

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-35

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009 Survey Report

Lake Conroe

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July 31, 2010

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SURVEY AND MANAGEMENT SUMMARY

The Lake Conroe fish community was surveyed from June 2009 through May 2010 using electrofishing, gill netting, and trap netting. A habitat and vegetation survey was conducted in September 2009. Angler use and harvest information was collected using a roving creel survey which was conducted from June 2008 through May 2009. 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 (SJRA), 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.
- **Management History:** Important sport fishes in Lake Conroe include largemouth bass, white bass, palmetto bass, blue catfish, channel catfish, white crappie, and black crappie. Recent management includes control of hydrilla using triploid grass carp beginning in 2006. Hydrilla was brought under control by spring 2008, but native aquatic vegetation was reduced from over 1,000 acres in 2006 to about 150 acres in 2008. The plant communities (including the exotic species hydrilla, giant salvinia, and water hyacinth) have been monitored at least biannually. A native aquatic vegetation nursery has been established below the Lake Conroe Dam in cooperation with the Seven Coves Bass Club and SJRA. Plants from the nursery have been planted in the reservoir.
- **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.
 - **Catfishes:** Catfishes are the second most sought after group of fishes by anglers accounting for 21.9% of total directed effort. Channel catfish are the most abundant catfish species in Lake Conroe. Blue catfish also provide a substantial fishery.
 - **Temperate basses:** White bass and palmetto bass are present in Lake Conroe with palmetto bass supported by stockings when adequate fish are produced by TPWD hatcheries.
 - **Largemouth bass:** The largemouth bass is the most sought after species in Lake Conroe, and the population provides high quality angling opportunities. The current lake record largemouth bass, caught in January 2009, weighed 15.93 pounds and measured 27 inches in length. The new record largemouth bass was one of four fish entered into the Toyota ShareLunker Program in the 2008-2009 season.
 - **Black crappie and white crappie:** Both black crappie and white crappie provide angling opportunities at Lake Conroe. Angler catches of crappie are good in the spring and fall.
- **Management Strategies:** The fisheries at Lake Conroe will continue to be managed with current length and bag limits. We will continue to work with SJRA, the Lake Conroe Association (LCA), the Seven Coves Bass Club, and other interested groups to address the ongoing problem of exotic vegetation control and native vegetation restoration at Lake Conroe. Palmetto bass and Florida largemouth bass stockings will be requested annually if stocking criteria are met. Largemouth bass will be sampled annually by electrofishing, and the temperate basses and catfish populations will be sampled biennially with gill 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 from June 2009 through May 2010. 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 2009 through 2010 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 generally a deep and moderately well drained combination of sand, loam and clay (Conroe, Wicksburg-Susquehanna, and Ferris-Houston Black-Kipling Associations). The San Jacinto River Authority (SJRA), the Water Development Board (WDB), 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- to 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 riprap along the dam, the FM 1097 bridge, and the FM 1375 bridge; and vegetation including submersed, emergent, and floating-leaved native vegetation.

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 2006) included the following:

1. Stock palmetto bass at 10/acre annually and monitor palmetto bass relative abundance biennially.
Action: Stocked a total of 490,072 palmetto bass fingerlings during annual stockings from 2007 through 2009. Monitored relative abundance in the spring of 2008 and 2010.
2. Continue cooperation with the Lake Conroe Restocking Association in the stocking of sub-adult (at least 4-inch) crappie annually. Maintain current 10-inch minimum length limit. Monitor relative abundance and angler harvest biennially.
Action: LCRA is no longer stocking crappie. The last stocking occurred in 2000. Conducted trap net survey in fall 2009 and a roving creel survey in 2008 through 2009. Results are included in this report.
3. Continue to support the efforts of private organizations to stock fingerling Florida largemouth bass. Monitor largemouth bass population parameters (e.g. genetics, relative abundance, condition, etc.) in the fall of 2006 and 2009. Request Florida largemouth bass fingerlings to be stocked in 2007 and 2008. Continue to manage the largemouth bass population with the 16-inch minimum length limit.
Action: There were no additional stockings of Florida largemouth bass by private organizations since 2006. Over 1.75 million fingerling Florida bass were stocked in 2007, 2008, and 2010 by TPWD. Monitoring surveys were conducted in the fall of 2007, 2008,

and 2009.

4. Support efforts to control giant salvinia, water hyacinth, and hydrilla.

Action: TPWD assisted the San Jacinto River Authority (SJRA) with integrated pest management of giant salvinia, water hyacinth, and hydrilla annually. Comprehensive vegetation surveys were conducted quarterly in 2006, 2007, and 2008 and biannually in 2009. Triploid grass carp purchased by the SJRA and the LCA were stocked in 2006 through 2008 according to the protocol defined in the Lake Conroe Hydrilla Management Plan. As of September 2009, giant salvinia, water hyacinth, and hydrilla were all under control in Lake Conroe.
5. Increase awareness of all Lake Conroe fisheries and management efforts.

Action: A Lake Conroe Advisory Board consisting of homeowners, anglers, business owners, and other interested constituents was formed in 2006 and met following each Lake Conroe habitat survey to discuss lake management options with TPWD and SJRA. Three large public format open meetings were held during 2006 and 2007 to keep constituents informed regarding Lake Conroe management. The Toyota Texas Bass Classic was held on Lake Conroe in 2009 highlighting fisheries management efforts. Magazine articles were written for Dockline magazine every month. Eight radio interviews have been given for a radio outdoor magazine program. Many phone interviews have been given to regional and local writers about the fisheries management, habitat management, and angling opportunities at Lake Conroe.

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 14-inch minimum length limit until September 1, 1993 when the Lake Conroe limit was increased to 16 inches. White bass regulations have fluctuated from a 10-inch minimum length limit (September 1, 1988) to a 12-inch minimum limit (September 1, 1992) and back to 10 inches (September 1, 2003); all have maintained a 25-fish bag limit. 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, and 2010. 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, 2006, 2008, and 2009) to enhance the trophy potential of the largemouth bass population at Lake Conroe. The LCRA periodically stocked advanced-sized Florida largemouth bass as well as black crappie and white crappie into Lake Conroe beginning in 1988. Their efforts helped to increase the percentage of Florida largemouth bass genes at Lake Conroe as well as helped to enhance the crappie population. Beginning in 2006, incremental stockings of triploid grass carp began as a part of an integrated pest management plan for the control of hydrilla. A total of 124,030 triploid grass carp were stocked from 2006 through 2008.

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 through 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 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. Over 868 acres of hydrilla were present by 2005 creating the need for a comprehensive hydrilla management plan including incremental stockings of triploid grass carp as part of an Integrated Pest Management (IPM) approach. In March 2006, 4,200 triploid grass carp were introduced into areas infested with hydrilla. Additional triploid grass carp stockings continued through 2007 and 2008 as mandated by the Lake Conroe Hydrilla Management Plan. These stockings have been successful at reducing the hydrilla infestation to levels consistent with management goals, but they also greatly reduced native vegetation coverage from 1,078 acres in July 2007 to 152 acres in May of 2008 with a shift in species composition from submersed species to more grass carp resistant emergent species (Appendices C and D). To help re-establish the native vegetation population, TPWD, SJRA, and their partners, including the Seven Coves Bass Club, BASS, TBBU, USFWS, and USCOE are continuing native vegetation planting in the reservoir. To supply native vegetation for these efforts, the Seven Coves Bass Club, BASS, SJRA, TPWD, and USFWS, and USCOE established a native aquatic vegetation nursery below Lake Conroe Dam. 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 netting 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 2009).

Fin clips were taken from a sub-sample of 30 age-0 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 September 2009 according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009).

A roving creel survey was conducted from June 2008 through May 2009 according to Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009). Nine creel days were surveyed each quarter for a total of 36 creel days. Creel day length was 12 hours during the summer, with two of six 2-hour time periods and two of three spatial strata sampled each day. During the remaining quarters, the creel day was defined as 8 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 Size Distribution (PSD) as defined by Guy et al. (2007)], 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 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 September 2009, Lake Conroe contained 254 acres of native vegetation and 9.6 acres of hydrilla (Table 4). Other non-native plants present are water hyacinth (0.04 acres), giant salvinia (6.15 acres), and alligatorweed (5.19 acres). To help re-establish the native vegetation population, TPWD, SJRA, and their partners including the Seven Coves Bass Club, BASS, TBBU, USFWS, and USCOE are continuing native vegetation planting in the reservoir. To supply native vegetation for these efforts, the Seven Coves Bass Club, BASS, SJRA, TPWD, USFWS, and USCOE established a native aquatic vegetation nursery below Lake Conroe Dam. TPWD continues to cooperate with SJRA to monitor and treat hydrilla, giant salvinia, and water hyacinth according to the Lake Conroe Habitat Management Plan.

Structural shoreline habitat has changed little since 2006. The predominant shoreline habitat is bulkhead and boat docks which encompass over 50% of the total shoreline. The upper third of the reservoir lies within the Sam Houston National Forest and is protected from commercial and residential development. Most of the ecologically functional shoreline habitat occurs in this section of the reservoir.

Creel: Total angling effort was 216,063 h in 2008-2009 (Table 6). Total angling expenditures were \$970,236. Largemouth bass account for the highest directed angling effort at Lake Conroe at 49.5% of the total directed effort in 2008 through 2009 (Table 5). Catfishes were the most highly sought after species group in 2005 accounting for 45,295 h of directed effort (39.3%); however, in 2008 through 2009, directed effort for catfishes as a percentage of total directed effort declined to 21.9%, second to largemouth bass, yet total angler hours directed at catfishes remained high at 44,073 h. Percentage of directed effort for crappies, white bass, and palmetto bass was 11.7%, 0.2%, and 0.4% respectively. The directed effort for palmetto bass has greatly decreased since the creel survey in 2006 through 2007 when 7.6% of all directed effort targeted palmetto bass (Table 5).

Prey species: The electrofishing catch rate of all species combined in 2009 was 832.5/h, about half that observed in the 2005 survey (1,617/h) (Henson & Webb 2006). Threadfin shad were the most abundant species in the sample at 450.0/h. Gizzard shad were captured at a rate of 142.0/h, slightly higher than in 2005 (109.5/h). The IOV is 55.6%, indicating adequate numbers of gizzard shad are available as prey (Figure 2).

