat access is excellent with one free public ramp, two U.S. Forest Service ramps, and six marinas with fee ramps; however, public bank angling access is limited primarily to bank access at the U.S. Forest Service parks in the upper reservoir and one public park owned and maintained by the San Jacinto River Authority near the dam. Other descriptive characteristics of Lake Conroe are found in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Webb and Henson 2002) included:

1. Increase sport fish angling opportunities at Lake Conroe while better utilizing abundant forage fish.
Action: Palmetto bass fingerlings were stocked in the spring of 2003, 2004, and 2005. Morone spp. populations were sampled with gill nets in spring 2004 and 2006.
2. Enhance opportunities for catch and harvest of crappies.
Action: No fingerling crappies were stocked by Lake Conroe Restocking Association during this period. The crappie population was sampled by trap nets in fall 2003 and 2005.
3. Increase angler catch of trophy largemouth bass.
Action: Lake Conroe Restocking Association stocked 40,000 Florida largemouth bass fingerlings in the spring of 2002, and TPWD stocked 5,180 and 4,592 ShareLunker offspring in 2004 and 2006 respectively. Electrofishing surveys were conducted in fall 2002, 2003, 2004, and 2005.
4. Lack of littoral habitat for juvenile fish.
Action: Planting and monitoring of native aquatic vegetation has continued in Lake Conroe since 1995 as part of TPWD's Habitat Enhancement Initiative. As of the summer 2005 habitat survey, Lake Conroe contained 1,475 acres of native aquatic vegetation.
5. Support efforts to control giant salvinia, water hyacinth, and hydrilla.
Action: TPWD has assisted the San Jacinto River Authority (SJRA) with chemical control of giant salvinia, water hyacinth, and hydrilla annually. As of the summer 2005 survey, giant salvinia and water hyacinth occupied only 1.4 and 9.1 acres, respectively, due to an Integrated Pest Management (IPM) program consisting primarily of herbicide

applications and bio-control insects. Hydrilla however had increased to 868 acres by summer of 2005 despite intensive herbicide application and the presence of bio-control insects. In fall of 2005 an IPM plan was drafted with implementation beginning in the spring of 2006. In addition to herbicide application SJRA stocked 4,300 triploid grass carp as part of the IPM approach. Also, as part of the Lake Conroe Hydrilla Management Plan, an advisory group consisting of angling organizations and homeowner groups was formed to provide feedback regarding progress of the hydrilla management program and to allow input into the hydrilla management process.

6. Increase awareness of all Lake Conroe fisheries and management efforts.

Action: A Lake Conroe fishing brochure has been developed to promote the reservoir's fisheries. Public meetings have been held in several forums to disseminate information regarding Lake Conroe fish and habitat management efforts. Numerous newspaper articles, magazine articles, and news releases have been distributed regarding all aspects of fish and habitat management at Lake Conroe. The Lake Conroe Hydrilla Management Advisory Group was formed to better facilitate communication between TPWD and our constituent groups.

Harvest regulation history: Sport fish are currently managed under statewide fishing regulations with the exception of largemouth bass (Table 2). Largemouth bass were under the statewide minimum length limit of 14 inches until September 1, 1993 when it was increased to 16 inches. White bass regulations have fluctuated from a 10-inch minimum length limit to a 12-inch minimum limit. The current statewide regulation (10-inch minimum and 25 fish bag) started on September 1, 1988. The 12-inch limit started on September 1, 1992. Lake Conroe reverted to the statewide 10-inch minimum length limit for white bass on September 1, 2003. Channel catfish were regulated under an experimental 14-inch minimum length limit beginning in 1992, but the regulation was changed in 1995 to the statewide 12-inch minimum length limit.

Stocking history: Fish stockings at Lake Conroe began in 1970 with pre-impoundment stockings of northern largemouth bass, blue catfish, and channel catfish (Table 3). Walleye were introduced in 1973, but a sustainable population was never created. Palmetto bass were first introduced in 1978 and stocked for three consecutive years. Stocking was suspended after 1980 for fifteen years and then resumed in 1995. Palmetto bass have been stocked annually since 1995, except for 2000-2001. Striped bass were stocked one time in 1994 and remained part of the fishery until about 1999 (Henson and Webb 2000). Florida largemouth bass were first introduced in 1979 and have been stocked periodically over the past 27 years (including stockings of ShareLunker offspring in 2004 and 2006) to enhance the trophy potential of the largemouth bass population at Lake Conroe. The Lake Conroe Restocking Association (LCRA) (a non-profit citizen organization) has also been stocking advanced sized Florida largemouth bass as well as black crappie and white crappie into Lake Conroe since 1988. Their efforts have helped to increase the percentage of Florida largemouth bass genes at Lake Conroe as well as helped to enhance the crappie population.

Vegetation/habitat history:

By 1979, Lake Conroe was infested with about 10,000 acres of hydrilla. The infestation seriously limited access and recreational use at the reservoir. To gain relief from the overabundant exotic vegetation the Lake Conroe Association in conjunction with Texas A&M University stocked 270,000 diploid grass carp into the reservoir in 1980-1982. By 1983 Klussman et al. (1988) reported that macrophytes had been almost completely removed from the reservoir resulting in an increase in primary productivity. However by 1986 most nutrients had returned to pre-treatment levels (Klussman et al. 1988). Lake Conroe remained largely devoid of aquatic vegetation until 1995 when TPWD in conjunction with the U.S. Army Corps of Engineers (USCOE) Lewisville Aquatic Ecosystem Research Facility (LAERF), SJRA, LCRA, and the Texas Black Bass Unlimited (TBBU) began establishing native aquatic vegetation founder colonies at Lake Conroe. These efforts introduced several species of native submersed, emergent, and floating-leaved vegetation into the reservoir. In 1996 hydrilla re-emerged at Lake Conroe. For the next nine years TPWD and SJRA successfully treated hydrilla with herbicides while allowing the native vegetation to expand. However, by 2005 over 868 acres of hydrilla were present, creating the need for a

comprehensive hydrilla management plan including stockings of triploid grass carp as part of an IPM approach. In March 2006, 4,200 triploid grass carp were introduced into areas infested with hydrilla. In addition to issues with hydrilla, the exotic plants giant salvinia and water hyacinth are both present in Lake Conroe and present a potential problem. To date both these species have been controlled using an IPM approach consisting of bio-control insects and herbicide treatments conducted by SJRA and TPWD. Littoral habitat is also provided at Lake Conroe by standing timber in the upper third of the reservoir and riprap along the dam, the FM 1097 bridge, and the FM 1375 bridge.

METHODS

Fishes were collected by electrofishing (2 hours at 24, 5-min stations), gill netting (15 net nights at 15 stations), and trap netting (15 net nights at 15 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 gill and trap nets as the number of fish 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 2005).

Mean age at legal length was determined for palmetto bass. Ages were determined using otoliths from 23 individuals with lengths ranging from one inch below to one inch above the legal length limit.

Fin clips were taken from a sub-sample of 60 age-1 largemouth bass to determine genotype (pure Florida, pure northern, F1 and Fx hybrids) and Florida and northern largemouth bass allele frequencies. Samples were sent to the A. E. Wood Fish Hatchery Lab for analysis.

Structural shoreline habitat and vegetation surveys were conducted in the summer 2005 according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

A roving creel survey was conducted from June 2004 through May 2005 according to Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004). Nine creel days were surveyed each quarter for a total of 36 creel days. Creel day length was 12 hours during the summer, with one of three 4-hour periods sampled each day. During the remaining quarters, the creel day was defined as 10 hours, with one of two 5-hour periods sampled each day. Two spatial strata were defined for the summer quarter by dividing the lake in half at the FM 1097 bridge (mid-lake), with each stratum having an equal probability of being sampled on a given day. During the remaining quarters, the entire lake was treated as a single spatial stratum. Equal temporal and spatial probabilities were applied throughout the entire creel year.

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 ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics and for creel statistics, and SE was calculated for structural indices and IOV. Source for water level data was the United States Geological Survey (USGS) website.

RESULTS AND DISCUSSION

Habitat: As of fall 2005 Lake Conroe contained 1,475 acres of native vegetation including eel grass, water star grass, coontail, pondweeds, bushy pondweed, spike rushes, bulrush, American lotus, white water lily, and spatterdock and 868 acres of hydrilla (Table 4). In winter of 2006 a comprehensive hydrilla management plan was adopted utilizing an IPM approach. The plan includes the use of grass carp and hydrilla flies as bio-controls in addition to herbicides, physical barriers, and mechanical plant control devices by SJRA, TPWD, and private contractors. In spring of 2006 4,300 triploid grass carp were stocked at a rate of 5/hydrilla acre into Lake Conroe in the Caney Creek, Lewis Creek, and Little Lake Creek arms. The May 2006 vegetation survey has been completed with approximately 472.5 acres of hydrilla found.

One hundred of the grass carp stocked in spring 2006 were implanted with radio transmitters to determine movement from stocked areas and specifically to test the theory that initial movement of stocked grass carp could be limited if the fish were introduced into enclosures within the reservoir to give them the opportunity to acclimate. Fifty of the 100 grass carp were stocked into pens and held for 2 weeks then released on the same day the other 50 tagged control fish were brought from the hatchery and released into the reservoir. Radio tracking of these fish is ongoing through summer of 2006.

Due to damage by Hurricane Rita, Lake Conroe was lowered approximately 4 feet to facilitate repairs to the dam. Repairs are now complete; however, little rainfall has occurred during spring 2006 leaving the reservoir about 4 feet low going into summer 2006 (Figure 1). Although the low water is responsible for part of the decrease in hydrilla from fall 2005 to spring 2006, continued low water may allow the hydrilla to infest areas of the reservoir ordinarily too deep for establishment. Once established, hydrilla will probably persist in these areas even after water levels return to normal (Figure 1).

Creel: Total angling effort was 188,879 h in 2004-2005 (Table 6). Total angling expenditures were \$707,380. Channel catfish account for the highest directed angling effort at Lake Conroe at 39.3% of the total directed effort in 2004-2005 (Table 5). Largemouth bass are the second most sought after species after channel catfish with 31.3% of the directed effort in 2004-2005. Percentage of directed effort for crappies, white bass, and palmetto bass was 13.5%, 0.6%, and 1.3% respectively.

Prey species: Electrofishing catch rates of prey fishes remain high in 2005. The catch rate of all species combined in 2005 was 1,617/h, much higher than it was in 2001 (1,017.5/h) (Webb & Henson 2002). Threadfin shad were the most abundant species in the sample at 970.5/h. Gizzard shad were captured at a rate of 109.5/h, slightly below the 2001 rate of 129.5/h. The IOV is 68%, indicating adequate numbers of gizzard shad are available as prey.

Sunfish are also abundant as prey. Bluegills are the predominant sunfish species with an electrofishing catch rate of 316.0/h. The size structure of the population indicates adequate numbers of individuals available as prey; approximately one half of those captured were ≤ 4 inches (Figure 3). Bluegills grow large enough to provide a fishery at Lake Conroe. Bluegills to 9 inches were captured in the 2005 electrofishing sample. The RSD-6 for the 2005 sample was 29.0, indicating a high relative abundance of desirable sized specimens. Creel data from 2004-2005 indicate over 73,000 bluegill were harvested (a 10 fold increase from 2001-2002). Specimens as large as 10 inches were harvested (Table 7, Figure 4). Electrofishing catch rates of redear sunfish have steadily increased since 1998. The catch rate in 2005 was 67.5/h, an increase from 2001 and 2002 (20.0/h and 28.5/h respectively). Other sunfish species contributing to the forage base at Lake Conroe include longear, green, and warmouth.

