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

Coleto Creek Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Coleto Creek Reservoir were surveyed from 2006 to 2010 using trap nets, electrofishing, and gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Coleto Creek Reservoir is a 3,100-acre reservoir located on Coleto Creek in the Guadalupe River Basin 13 miles southwest of Victoria. Regulated by the Guadalupe-Blanco River Authority, it receives water from Coleto and Perdido creeks as well as several smaller tributaries and is used as a power plant cooling and recreation. Approximately 600 acres are used for cooling ponds and are inaccessible to anglers. Water level is typically stable. Substrate is composed primarily of clays, deep loams and small rock. Littoral habitat consisted of many native and exotic species of aquatic vegetation and flooded timber.

- **Management History:** Important sport fish species include blue, channel, and flathead catfish, white bass, largemouth bass, and white and black crappie. Palmetto bass and red drum were previously stocked in the reservoir but these stockings have been discontinued due to low gill net catch rates and low directed angling effort. The 2006 management plan focused on nuisance aquatic vegetation control and the continuation of roving creel surveys every other year to estimate angling effort, catch, and harvest. Hydrilla, milfoil and water hyacinth have historically restricted access to some areas of the reservoir and these problematic areas have been treated with herbicides and bio-control organisms. In addition to standard electrofishing surveys conducted every year; additional largemouth bass sampling was conducted in 2009 to assess age and growth and to obtain total annual mortality estimates for the population.

- **Fish Community**
  - **Prey species:** Abundant sunfish (bluegill and redear) populations provided adequate prey for existing predator fish populations. Gizzard and threadfin shad catches declined and roughly half of the gizzard shad collected were suitable prey size for most size classes of bass.

  - **Catfishes:** The catfish community was dominated by channel catfish. Blue catfish were also present in the reservoir in low abundance. Several quality-size catfish were collected.

  - **Temperate basses:** White bass were present in low abundance and catches dropped substantially compared to the 2006 survey. Palmetto bass are assumed no longer present in the reservoir, as evidenced by zero catches in both 2006 and 2010 gill net surveys.

  - **Largemouth bass:** Largemouth bass continued to be abundant in the reservoir. Size distribution of the population remained consistent and body condition was adequate for all size classes. Most largemouth bass grew to 14-inches in three years.

  - **Crappie:** Black and white crappie were present in the reservoir with white crappie being most abundant. White crappie abundance has decreased substantially; however, all fish collected were legal size.

- **Management strategies:** Initiate creel survey in 2011/12 to collect angling effort and catch and harvest data and to monitor apparent declines in important sport fisheries (i.e., crappies, white bass, and channel catfish). Conduct springtime electrofishing surveys to assess low catch and lack of quality-sized largemouth bass represented in samples. Network with local bass clubs to set up a largemouth bass tournament reporting system to supplement standard largemouth bass data collection. Continue to work with GBRA on monitoring and controlling milfoil and hydrilla in problematic areas.

INTRODUCTION

This document is a summary of fisheries data collected from Coleto Creek Reservoir in 2006-2010. The purpose is to provide fisheries information and provide management recommendations to protect and improve the sport fishery. This report deals primarily with major sport fishes and important prey species. Management recommendations address existing problems and/or opportunities. Historical data are presented for comparison.

Reservoir Description

Coleto Creek Reservoir is a 3,100-acre reservoir located on Coleto Creek in the Guadalupe River Basin 13 miles southwest of Victoria. Regulated by the Guadalupe-Blanco River Authority (GBRA), it receives water from Coleto Creek and several smaller tributaries and is used as a power plant cooling supply and for recreation. Approximately 600 acres are used for cooling ponds and are inaccessible to anglers. The reservoir experiences little water level fluctuation. Water level was slightly below conservation pool during vegetation, electrofishing, trap net, and gill net surveys (Figure 1). Substrate is composed primarily of clays, deep loams and small rock. Littoral habitat consisted of many native species of aquatic vegetation including bulrush, coontail, water stargrass, American lotus, banana lily, and periodically flooded live and dead terrestrial vegetation. Exotic species present included hydrilla and Eurasian water milfoil. Hydrilla and water hyacinth have been problematic since the previous report and subsequently treated with herbicides (hydrilla and water hyacinth, GBRA) and bio-control organisms (hydrilla only) under the guidance of Texas Parks and Wildlife (TPWD) District 1E.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Findeisen and Neahr 2006) included:

1. Monitor angling effort, catch, and harvest rates of important sport fishes via roving creel surveys conducted every other year. Write and distribute press releases from data obtained during creel encounters.
   Action: No additional creel surveys were conducted since the last management report. Creel efforts were instead directed towards a catfish special research project requiring high numbers of creel interviews and extensive data collection at Choke Canyon Reservoir. Several press releases from data obtained through standard surveys were distributed since the last report highlighting angling opportunities.
2. Exotic vegetation has continued to be problematic in this reservoir. Continue to assist and serve as advisors to GBRA on all vegetation control activities. Continue to release bio-control agents for hydrilla management and contact US Department of Agriculture for procurement of new water hyacinth bio-control agents.
   Action: District 1E monitored the expansion of nuisance vegetation and circumnavigated the lake conducting an aquatic vegetation survey in 2009. No additional bio-control organisms were released since the last report attributed to the fact hydrilla and water hyacinth have been maintained at manageable levels through herbicide treatments.

Harvest regulation history: Sport fishes in Coleto Creek Reservoir are currently managed with statewide regulations with the exception of red drum, that are managed with a 20-inch minimum length limit and three fish daily bag (Table 2). When Coleto Creek Reservoir was opened to anglers in 1981, the largemouth bass regulation was a 16-inch minimum length limit and three fish daily bag, but changed to a 14-inch minimum length limit with a five fish daily bag in the late 1980s to correspond with existing statewide largemouth bass regulations for most fisheries.

Stocking history: Coleto Creek Reservoir was stocked in 2003, 2004, and 2005 with northern largemouth bass as part of a research project aimed to evaluate the contribution of northern largemouth

bass in reservoirs that were composed primarily of Florida strain largemouth bass. Red drum were stocked in 2001 with efforts to create another sport fish population for anglers to utilize. However, no red drum hwere collected during routine fisheries surveys; only anecdotal angler catches have been reported. Palmetto bass were last stocked in 1999 but have been discontinued due to low gill net catch rates and minimal angling effort directed toward this species. The complete stocking history is in Table 3.

Vegetation/habitat management history: Coleto Creek Reservoir supports native emergent, native submersed, and native floating vegetation, several exotic species, and standing timber (Table 4). Hydrilla and milfoil have been problematic in the reservoir by restricting access and historically have been treated annually with herbicides. Additionally, bio-control organisms (hydrilla flies) have been introduced to assist with hydrilla control. Hydrilla abundance in the reservoir has decreased substantially since 1998. This is likely attributed to high water temperatures, herbivores such as tilapia, hydrilla fly introductions, and competition with native species such as coontail.

Water hyacinth, while scarcely present in the reservoir, did not become problematic until 2005. It is thought that the water hyacinth was flushed from an ornamental pond adjacent to Coleto Creek Reservoir during a flood event in 2004 establishing itself in the reservoir. Through GBRA management efforts, water hyacinth is currently under control at the reservoir. However, the potential exists for it becoming problematic in the future.

METHODS

Fishes were collected using standard electrofishing (1.0 hours at 12, 5-minute stations), bass-only electrofishing (1.7 hours at 10, 10-minute stations), trap nets (5 net nights at 5 stations), and gill nets (5 net nights at 5 stations). Standard electrofishing surveys were conducted during night time and sample station selection was random for all gear types as prescribed by the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009) (Appendix B). Additional daytime electrofishing was conducted at 10-minute randomly selected stations to collect a 200-fish sample for age and growth analysis. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing (fish/h) and for gill and trap nets as the number of fish caught in one net set overnight (fish/nn). An aquatic vegetation survey was conducted in 2009. Ages for largemouth bass were determined using 13 fish between 13.5-14.5-inches total length in 2007 and 2008 and from all fish > 6-inches total length in 2009. Largemouth bass were aged using otoliths.

Growth parameters were estimated using the von Bertalanffy growth equation utilizing non-linear least squares methodology (Haddon 2001). Mean length-at-age was described by: $L_a = L\infty\ (1\text{-}e^{-K(t - to)})$; where L_a = length-at-age, $L\infty$ = average asymptotic length, K = metabolic growth coefficient, and t_o = hypothetical age where the fish has a length of zero. Mortality estimates were obtained by regressing *ln*(catch at age) against each age class and the slope of the line was used as an estimate of instantaneous mortality (*Z*). Survival (*S*) was calculated as $e^{(-Z)}$ and total annual mortality (*A*) was calculated as 1-*S*. Residuals from the catch curve were plotted by year class allowing inference into year class strength and recruitment dynamics (Maceina 1997; 2004).

Genetic analysis of largemouth bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2006). Micro-satellite analysis was used to determine genotype of individual fish in 2005, 2008 and 2009 and by electrophoresis for previous years.

Sampling statistics (CPUE for various length categories) and structural indices [Proportional Size Distribution (PSD) for various length categories, as defined by Guy et el. (2007)], and condition indices [relative weight indices (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad according to DiCenzo et al. (1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all catch statistics and SE was calculated for structural indices and IOV. Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of featureless shoreline, overhanging brush, flooded timber, and native and non-native submersed vegetation (Table 4). In 2009, 1,129 of the 3,100 acres (36%) of Coleto Creek Reservoir contained submersed aquatic vegetation. This represented a substantial increase in coverage compared to 2005 when submerged vegetation occupied only 237 acres covering 8% of the reservoir. Water stargrass (329 acres/10.6% coverage) was the most abundant native vegetation and the reservoir experienced substantial increases in hydrilla and Eurasian milfoil covering 241 acres (7.7%) and 481 acres (15.5%), respectively (Table 4).

Prey species: In 2009, electrofishing catch rates for gizzard and threadfin shad were 16.0/h and 40.0/h, respectively. The electrofishing catch rate for gizzard shad in 2009 was lower than in both 2007 (192.0/h) and 2008 (29.0/h) (Figure 2). The IOV for gizzard shad was 50, lower than 2007 (82) and 2008 (59) values; indicating 50% of the gizzard shad sampled in 2009 were less than 8-inches in length and available as forage to most predator fishes. Decreased shad catches in electrofishing sample was likely attributed to heavily vegetated sample sites as gill net sample indicated availability of gizzard shad to the predator assemblage (Appendix 1). The bluegill catch rate in 2009 was 198.0/h similar to prior surveys in 2007 (249.0/h) and 2008 (169.0/h) (Figure 3). A substantial increase in redear sunfish relative abundance was observed in 2009. Electrofishing catch rate for redear sunfish was 225.0/h compared to 63.0/h in 2007 and 46.0/h in 2008 (Figure 4). Size classes of bluegill and redear sunfish were suitable for most predators as indicated by low PSD values. Several quality-sized (> 6-inches) redear sunfish were also collected. Taken as a whole, survey results indicated ample prey base for sport fishes, primarily attributed to high abundance of bluegill and redear sunfish. Availability of prey should not be a limiting factor to the growth and condition of sport fishes in the reservoir.

Blue catfish: The 2010 blue catfish gill net catch rate was 1.8/nn, slightly higher than previous surveys in 2002 (0.4/nn) and 2006 (1.2/nn) (Figure 5). Historical gill net catch rates for blue catfish have been low in the reservoir. Although the 2010 blue catfish catch was low, the majority of fish collected were quality-sized fish as indicated by CPUE-20 of 1.2/nn (Figure 5). Relative weights of the fish collected were adequate.

Channel catfish: The gill net catch rate for channel catfish in 2010 was 4.6/nn, lower than the rate in 2006 (8.8/nn) survey, but slightly higher than in 2002 (2.0/nn) (Figure 6). The population structure of channel catfish was adequate as indicated by PSD of 32. Several quality-sized individuals were collected as indicated by CPUE-16 of 1.2/nn (Figure 6). Body condition of stock-size and larger channel catfish was excellent as relative weight values were greater than average historical values for the reservoir with mean relative weights at or above 90 (Figure 7).