Estimates of sunfish prey relative abundance have declined since 2005 and 2008. In the 2009 sample, bluegills were the predominant sunfish species with an electrofishing catch rate of 118.0/h, down from 316.0/h in 2005 and 355.0/h in 2008. The size structure of the population indicates fewer individuals are available as prey compared to 2005 and 2008 samples (Figure 3). Bluegills grow large enough to provide a fishery at Lake Conroe. Bluegills to 9 inches were captured in the 2009 electrofishing sample. The CPUE-8 for the 2009 sample was 8.0/h, indicating a high relative abundance of large individuals available to anglers. Creel data from 2008 through 2009 indicate that directed effort for sunfishes is negligible, only 1.2% of total directed effort; however, an estimated 4,800 bluegill were harvested by anglers with specimens as large as 10 inches observed in the creel survey (Table 7, Figure 4). Estimates of angler harvest have greatly declined since 2004 through 2005 (73,064) and 2006 through 2007 (17,068). Electrofishing catch rates of redear sunfish had steadily increased since 1998; however, the catch rate in 2009 (43.5/h) was much lower than that observed in 2008 (264.0/h) (Figure 5). The significant reduction in vegetation from 2008 to 2009 may have contributed to the low catch rates of bluegill and redear sunfish in 2009. Other sunfish species contributing to the forage base at Lake Conroe include longear sunfish, green sunfish, and warmouth.

Catfish: Both blue catfish and channel catfish occur at Lake Conroe, but channel catfish are the dominant species (Appendix A). Gill net catches of blue catfish have changed little since 2006. The catch rate in spring 2010 was 3.9/nn compared to 5.6/nn in 2006 and 1.6/nn in 2008 (Figure 6). Blue catfish to 40 inches total length were observed in the 2008 sample and 35 inches in the 2010 sample. The length distribution of the 2010 sample indicates the majority of the population is between 15 and 25 inches. Anglers harvested an estimated 9,865 blue catfish during the 2008 through 2009 creel period, a 500% increase compared to the creel period 2006 through 2007. With the exception of the 2006 through 2007 creel period, the harvest

of blue catfish has steadily increased since 2000 through 2001 (Table 8). Blue catfish observed in the creel ranged in length from 12 to 30 inches (Figure 8).

The gill net catch rate of channel catfish in spring 2010 was 14.7/nn, similar to that of previous years (Figure 7). Channel catfish relative abundance in the gill net samples has declined since 1999 when the catch rate was 33.1/nn (Webb and Henson 2002). The decline in relative abundance of channel catfish may be the result of increased directed angling pressure and harvest from 2001 through 2009 (Table 9). The size distribution of the population indicates a high proportion of the population available for harvest (PSD-12=90). During the 2008 through 2009 creel period, anglers harvested an estimated 34,765 channel catfish, almost identical to that observed in 2006 through 2007 (34,883), but less than half that seen in the 2004 through 2005 creel survey when anglers harvested an estimated 83,360 channel catfish. Channel catfish harvested ranged from 12 to 25 inches in length in 2008 through 2009 (Figure 9).

Temperate basses: The gill net catch rates of white bass have been relatively low (<2.0/nn) during the previous three survey periods (Figure 10). The 2008 through 2009 creel survey indicated that directed pressure for white bass declined from 3,343 h in 2006 through 2007 to 443 h in 2008 through 2009. No directed angler catch was noted, and estimated harvest was 290 fish (Table 9). Only two harvested white bass were observed in the creel period (Figure 11).

The gill net catch rate of palmetto bass in 2010 was 3.0/nn, similar to that in 2008 (2.8/nn) but about half that observed in 2006 (5.5/nn) (Figure 12). The PSD-18 was 64, indicating that a high proportion of the population is available to anglers for harvest. The 2008 through 2009 creel survey indicated that directed pressure for palmetto bass dropped drastically from 11,938 h in 2006 through 2007 to 706 h (Table 10). Total catch per hour for anglers seeking palmetto bass was 0.0 in 2008 through 2009 compared to 0.62/h in 2006 through 2007. Angler harvest was estimated at 365 fish with only 2 individual palmetto bass observed during the creel year (Figure 13). Palmetto bass reach harvestable length by age 2 (Henson and Webb 2006).

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

The electrofishing catch rate of largemouth bass in 2009 was 53.0/h and has changed little over the past three years (2008=58.5/h and 2007=57.0/h). The population size distribution indicates that the population is doing well under the 16-inch minimum length limit. The PSD-16 was 24 in 2009 and has steadily increased since 2007 (PSD-16=11) and 2008 (PSD-16=17) (Figure 14). This increase in the relative abundance of bass over 16 inches may be due to a large increase in the numbers of 8- to 12-inch fish seen in the 2005 sample. The largemouth bass fishery is the most popular with anglers at Lake Conroe, and directed effort for bass has steadily increased since 2000 through 2001 (Table 5). Angling pressure directed toward largemouth bass increased from 35,679 h in 2000 through 2001 to 99,646 h in 2008 through 2009 (Table 11). Angler catch rate has also steadily increased during that period from 0.20/h in 2000 through 2001 to 0.70/h in 2008 through 2009. Angler harvest of bass was estimated to be 5,690 in the 2008 through 2009 creel, with bass ranging from 16 to 23 inches. No sub-legal fish were observed in the creel (Figure 15).

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 12). A sub sample of 30 age-0 fish from spring 2010 indicates a population dominated by Fx hybrids with very few pure Florida genotypes.

Crappie: Trap nets in fall 2010 captured 0.3 white crappie/nn and 0.2 black crappie/nn, down from 2005 when trap nets captured 2.7/nn of both species combined (Figures 16 and 17). Though the trap net survey numbers were down, angling effort for crappie remained high at 23,492 hours (Table 13). The angler catch per hour for anglers targeting crappie was also high during the 2008 through 2009 creel period at 2.2/h. An estimated 15,733 white crappie and 1,811 black crappie were harvested by anglers ranging in length from 10 to 15 inches (Figure 18). One sub-legal white crappie (8 inches) was observed in the creel.

Fisheries management plan for Lake Conroe, Texas

Prepared – July 2010

ISSUE 1: Habitat management continues to be a major focus at Lake Conroe. Hydrilla, giant salvinia, and water hyacinth have all been brought under control using IPM methods outlined in the Lake Conroe Habitat Management Plan; however, native vegetation has also decreased sharply due to the stocking of 124,030 triploid grass carp for hydrilla control.

MANAGEMENT STRATEGIES

1. Update the Lake Conroe Habitat Management Plan annually in conjunction with SJRA and with input from the Lake Conroe Advisory Board, other agencies, government entities, and constituent groups.
2. Continue comprehensive vegetation surveys at the beginning and end of each growing season.
3. Continue to cooperate with SJRA, the Seven Coves Bass Club, the USCOE and others to maintain the native aquatic plant nursery below Lake Conroe Dam.
4. Continue to cooperate with SJRA, the Seven Coves Bass Club, the USCOE and others to plant grass carp tolerant native aquatic vegetation in Lake Conroe.
5. Continue to cooperate with SJRA in treating exotic vegetation when necessary using IPM methods outlined in the Lake Conroe Habitat Management Plan.

ISSUE 2: Lake Conroe is a high-profile reservoir with diverse constituent groups who have great interest in all aspects of the reservoir's management.

MANAGEMENT STRATEGIES

1. Continue to meet with the Lake Conroe Advisory Board whenever new information regarding habitat management or other issues is available.
2. Continue to publish magazine articles and press releases whenever possible highlighting fisheries and habitat management issues at Lake Conroe.
3. Continue to present information at public meetings and other venues when requested highlighting fisheries and habitat management issues at Lake Conroe.
4. Highlight conservation programs during the 2010 Toyota Texas Bass Classic to be held at Lake Conroe.
5. Continue to highlight conservation efforts at Lake Conroe through the San Jacinto River Watershed Management Initiative.
6. Increase opportunities for constituents to participate in conservation efforts at Lake Conroe through the formation of a local "Partnership for Fish Friendly Waters" under the Friends of Reservoirs umbrella organization as part of the Reservoir Fisheries Habitat Partnership.

ISSUE 3: Largemouth bass provide a very popular fishery at Lake Conroe.

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 largemouth bass size distribution, body condition, and growth as well as genetics (allele frequencies and relative abundance of pure Florida largemouth bass in the stock) in the fall of 2010.
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 annually if stocking criteria are met.

ISSUE 4: Palmetto bass are believed to be a popular fishery at Lake Conroe although the most recent creel survey indicates a marked drop in effort directed toward Palmetto bass.

MANAGEMENT STRATEGIES

1. Request stocking of palmetto bass at a rate of 10 fish per acre annually.
2. Continue to monitor white bass and palmetto bass populations with gill nets biennially for any changes in relative abundance and size distribution.
3. Attempt to obtain palmetto bass catch records from alternate sources including palmetto bass guides, online forums, magazines, etc.
4. Conduct a standard creel survey in 2012 through 2013 making every effort to contact all palmetto bass anglers including those trolling.

ISSUE 5: Zebra mussels pose a threat to all inland waters of Texas.

MANAGEMENT STRATEGIES

1. Provide educational support and materials regarding zebra mussel infestation to Huntsville State Park personnel and visitors.
2. Install Portland samplers under piers at the SJRA boat house, the USFS courtesy pier at Cagle Park, and other locations throughout Lake Conroe to monitor for possible zebra mussel infestations.

SAMPLING SCHEDULE JUSTIFICATION: Fall electrofishing surveys are conducted annually to monitor largemouth bass and prey fish populations. Gill netting surveys are conducted biennially to monitor temperate bass and catfish populations. Crappie populations will be monitored using an angler creel survey as trap netting has proven ineffective at Lake Conroe. Creel surveys are conducted every four years to monitor sport fish catch and harvest and angler expenditures. Vegetation surveys are currently conducted biannually to monitor exotic and native vegetation as part of the Lake Conroe Habitat Management Plan. Structural habitat surveys and access surveys are conducted every 4 years (Table 14).