Catfish: Both blue and channel catfish occur at Lake Conroe, but channel catfish are the dominant species (Appendix A). The gill net catch rate of channel catfish in spring 2006 was 17.3/nn (Figure 8), a decline since 1999 when the catch rate was 33.1/nn (Webb and Henson 2002). However, size distribution has substantially improved from a PSD of 14 in 2002 to 46 in 2006. The decline in relative abundance of channel catfish may be the result of increased directed angling pressure from 1.3h/acre in 2001 to 2.2h/acre in 2005 (Table 9). Catfishes were the most highly sought after species group in 2005

accounting for 45,295 h of directed effort, an increase from the 2001 directed effort estimate of 26,501 h. Angler catch rate of channel catfish (2.6/h) for anglers seeking all catfish was the highest of any species in 2005. Channel catfish harvested ranged from 12 to 24 inches in length (Figure 9).

Gill net catches of blue catfish have changed little since 2002. The catch rate in spring 2006 was 5.6/nn compared to 3.8/nn in 2004 and 6.5/nn in 2002 (Figure 6). A higher proportion of large fish were observed in 2004 (PSD=34) and in 2006 (PSD=31) compared to 2002 (PSD=1). Blue catfish to 28 inches total length were observed in the 2006 sample. While no directed effort by anglers was recorded in the 2004-2005 creel survey, anglers harvested an estimated 3,275 blue catfish during the creel period (Table 8).

Temperate basses: The gill net catch rate of white bass in spring 2006 (1.9/nn) was higher than it was in 2002 and 2004 (1.7/nn and 0.6/nn respectively) (Figure 10). Size distribution indicates a population with a high proportion of harvestable white bass (RSD10=83). The 2004-2005 creel survey indicated that directed pressure for white bass declined from 3,468 h in 2000-2001 to 1,083 h in 2004-2005; however, the catch rate rose from 0.2/h in 2000-2001 to 0.5/h in 2004-2005, and estimated harvest increased from 444 to 2,061 (Table 10). White bass harvested ranged from 12 to 15 inches in length (Figure 11).

The gill net catch rate of palmetto bass in 2006 (5.5/nn) was similar to that in 2002 (5.7/nn) but was higher than it was in 2004 (2.2/nn) (Figure 12). The RSD18 was 43, indicating a good proportion of the population is available to anglers for harvest. The 2004-2005 creel survey indicated that directed pressure for palmetto bass increased by 31% from 1,651 h in 2000-2001 to 2,155 h in 2004-2005 (Table 11). The catch per angler hour for anglers seeking palmetto bass increased from 0.0 in 2000-2001 to 0.13 in 2004-2005. Palmetto bass harvested ranged from 16 to 21 inches indicating some illegal harvest (Figure 13).

A sub sample of 23 palmetto bass from 17 to 19 inches in length was aged, and all were determined to be two years old (Figure 14).

Largemouth bass: Both largemouth and spotted black bass occur in electrofishing samples at Lake Conroe; however, spotted bass are few in number and do not contribute to the black bass fishery.

The electrofishing catch rate of largemouth bass in 2005 was 76.5/h, an increase from 2003 (51.5/h) and 2004 (41.0/h). The PSD was 41 and RSD16 was 10, slightly lower than it was in 2003 and 2004 (Figure 15). This change in size structure is due to an increase in the numbers of 8-12 inch fish in the 2005 sample. The largemouth bass fishery is second only to catfish with anglers at Lake Conroe (Table 5). Angling pressure directed toward largemouth bass increased from 35,679 h in 2000-2001 to 53,710 h in 2004-2005 (Table 12). Angler catch rate doubled from 0.20 fish/h in 2000-2001 to 0.41 fish/h in 2004-2005. Estimated harvest also increased from 192 fish in 2000-2001 to 3,715 fish in 2004-2005; however, creel procedures changed during that period, and fish in live wells (possibly destined for eventual release) were recorded as harvested in the later creel. Largemouth bass harvested ranged from 12 to 21 inches indicating some illegal harvest (Figure 16).

Stockings of Florida largemouth bass (FLMB) both by TPWD and the LCRA have helped maintain a high frequency of Florida alleles in the population at Lake Conroe (Table 13). A sub sample of 60 age-1 fish from the fall 2005 sample indicates an allele frequency of 71.3% with 12.0% of the sample made up of pure FLMB. No northern strain largemouth bass occurred in that sub sample.

Crappie: Trap nets in fall 2005 captured 2.5 white crappie/nn and 0.2 black crappie/nn (Figure 17, Figure 19). These numbers are much lower for both species than they were in 2001 but slightly increased from 2003. Length frequency data indicates good numbers of white crappie available to anglers (RSD10=31). Directed pressure toward crappies declined from 34,598 h in 2000-2001 to 15,640 h in 2004-2005. This may have been related to decline in angler catch rate from 0.60/angler hour in 2000-2001 to 0.38/angler hour in 2004-2005 (Tables 14 and 15). Crappies harvested ranged from 10 to 16 inches (Figures 18 and 20).

Fisheries management plan for Lake Conroe, Texas

Prepared – July 2006

ISSUE 1 Prey fish densities in Lake Conroe have remained very high over the past several years. Beginning in 1995, palmetto bass were introduced to provide an additional game fish for anglers and to take advantage of the abundant pelagic prey base. We anticipated no adverse impacts to native sport fish stocks; however, a decline in the relative abundance of white bass in our gill net samples beginning in 1996 was statistically correlated to an increase in the occurrence of palmetto bass in those samples (Webb and Henson 2002). Few anglers target white bass at Lake Conroe

MANAGEMENT STRATEGIES

1. Continue stocking palmetto bass at a rate of 10 fish per acre.
2. Continue to monitor white bass and palmetto bass populations with gill nets biennially for any changes in relative abundance and size distribution.

ISSUE 2 Crappies (black and white) nearly disappeared from Lake Conroe following the removal of aquatic macrophytes by grass carp in the early 1980's (Webb et al.1994). Since the Lake Conroe Restocking Association began stocking advanced juvenile crappie in 1990, the crappie fishery has rebounded; however, declines in crappie catch and directed effort have been noted in the most recent creel survey.

MANAGEMENT STRATEGIES

1. Continue to support the LCRA in the stocking of sub-adult (at least 4 inch) crappie annually.
2. Maintain the current 10-inch minimum length limit to allow protection of stocked fish until they have had the opportunity to spawn.
3. Continue to monitor the crappie populations and angler harvest every 2 years at Lake Conroe, and advise LCRA if stockings are no longer necessary.

ISSUE 3 Lake Conroe has proven potential to produce trophy-sized largemouth bass. Directed effort for largemouth bass is very high at Lake Conroe and anglers desire the potential to catch largemouth bass >10 pounds. Stockings of Florida largemouth bass may be needed to achieve this goal.

MANAGEMENT STRATEGIES

1. Continue to support the efforts of the Lake Conroe Restocking Association and other organizations, to stock Florida largemouth bass fingerlings.
2. Monitor Florida bass size distribution, body condition, and growth as well as genetics (allele frequencies and relative abundance of pure Florida bass in the stock) in the fall of 2006.
3. Continue to manage the largemouth bass population under the special 16-inch minimum length limit. This regulation provides additional protection to stocked FLMB, enhances recruitment, and improves the quality of the fishery.
4. Request stocking of additional Florida largemouth bass at a rate of 25/acre in 2007.

ISSUE 4 As of fall 2005 Lake Conroe contained 1,475 acres of native vegetation and 868 acres of hydrilla. In the winter of 2006 a comprehensive hydrilla management plan was adopted utilizing an IPM approach. The plan includes the use of grass carp and hydrilla flies as bio-controls in addition to herbicides, physical barriers, and mechanical plant control devices by SJRA, TPWD, and private contractors. In spring of 2006 4,300 triploid grass carp were stocked (5/hydrilla acre) into Lake Conroe in the Caney Creek, Lewis Creek, and Little Lake Creek arms.

MANAGEMENT STRATEGIES

1. Conduct comprehensive vegetation surveys in May, July, and September 2006 to determine if additional grass carp stocking is needed for hydrilla control as part of the Lake Conroe hydrilla management plan.
2. Assist the SJRA with herbicide treatments of hydrilla, water hyacinth, and giant salvinia whenever requested and when feasible.
3. Assist in the dissemination of information to the public on the importance of early detection and treatment of exotic aquatic plants.
4. Continue to monitor the progress of existing native aquatic vegetation plantings, making additional plantings when necessary.

ISSUE 5 Although Lake Conroe is a high profile fishery receiving a great deal of media attention, many anglers are still unfamiliar with on-going fisheries management strategies.

MANAGEMENT STRATEGIES

1. Seek funding for the construction of angler information boards for use at major access points. Boards will be used to display information on harvest regulations, TPWD Angler Recognition Programs, and cooperative efforts between TPWD and LCRA.
2. Encourage marina operators to provide weigh stations with certified scales to give anglers greater opportunity to participate in TPWD angler recognition programs, thereby allowing TPWD and LCRA to publicize outstanding catches from Lake Conroe.
3. Publicize stocking events through press releases to news media and local print media giving reasons for all stockings.
4. Promote and publicize LCRA's stocking and fund raising efforts designed to improve fishing at Lake Conroe.

SAMPLING SCHEDULE JUSTIFICATION: Fall electrofishing surveys are conducted annually to monitor largemouth bass and forage populations. Trap net and gill net surveys are conducted biennially to monitor crappie, catfish, and true bass populations. Creel surveys are conducted biennially to monitor sport fish catch and harvest and angler expenditures. Vegetation surveys are currently conducted triannually to monitor exotic and native vegetation as part of the Lake Conroe Hydrilla Management Plan. Structural habitat surveys and access surveys are conducted every 4 years (Table 16).

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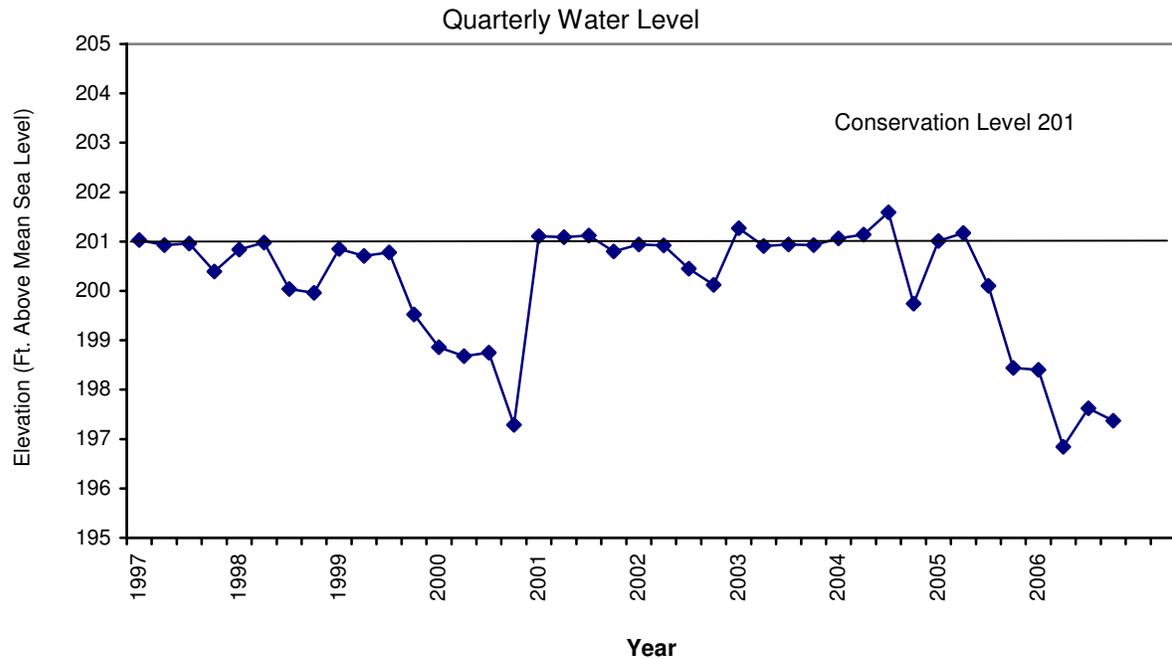


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Conroe, Texas.