White bass: The 2010 gill net catch rate for white bass was 0.4/nn, considerably lower than the catch rate in 2006 (10.6/nn), but consistent with catches in 2002 (1.6/nn) (Figure 8). Both fish collected in 2010 were greater than the 10-inch minimum length limit.

Palmetto bass: Palmetto bass were not collected in 2010 or 2006 gill net surveys and only 4 fish were collected in 2002 (0.8/nn). This species has not been stocked in the reservoir since 1999 and the population is considered to be no longer present.

Largemouth bass: Electrofishing catch rate for largemouth bass was 148.0/h in 2009, consistent with 2008 (139.0/h) and higher than in 2007 (108.0/h) (Figure 9). Size structure indices indicated a stable and balanced population with PSD values of 41 (standard nighttime electrofishing; Figure 9) and 56 (daytime bass-only electrofishing; Figure 10); values consistent with previous surveys. Body condition of stock-size and larger largemouth bass was good as relative weight values were consistent with average historical values for the reservoir with mean relative weights at or above 90 (Figure 11). Growth was considered slow with most fish reaching 14-inches total length (TL) by age-3 (Figure 12). Total annual mortality (*A*) for the population was considered moderate, estimated at 0.57 in 2009 (Figure 13). The

contribution of a strong 2007 year class (Figure 14) was evident in 2009 length frequency histograms with several fish in the population in the 10 to 13-inch size classes (Figures 9 & 10). Catch of larger bass (≥ 18-inches) was low (n = 1) in 2009 (CPUE-18 = 0.0/h for standard electrofishing, CPUE-18 = 0.6/h for daytime bass-only electrofishing) considering the increased effort (2.7 hours) and when compared to prior surveys in 2007 (CPUE-18 = 3.0/h) and 2008 (CPUE-18 = 1.0/h) where only 1 hour effort was allotted (Figures 9 & 10). Introgression of FLMB genetics in the population remained high and was consistent with previous years; FLMB alleles averaged 87% in 2009 and 19% of the population consisted of pure Florida largemouth bass (Table 5).

White Crappie: Trap net catch rate for white crappie was 1.6/nn in 2009, substantially lower than catch rates in 2005 (12.4/nn) and 2007 (8.8/nn) (Figure 15). Size structure of white crappie collected in 2009 was dominated by larger individuals and all fish sampled were at least 10-inches TL as evidenced by CPUE-10 of 1.6/nn, much lower than 5.0/nn in 2005 and 3.6/nn in 2007. Relative weights of collected white crappie were 90 or better, consistent with historical relative weight values indicating sufficient fish condition.

Fisheries management plan for Coleto Creek Reservoir, Texas

Prepared - June 2010.

ISSUE 1 Possible declines in the relative abundance of important sport fishes (i.e., channel catfish, white bass, and white crappie) and lack of fishery data necessitate the need to gain more insight into the dynamics of these populations.

MANAGEMENT STRATEGIES

1. Monitor angling effort and catch and harvest rates of existing fisheries through the use of a creel survey conducted in 2011/2012. A stratified random design will likely be utilized designed from data collected during the 2005/2006 roving creel survey in order to maximize efficiency of data collection.
2. Conduct additional gill net sample in spring 2012 to monitor declines in relative abundance of channel catfish and white bass.
3. Write and distribute press releases concerning angling opportunities identified from creel survey data.

ISSUE 2 Few preferred-size (≥15-inches) have been collected during the last two electrofishing surveys (total effort = 3.7/h). Although the total annual mortality estimate in 2009 (A = 0.57) was considered moderate relative to other populations the lack of larger fish in the sample may illustrate these larger size-classes are experiencing a disproportionate level of mortality.

MANAGEMENT STRATEGIES

1. Conduct spring electrofishing surveys in 2011 and 2012 in efforts to verify presence of larger fish in the population.
2. Initiate and maintain a bass tournament and trophy database reporting system through GBRA's tournament records and networking with local bass clubs and tournament organizers.
3. Evaluate creel statistics (specifically, harvest and % legal fish released) from returns during 2011/2012 creel and if harvest appears to have increased since 2005/2006 creel, determine the effects of a regulation change (i.e., bag reduction) via yield-per-recruit analysis.

ISSUE 3 Exotic vegetation has the potential to be problematic in this reservoir. Abundance of hydrilla and Eurasian milfoil has increased substantially since last vegetation survey conducted in 2005.

MANAGEMENT STRATEGIES

1. Monitor spread of nuisance vegetation through periodic vegetation surveys.
2. Continue to serve as advisors to GBRA on all vegetation control activities.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes annual electrofishing, biennial trap netting, a creel survey scheduled for 2011/2012, and mandatory monitoring in 2013/2014 (Table 6). Additional springtime electrofishing will be conducted in 2011 and 2012 to assess poor catch and lack of preferred-size largemouth bass represented in samples. Gill net surveys will be conducted biennially to monitor the catfish and white bass populations.

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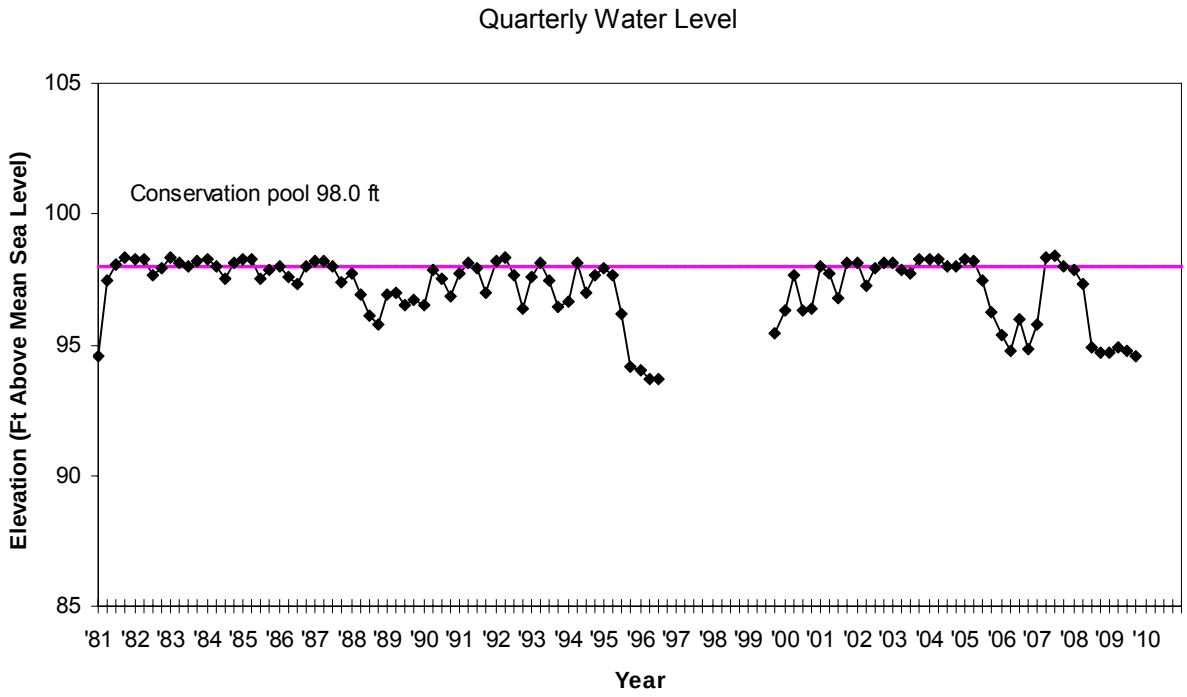


Figure 1. Quarterly water level elevations in feet above mean sea level recorded for Coleto Creek Reservoir, Texas.

Table 1. Characteristics of Coleto Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1980
Controlling authority	Guadalupe-Blanco River Authority
Counties	Goliad, Victoria
Reservoir type	Mainstem
Shoreline Development Index	7.8
Conductivity	500-700 umhos/cm
Access: Boat	Adequate, 1 ramp
Bank	Adequate, park area with pier
Handicapped	Adequate, park area with pier

Table 2. Harvest regulations for Coleto Creek Reservoir.

Species	Bag Limit (per person)	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 – No Limit
Catfish, flathead	5	18 – No Limit
Bass, white	25	10 – No Limit
Bass, palmetto	5	18 – No Limit
Bass, largemouth	5	14 – No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 – No Limit
Drum, red	3	20 – No Limit

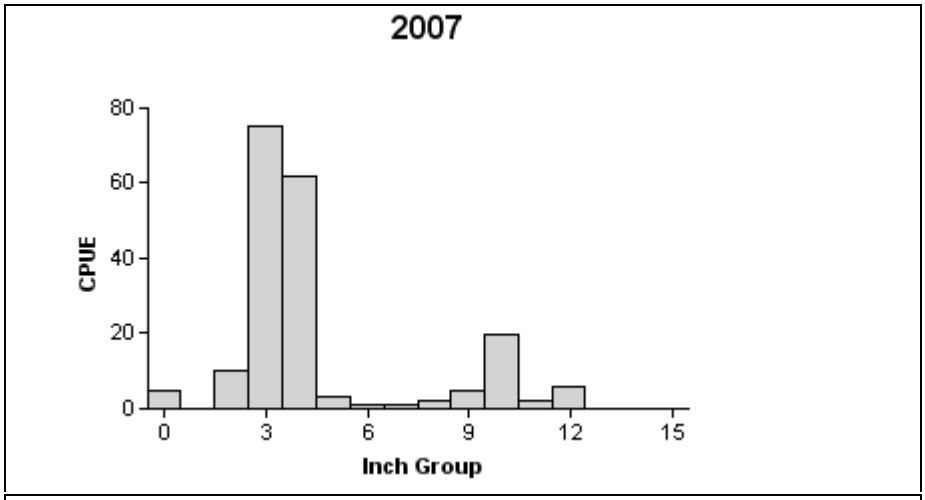
Table 3. Stocking history of Coleto Creek Reservoir, Texas. Size categories are: FGL = 1-3 inches and ADL = adults.