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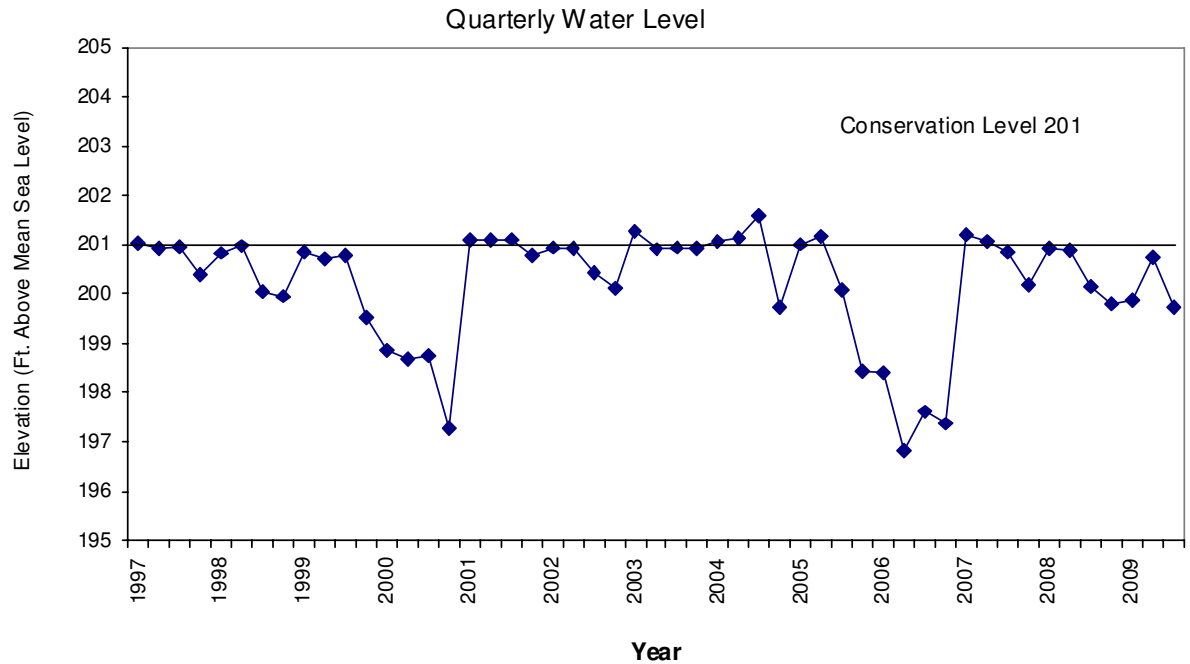


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Conroe, Texas.

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
Bass, spotted	5	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
	2007	169,027	FGL
	2008	217,000	FGL
2009	104,045	FGL	
Total	2,500,413		
Largemouth bass	1970	75,000	FGL
ShareLunker largemouth bass	2004	5,180	FGL
	2006	4,592	FGL
	2008	2,779	FGL
	2009	3,014	FGL
		15,565	
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	

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
Florida largemouth bass	2004	5,180	FGL
	2007	504,192	FGL
	2008	501,191	FGL
	2010	267,517	FGL
	Total	1,278,080	
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	27,441	AFGL
	2007	58,750	AFGL
	2008	37,839	AFGL
	Total	124,030	

* Stocking conducted by the Lake Conroe Restocking Association (LCRA).

** 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, September 2009. 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	13.2	4.2		
Natural shoreline ¹	8.4	8.5		
Natural shoreline/Flooded terrestrial	9.8	7.4		
Natural shoreline/Native emergent	0.3	0.2		
Rock ¹	6.5	5.0		
Under development ¹	1.4	1.1		
Bulkhead/ Boat dock ¹	70.2	54.2		
Bulkhead/ Standing timber ¹	1.1	0.9		
Natural shoreline/ Standing timber ¹	12.4	9.4		
Natural shoreline/Flooded terrestrial/ Standing timber	2.4	1.8		
Natural shoreline/Flooded terrestrial/ Native emergent	9.4	7.2		
Natural shoreline/Flooded terrestrial/ Native submersed	0.1	0.1		
Natural shoreline/ Native emergent	0.3	0.2		
Natural shoreline/Flooded terrestrial/ Standing timber/ Native emergent	0.2	0.1		
Natural shoreline/Flooded terrestrial/ Native emergent/ Native submersed	0.4	0.3		
Alligatorweed			5.2	<0.1
Giant salvinia			6.4	<0.1
Hydrilla			9.6	<0.1
Water hyacinth			0.2	<0.1
Native vegetation			254.0	1.3

¹ – Abiotic features

Table 5. Percent directed angler effort by species for Lake Conroe, Texas, 2004 through 2009. The creel year runs from June 1 through May 31.

Species	Year		
	2004/2005	2006/2007	2008/2009
Catfishes	39.3	19.2	21.9
White bass	0.6	2.1	0.2
Palmetto bass	1.3	7.6	0.4
Largemouth bass	31.3	45.9	49.5
Crappies	13.5	5.5	11.7

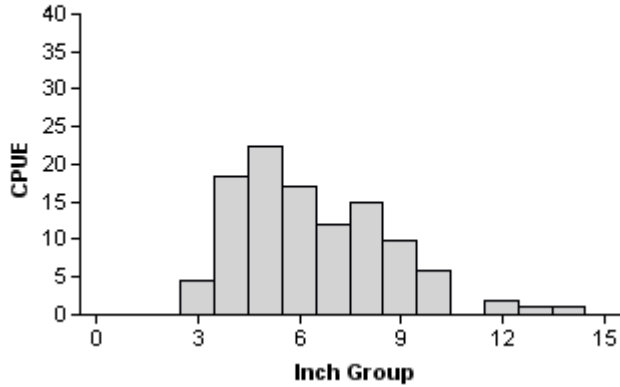
Table 6. Total fishing effort (h) for all species and total directed expenditures at Lake Conroe, Texas, 2004 through 2009. The creel year runs from June 1 through May 31.

Creel Statistic	Year		
	2004/2005	2006/2007	2008/2009
Total fishing effort	188,879	177,867	216,063
Total directed expenditures	\$707,380	\$822,742	\$970,236

Gizzard Shad

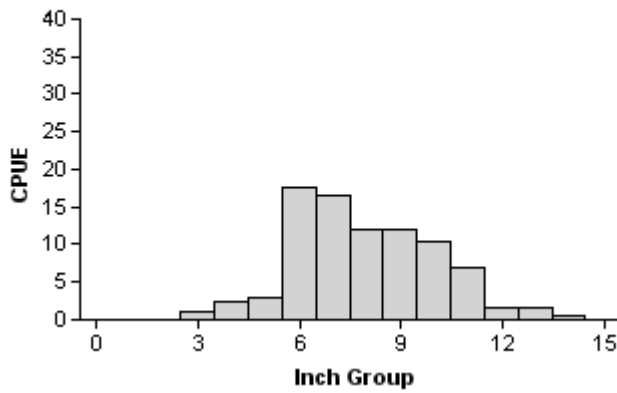
2005

Effort = 2.0
 Total CPUE = 109.5 (23; 219)
 IOV = 68.04 (7.5)



2008

Effort = 2.0
 Total CPUE = 85.5 (21; 171)
 IOV = 47.37 (5.1)



2009

Effort = 2.0
 Total CPUE = 142.0 (15; 284)
 IOV = 55.63 (9.8)

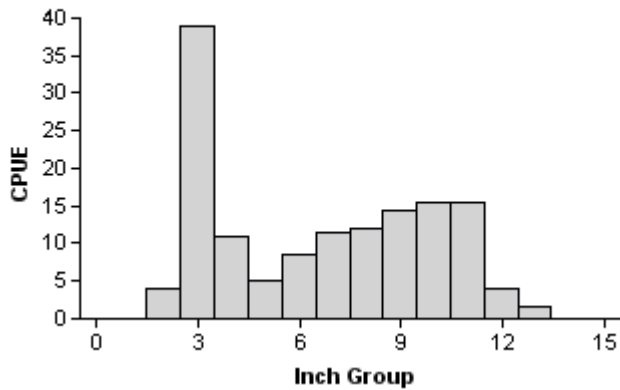
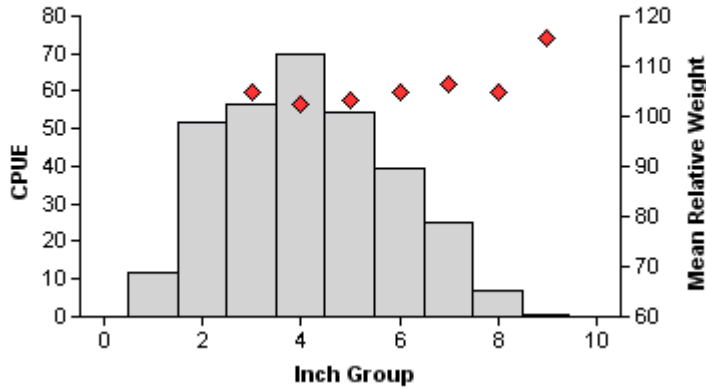


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Conroe, Texas, 2005, 2008, and 2009.

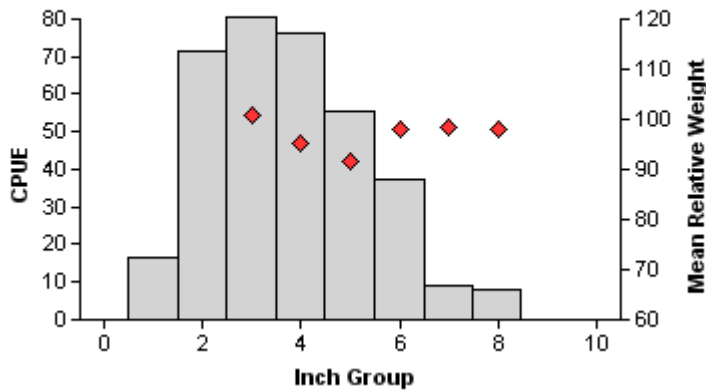
Bluegill

2005



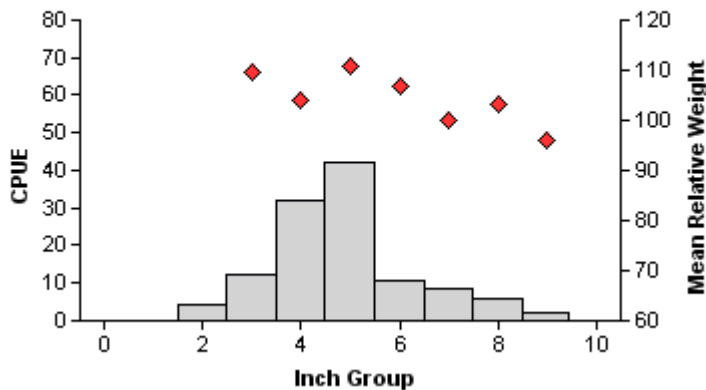
Effort = 2.0
 Total CPUE = 316.0 (26; 632)
 Stock CPUE = 253.0 (23; 506)
 CPUE-8 = 7.5 (65; 15)

2008



Effort = 2.0
 Total CPUE = 355.0 (16; 710)
 Stock CPUE = 267.0 (17; 534)
 CPUE-8 = 8.0 (52; 16)

2009



Effort = 2.0
 Total CPUE = 118.0 (32; 236)
 Stock CPUE = 113.5 (33; 227)
 CPUE-8 = 8.0 (39; 16)

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, 2005, 2008, and 2009.