Table 1. Characteristics of Lake Conroe, Texas.

Characteristic	Description
Year constructed	1973
Controlling authority	San Jacinto River Authority
Counties	Montgomery and Walker
Reservoir type	Main stream
Shoreline Development Index (SDI)	7.4
Conductivity	140-260 μ mhos/cm

Table 2. Harvest regulations for Lake Conroe, 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, palmetto	5	18 - No Limit
Bass, white	25	10 - No Limit
Bass, largemouth	5	16 - No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

Table 3. Stocking history of Lake Conroe, Texas. Size Categories are: FRY =<1 inch; FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

Species	Year	Number	Size
Blue catfish	1971	27,440	FGL
Channel catfish	1970	2,000	FGL
	1971	193,852	FGL
	1973	68,570	FGL
	Total	264,422	
Striped bass	1994	210,000	FGL
Palmetto bass	1978	119,313	FGL
	1979	210,950	FGL
	1980	126,000	FGL
	1995	212,900	FGL
	1996	102,228	FGL
	1997	123,097	FGL
	1998	217,800	FGL
	1999	106,338	FGL
	2002	105,170	FGL
	2003	151,195	FGL
	2004	201,554	FGL
	2005	201,367	FGL
	2006	132,429	FGL
	Total	2,010,341	
Largemouth bass	1970	75,000	FGL
Florida largemouth bass	1979	549,104	FGL
	1988	55,278	FGL
	1989	52,148	FGL
	1990	51,256	FGL
	1991	151,453	FGL
	1992	209,310	FGL
	1993	101,217	FGL
	1994	103,416	FGL
	1995	526,806	FGL
	1996	543,871	FGL
	1997*	40,000	FGL
	1999	29,607	FGL
	2000	296,696	FGL
	2000*	31,050	FGL
	2001	448,267	FGL
	2002*	40,000	FGL
	2004	5,180	FGL
2006	4,592	FGL	
Total	3,239,251		

Table 3 continued. Stocking history of Lake Conroe, Texas. Size Categories are: FRY =<1 inch; FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

Species	Year	Number	Size
White crappie	1990*	10,000	FGL
	1992*	5,371	FGL
	1995*	18,200	FGL
	1996*	26,444	FGL
	Total	60,015	
Black crappie	1989*	99,850	FGL
	1992*	6,371	AFGL
	1994*	41,970	AFGL
	1996*	22,000	AFGL
	1998*	41,466	AFGL
	1999*	13,300	AFGL
	2000*	36,500	AFGL
Total	261,457		
Walleye	1973	5,900,000	FGL
	1974	4,500,000	FGL
	Total	10,400,000	
White amur (diploid)	1981**	166,835	AFGL
	1982**	103,165	AFGL
	Total	270,000	
White amur (triploid)	2006	4,300	AFGL

* Private stocking by Lake Conroe Restocking Association.

** Stocking authorized by Texas Legislature in cooperation with Texas A&M University for research study on the effectiveness of white amur at removal of the exotic plant hydrilla.

Table 4. Survey of littoral zone and physical habitat types, Lake Conroe, Texas. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area were 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
Bulkhead ¹	10.7	2.3		
Concrete ¹	2.5	1.9		
Featureless ¹	5.0	3.8		
Flooded terrestrial	9.8	7.4		
Native emerged	0.3	0.2		
Overhanging brush	3.4	4.7		
Rip rap ¹	6.5	5.0		
Under development ¹	1.4	1.1		
Bulkhead/ Boat dock ¹	69.9	53.3		
Bulkhead/ Dead trees ¹	1.1	0.9		
Concrete/ Boat dock ¹	0.3	0.3		
Featureless/ Dead trees ¹	0.4	0.3		
Flooded terrestrial/ Dead trees	2.4	1.8		
Flooded terrestrial/ Native emerged	9.4	7.2		
Flooded terrestrial/ Native submerged	0.1	0.1		
Overhanging brush/ Dead trees	12.0	9.1		
Overhanging brush/ Native emerged	0.3	0.2		
Flooded terrestrial/ Dead trees/ Native emerged	0.2	0.1		
Flooded terrestrial/ Native emerged/ Native submerged	0.4	0.3		
Alligatorweed			Trace	<0.1
Giant salvinia			1.4	<0.1
Hydrilla			868.0	4.1
Parrots feather			Trace	<0.1
Water lettuce			3.7	<0.1
Water hyacinth			9.1	<0.1
Native emerged			339.2	1.6
Native submerged			103.2	0.5
Mixed native emerged/native submerged			781.8	3.7
Mixed native emerged/submerged/floating			250.8	1.2

¹ – Abiotic features

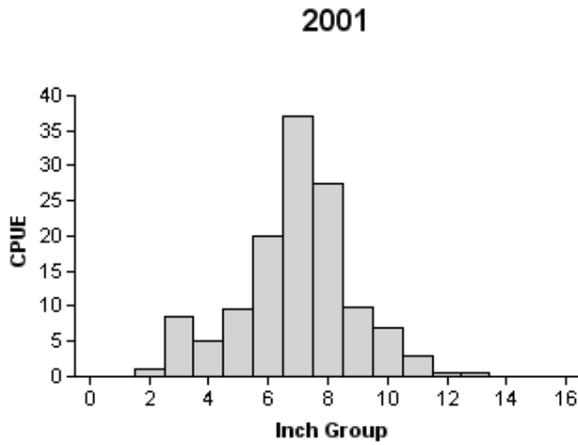
Table 5. Percent directed angler effort by species for Lake Conroe, Texas, 2000-2005. The 2000/2001 creel survey was an access point survey, and the 2004/2005 survey was a roving survey.

Species	Year	
	2000/2001	2004/2005
Catfishes	19.0	39.3
White bass	2.5	0.6
Palmetto bass	1.2	1.3
Largemouth bass	32.7	31.3
Crappies	25.0	13.5

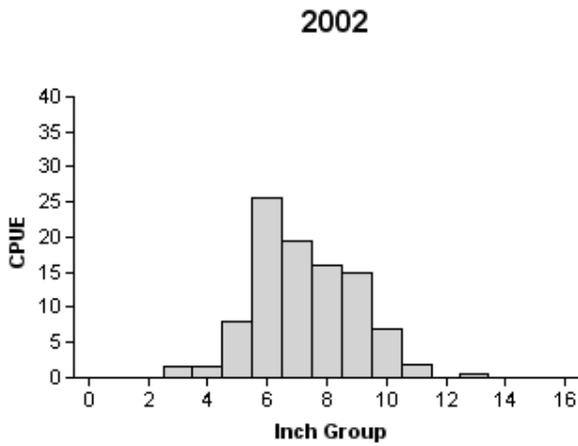
Table 6. Total fishing effort (h) for all species and total directed expenditures at Lake Conroe, Texas, 2000-2005. The 2000/2001 creel survey was an access point survey, and the 2004/2005 survey was a roving survey.

Creel Statistic	Year	
	2000/2001	2004/2005
Total fishing effort	138,635	188,879
Total directed expenditures	\$547,658	\$707,380

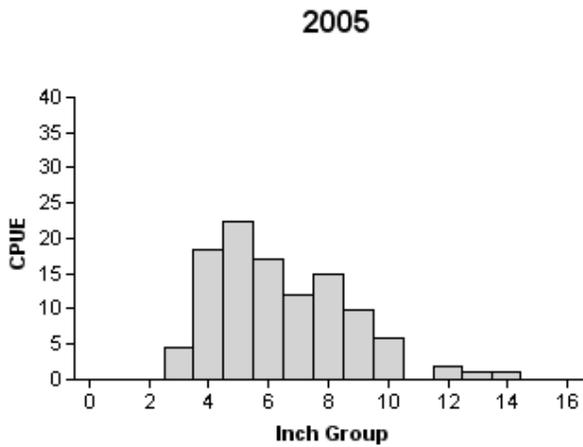
Gizzard Shad



Effort = 2.0
 Total CPUE = 129.5 (19; 259)
 Stock CPUE = 85.5 (19; 171)
 PSD = 5.0 (0.03)
 IOV = 62.55 (0.07)



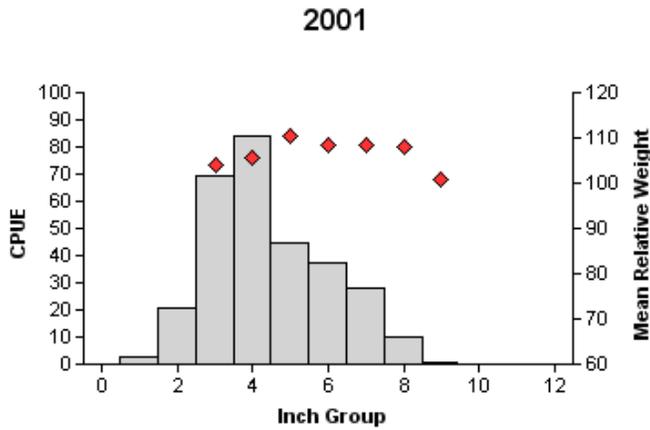
Effort = 2.0
 Total CPUE = 96.5 (22; 193)
 Stock CPUE = 60.0 (21; 120)
 PSD = 4.0 (0.03)
 IOV = 58.03 (0.08)



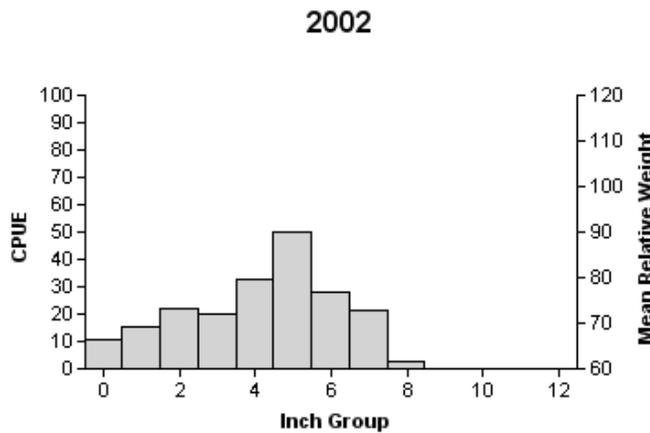
Effort = 2.0
 Total CPUE = 109.5 (23; 219)
 Stock CPUE = 47.0 (19; 94)
 PSD = 9.0 (0.03)
 IOV = 68.04 (0.07)

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, Lake Conroe, Texas, 2001, 2002, and 2005.

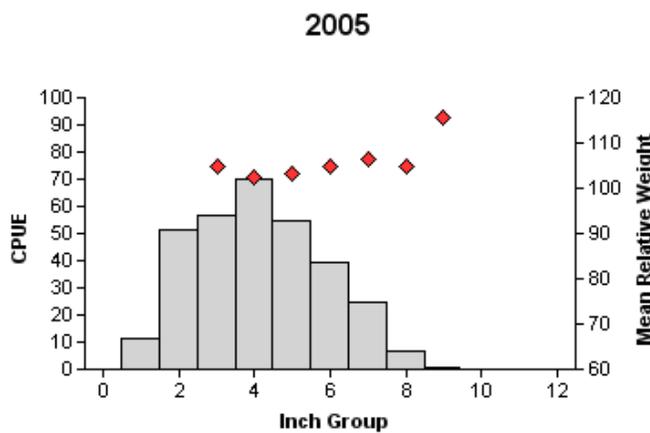
Bluegill



Effort = 2.0
 Total CPUE = 297.0 (21; 594)
 Stock CPUE = 273.5 (22; 547)
 PSD = 28.0 (0.1)
 RSD-6 = 28.0 (0.1)



Effort = 2.0
 Total CPUE = 203.0 (17; 406)
 Stock CPUE = 154.5 (20; 309)
 PSD = 34.0 (0.07)
 RSD-6 = 34.0 (0.07)



Effort = 2.0
 Total CPUE = 316.0 (25; 632)
 Stock CPUE = 253.0 (22; 506)
 PSD = 28.0 (0.09)
 RSD-6 = 29.0 (0.1)

Figure 3. Number of bluegill caught per hour (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Conroe, Texas 2001, 2002, and 2005. Relative Weight was not evaluated in 2002.