Year	Number	Size
Threadfin shad		
1980	17,900	ADL
Nile perch		
1981	68,119	FGL
Peacock bass		
1980	4,147	FGL
Coppernose bluegill		
1982	249,992	FGL
Blue catfish		
1990	31,496	FGL
Channel catfish		
1980	100,583	FGL
Palmetto bass		
1981	34,461	FGL
1982	30,980	FGL
1986	30,500	FGL
1987	10,021	FGL
1988	64,567	FGL
1989	68,584	FGL
1991	46,000	FGL
1992	31,300	FGL
1995	30,470	FGL
1996	46,500	FGL
1997	41,021	FGL
1998	49,642	FGL
1999	46,747	FGL
Species total	484,293	
Northern largemouth bass		
2003	38,613	FGL
2004	31,872	FGL
2005	31,249	FGL
Species total	101,734	
Florida largemouth bass		
1980	356	ADL
1981	92,092	FGL
1982	160,294	FGL
1983	161,800	FGL
Species total	414,542	
Red drum		
2001	25,445	FGL

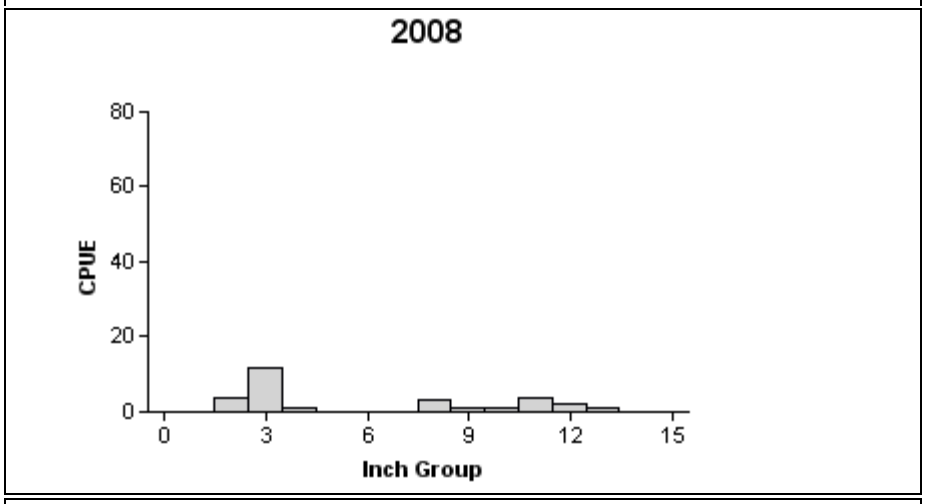
Table 4. Survey of littoral zone and physical habitat types, Coleto Creek Reservoir, Texas, 2005 (shoreline), 2009 (vegetation). A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

		Shoreline Distance		Areal Coverage	
Habitat	Type	Miles	Percent	Acres	Percent
Shoreline	Boulder	0.5	0.7		
	Boat dock	0.3	0.4		
	Bulkhead	0.3	0.4		
	Concrete	0.7	1.0		
	Cutbank	3.4	5.0		
	Eroded bank	1.5	2.2		
	Featureless	44.7	65.3		
	Overhanging brush	16.8	24.5		
	Rip rap	0.2	0.3		
	Rock bluff	0.1	0.1		
	Rocky/gravel shoreline	0.3	0.4		
	Total	68.5	100		
	Standing Timber	30.9	45.1		
Vegetation	Native emergent				
	Bulrush			0.33	0.01
	Native floating				
	American lotus			2.99	0.10
	Banana lily			1.20	0.04
	Native Submersed				
	Water stargrass			328.98	10.60
	Coontail			69.98	2.30
	Chara			7.65	0.25
	Non-native submersed				
	Hydrilla			240.79	7.80
	Eurasian watermilfoil			481.17	15.52

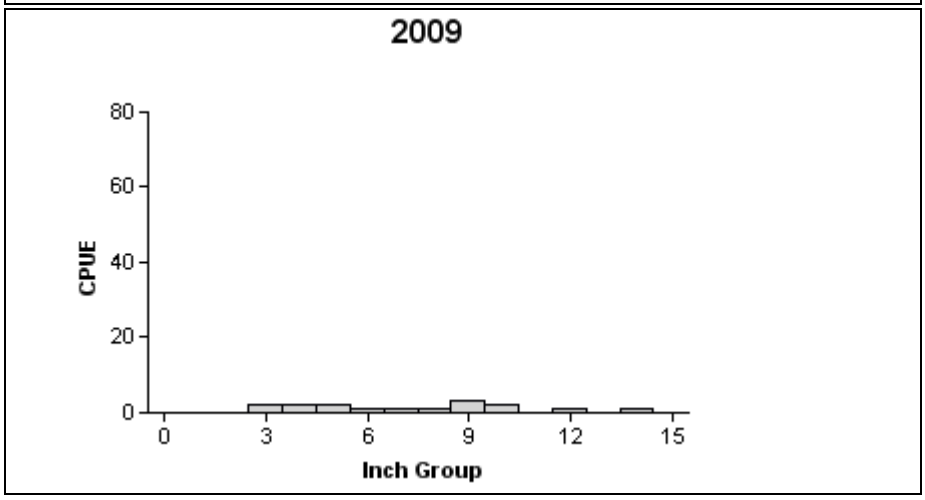
Gizzard Shad



Effort = 1.0
Total CPUE = 192.0 (72; 192)
Stock CPUE = 36.0 (38; 36)
IOV = 82.0 (12.2)



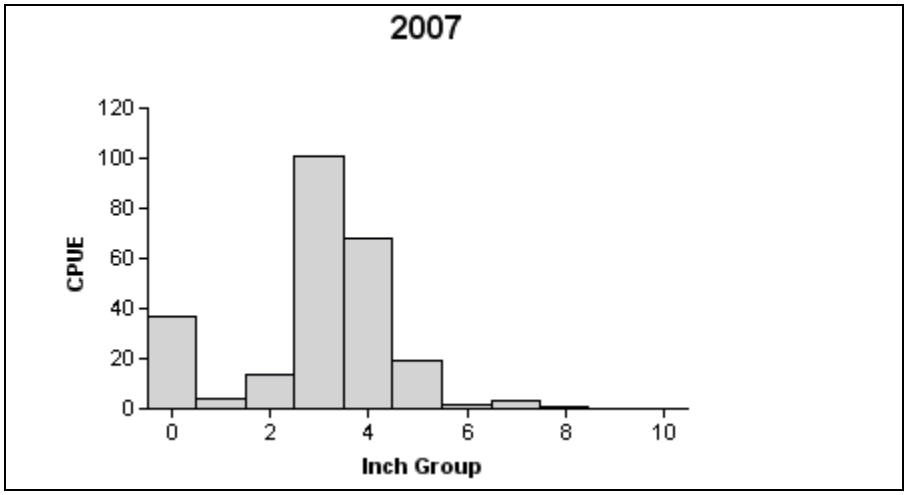
Effort = 1.0
Total CPUE = 29.0 (49; 29)
Stock CPUE = 12.0 (30; 12)
IOV = 59.0 (17.4)



Effort = 1.0
Total CPUE = 16.0 (46; 16)
Stock CPUE = 9.0 (37; 9)
IOV = 50.0 (19)

Figure 2. Number of gizzard shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Coleto Creek Reservoir, Texas, 2007, 2008, and 2009.

Bluegill



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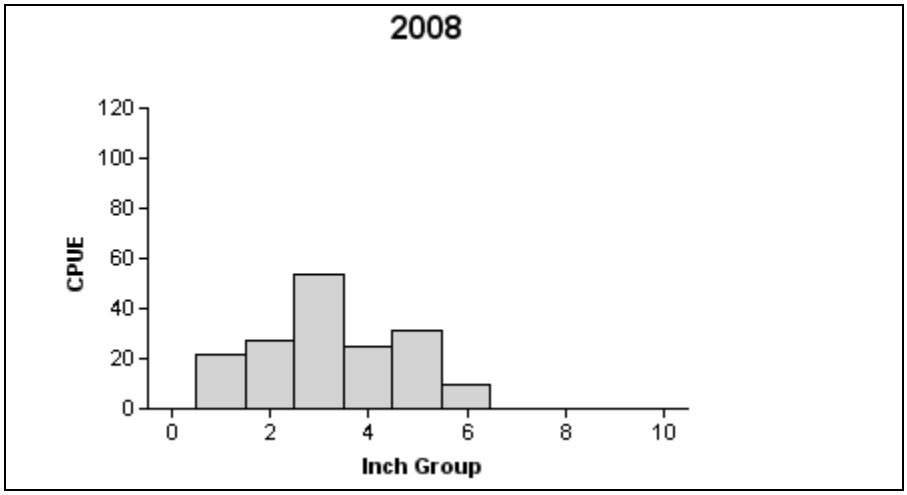
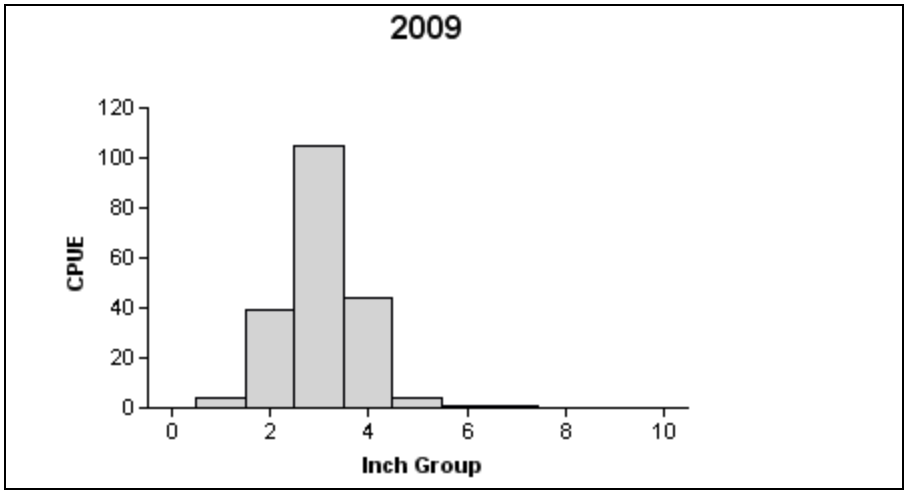
Total CPUE = 249.0 (19; 249)
Stock CPUE = 194.0 (22; 194)
PSD = 3 (1.3)



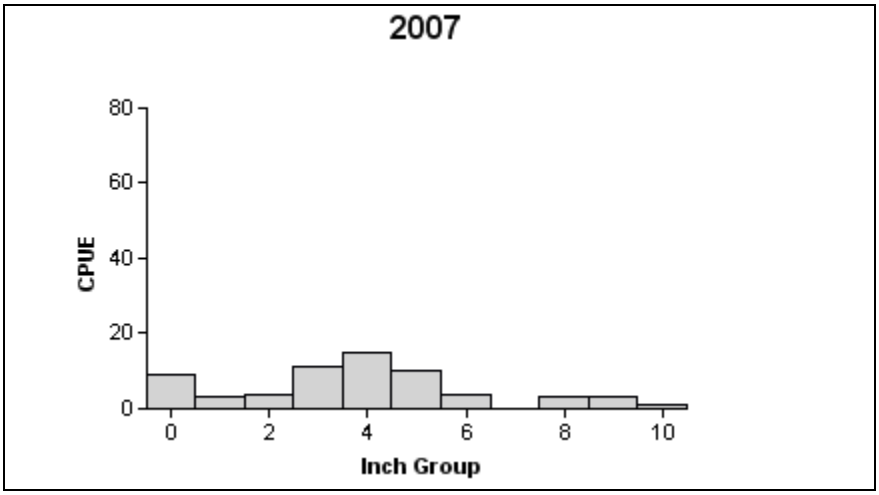
Effort = 1.0
Total CPUE = 169.0 (18; 169)
Stock CPUE = 120.0 (23; 120)
PSD = 8 (3.3)



Effort = 1.0
Total CPUE = 198.0 (27; 198)
Stock CPUE = 155.0 (29; 155)
PSD = 1 (1)

Figure 3. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coleto Creek Reservoir, Texas, 2007, 2008, and 2009.