Bluegill

Table 7. Roving creel survey statistics for bluegill at Lake Conroe from June through May 2004 through 2005, 2006 through 2007, and 2008 through 2009. Directed effort is for anglers targeting Lepomid sunfishes while catch rate and harvest are the estimated numbers of bluegill caught and harvested by all anglers combined. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2004/2005	2006/2007	2008/2009
Directed effort (h)	6,736 (45.1)	8,655 (44.2)	4,287 (48.5)
Directed effort/acre	0.33 (45.1)	0.43 (44.2)	0.21 (48.5)
Total catch per hour	2.5 (60.9)	4.2 (47.1)	1.6 (37.5)
Total harvest	73,064 (45.5)	17,068 (21.8)	4,800 (83.9)
Harvest/acre	3.63 (45.5)	0.85 (21.8)	0.24 (83.9)
Percent legal released	19.4	44.6	74.5

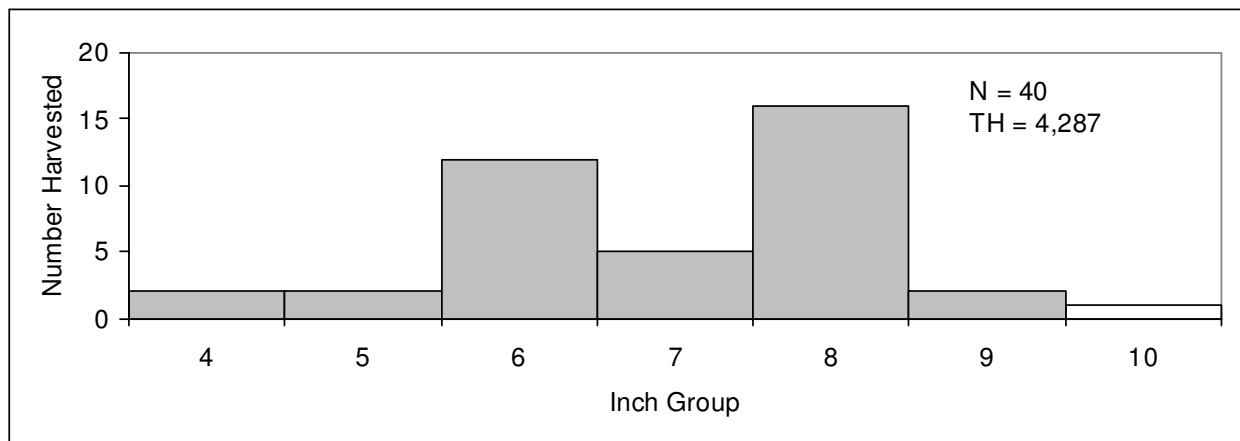
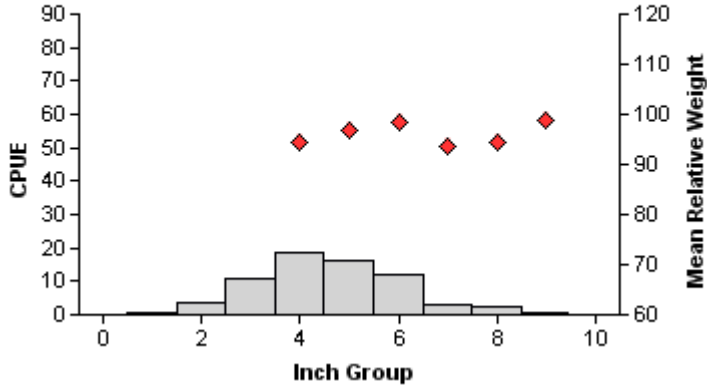


Figure 4. Length frequency of harvested bluegill observed during creel surveys at Lake Conroe, Texas, June 2008 through May 2009, all anglers combined. N is the number of harvested bluegill observed during creel surveys, and TH is the total estimated harvest for the creel period.

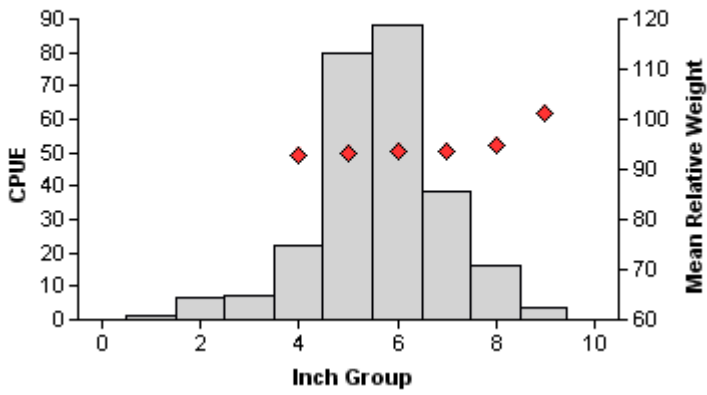
Redear Sunfish

2005



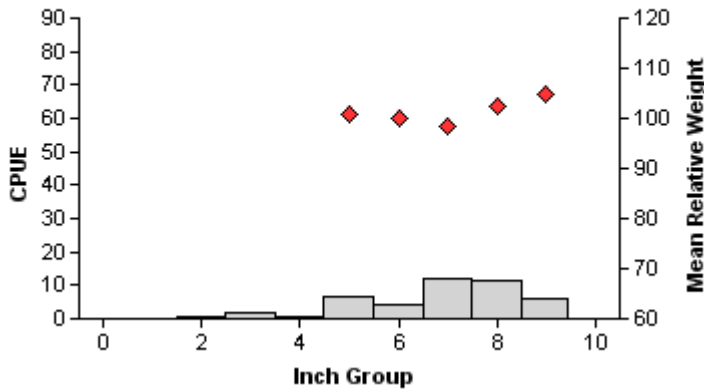
Effort = 2.0
 Total CPUE = 67.5 (36; 135)
 Stock CPUE = 52.5 (32; 105)
 CPUE-8 = 3.0 (50; 6)

2008



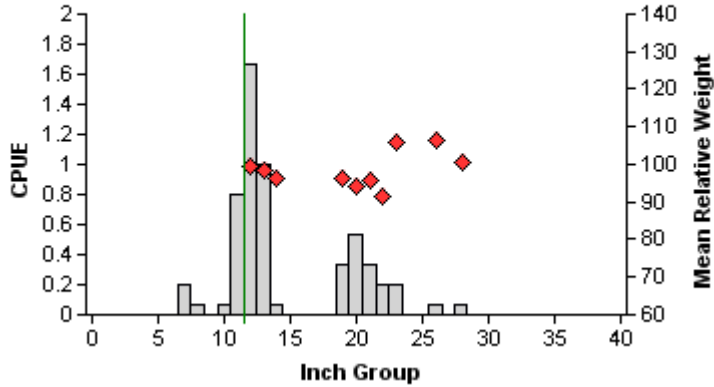
Effort = 2.0
 Total CPUE = 264.0 (17; 528)
 Stock CPUE = 248.5 (18; 497)
 CPUE-8 = 21.5 (27; 43)

2009

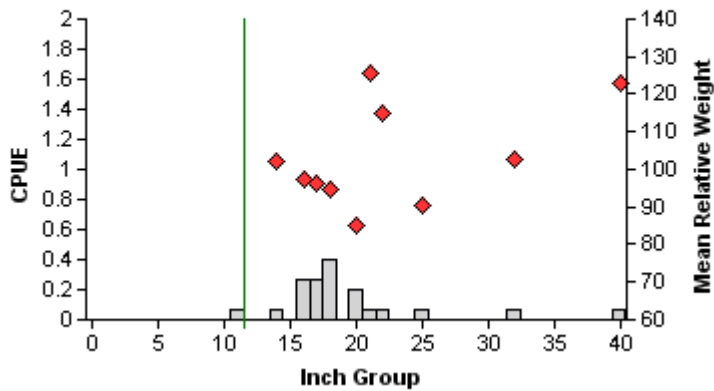


Effort = 2.0
 Total CPUE = 43.5 (22; 87)
 Stock CPUE = 41.0 (23; 82)
 CPUE-8 = 18.0 (27; 36)

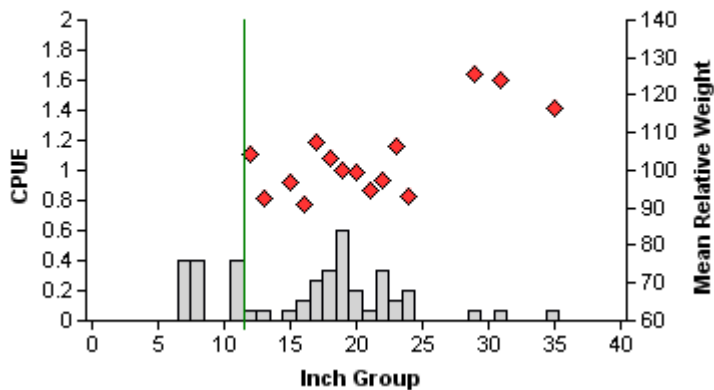
Figure 5. Number of redear sunfish caught per hour (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Conroe, Texas, 2005, 2008, and 2009.

Blue Catfish**2006**

Effort = 15.0
 Total CPUE = 5.6 (49; 84)
 Stock CPUE = 4.5 (40; 67)
 PSD-12 = 100 (0)

2008

Effort = 15.0
 Total CPUE = 1.6 (22; 24)
 Stock CPUE = 1.5 (23; 23)
 PSD-12 = 100 (0)

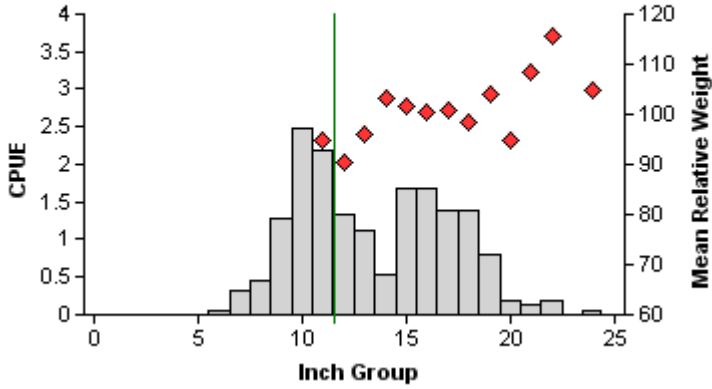
2010

Effort = 15.0
 Total CPUE = 3.9 (37; 58)
 Stock CPUE = 2.7 (39; 40)
 PSD-12 = 100 (0)

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, 2006, 2008, and 2010. Vertical line represents minimum length limit at time of survey.