Bluegill

Table 7. Creel survey statistics for bluegill at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting bluegill and total harvest is the estimated number of bluegill harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 creel was an access point creel, and the 2004/2005 creel was a roving creel.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	3,261 (559.1)	6,736 (45.1)
Directed effort/acre	0.16 (559.1)	0.33 (45.1)
Total catch per hour	0.0	2.5 (60.9)
Total harvest	7,540 (106.8)	73,064 (45.5)
Harvest/acre	0.37 (106.8)	3.63 (45.5)
Percent legal released	66.2	19.3

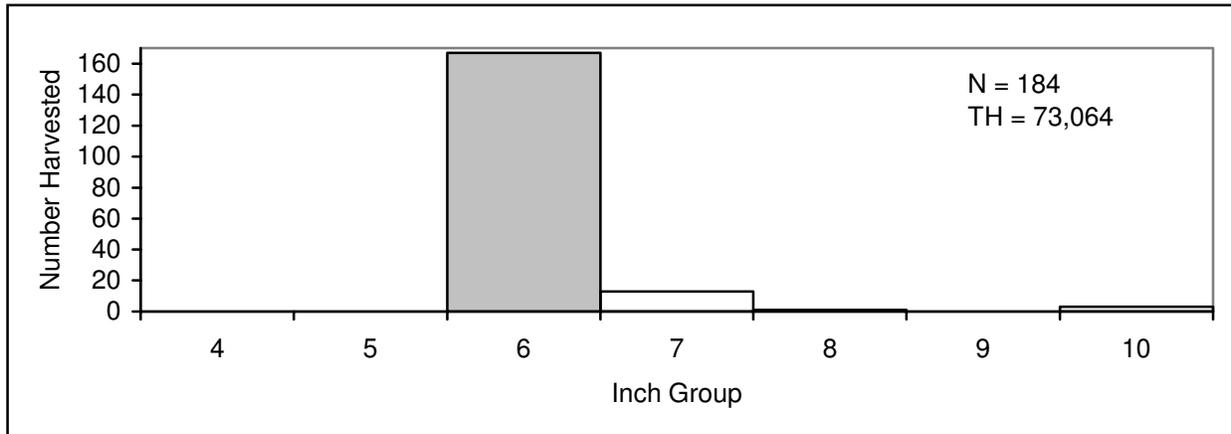


Figure 4. Length frequency of harvested bluegill observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested sunfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

Redear Sunfish

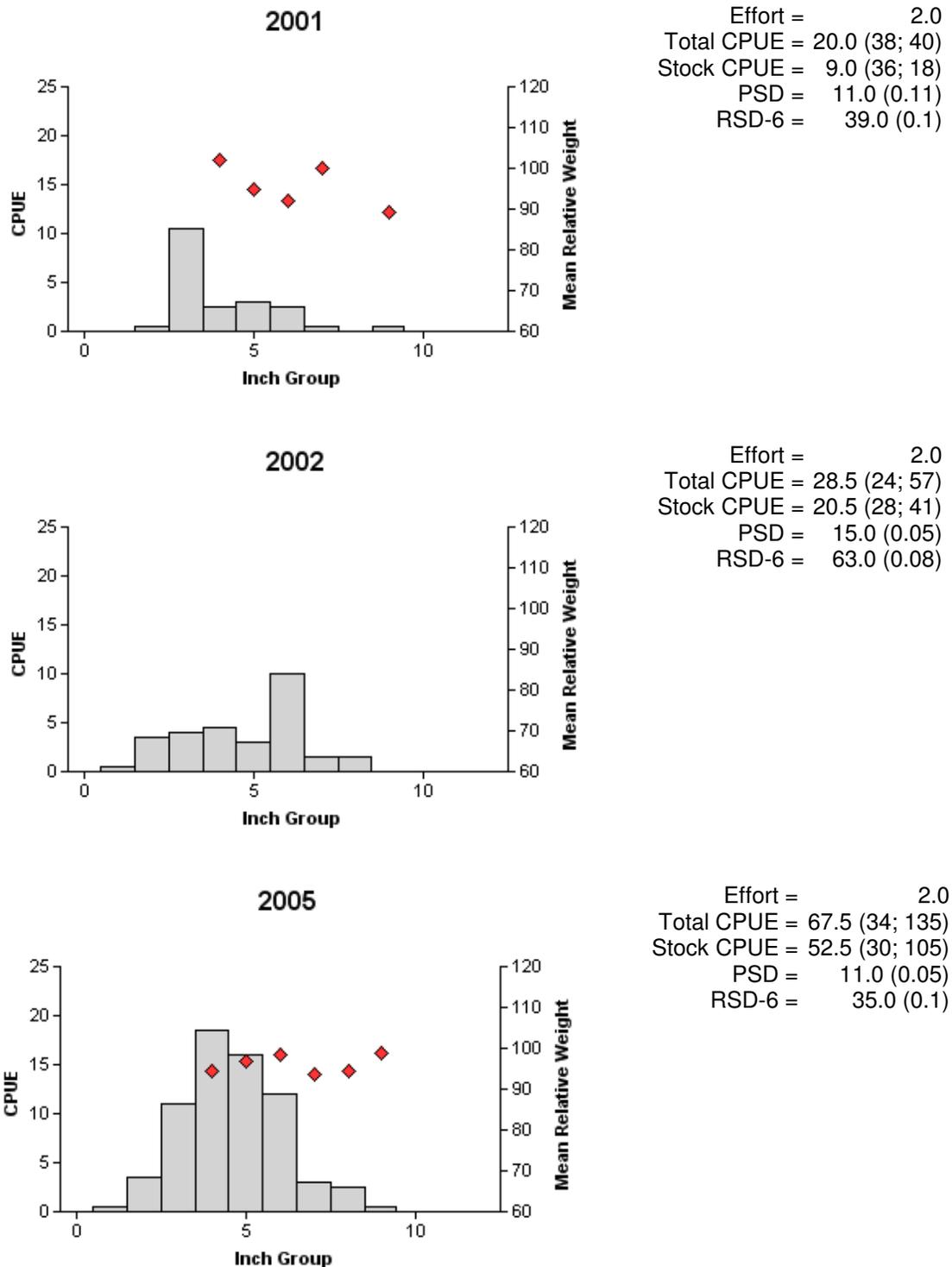


Figure 5. Number of redear sunfish caught per hour (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Conroe, Texas 2001, 2002, and 2005. Relative Weight was not evaluated in 2002.

Blue Catfish

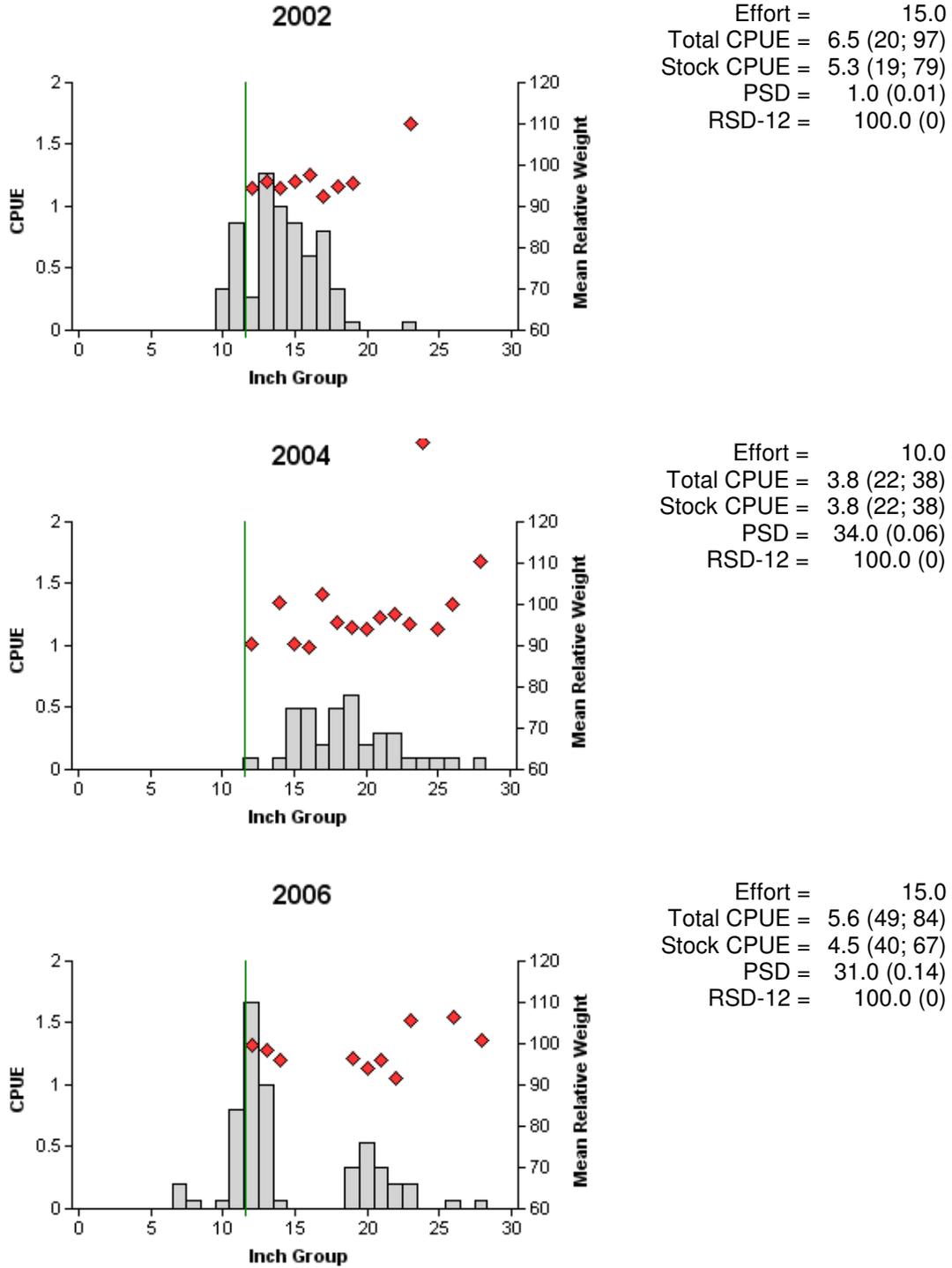


Figure 6. Number of blue catfish caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Conroe, Texas, 2002, 2004, and 2006. Vertical line represents minimum length limit at time of survey.