Redear sunfish



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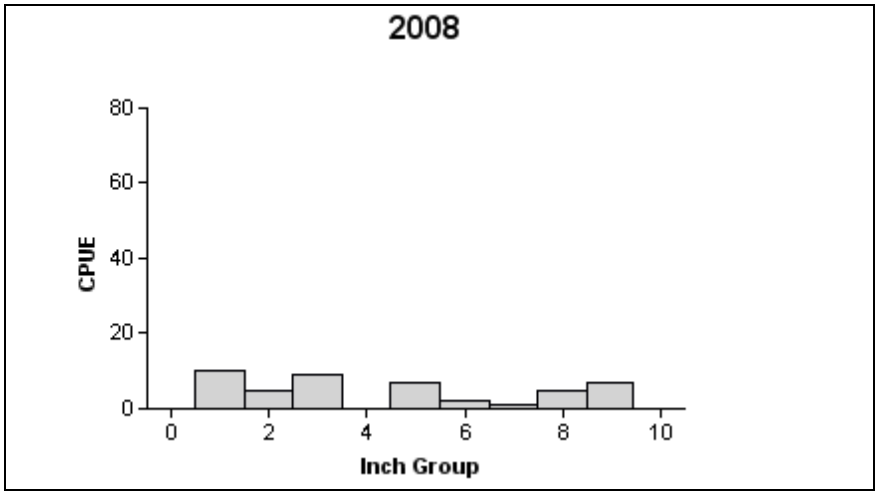
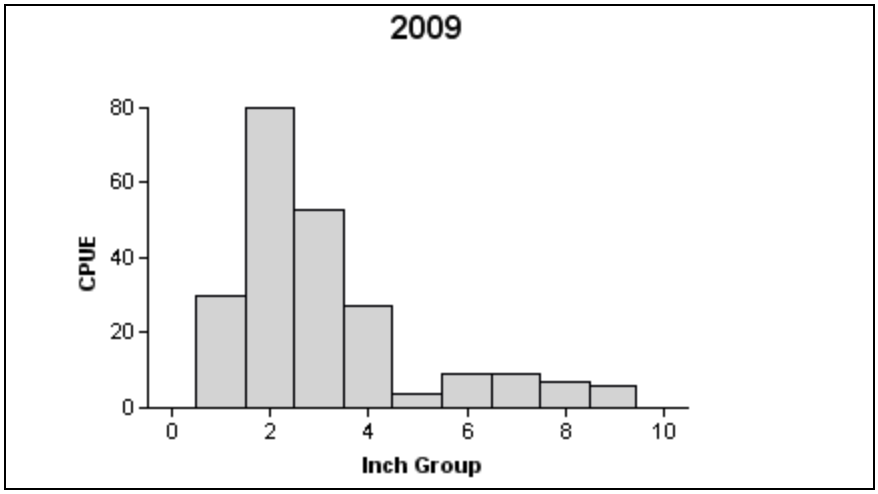
Total CPUE = 63.0 (20; 63)
Stock CPUE = 36.0 (26; 36)
PSD = 19 (7.2)



Effort = 1.0
Total CPUE = 46.0 (25; 46)
Stock CPUE = 22.0 (27; 22)
PSD = 59 (10.0)

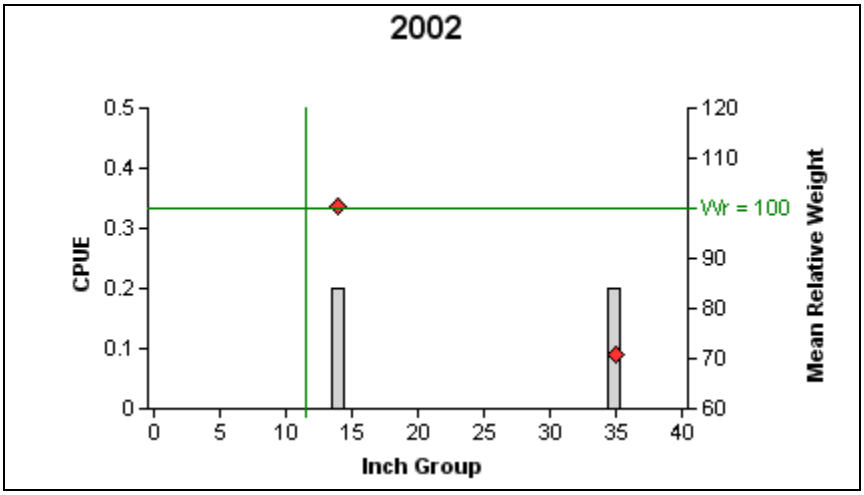


Effort = 1.0
Total CPUE = 225.0 (22; 225)
Stock CPUE = 62.0 (22; 62)
PSD = 35 (9.4)

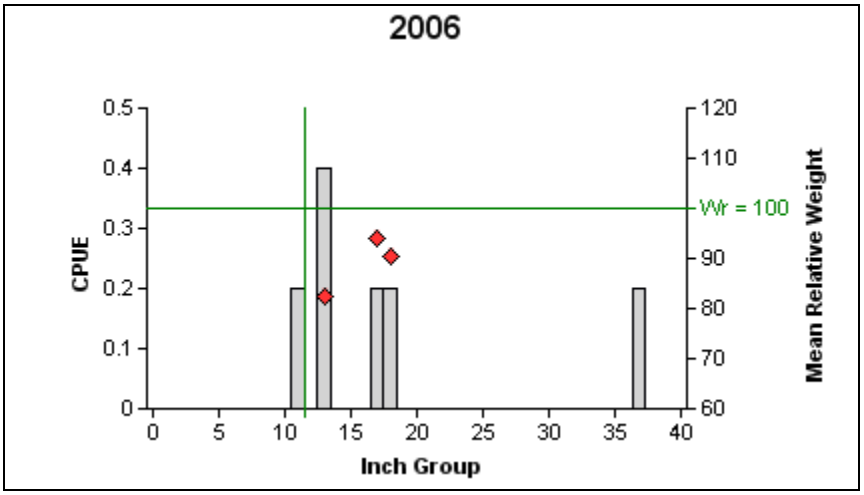
Figure 4. Number of redear sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coleto Creek Reservoir, Texas, 2007, 2008, and 2009.

.

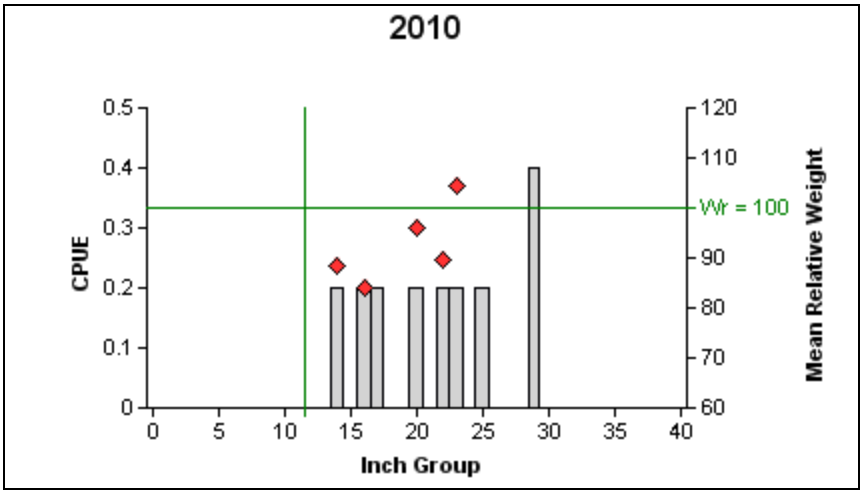
Blue Catfish



Effort =	5.0
Total CPUE =	0.4 (100; 2)
Stock CPUE =	0.4 (100; 2)
CPUE-20 =	0.2 (100; 1)
PSD =	50 (0)



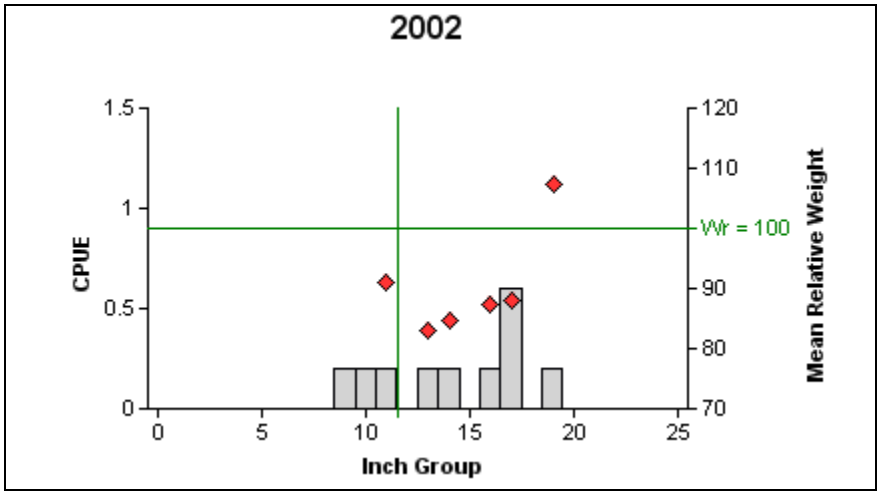
Effort =	5.0
Total CPUE =	1.2 (61; 6)
Stock CPUE =	1.0 (55; 5)
CPUE-20 =	0.2 (100; 1)
PSD =	20 (22.8)



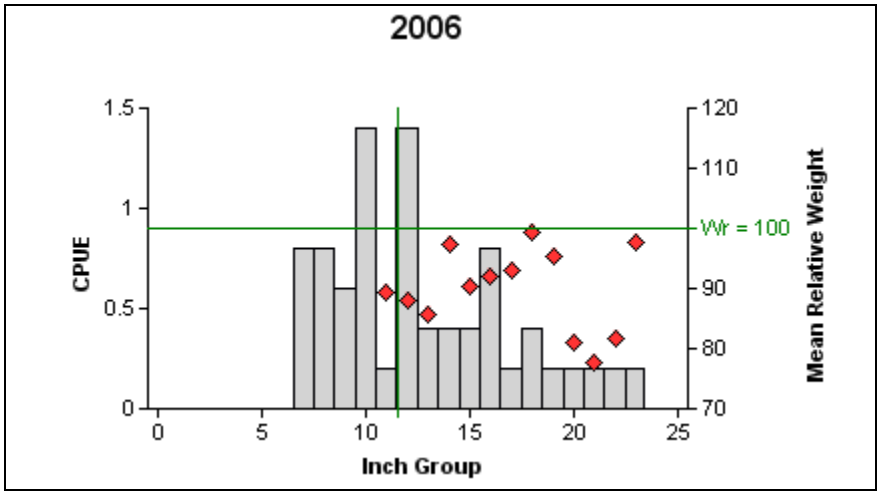
Effort =	5.0
Total CPUE =	1.8 (62; 9)
Stock CPUE =	1.8 (62; 9)
CPUE-20 =	1.2 (81; 6)
PSD =	67 (29.3)

Figure 5. Number of blue catfish caught per net night (CPUE, bars), relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill surveys, Coleto Creek Reservoir, Texas, 2002, 2006, and 2010. Vertical lines denote 12-inch minimum length limit and horizontal lines denote Wr of 100.

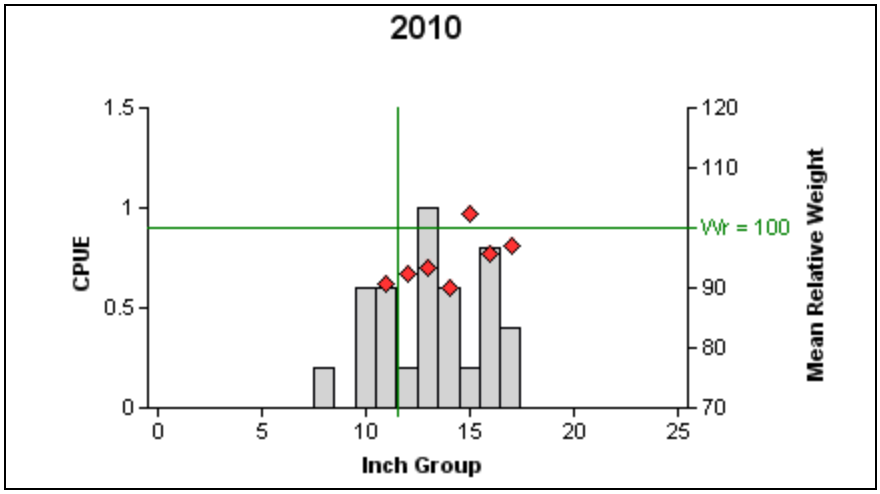
Channel Catfish



Effort =	5.0
Total CPUE =	2.0 (42; 10)
Stock CPUE =	1.6 (42; 8)
CPUE-16 =	1.0 (45; 5)
PSD =	62 (16.2)



Effort =	5.0
Total CPUE =	8.8 (43; 44)
Stock CPUE =	5.2 (30; 26)
CPUE-16 =	2.4 (36; 12)
PSD =	46 (12.5)



Effort =	5.0
Total CPUE =	4.6 (42; 23)
Stock CPUE =	3.8 (44; 19)
CPUE-16 =	1.2 (17; 6)
PSD =	32 (9.2)

Figure 6. Number of channel catfish caught per net night (CPUE, bars), relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill surveys, Coleto Creek Reservoir, Texas, 2002, 2006, and 2010. Vertical lines denote 12-inch minimum length limit and horizontal lines denote Wr of 100.