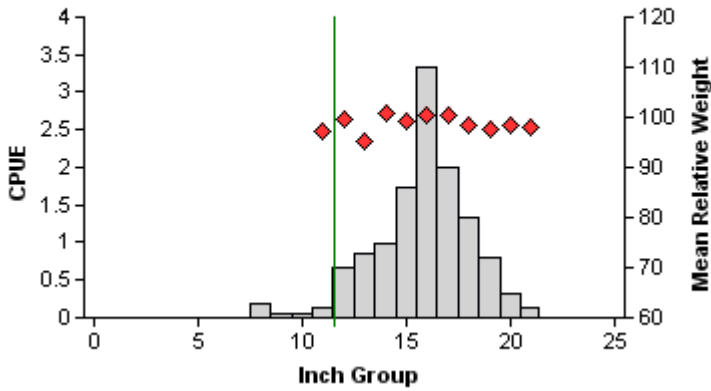
Channel Catfish

2006



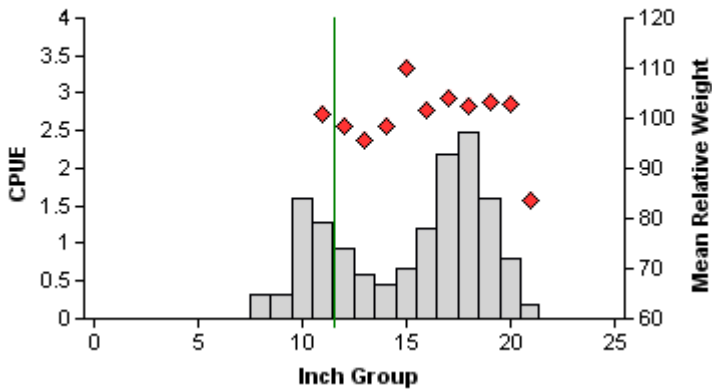
Effort = 15.0
 Total CPUE = 17.3 (14; 260)
 Stock CPUE = 12.7 (17; 191)
 PSD-12 = 83 (2.4)

2008



Effort = 15.0
 Total CPUE = 12.7 (6; 190)
 Stock CPUE = 12.3 (6; 185)
 PSD-12 = 99 (1.1)

2010



Effort = 15.0
 Total CPUE = 14.7 (11; 220)
 Stock CPUE = 12.4 (10; 186)
 PSD-12 = 90 (1.8)

Figure 7. 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, 2006, 2008, and 2010. Vertical line represents minimum length limit at time of survey.

Catfishes

Table 8. Roving creel survey statistics for channel catfish and blue catfish at Lake Conroe from June through May 2004 through 2005, 2006 through 2007, and 2008 through 2009 where directed effort and total catch per hour is for anglers targeting any catfish species and total harvest is the estimated number catfishes harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2004/2005	2006/2007	2008/2009
Directed effort (h)	45,295 (16.9)	29,997 (27.4)	44,073 (20.7)
Directed effort/acre	2.2 (16.4)	1.49 (27.4)	2.2 (20.7)
Total catch per hour	1.16 (36.3)	1.52 (38.5)	0.99 (45.1)
<u>Harvest/acre</u>			
Channel catfish	4.1 (45.8)	1.7 (29.9)	1.7 (30.4)
Blue catfish	0.16 (124.1)	0.09 (120.9)	0.49 (65.5)
<u>Total harvest</u>			
Channel catfish	83,360 (45.8)	34,883 (29.9)	34,765 (30.4)
Blue catfish	3,275 (124.1)	1,911 (120.9)	9,865 (65.5)
Percent legal released	3.9	4.0	10.4

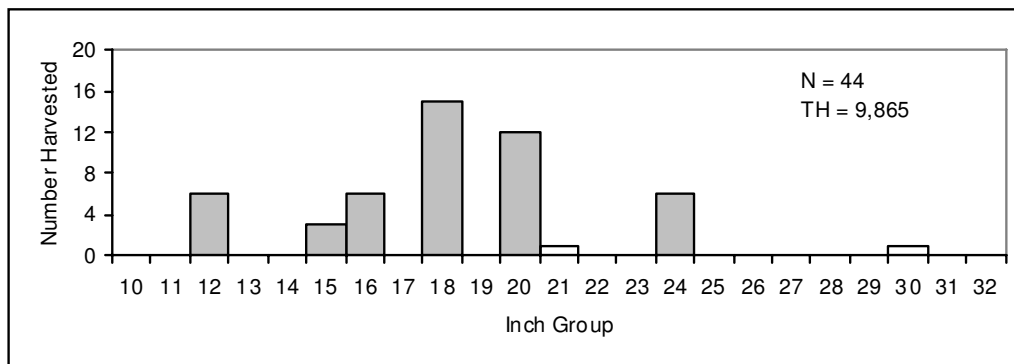


Figure 8. Length frequency of harvested blue catfish observed during creel surveys at Lake Conroe, Texas, June 2008 through May 2009, all anglers combined. N is the number of harvested blue catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

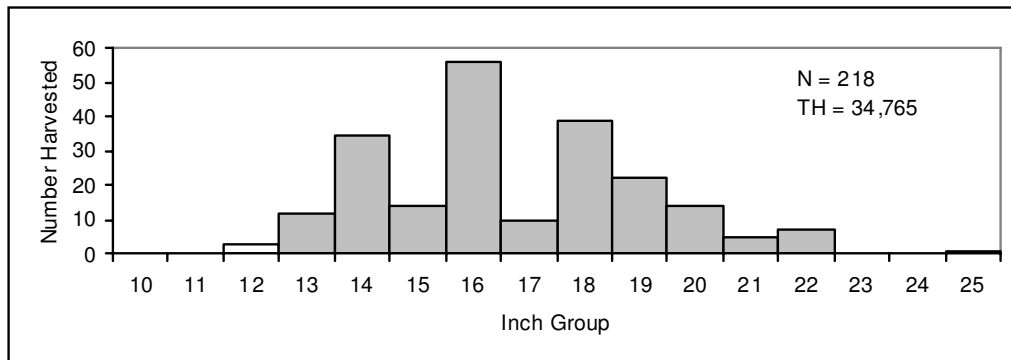
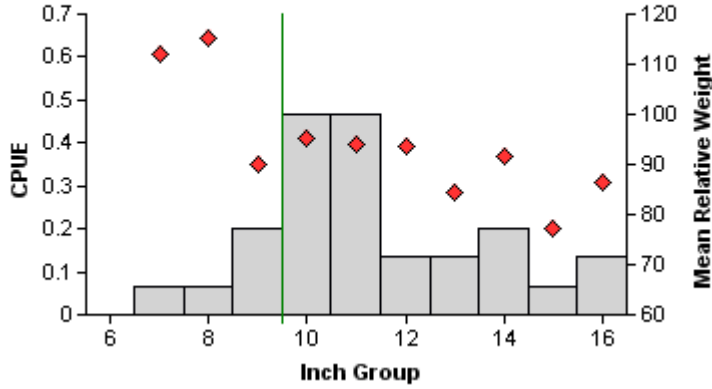


Figure 9. Length frequency of harvested channel catfish observed during creel surveys at Lake Conroe, Texas, June 2008 through May 2009, all anglers combined. N is the number of harvested channel catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

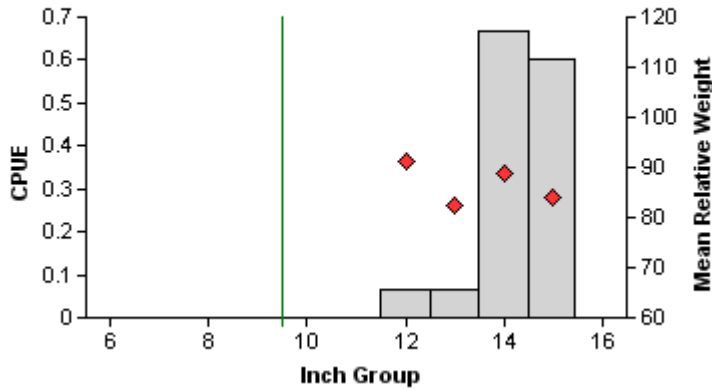
White Bass

2006



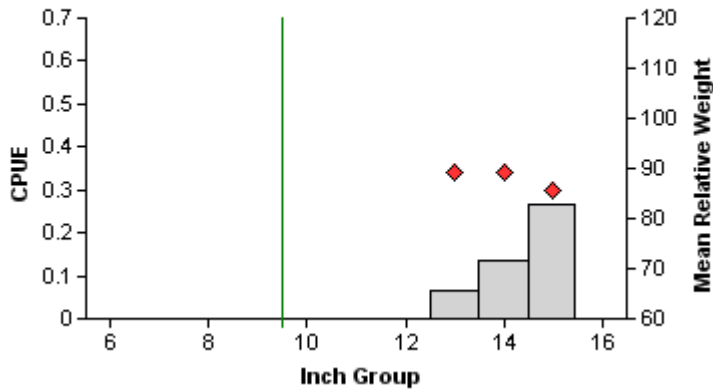
Effort = 15.0
 Total CPUE = 1.9 (30; 29)
 Stock CPUE = 1.9 (30; 29)
 PSD-10 = 83 (7)

2008



Effort = 15.0
 Total CPUE = 1.4 (30; 21)
 Stock CPUE = 1.4 (30; 21)
 PSD-10 = 100 (0)

2010



Effort = 15.0
 Total CPUE = 0.5 (41; 7)
 Stock CPUE = 0.5 (41; 7)
 PSD-10 = 100 (0)

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, 2006, 2008, and 2010. Vertical line represents minimum length limit at time of survey.

White Bass

Table 9. Roving creel survey statistics for white bass at Lake Conroe from June through May 2004 through 2005, 2006 through 2007, and 2008 through 2009 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.