Blue Catfish

Table 8. Creel survey statistics for blue catfish at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting any catfish species and total harvest is the estimated number of blue catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 creel was an access point creel, and the 2004/2005 creel was a roving creel.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	26,501 (70.4)	45,295 (16.9)
Directed effort/acre	1.3 (70.4)	2.2 (16.4)
Total catch per hour	2.60 (49.4)	1.16 (36.3)
Harvest/acre	0.03 (831.2)	0.16 (124.1)
Total harvest	594 (831.2)	3,275 (124.1)
Percent legal released	4.7	2.2

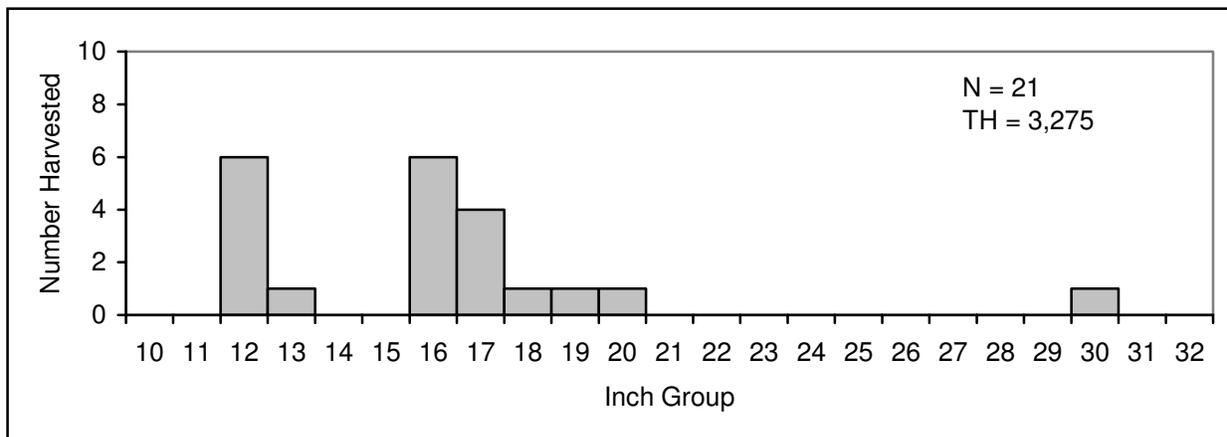


Figure 7. Length frequency of harvested blue catfish observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested blue catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

Channel Catfish

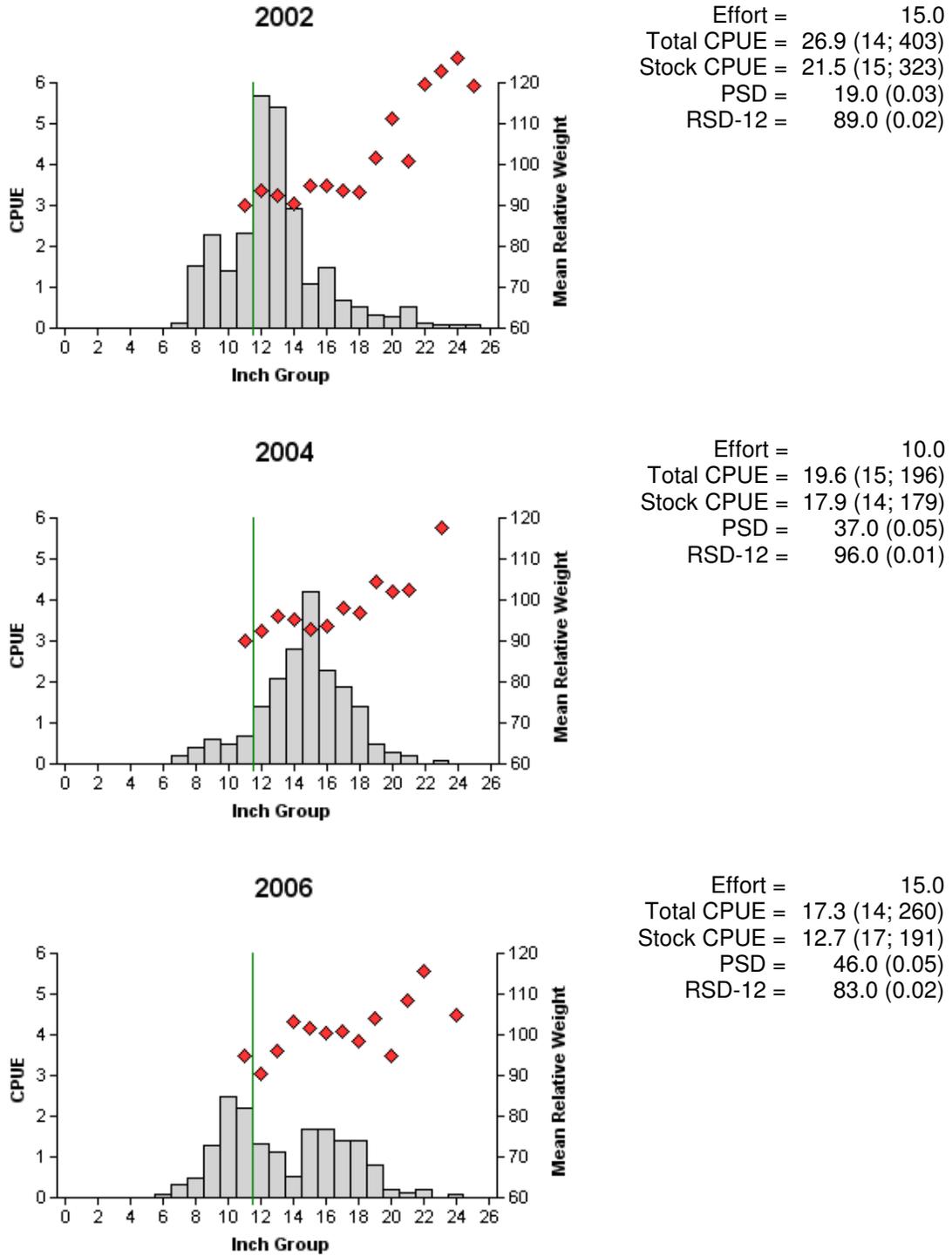


Figure 8. Number of channel catfish caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Conroe, Texas, 2002, 2004, and 2006. Vertical line represents minimum length limit at time of survey.

Channel Catfish

Table 9. Creel survey statistics for channel catfish at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting any catfish species and total harvest is the estimated number of channel catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 creel was an access point creel, and the 2004/2005 creel was a roving creel.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	26,501 (70.4)	45,295 (16.9)
Directed effort/acre	1.3 (70.4)	2.2 (16.4)
Total catch per hour	2.60 (49.4)	1.16 (36.3)
Harvest/acre	1.2 (42.7)	4.1 (45.8)
Total harvest	24,110 (42.7)	83,360 (45.8)
Percent legal released	4.7	2.8

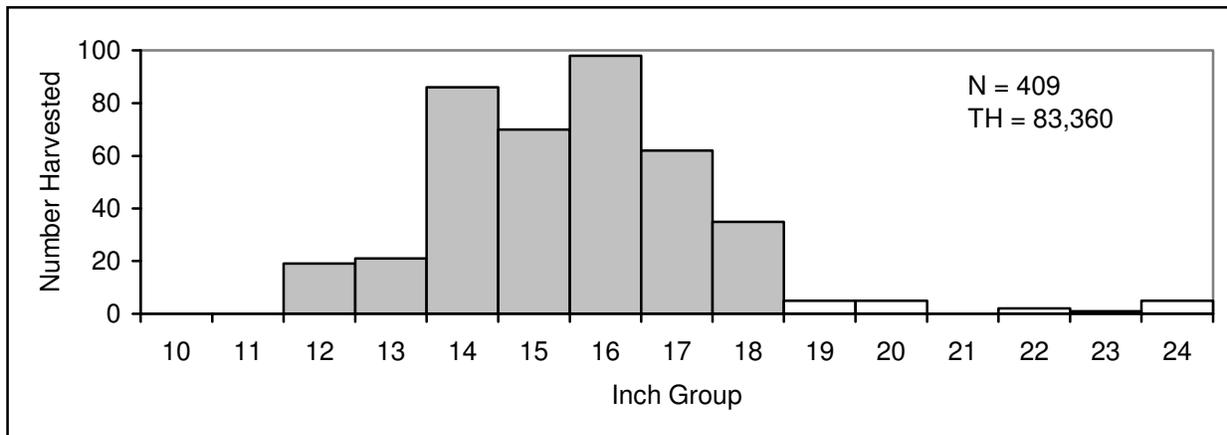


Figure 9. Length frequency of harvested channel catfish observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested channel catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

White Bass

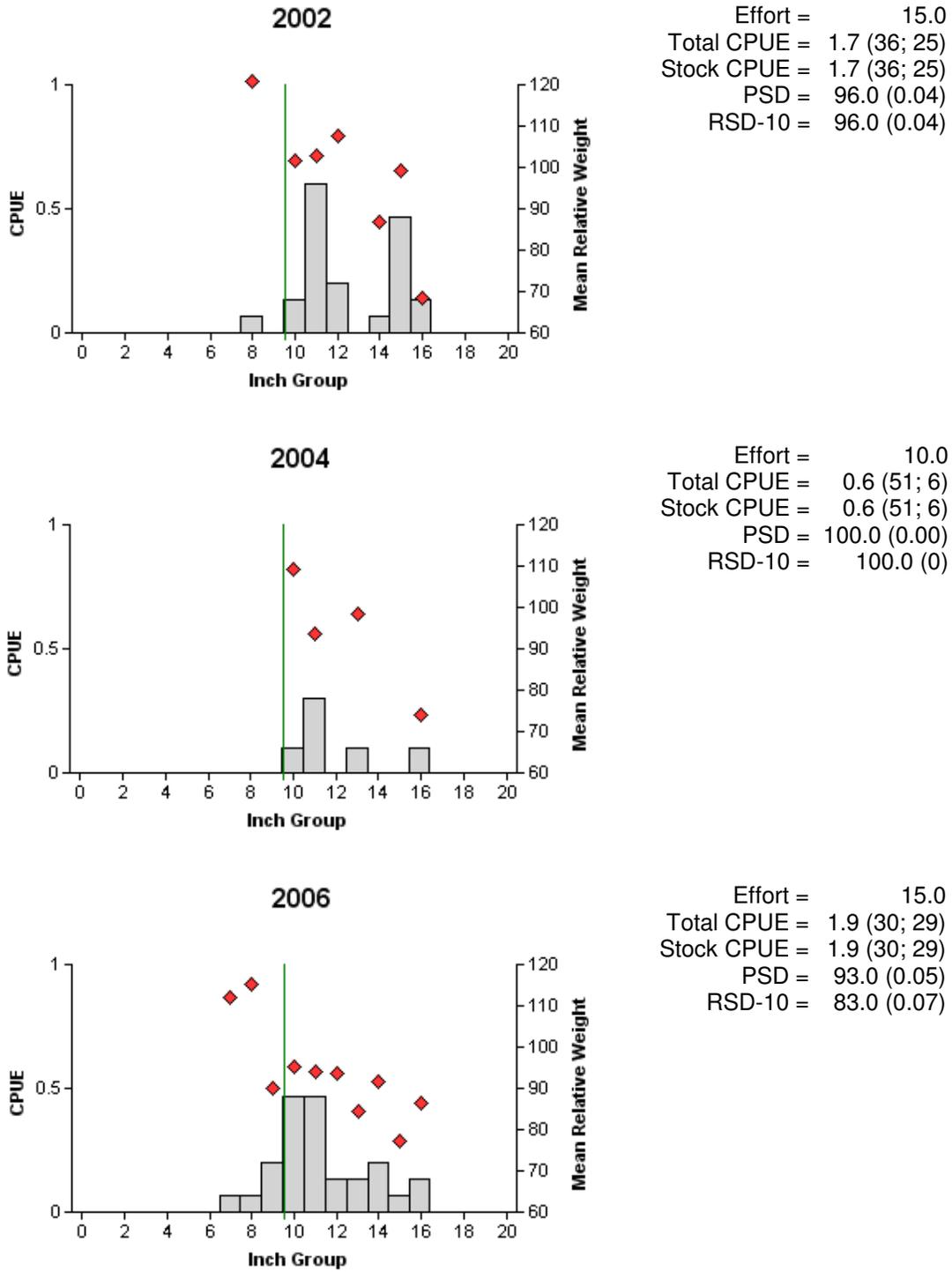


Figure 10. Number of white bass caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Lake Conroe, Texas, 2002, 2004, and 2006. Vertical line represents minimum length limit at time of survey.