Channel Catfish

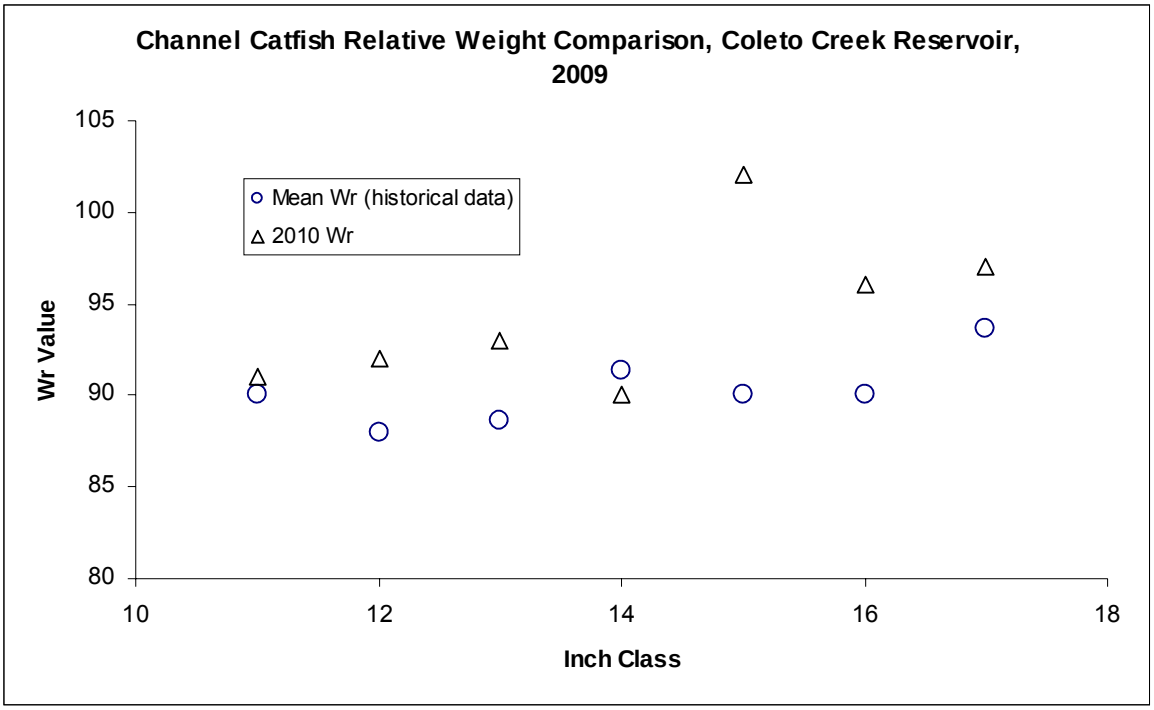
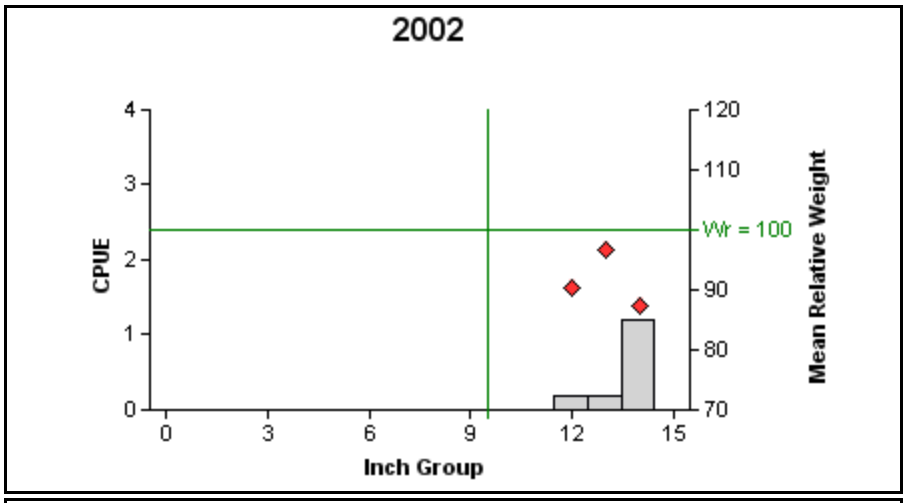
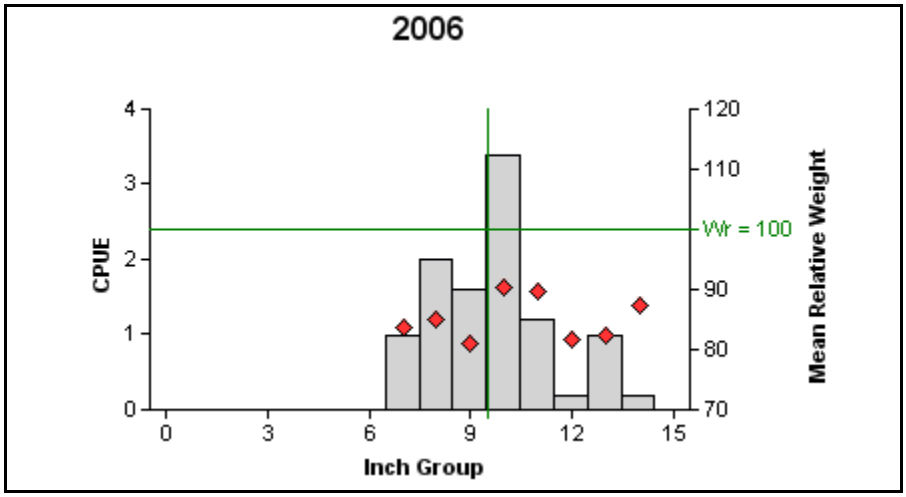


Figure 7. Comparison of 2010 channel catfish W_r values to mean W_r values from historical data (previous 3 surveys) by inch class.

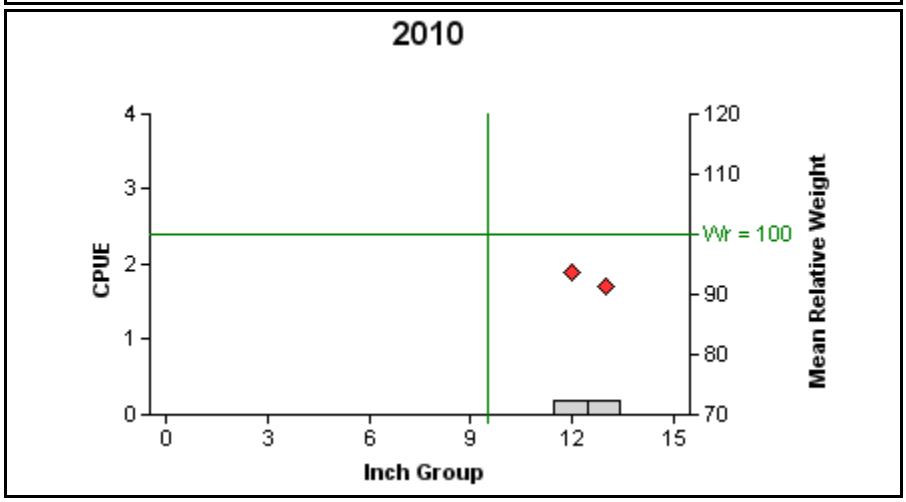
White Bass



Effort =	5.0
Total CPUE =	1.6 (73; 8)
Stock CPUE =	1.6 (73; 8)
CPUE-10 =	1.6 (73; 8)
PSD =	100 (0)



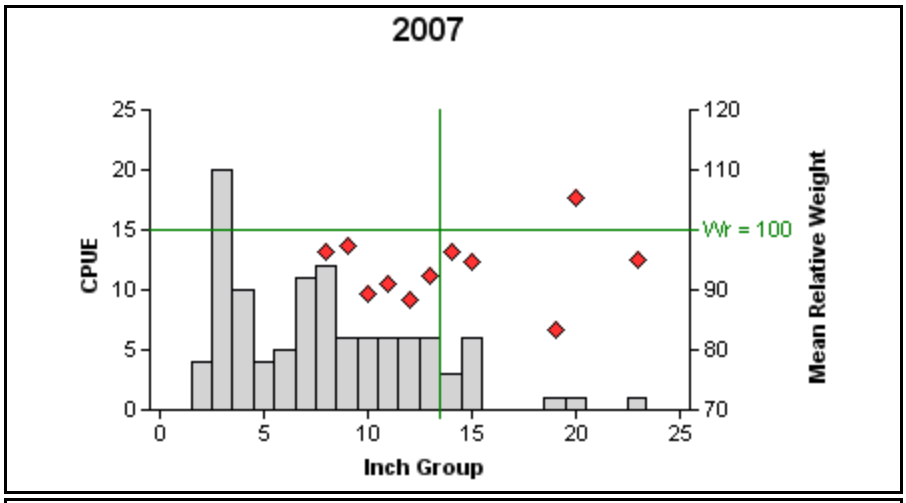
Effort =	5.0
Total CPUE =	10.6 (29; 53)
Stock CPUE =	10.6 (29; 53)
CPUE-10 =	6.0 (37; 30)
PSD =	72 (17.1)



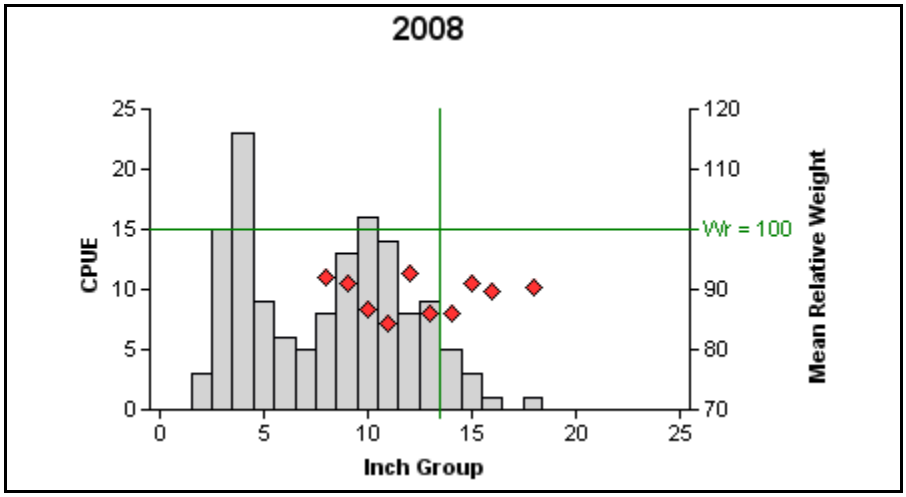
Effort =	5.0
Total CPUE =	0.4 (61; 2)
Stock CPUE =	0.4 (61; 2)
CPUE-10 =	0.4 (61; 2)
PSD =	100 (0)

Figure 8. Number of white bass caught per net night (CPUE, bars), relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill surveys, Coleto Creek Reservoir, Texas, 2002, 2006, and 2010. Vertical lines denote 10-inch minimum length limit and horizontal lines denote Wr of 100.