Creel Survey Statistic	Year		
	2004/2005	2006/2007	2008/2009
Directed effort (h)	1,083 (85.8)	3,343 (63.9)	443 (126.4)
Directed effort/acre	0.05 (85.8)	0.17 (63.9)	0.02 (126.4)
Total catch per hour	0.5 (n/a)	2.8 (58.3)	0.0
Harvest/acre	0.10 (240.6)	0.20 (89.1)	0.01 (423.8)
Total harvest	2,061 (240.6)	4,113 (89.1)	290 (423.8)
Percent legal released	0.0	37.7	67.5

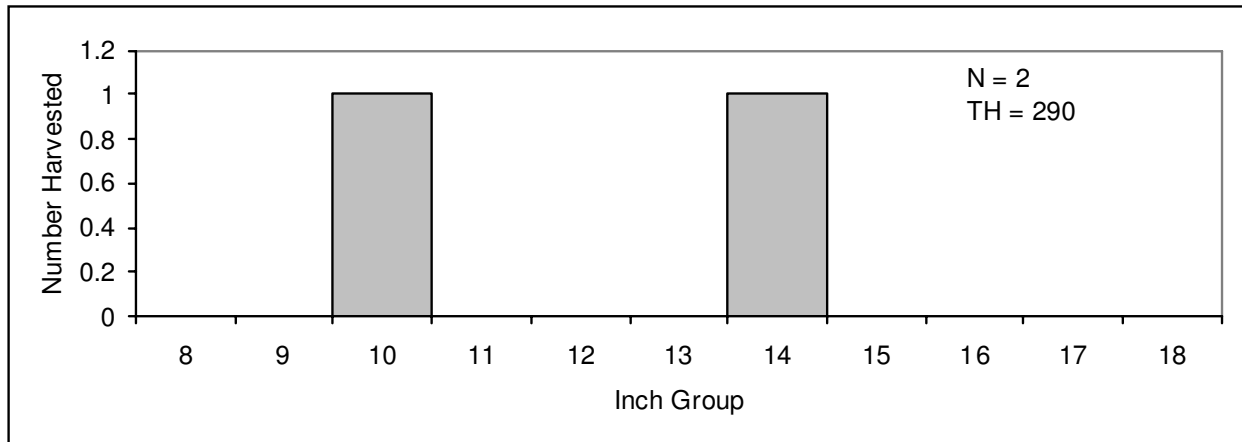
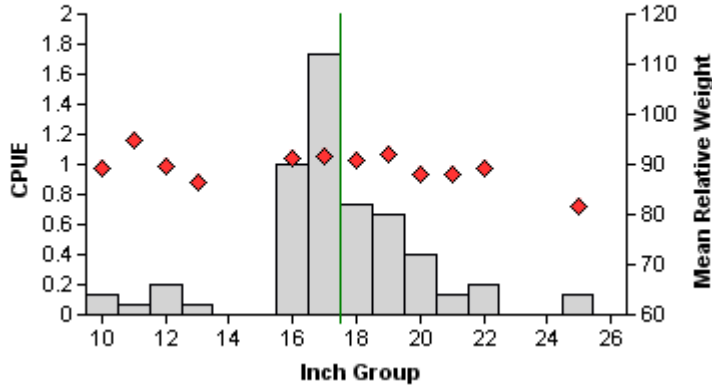


Figure 11. Length frequency of harvested white bass observed during creel surveys at Lake Conroe, Texas, June 2008 through May 2009, all anglers combined. N is the number of harvested white bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Palmetto Bass

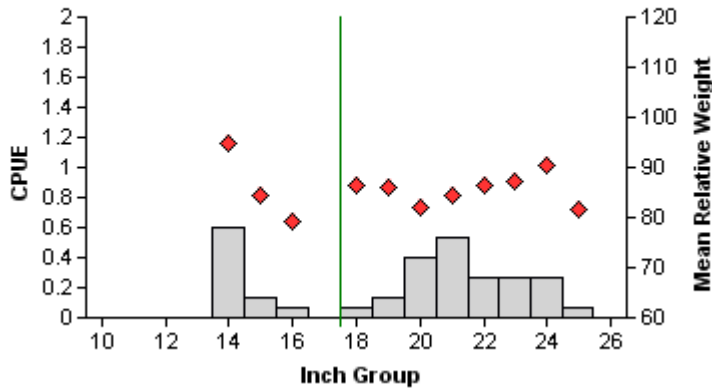
2006

Effort = 15.0
 Total CPUE = 5.5 (45; 82)
 Stock CPUE = 5.5 (45; 82)
 PSD-18 = 43 (2.2)



2008

Effort = 15.0
 Total CPUE = 2.8 (46; 42)
 Stock CPUE = 2.8 (46; 42)
 PSD-18 = 71 (12.3)



2010

Effort = 15.0
 Total CPUE = 3.0 (25; 45)
 Stock CPUE = 3.0 (25; 45)
 PSD-18 = 64 (8.4)

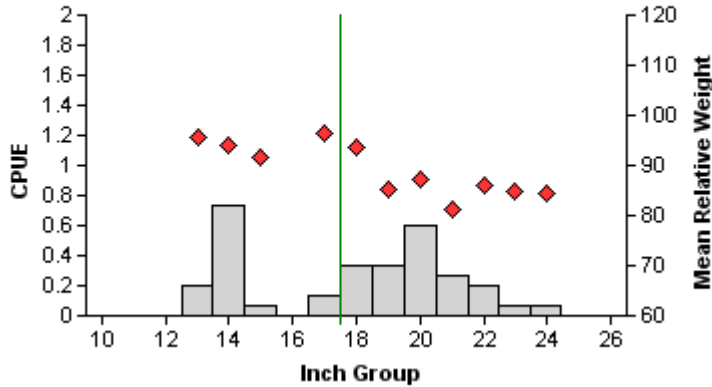


Figure 12. Number of palmetto bass caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Lake Conroe, Texas, 2006, 2008, and 2010. Vertical line represents minimum length limit at time of survey.

Palmetto Bass

Table 10. Creel survey statistics for palmetto bass at Lake Conroe from June through May 2004 through 2005, 2006 through 2007 and 2008 through 2009 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.

Creel Survey Statistic	Year		
	2004/2005	2006/2007	2008/2009
Directed effort (h)	2,155 (76.7)	11,938 (35.1)	706 (100.1)
Directed effort/acre	0.11 (76.7)	0.59 (35.1)	0.04 (100.1)
Total catch per hour	0.13 (100.0)	0.62 (48.7)	0.0
Harvest/acre	0.08 (282.8)	0.15 (111.9)	0.02 (351.6)
Total harvest	1,629 (282.8)	3,179 (111.9)	365 (351.6)
Percent legal released	0.0	36.3	31.4

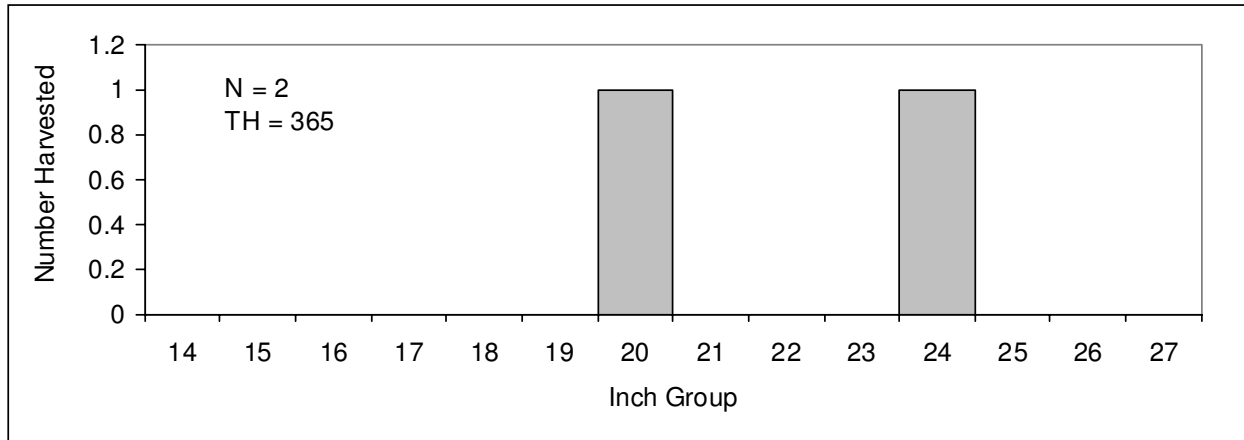


Figure 13. Length frequency of harvested palmetto bass observed during creel surveys at Lake Conroe, Texas, June 2008 through May 2009, all anglers combined. N is the number of harvested palmetto bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass

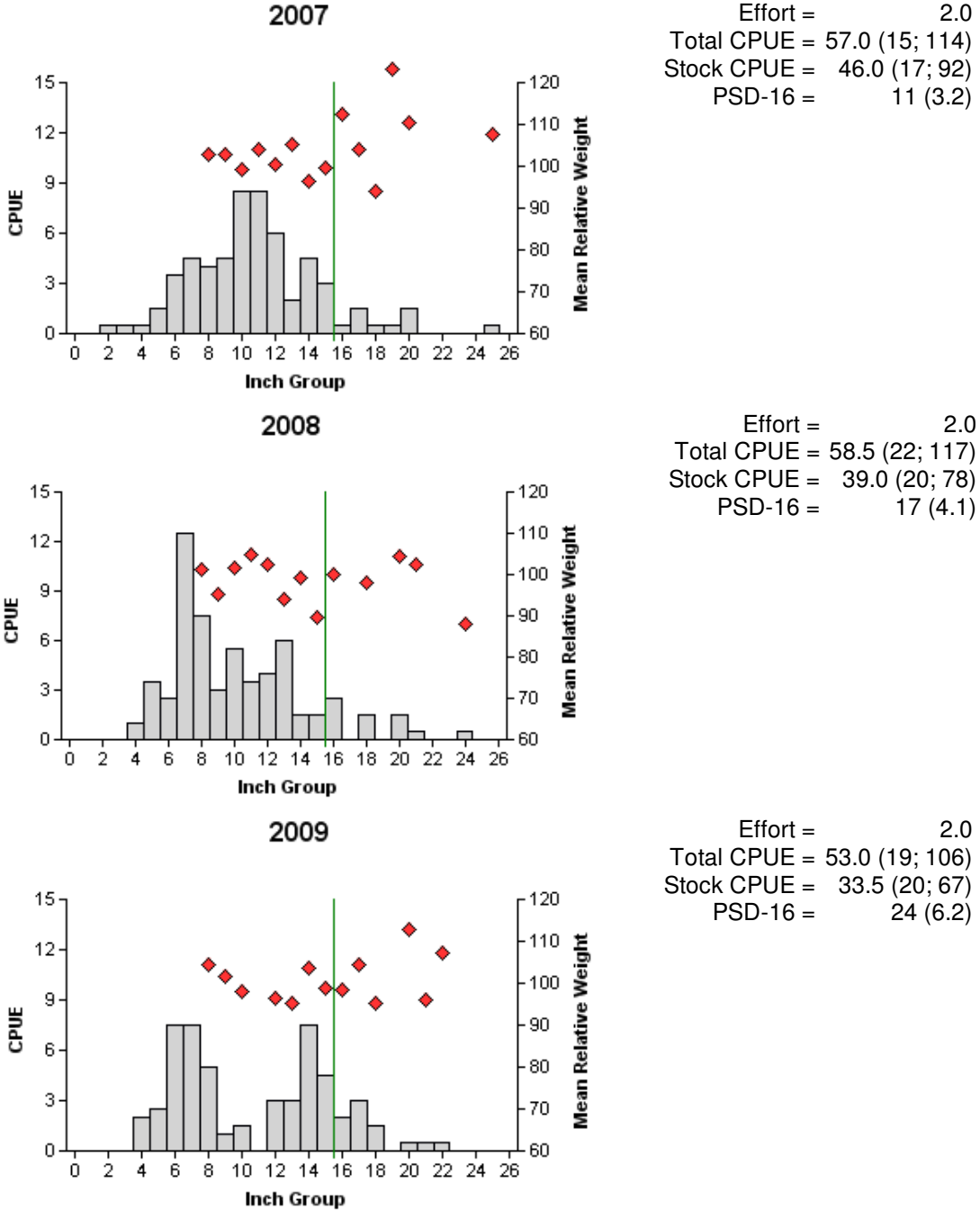


Figure 14. Number of largemouth bass caught per hour (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Conroe, Texas, 2007, 2008, and 2009. Vertical line represents minimum length limit at time of survey.

Largemouth Bass

Table 11. Creel survey statistics for largemouth bass at Lake Conroe from June through May 2004 through 2005, 2006 through 2007, and 2008 through 2009 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.

Creel Survey Statistic	Year		
	2004/2005	2006/2007	2008/2009
Directed effort (h)	53,710 (15.6)	71,785 (19.9)	99,646 (18.3)
Directed effort/acre	2.67 (15.6)	3.57 (19.9)	4.95 (18.3)
Total catch per hour	0.41 (37.7)	0.68 (34.9)	0.70 (25.3)
Harvest/acre	0.19 (100.5)	0.26 (58.3)	0.28 (43.7)
Total harvest	3,902 (100.5)	5,145 (58.3)	5,690 (43.7)
Number tournament retained	2,439 (100.5)	4,315 (58.3)	2,845 (43.7)
Percent tournament retained	62.5	83.8	50.0
Percent legal released	51.4	40.2	70.1

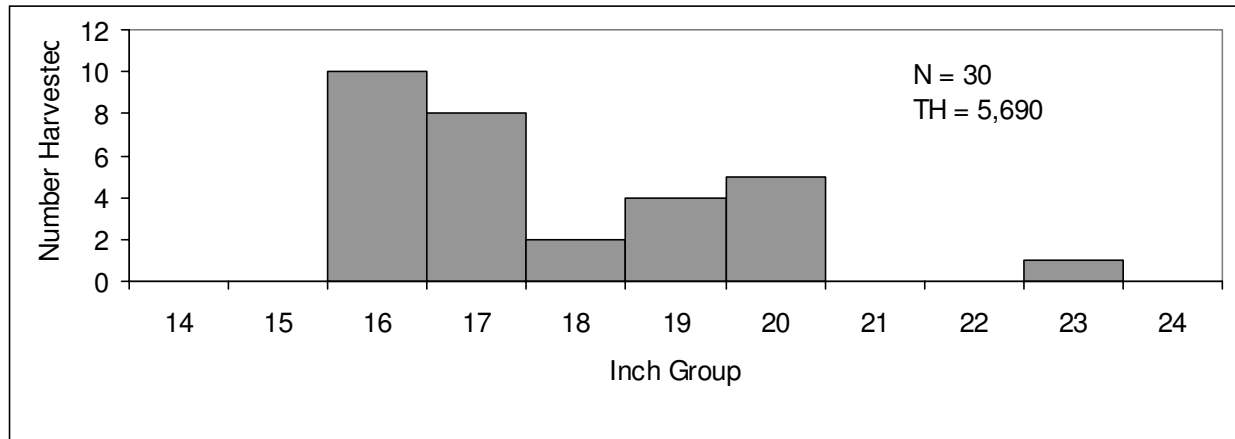


Figure 15. Length frequency of harvested largemouth bass observed during creel surveys at Lake Conroe, Texas, June 2008 through May 2009, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass

Table 12. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake Conroe, Texas, 1993 through 1999, 2001, 2005, and 2010. 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
2010	30	2	0	28	0	76.0	6.7

White Crappie

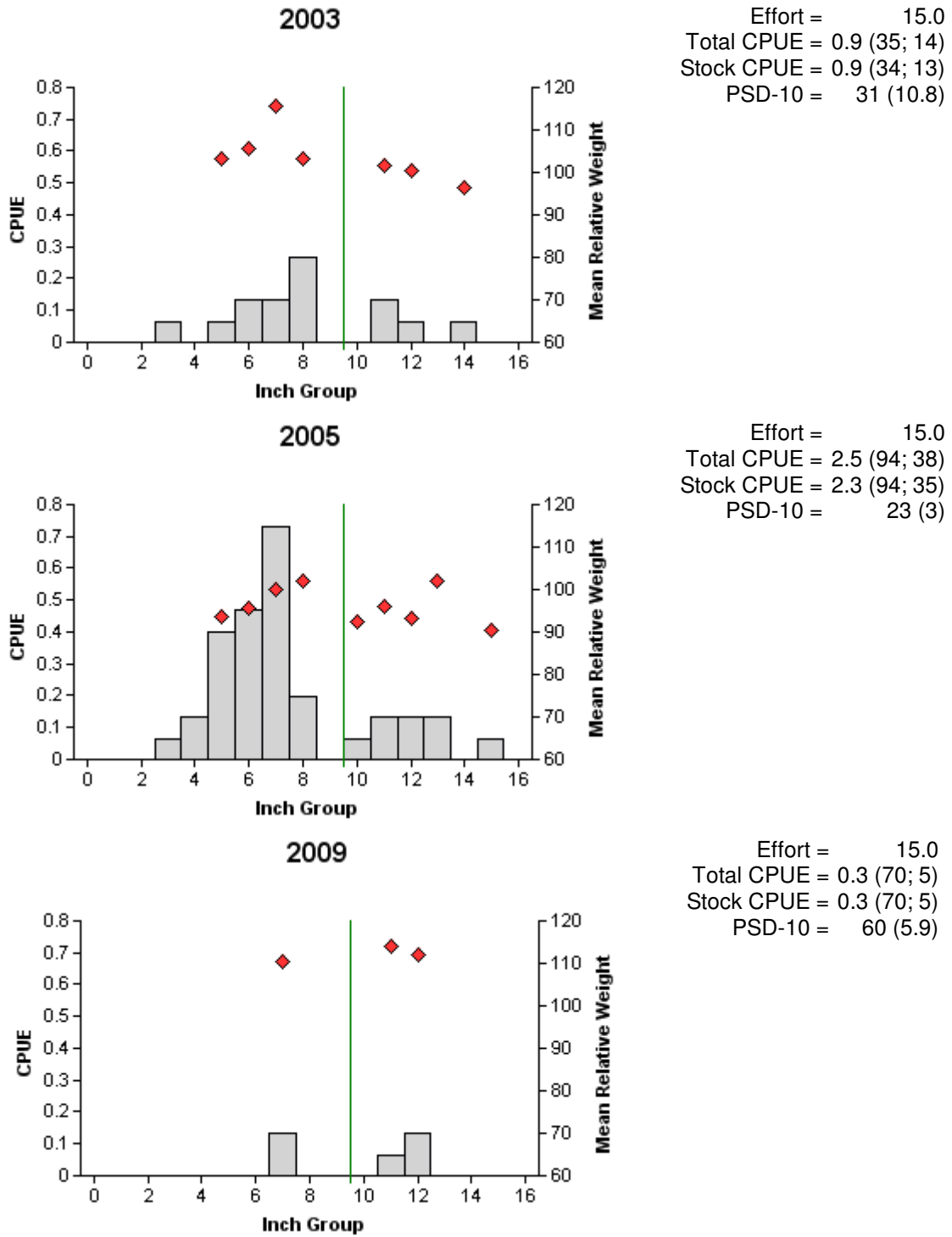
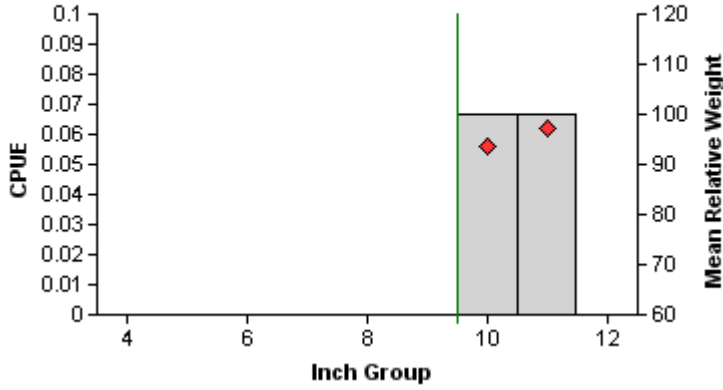


Figure 16. Number of white crappie caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Conroe, Texas, 2003, 2005, and 2009. Vertical line represents minimum length limit at time of survey.

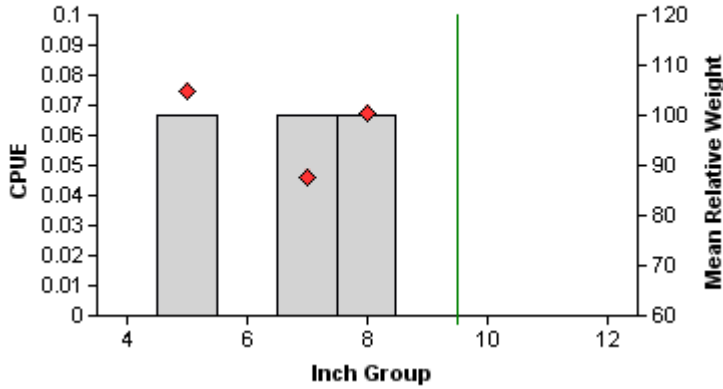
Black Crappie

2003



Effort = 15.0
 Total CPUE = 0.1 (100; 2)
 Stock CPUE = 0.1 (100; 2)
 PSD-10 = 100 (0)

2005



Effort = 15.0
 Total CPUE = 0.2 (100; 3)
 Stock CPUE = 0.2 (100; 3)
 PSD-10 = 0 (0)

Figure 17. 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, 2003 and 2005. No black crappie were captured in the 2009 survey. Vertical line represents minimum length limit at time of survey.

Crappies

Table 13. Creel survey statistics for white crappie and black crappie at Lake Conroe from June through May 2004 through 2005, 2006 through 2007, and 2008 through 2009 where directed effort and total catch per hour is for anglers targeting crappies and total harvest is the estimated number of crappies harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2004/2005	2006/2007	2008/2009
Directed effort (h)	15,640 (26.1)	22,075 (27.4)	23,492 (24.8)
Directed effort/acre	0.78 (26.1)	1.09 (27.4)	1.17 (24.8)
Total catch per hour	0.38 (42.6)	0.92 (48.0)	2.20 (59.9)
<u>Harvest/acre</u>			
White crappie	0.59 (67.8)	0.45 (59.6)	0.78 (43.8)
Black crappie	0.04 (912.1)	0.05 (304.6)	0.09 (224.6)
<u>Total harvest</u>			
White crappie	11,930 (67.8)	9,125 (59.6)	15,773 (43.8)
Black crappie	744 (912.1)	1,050 (304.6)	1,811 (224.6)
Percent legal released	0.0	0.0	8.6

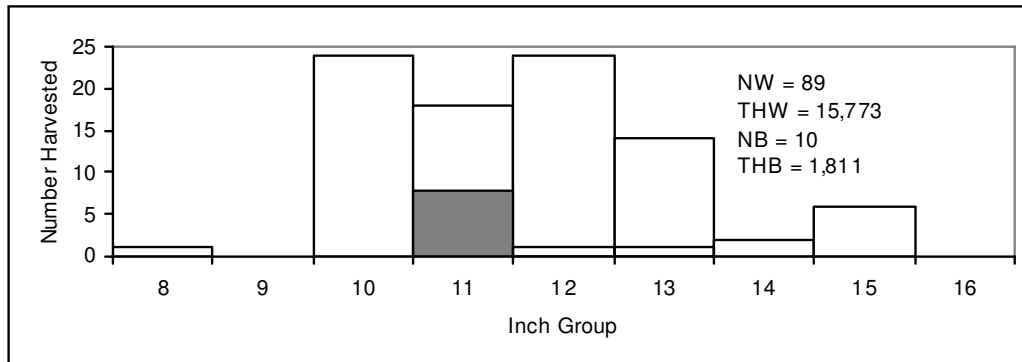


Figure 18. Length frequency of harvested white crappie (light bars) and black crappie (dark bars) observed during creel surveys at Lake Conroe, Texas, June 2008 through May 2009, all anglers combined. NW is the number of harvested white crappie and NB is for the number of harvested black crappie observed during creel surveys. THW is the total estimated harvest of white crappie and THB is the total estimated harvest of black crappie for the creel period.

Table 14. 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.

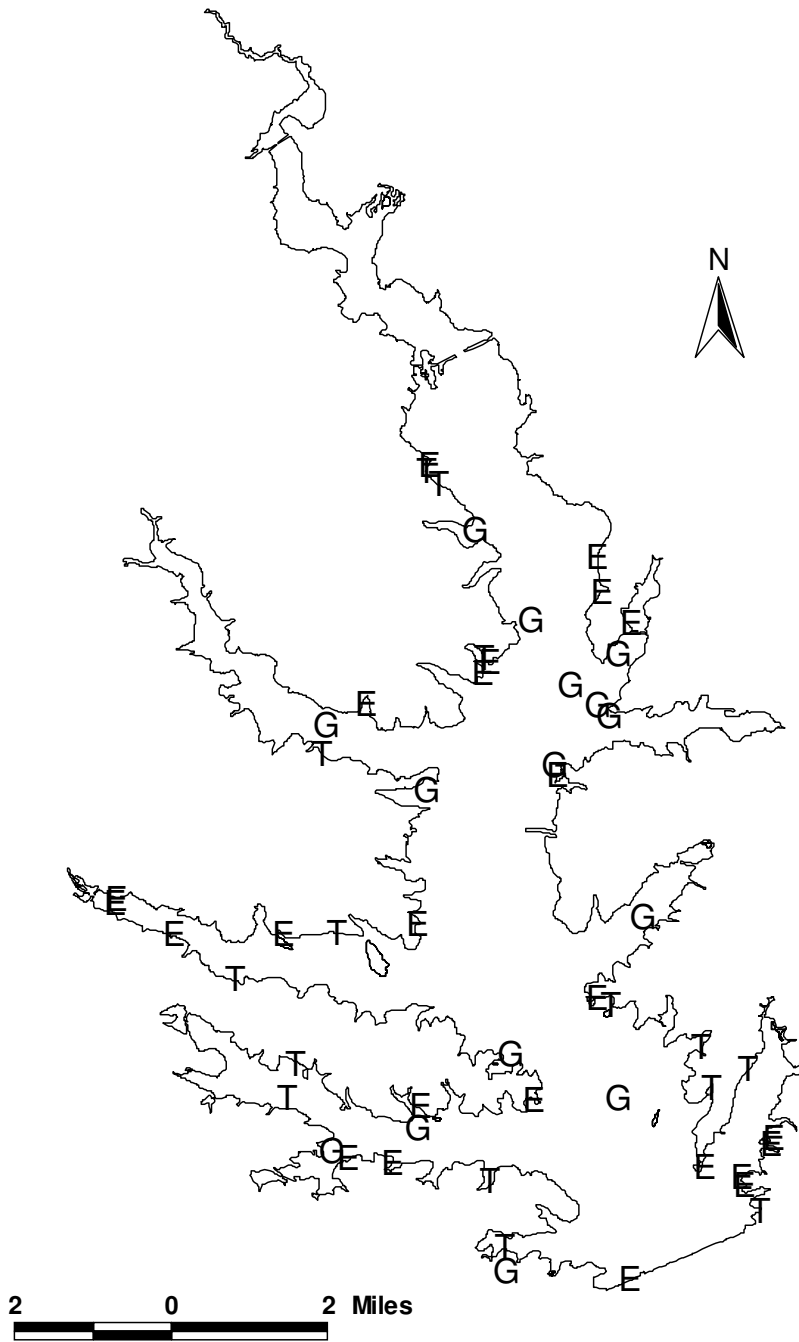
Survey Year	Electrofishing	Gill Net	Creel Survey	Vegetation Survey	Habitat Survey	Access Survey	Report
Fall 2010-Spring 2011	A			A			
Fall 2011-Spring 2012	A	A		A			
Fall 2012-Spring 2013	A		A	A			
Fall 2013-Spring 2014	S	S		S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Conroe, Texas, 2009 through 2010.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					284	142.0
Threadfin shad					900	450.0
Golden shiner					1	0.5
Bullhead minnow					2	1.0
Inland silverside					88	44.0
Brook silverside					6	3.0
Blacktail shiner					1	0.5
Blackspotted topminnow					37	18.5
Blue catfish	58	3.9				
Channel catfish	220	14.7				
White bass	7	0.5				
Palmetto bass	45	3.0			1	0.5
Bluegill					237	118.5
Longear sunfish					24	12.0
Redear sunfish					87	43.50
Spotted bass					6	3.0
Largemouth bass					106	53.0
White crappie			5	0.3	5	2.5
Black crappie			0	0.0	2	1.0
Logperch					1	0.5
Blue tilapia					1	0.5

APPENDIX B



Location of sampling sites, Lake Conroe, Texas, 2009 through 2010. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and E, respectively.

APPENDIX C

Lake Conroe triploid grass carp stocking rates from March 2006 through June 2010. Grass carp mortality was calculated at 32% annually.

Date	Number Stocked	Acres of hydrilla	Actual number of fish in the lake	Stocking rate (per vegetated acre) including mortality
3/15/2006	4,330	474	4,330	9
8/20/2006	9,311	877	13,100	15
10/23/2006	13,800	1,167	26,168	23
2/22/2007	10,000	700*	33,376	18
4/22/2007	23,386	1,871	54,983	29
5/22/2007	0	1,480	53,499	36
9/13/2007	25,000	1,776	78,499	41
3/30/2008	33,474	2,052	112,860	55
4/24/2008	0	363	109,883	302
6/24/2008	0	3	103,883	41,553
6/19/2010	0	10	48,035	5,004

* 700 acres including tubers

Lake Conroe changes in aquatic vegetation relative abundance coinciding with the stockings from June 2005 through September 2009.

Date	Species					
	Hydrilla	Water hyacinth	Alligatorweed	Giant salvinia	Water lettuce	Natives
Jun-05	868	9	0	1	4	1,476
May-06	474			193		112
Jul-06	740			183		
Aug-06	877					
Sep-06	1,167			222		890
Mar-07	1,871					
May-07	1,480					
Jul-07	1,776	338	33	226	0	1,078
Nov-07	1,942					
Jan-08	2,052					
Mar-08	363					
May-08	3	106	0	284	0	152
Jul-08	1	68	133	629	0	140
May-09		<1	25	582	0	157
Sep-09	10	<1	5	6	0	81

APPENDIX D

Changes in native vegetation species dominance following the removal of hydrilla by periodic triploid grass carp stockings at Lake Conroe, Texas.

May – June 2008	May – June 2009
American lotus	Water pennywort
Cattail	Smartweed
Spatterdock	Sedge sp.
Coontail	Panicum sp.
Water primrose	Duckweed
Water pennywort	Bulrush
Water willow	Water hyssop
Bull tongue	Spatterdock
Bladderwort	Water willow
Bushy pondweed	Floating heart