White Bass

Table 10. Creel survey statistics for white bass at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting white bass and total harvest is the estimated number of white bass harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 creel was an access point creel, and the 2004/2005 creel was a roving creel.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	3,468 (75.6)	1,083 (85.8)
Directed effort/acre	0.17 (75.6)	0.05 (85.8)
Total catch per hour	0.2 (104.7)	0.5 (n/a)
Harvest/acre	0.02 (282.2)	0.10 (240.6)
Total harvest	444 (282.2)	2,061 (240.6)
Percent legal released	44.1	0.0

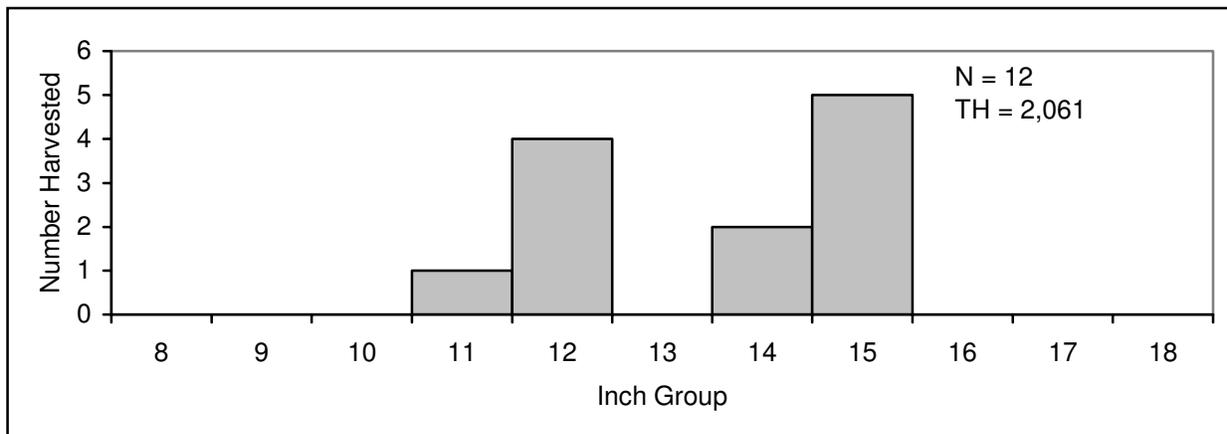
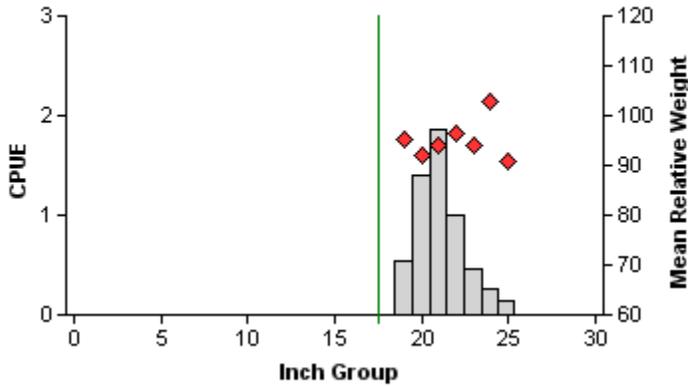


Figure 11. Length frequency of harvested white bass observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested white bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

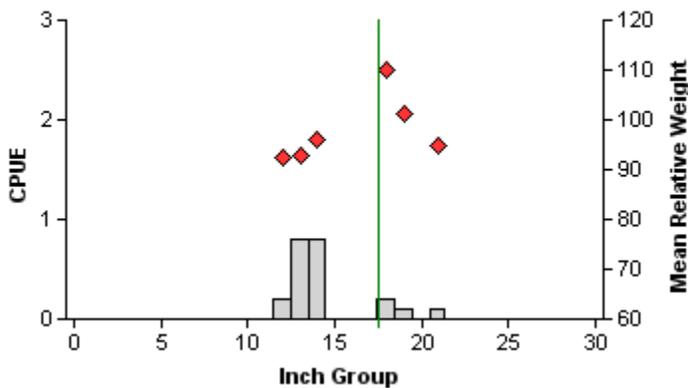
Palmetto Bass

2002



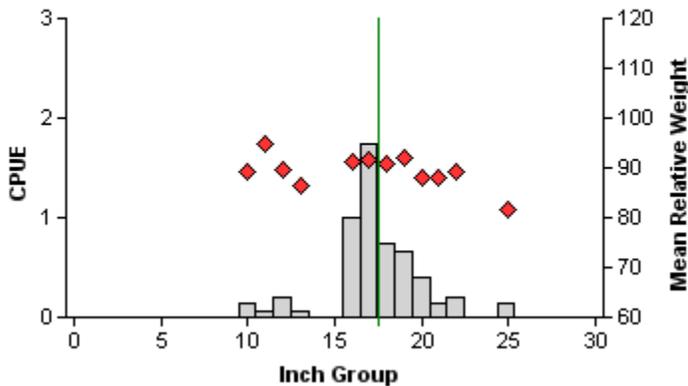
Effort = 15.0
 Total CPUE = 5.7 (28; 85)
 Stock CPUE = 5.7 (28; 85)
 PSD = 100.0 (0)
 RSD-18 = 100.0 (0)

2004



Effort = 10.0
 Total CPUE = 2.2 (42; 22)
 Stock CPUE = 2.2 (42; 22)
 PSD = 100.0 (0.00)
 RSD-18 = 18.0 (0.2)

2006



Effort = 15.0
 Total CPUE = 5.5 (26; 82)
 Stock CPUE = 5.5 (26; 82)
 PSD = 96.0 (0.03)
 RSD-18 = 43.0 (0.02)

Figure 12. Number of palmetto bass caught per net night (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Lake Conroe, Texas, 2002, 2004, and 2006. Vertical line represents minimum length limit at time of survey.

Palmetto Bass

Table 11. Creel survey statistics for palmetto bass at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting palmetto bass and total harvest is the estimated number of palmetto bass harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 creel was an access point creel, and the 2004/2005 creel was a roving creel.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	1,651 (106.4)	2,155 (76.7)
Directed effort/acre	0.08 (106.4)	0.11 (76.7)
Total catch per hour	0.0	0.13 (100.0)
Harvest/acre	0.02 (511.6)	0.08 (282.8)
Total harvest	385 (511.6)	1,629 (282.8)
Percent legal released	19.7	0.0

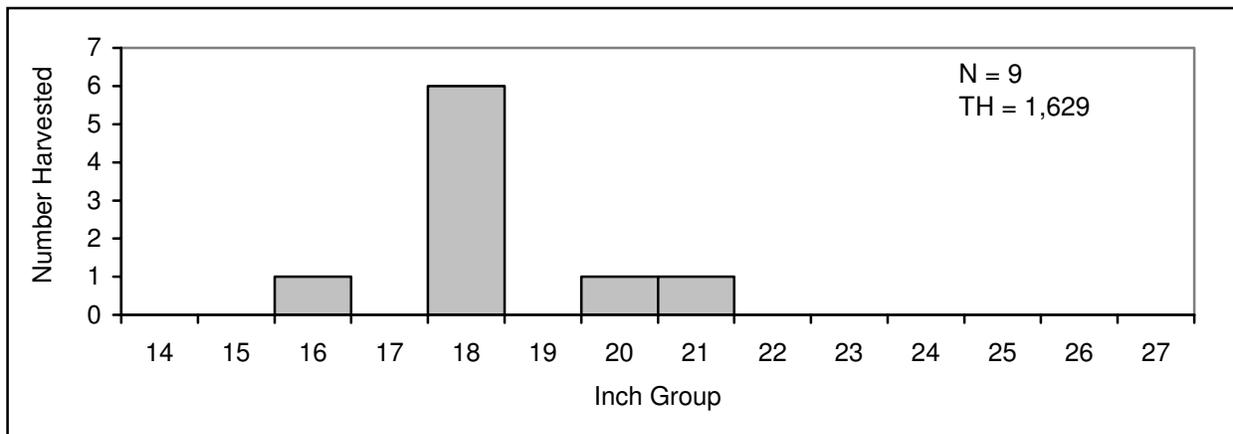


Figure 13. Length frequency of harvested palmetto bass observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested palmetto bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

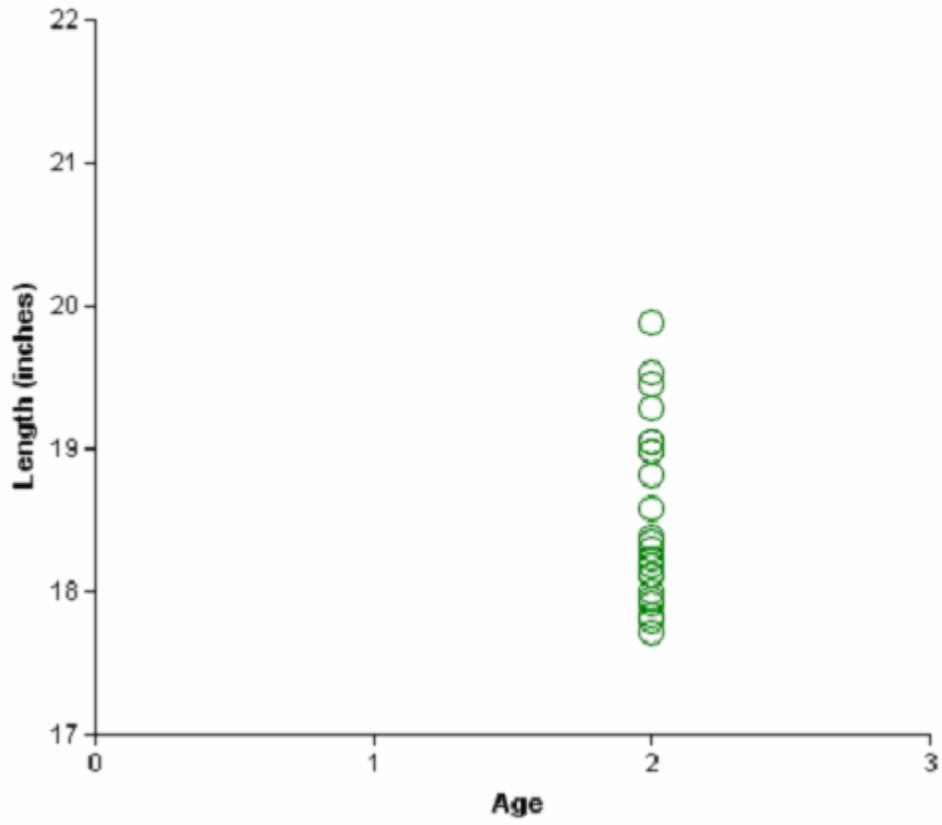


Figure 14. Length at age for palmetto bass collected from gill nets at Lake Conroe, Texas, March 2006.