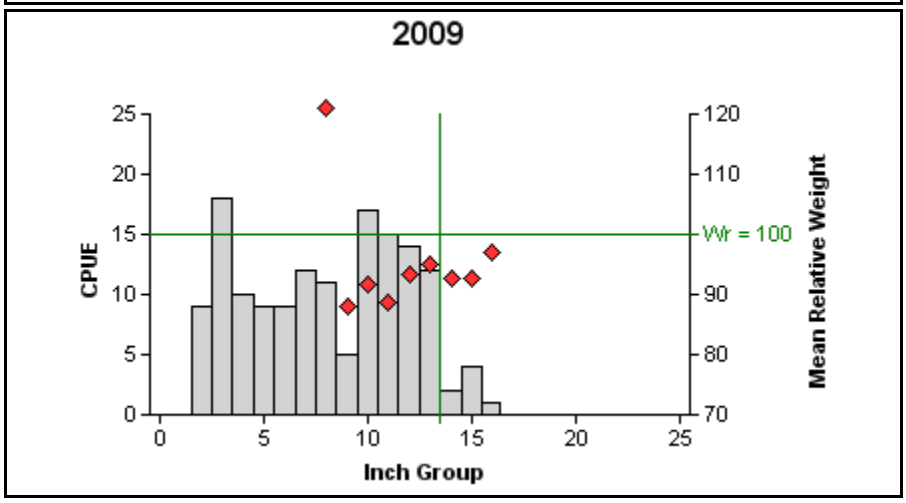
Largemouth Bass



Effort =	1.0
Total CPUE =	108.0 (12; 108)
Stock CPUE =	54.0 (14; 54)
CPUE-18 =	3.0 (72; 3)
PSD =	44 (9.1)



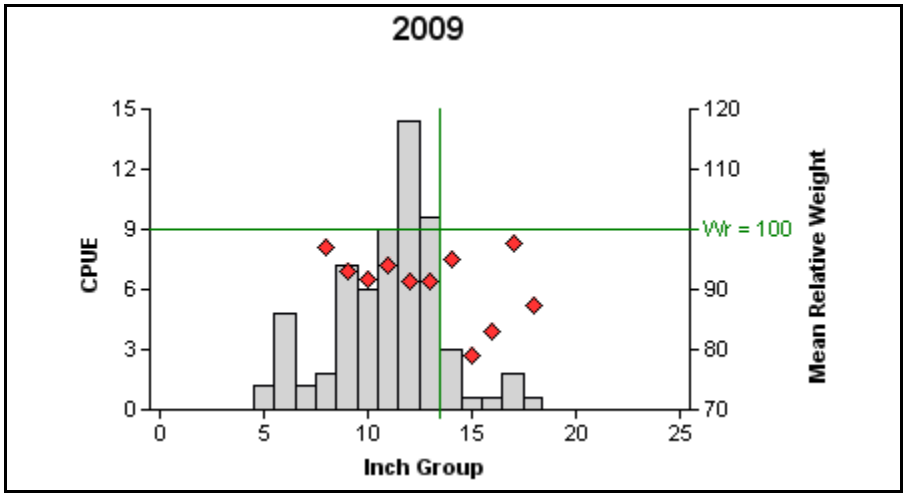
Effort =	1.0
Total CPUE =	139.0 (17; 139)
Stock CPUE =	78.0 (17; 78)
CPUE-18 =	1.0 (100; 1)
PSD =	35 (8.4)



Effort =	1.0
Total CPUE =	148.0 (13; 148)
Stock CPUE =	81.0 (18; 81)
CPUE-18 =	0.0 (0; 0)
PSD =	41 (4.2)

Figure 9. Number of largemouth bass caught per hour (CPUE, bars), relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coleto Creek Reservoir, Texas, 2007, 2008, and 2009. Vertical lines denote 14-inch minimum length limit and horizontal lines denote Wr of 100.

Largemouth Bass



Effort =	1.7
Total CPUE =	61.8 (12; 103)
Stock CPUE =	54.6 (14; 91)
CPUE-18 =	0.6 (100; 1)
PSD =	56 (6.3)

Figure 10. Number of largemouth bass caught per hour (CPUE, bars), relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall daytime bass-only electrofishing survey, Coleto Creek Reservoir, Texas, 2009. Vertical lines denote 14-inch minimum length limit and horizontal lines denote Wr of 100.

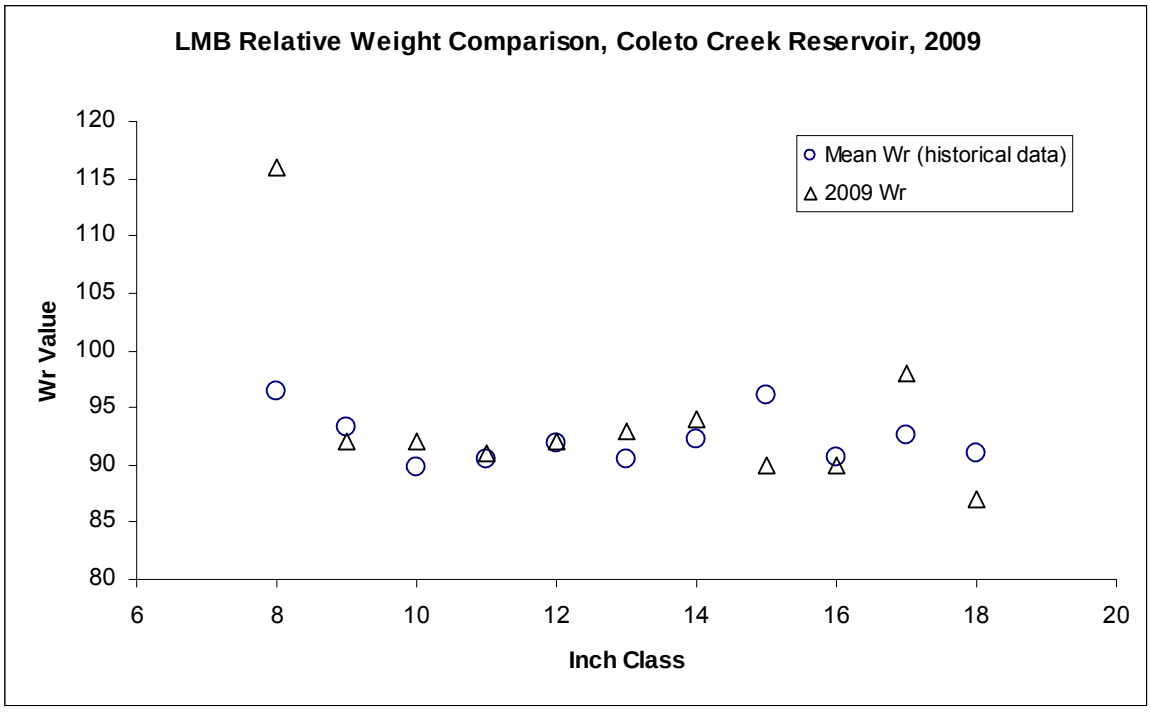


Figure 11. Comparison of 2009 largemouth bass W_r values to mean W_r values from historical data (previous 5 surveys) by inch class.

Largemouth Bass

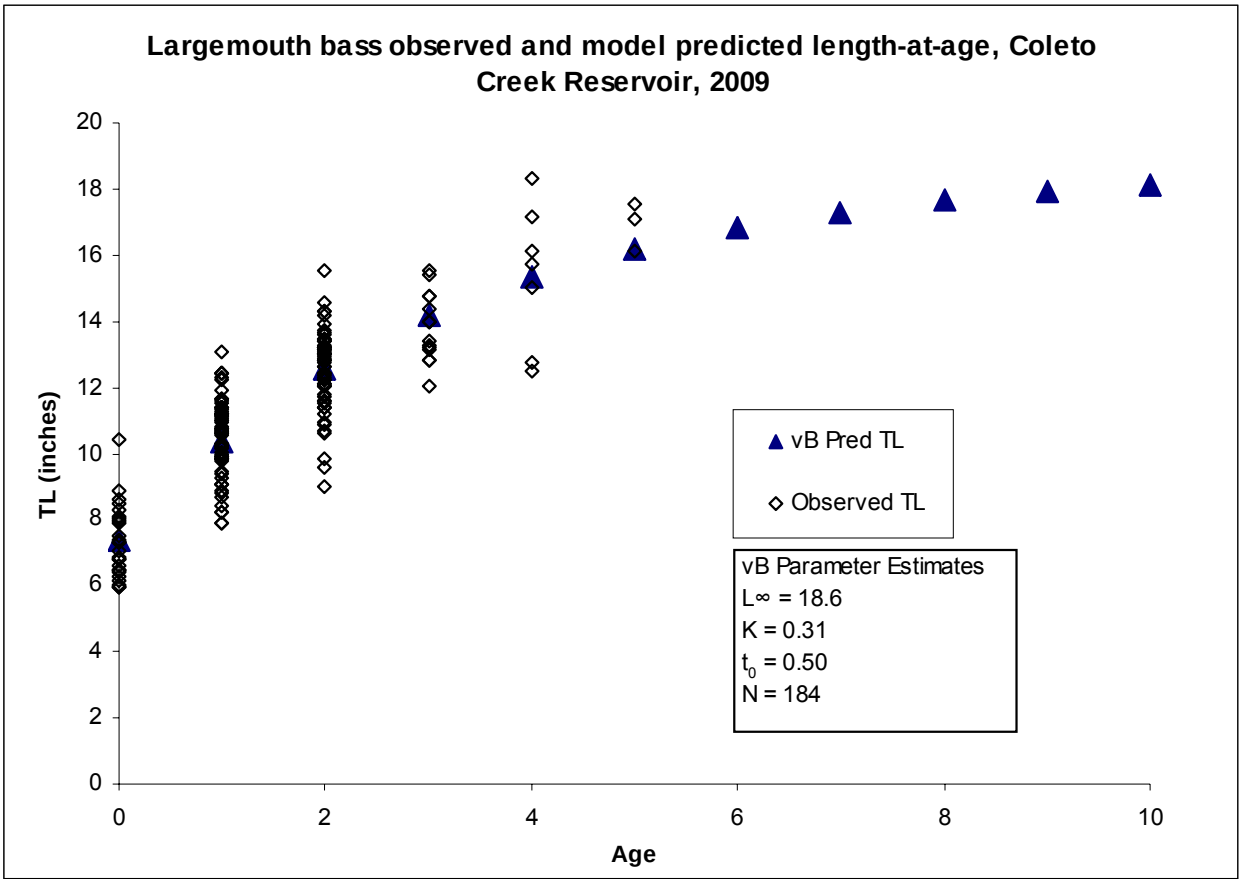


Figure 12. Observed and model predicted length-at-age from von Bertalanffy growth model, Coleto Creek Reservoir, Texas, 2009. Growth model was generated with fish sampled from random sites surveyed from both daytime and nighttime electrofishing.

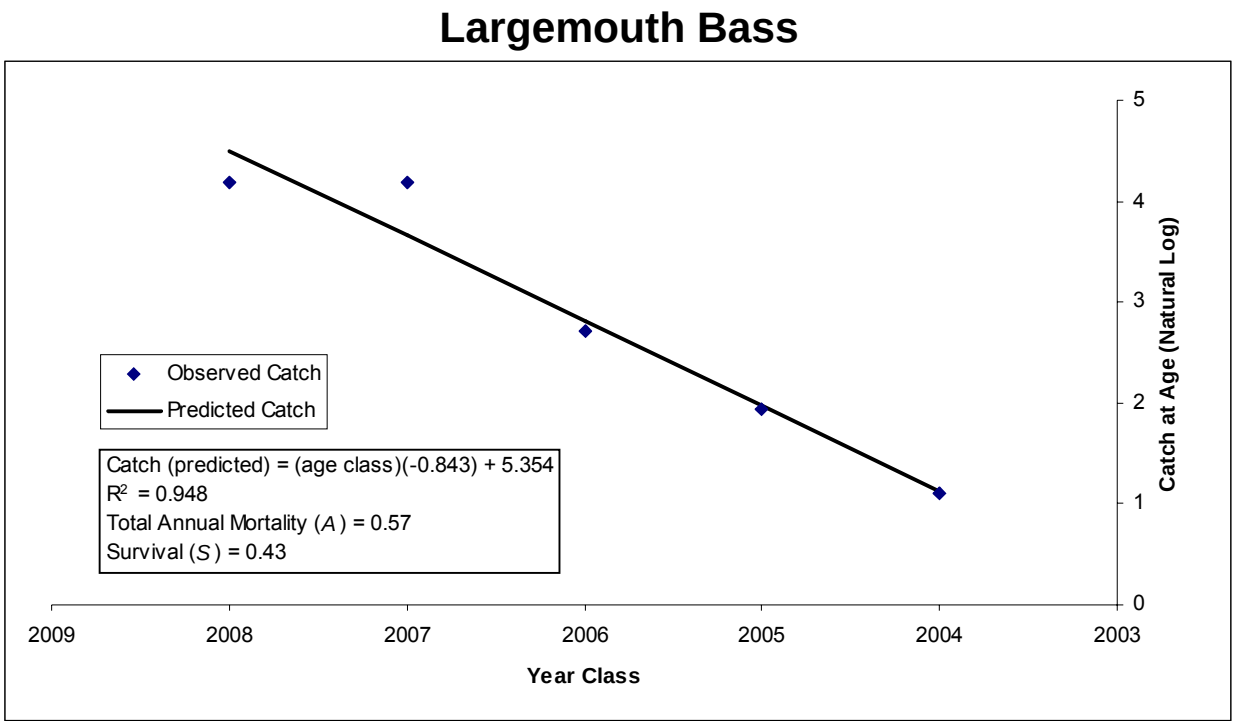


Figure 13. Plot of largemouth bass catch curve to illustrate total annual mortality (*A*).