Largemouth Bass

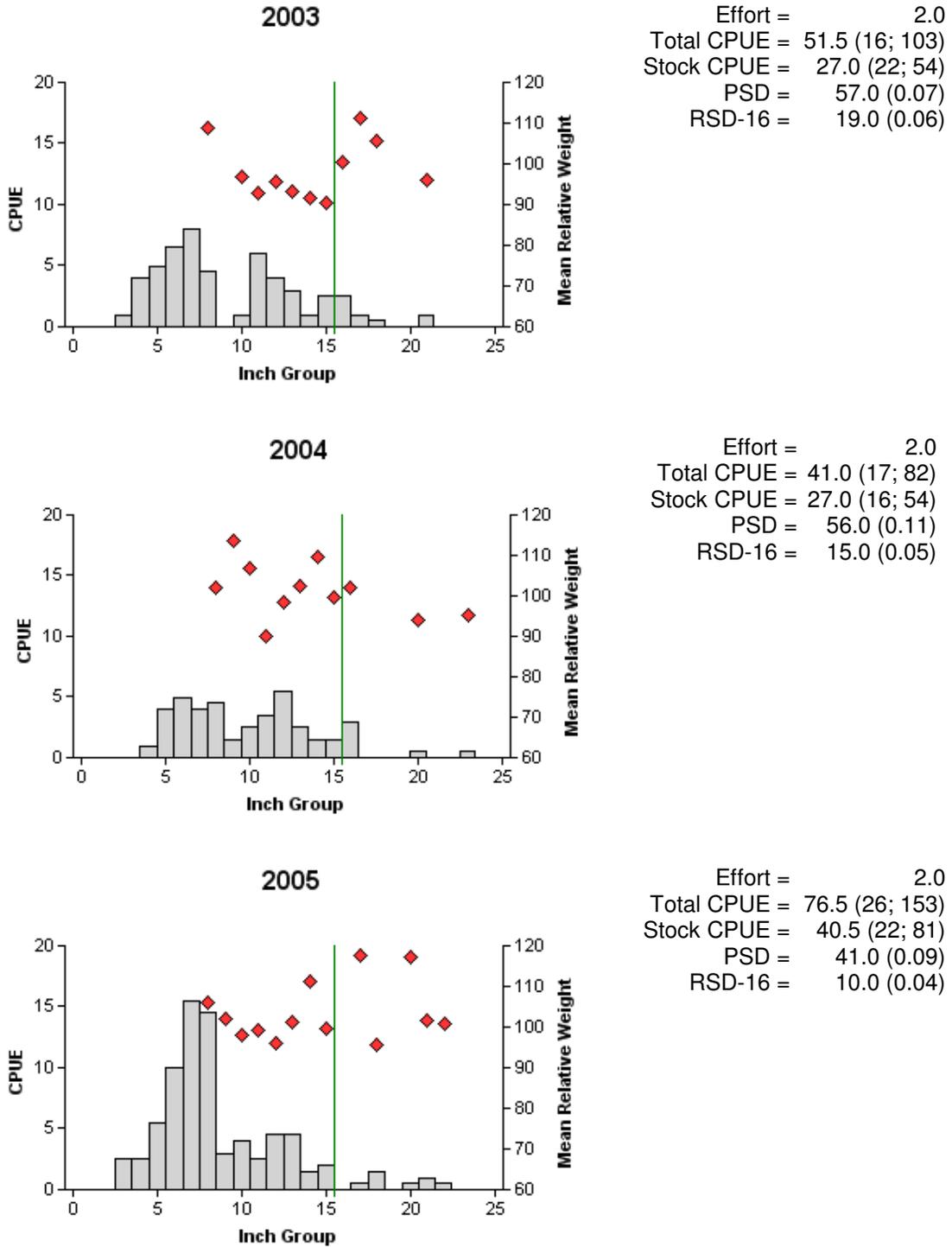


Figure 15. Number of largemouth bass caught per hour (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Conroe, Texas, 2003, 2004, and 2005. Vertical line represents minimum length limit at time of survey.

Largemouth Bass

Table 12. Creel survey statistics for largemouth bass at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 survey was an access point survey, and the 2004/2005 survey was a roving survey.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	35,679 (28.3)	53,710 (15.6)
Directed effort/acre	1.77 (28.3)	2.67 (15.6)
Total catch per hour	0.2 (42.0)	0.41 (38.1)
Harvest/acre	0.01 (513.2)	0.18 (102.9)
Total harvest	192 (513.2)	3,715 (102.9)
Percent legal released	14.1	13.4

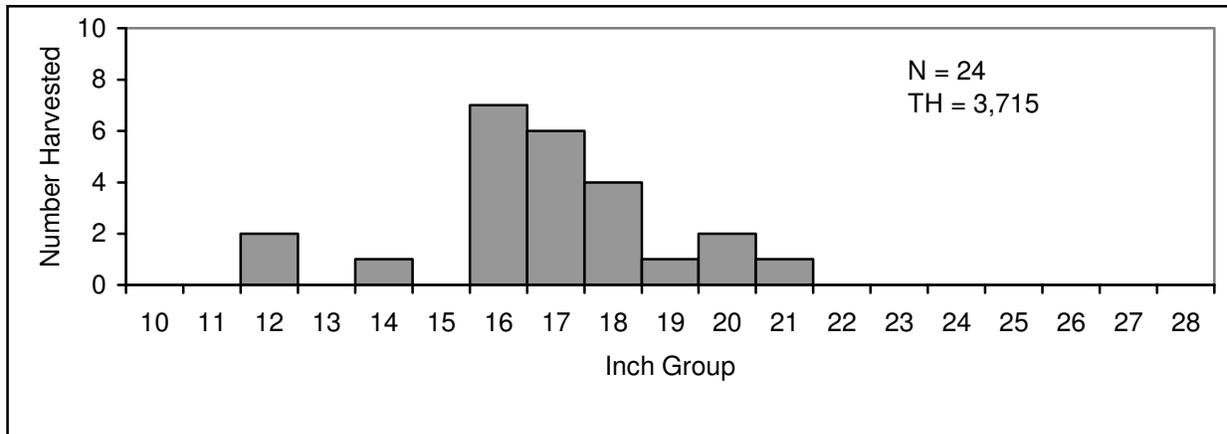


Figure 16. Length frequency of harvested largemouth bass observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass

Table 13. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake Conroe, Texas, 1993-1999, 2001, and 2005. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
1993	31	2	5	19	5	46.0	6.5
1994	50	9	9	30	2	57.4	18.0
1995	35	9	9	13	4	61.4	25.7
1996	27	4	12	7	4	54.6	14.8
1997	30	10	5	12	3	62.3	33.3
1998	26	5	8	13	0	60.6	19.2
1999	25	4	5	16	0	67.0	16.0
2001	30	6	8	15	1	64.2	20.0
2005	60	7	2	51	0	71.3	12.0

White Crappie

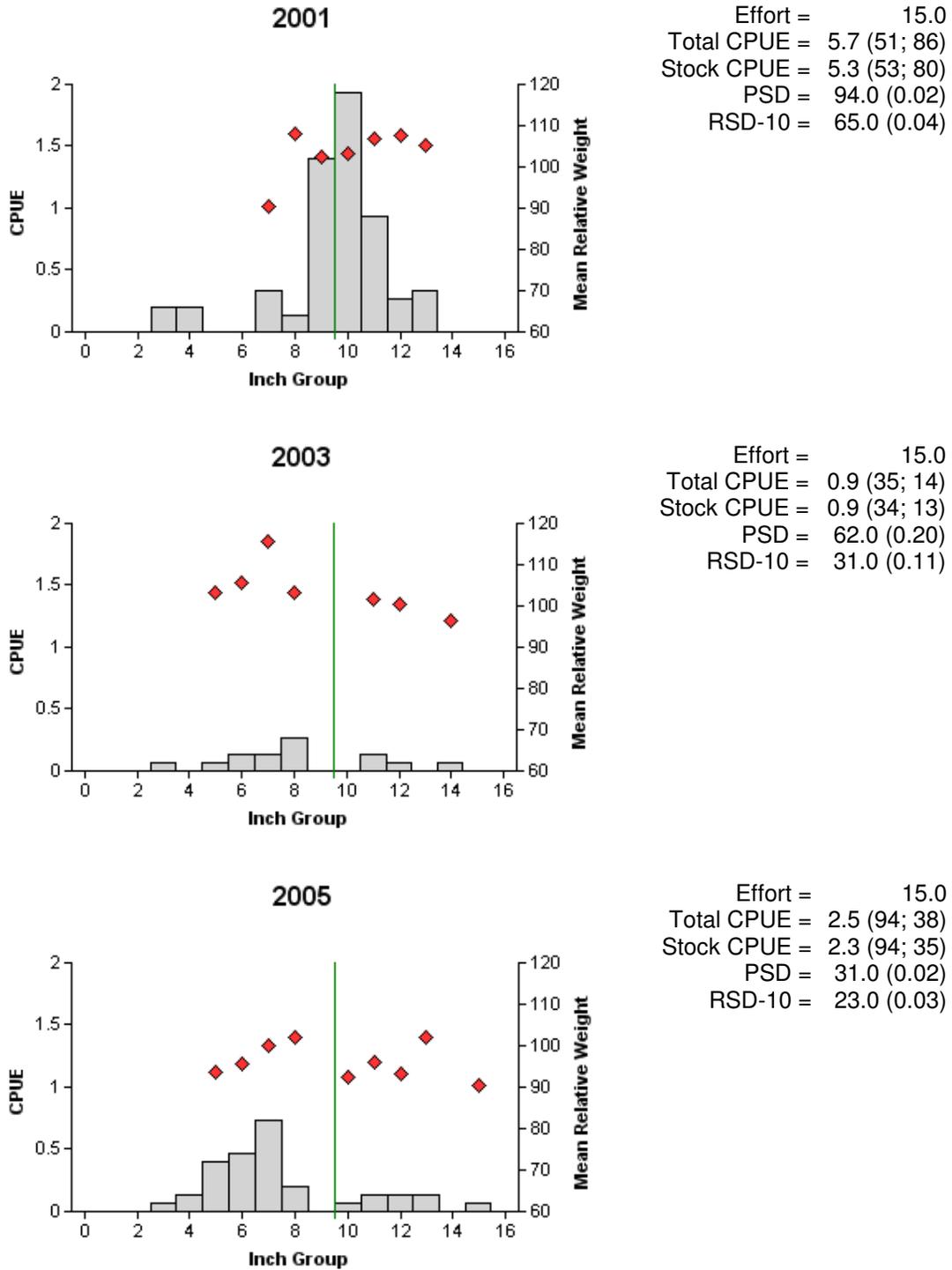


Figure 17. Number of white crappie caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Conroe, Texas, 2001, 2003, and 2005. Vertical line represents minimum length limit at time of survey.