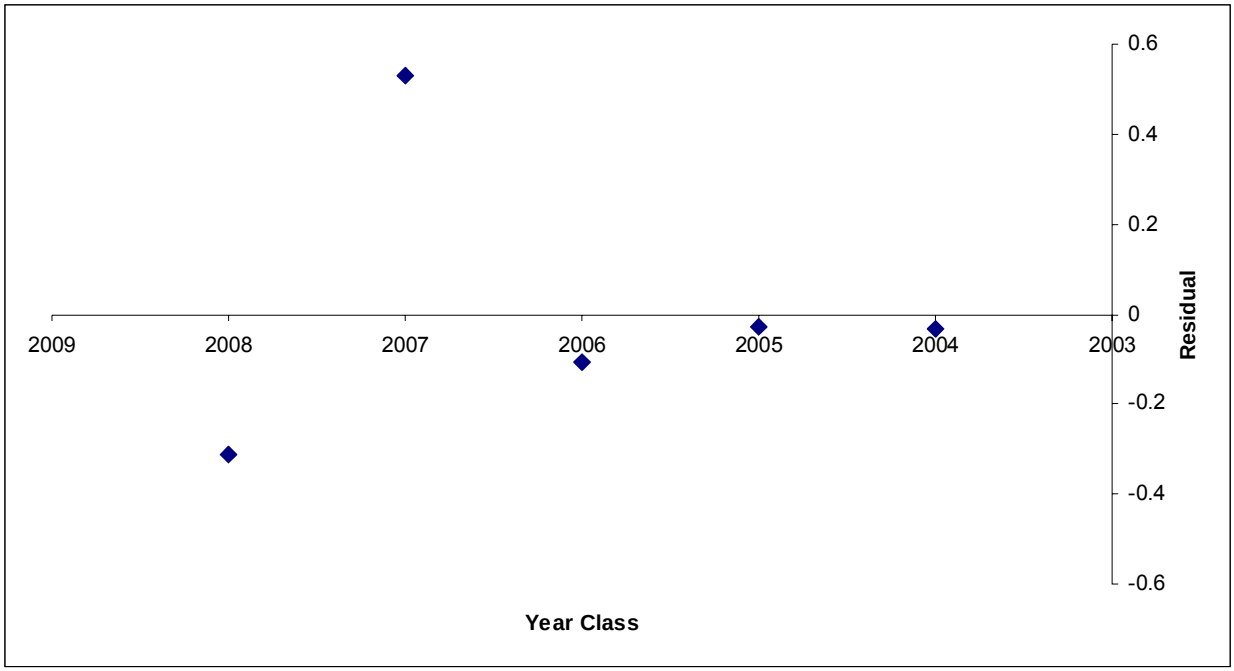


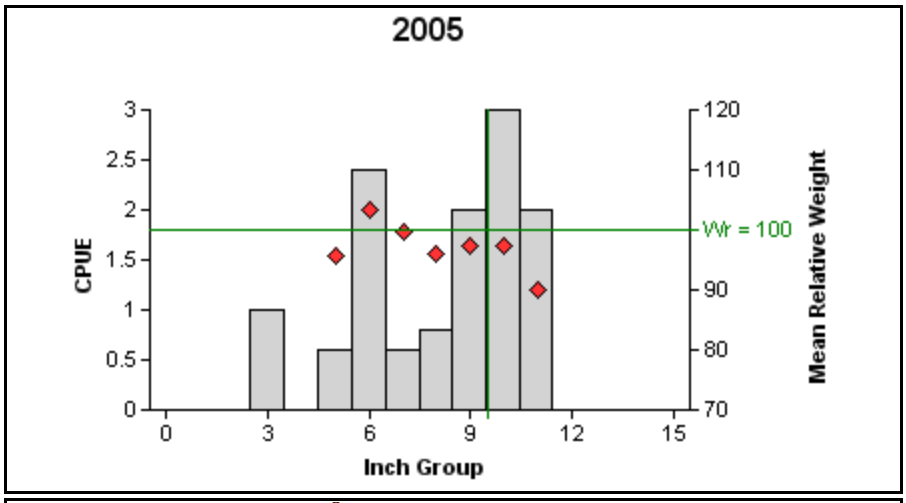
Figure 14. Plot of residuals from largemouth bass catch curve shown in Figure 12 to illustrate varying year class strength. Points below the line represent relatively weak year classes and points above the line represent relatively strong year classes.

Largemouth Bass

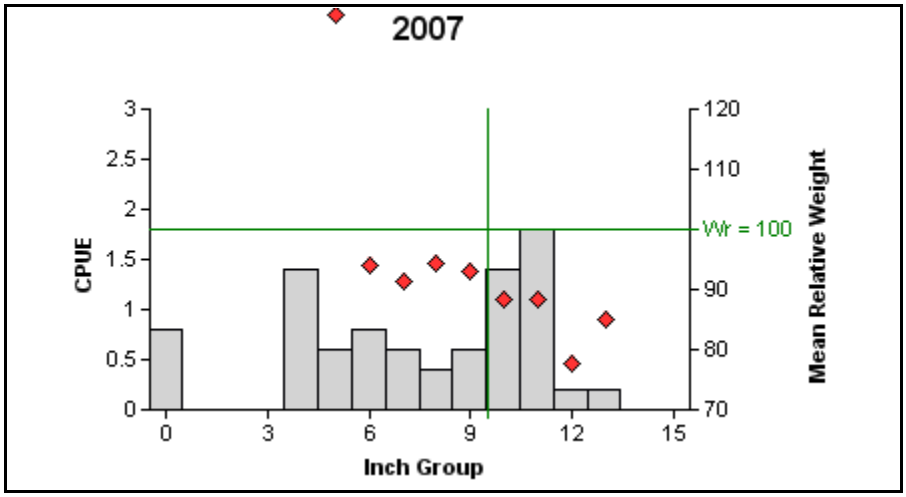
Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Coleto Creek Reservoir, Texas 2001, 2003, 2005, 2008, and 2009. Electrophoresis analysis was used to determine genetic composition in 2001 and 2003 and micro-satellite DNA analysis was used in 2005, 2008, and 2009. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation intergrades between a FLMB and a NLMB, Fx = second or higher generation intergrades between a FLMB and a NLMB.

		Genotype					
Year	Sample size	FLMB	F1	Fx	NLMB	% FLMB alleles	% FLMB genotype
2001	30	22	2	6	0	91.7	Unknown
2003	30	18	1	11	0	89.2	Unknown
2005	31	13	0	17	0	80.7	43.0
2008	31	6	0	25	0	87.0	20.0
2009	30	6	0	24	0	87.0	19.0

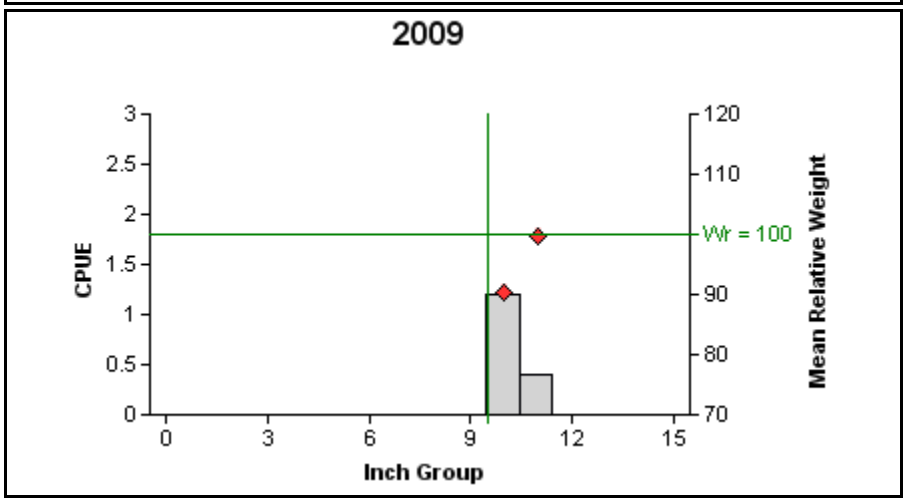
White Crappie



Effort =	5.0
Total CPUE =	12.4 (56; 62)
Stock CPUE =	11.4 (56; 57)
CPUE-10 =	5.0 (58; 25)
PSD =	68 (10.7)



Effort =	5.0
Total CPUE =	8.8 (72; 44)
Stock CPUE =	6.6 (89; 33)
CPUE-10 =	3.6 (86; 18)
PSD =	70 (4.1)



Effort =	5.0
Total CPUE =	1.6 (64; 8)
Stock CPUE =	1.6 (64; 8)
CPUE-10 =	1.6 (64; 8)
PSD =	100 (0)

Figure 15. Number of white crappie caught per net night (CPUE, bars), relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Coleto Creek Reservoir, Texas, 2005, 2007, and 2009. Vertical lines denote 10-inch minimum length limit and horizontal lines denote Wr of 100.

Table 6. Proposed sampling schedule for Coleto Creek Reservoir, Texas. Electrofishing and trap net surveys are conducted in the fall and the gill net survey in the spring. Standard surveys are denoted by S and additional surveys are denoted by A.

Survey Year	Electrofishing	Trap Netting	Gill Netting	Creel Survey	Report
Fall 2010-Spring 2011	A*				
Fall 2011-Spring 2012	A*	A	A	A	
Fall 2012-Spring 2013	A				
Fall 2013-Spring 2014	S	S	S		S

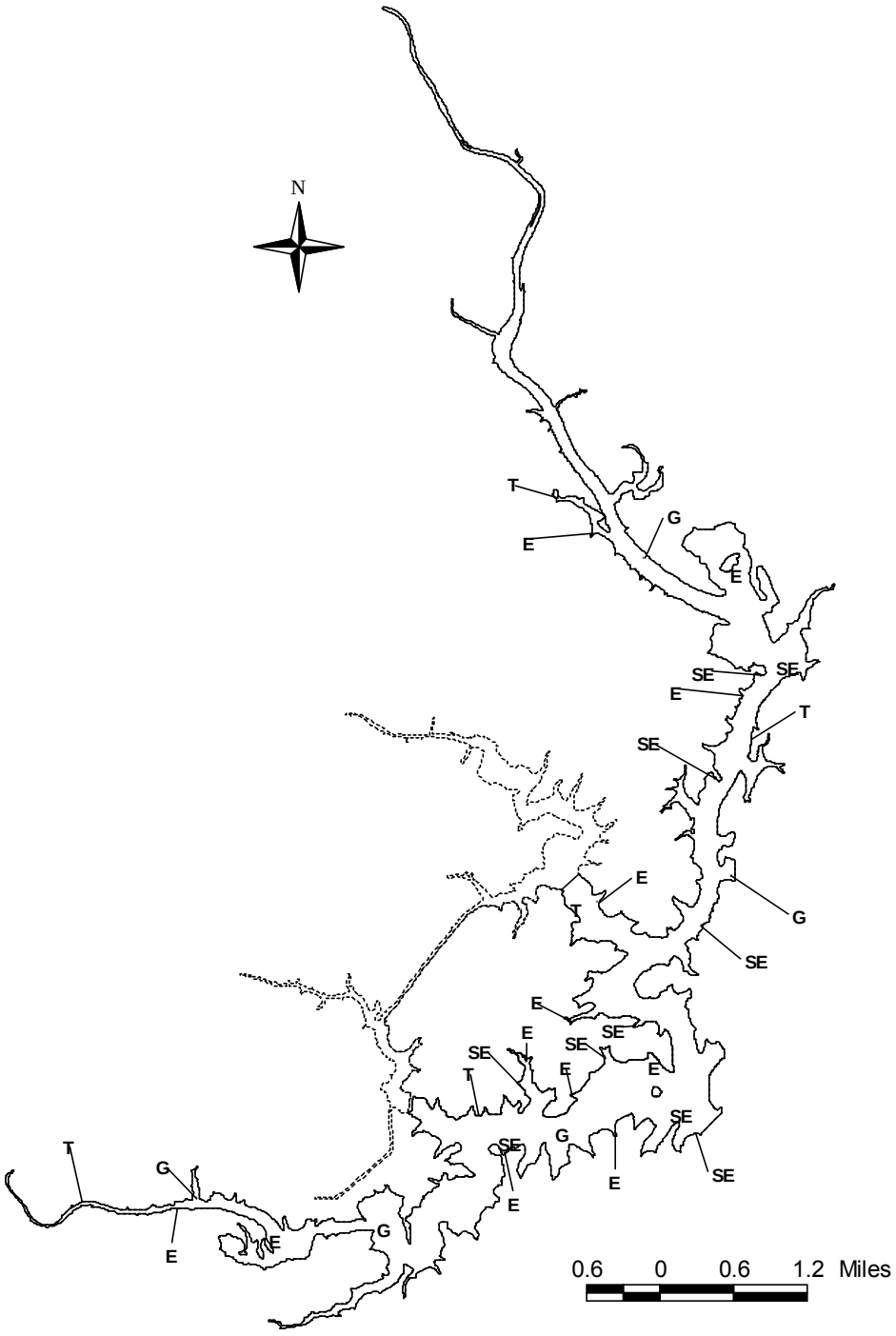
* Denotes additional springtime bass-only electrofishing will be conducted in conjunction with standard electrofishing samples.

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Coleto Creek Reservoir, Texas, 2009-2010.

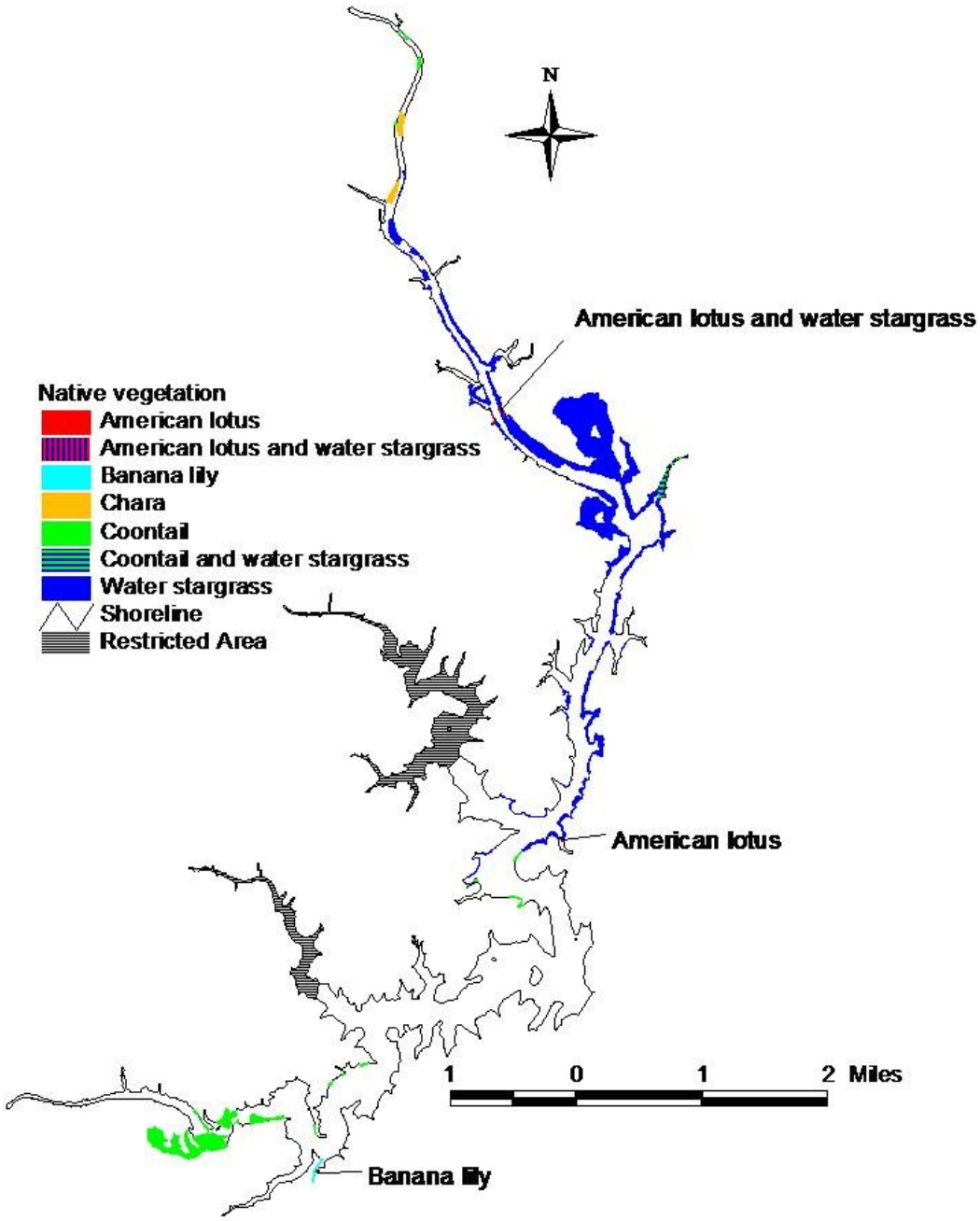
Species	Electrofishing		Trap netting		Gill netting	
	N	CPUE	N	CPUE	N	CPUE
Spotted gar			1	0.2		
Longnose gar			1	0.2		
Gizzard shad	16	16.0			94	18.8
Threadfin shad	40	40.0				
Common carp					10	2.0
Bullhead minnow	5	5.0				
Inland silverside	1	1.0				
River carpsucker					29	5.8
Blue catfish					9	1.8
Channel catfish					23	4.6
White bass	2	2.0			2	0.4
Warmouth	2	2.0			2	0.4
Bluegill	198	198.0	24	4.8	2	0.4
Longear sunfish	20	20.0				
Redear sunfish	225	225.0	33	6.6	1	0.2
Largemouth bass	148	148.0	1	0.2	6	1.2
White crappie			8	1.6	10	2.0
Black crappie			2	0.4		
Rio Grande cichlid	1	1.0	2	0.4		
Blue tilapia			2	0.4		

APPENDIX B



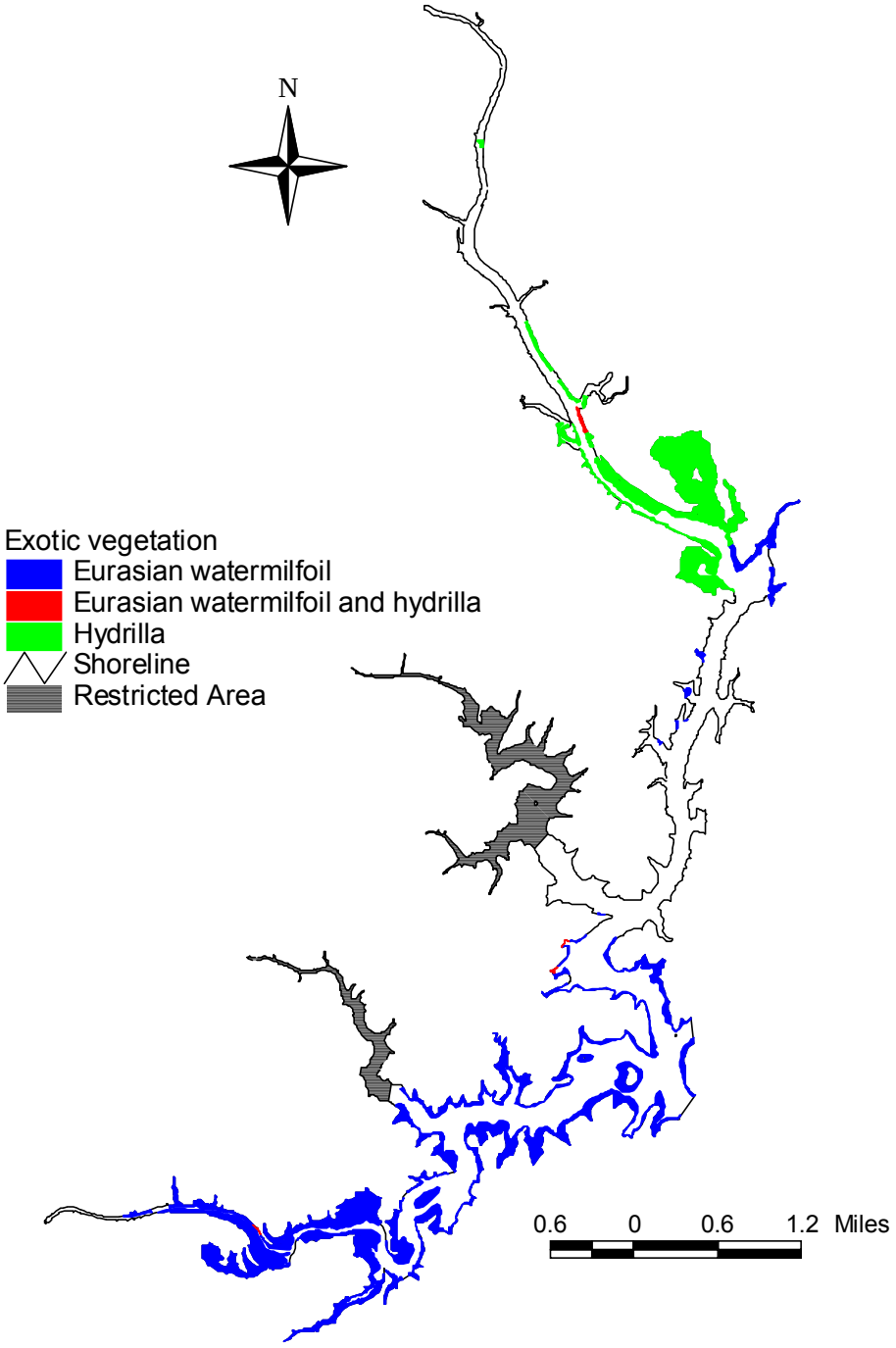
Location of sampling sites, Coleto Creek Reservoir, Texas, 2009-2010. Trap net, gill net, and electrofishing stations are indicated by T, G and E, respectively. SE denotes supplemental daytime electrofishing. Dotted lake outline indicates area inaccessible to anglers.

APPENDIX C



Native aquatic vegetation map for Coleto Creek Reservoir, Texas, 2009.

APPENDIX D



Exotic aquatic vegetation map for Coleto Creek Reservoir, Texas, 2009.