White Crappie

Table 14. Creel survey statistics for white crappie at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting crappies (species combined) and total harvest is the estimated number of white crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 survey was an access point survey, and the 2004/2005 survey was a roving survey.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	34,598 (40.4)	15,640 (26.1)
Directed effort/acre	1.72 (40.4)	0.78 (26.1)
Total catch per hour	0.60 (49.4)	0.38 (42.6)
Harvest/acre	0.59 (61.2)	0.59 (67.8)
Total harvest	11,916 (61.2)	11,930 (67.8)
Percent legal released	6.4	0.0

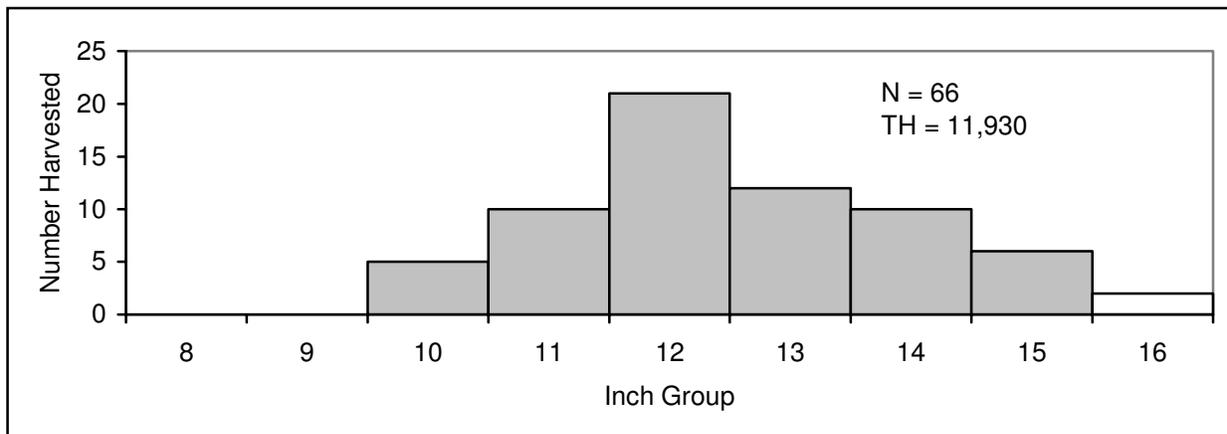


Figure 18. Length frequency of harvested white crappie observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested white crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Black Crappie

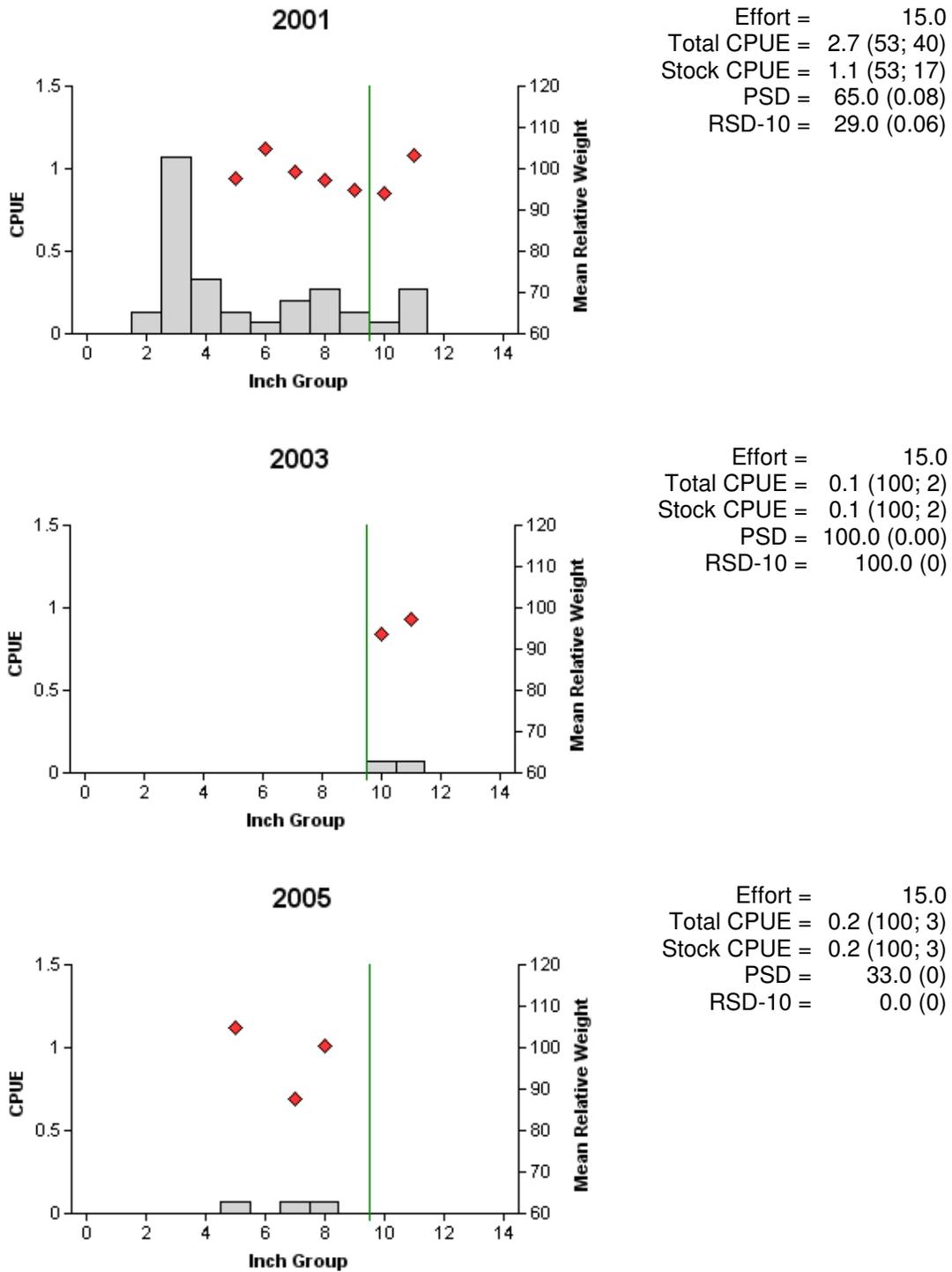


Figure 19. Number of black crappie caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Conroe, Texas, 2001, 2003, and 2005. Vertical line represents minimum length limit at time of survey.

Black Crappie

Table 15. Creel survey statistics for black crappie at Lake Conroe from June 2000 through May 2001 and June 2004 through May 2005, where total catch per hour is for anglers targeting crappies (species combined) and total harvest is the estimated number of black crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses. The 2000/2001 survey was an access point survey, and the 2004/2005 survey was a roving survey.

Creel Survey Statistic	Year	
	2000/2001	2004/2005
Directed effort (h)	34,598 (40.4)	15,640 (26.1)
Directed effort/acre	1.72 (40.4)	0.78 (26.1)
Total catch per hour	0.60 (49.4)	0.38 (42.6)
Harvest/acre	0.13 (105.7)	0.04 (912.1)
Total harvest	2,606 (105.7)	744 (912.1)
Percent legal released	6.4	0.0

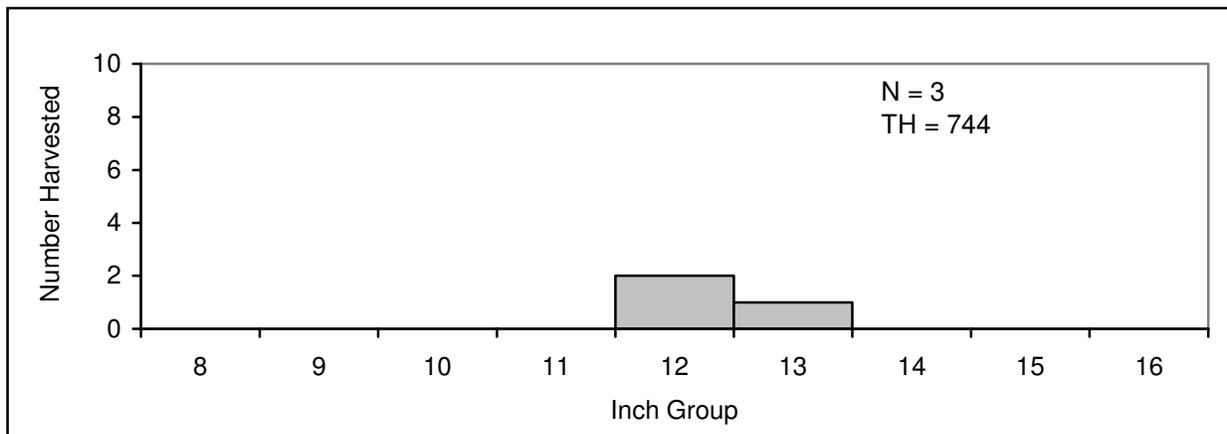


Figure 20. Length frequency of harvested black crappie observed during creel surveys at Lake Conroe, Texas, June 2004 through May 2005, all anglers combined. N is the number of harvested black crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 16. Proposed sampling schedule for Lake Conroe, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

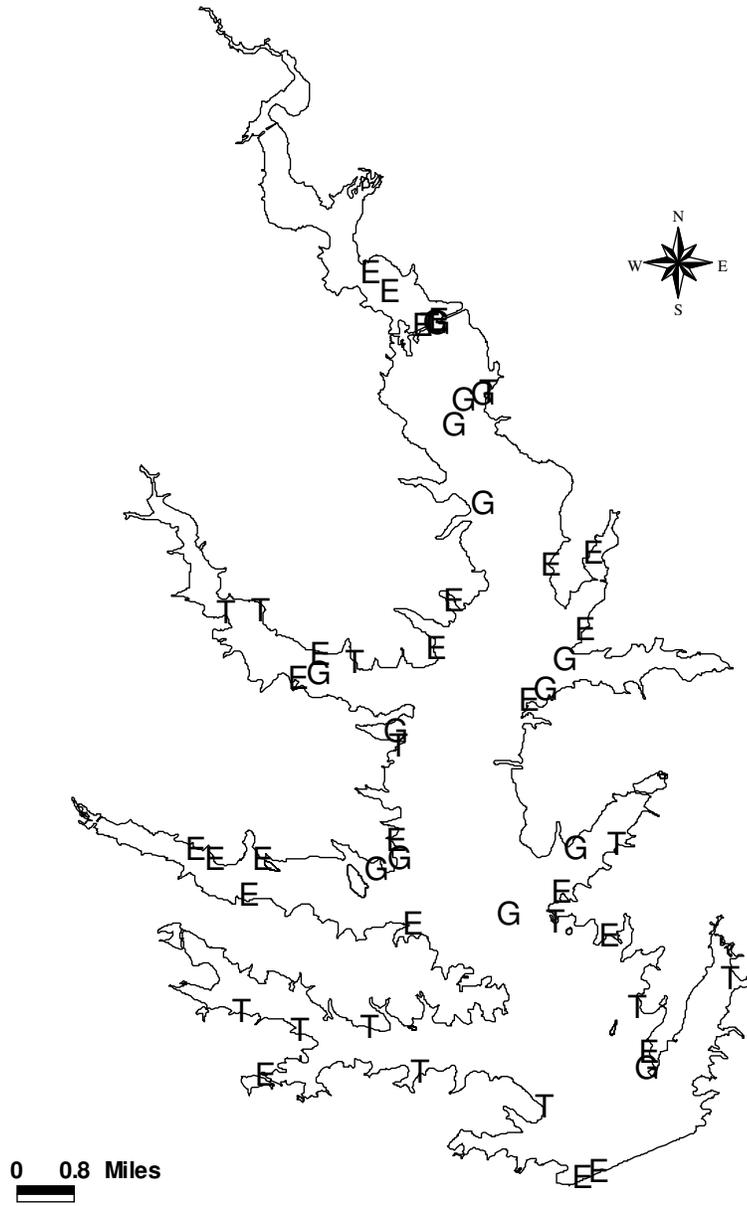
Survey Year	Electrofishing	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Habitat Survey	Access Survey	Report
Fall 2006-Spring 2007	A			A	A			
Fall 2007-Spring 2008	A	A	A		A			
Fall 2008-Spring 2009	A			A	A			
Fall 2009-Spring 2010	S	S	S		S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Conroe, Texas, 2005-2006.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					219	109.5
Threadfin shad					1941	970.5
Golden shiner					1	0.5
Bullhead minnow					10	5.00
Inland silverside					17	8.50
Brook silverside					1	0.50
Blacktail shiner					3	1.50
Blue catfish	75	5.60				
Channel catfish	260	17.33				
White bass	29	1.93				
Palmetto bass	83	5.47				
Green sunfish					1	0.50
Warmouth					4	2.00
Bluegill					732	316.00
Longear sunfish					270	135.00
Redear sunfish					135	67.50
Spotted bass					4	2.00
Largemouth bass					153	76.50
White crappie	8	0.47	38	2.53		
Black crappie			3	0.20		
Logperch					5	2.50
Blue tilapia					5	2.50

APPENDIX B



Location of sampling sites, Lake Conroe, Texas, 2005-2006. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively.