PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-1

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

Walter E. Long Reservoir

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TABLE OF CONTENTS

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Walter E. Long Reservoir were surveyed in 2010 using electrofishing and in 2011 using gill nets. This report summarizes results of the surveys and contains a fisheries management plan for the reservoir based on those findings.

- **Reservoir Description:** Walter E. Long Reservoir is a 1,269-acre impoundment of Decker Creek, a tributary of the Colorado River, and is located east of Austin, Travis County, Texas. The dam was constructed in 1967 for supplying water to a power plant operated by the City of Austin. The reservoir has a drainage area of 9.3 square miles, a shoreline length of 16 miles, and a shoreline development index of 3.3. The reservoir lies within the blackland prairies ecological region.

- **Management history:** Important sport fish included largemouth bass, palmetto bass, catfish species and white bass. Palmetto bass were stocked from 2007-2010 at reduced rates of 5/acre to evaluate density-dependent growth and condition of the predatory fish population. Largemouth bass have been managed since 1993 with a 14- to 21-inch slot-length limit. Aquatic vegetation habitat surveys have been conducted annually to monitor invasive species and evaluate angler access conditions.

- **Fish Community**
  - **Prey species:** Sunfishes, gizzard shad and threadfin shad were the predominant prey species available.

  - **Catfishes:** Channel catfish were the predominant catfish species present. Flathead catfish were present in low density.

  - **Temperate basses:** Palmetto and white bass were present in the reservoir. Palmetto bass were a popular sport fish. Legal-size (≥ 18 inches) palmetto bass were present.

  - **Black basses:** Largemouth bass were abundant and displayed good growth and condition. Fish above the slot limit (≥ 21 inches) were present as well.

- **Management Strategies:** The reservoir should continue to be managed with existing harvest regulations. Palmetto bass stockings should continue to be requested but at the reduced stocking rate of 5/acre. Continue to pursue the relocation of the fishing pier to a more suitable location.

INTRODUCTION

This document is a summary of fisheries data collected from Walter E. Long Reservoir from 2010-2011. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented for comparison.

Reservoir Description

Walter E. Long Reservoir is a 1,269-acre stable-level impoundment of Decker Creek, a tributary of the Colorado River, and is located east of Austin, Travis County, Texas. The dam was constructed in 1967 for supplying water to a power plant operated by the City of Austin. The reservoir has a drainage area of 9.3 square miles, a shoreline length of 16 miles, and a shoreline development index of 3.3. The reservoir lies within the blackland prairies ecological region. The entire reservoir shoreline is owned by the City of Austin, limiting bank access to a city-operated park on the south shore. Shoreline access was excellent within the park boundaries, although submerged aquatic vegetation limited bank angling access and success. A fishing pier was available in the park. A multi-lane, concrete boat ramp (3 boat lanes total) was located within the park, offering adequate boat access to the reservoir. No amenities specially designed for physically disabled persons were available. Other descriptive characteristics for Walter E. Long Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Magnelia and De Jesus 2007) included:

1. Stock palmetto bass at reduced rates of 5/acre.
   Action: Palmetto bass were stocked at 5/acre from 2007 to 2010 in efforts to reduce possible foraging competition among predators.
2. Make City of Austin park management aware of *Morone* identification challenges and arrange for signage installation for *Morone* identification at park site.
   Action: Park management was contacted, but no action was taken by the city to install signage. A meeting to discuss this issue was scheduled for June 2010.
3. Request vegetation control for park shoreline to improve bank angler access.
   Action: A request for park shoreline vegetation control was refused by the City of Austin on the basis that the established shoreline vegetation was native species.
4. Explore techniques for improving catch rates for bank anglers at the city park.
   Action: A proposal was developed to relocate and expand the existing fishing pier to a more conducive site within the park. The proposal is under evaluation by City of Austin park management.
5. Continue annual aquatic vegetation monitoring.
   Action: Aquatic vegetation was surveyed annually since 2007 to help monitor this dynamic plant population and the potential for unwanted expansion of invasive species.
6. Collect an extensive age-and-growth sample of largemouth bass in the 2007 optional electrofishing survey to evaluate growth.
   Action: An optional bass-only electrofishing survey was conducted in fall 2008; however, an intensive age and growth sample was not collected until the fall 2010 electrofishing survey.

Harvest regulation history: Sport fishes in Walter E. Long Reservoir were managed with statewide regulations with the exception of largemouth bass (Table 2). From 1986 to 1993, largemouth bass were managed with a 14-inch minimum length limit. A 14- to 21-inch slot length limit was implemented on September 1, 1993 to: increase abundance of bass greater than 14 inches in length; increase angler catches of bass greater than 14 inches in length; and, re-direct harvest at individuals less than 14 inches in length.

Stocking history: Florida largemouth bass and palmetto bass were important species which were requested and/or stocked. A complete stocking history is in Table 3.

Aquatic vegetation/habitat history: The exotic plant hydrilla *Hydrilla verticillata* was present in this reservoir along with a diverse group of native aquatic plant species. Summer total coverage estimate of all plant species in 2007 was 26%, more than triple the 2006 total (7%). Aquatic plant coverage in this reservoir fluctuates, although no treatments have been made since 1996 (Appendix C). Coverage receded in 2008, slowly recovering to almost 17% in 2010 (Appendix C). Mean total coverage over the past four years was 15.8%, resembling the previous 5-year average reported of 15.3%. Hydrilla coverage during the 4-year span has increased to a total of 10 acres (2.0%). In the past the City of Austin has facilitated several herbicide treatments (e.g., 1989, 1993, 1996) to control hydrilla. In recent years these treatments haven't been necessary. Aquatic plants offered excellent fish habitat, especially for largemouth bass and sunfishes.

Water Transfer: There are no inter-basin water diversion structures at Walter E. Long Reservoir.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18 5-min stations) and gill 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 nets as the number of fish per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures Manual (TPWD, Inland Fisheries Division, unpublished manual revised 2009). Aquatic vegetation surveys were conducted during peak growing season around the entire reservoir. Aquatic vegetation coverage was estimated by the use of Trimble® GPS unit in conjunction with sonar depth finder. Species identification was confirmed on samples collected with a modified aquatic rake. Littoral habitat was observed and documented along the entire shoreline from a survey boat.

Sampling statistics (CPUE for various length categories) and structural indices [Proportional Size Distribution (PSD); as defined by Guy et al. (2007)], and condition indices [relative weights (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). The Index of Vulnerability (IOV) was used to determine the percentage of gizzard shad vulnerable to predation (DiCenzo et al. 1996). Relative standard error (RSE = 100 x SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined for LMB using otoliths from 134 fish between 150 and 500mm (category 3 age analysis for LMB; TPWD, Inland Fisheries Division, unpublished manual revised 2009). Ages were determined for palmetto bass using otoliths from 13 fish between 432 and 508mm (category 2 age analysis (TPWD, Inland Fisheries Division, unpublished manual revised 2009).

RESULTS AND DISCUSSION

Habitat: Structural and littoral habitat consisted primarily of emergent vegetation (bulrush, *Scripus* spp.) (Table 4). Submerged, floating and emergent aquatic vegetation provided good habitat for phytophilic fish species (Table 5). Aquatic vegetation coverage (16.8%) was below optimal (20-30%) for fish production (Durocher et al. 1984, Dibble et al. 1996).

Prey species: Electrofishing catch rates of gizzard shad, redbreast sunfish and bluegill were 11.3/h, 204.6/h, and 205.3/h, respectively. Threadfin shad, redear sunfish, red spotted sunfish and inland silversides were also available as forage. Index of vulnerability (IOV) for gizzard shad in 2010 indicated that no gizzard shad were available to existing predators; similar to 2002. This value declined from 22% in 2006. Total CPUE of gizzard shad also declined by over half, compared to 2006 (Figure 1). Total CPUE of redbreast sunfish and bluegill in 2010 increased to 205/h (each species) since the survey in 2002, when collected at 146/h and 154/h, respectively (Figure 2 and 3). While smaller forage-size sunfish dominated the population, many larger individuals were also present. These larger individuals offered the opportunity for quality sunfish fishing (Figure 2 - 4).

Catfishes: The gill net catch rate for channel catfish was 4.5/nn in 2011, which almost doubled from 2.5/nn in the two previous surveys in 2007 and 2009 (Figure 5). Individuals greater than 12 inches in length made up the majority (91%)of the gill net catch, and several large channel catfish (≥20 inches) were available. Overall condition for channel catfish was good, with all sizes averaging relative weights above 90. Flathead catfish were present in low density (0.3/nn).

White bass: Walter E. Long Reservoir has historically supported a low-density white bass population. Historical gill net catch rates since 1991 seldom surpassed 2.2/nn, and reproductive success appeared to be inconsistent until recent age and growth evaluations revealed more consistent recruitment in 2006 (Magnelia and De Jesus 2007). Total gill net catch rates for white bass have increased from the 1.9/nn in 2007 to 4.1/nn and 5.2/nn in 2009 and 2011, respectively (Figure 6). These are the highest values recorded for this species at this reservoir. This possibly could be explained by reduced interspecfic competition with palmetto bass stocked at the reduced rates, but it is more likely consistent year classes have been produced in recent years. All white bass sampled were ≥12 inches, exhibiting good condition with relative weights averaging above 90 at all length groups. These larger fish may continue to confuse anglers trying to distinguish them from smaller palmetto bass, common in the reservoir (Magnelia and De Jesus 2007). A recent creel survey determined that most catches of these species were released (98.7% for white bass and 97.5% for palmetto bass), making this issue of minor concern (Magnelia and De Jesus 2007).

Palmetto bass: The gill net catch rate of palmetto bass was 4.2/nn in 2011, remaining stable since 2007 when the last increase was noted (Figure 7). Forty percent of the adult palmetto bass sampled exceeded 18 inches, which was lower than 2007 (56%), but higher than 2009 (35%). Body condition (Wr) was sub-optimal (<100), but still good (>90 for all length groups). An improvement in condition from previous surveys is best expressed in smaller-size individuals (Figure 7). In 2009 and 2011 palmetto bass reached legal length between ages two and three (Figure 8), which equaled growth in 2007 and was similar to the ecological area average (Prentice 1987). While growth remained stable, condition of younger fish seems to have improved since 2009. Interspecific competition between palmetto bass, white bass and a high density largemouth bass population, expressed as sub-optimal body condition at higher palmetto bass stocking rates (15/acre), was a concern in 2006 (Magnelia and De Jesus 2007). Reduced stocking rates (5/acre) of palmetto bass since 2005 may have positively influenced condition and did not reduce abundance of this species (Appendix D). The last creel survey conducted on this reservoir (2004-05) indicated most (97.5%) palmetto bass caught by anglers are released (Magnelia and De Jesus 2007), which may explain why even at reduced stocking rates gill net catch rates remained stable.

Largemouth bass: The reservoir contained a moderate-to-high density largemouth bass population relative to bass populations in other central Texas reservoirs. The largemouth bass 2010 electrofishing total catch rate (134.0/h) declined since 2006 (233/h) (Figure 9), and was lower than the reservoir average (171.1/h) since the start of the slot length limit (September 1, 1993). Record-high catch rates

2005 and 2006 may have been attributed to a combination of a strong year class in 2004, during high aquatic vegetation coverage (Appendix C) and vulnerability of small fish (≤8 inches) to electrofishing in 2006 due to low vegetation coverage. The electrofishing catch rate for largemouth bass ≥14 inches (56/h) in 2008 and 2010 was slightly below the average (59.5/h) since the start of the slot length limit in 2003 (Appendix E). A stable trend in CPUE14 while total catch rates declined further show that sampling variability was more visible in smaller size (≤8 inches) groups. Largemouth bass condition (Wr) trends seem to be better associated with aquatic vegetation coverage and intraspecific competition rather than interspecific competition for forage, as was inferred by Magnelia and De Jesus (2007) (Appendix F). Based on observed trends, mean relative weights (Wr) seem to be inversely related to vegetation coverage, except for 2010 when lower largemouth bass abundance may have alleviated intraspecific competition. While condition has fluctuated within sub-optimal ranges, mean relative weights have consistently remained good (≥90) throughout our surveys (Figure 9). Growth rates for largemouth bass exceeded eco-region averages (Prentice 1987). Age and growth analysis from 2010 indicated individuals on average reached 14 inches by age 2 (14.3 inches; N = 134). This confirmed slow growth observed during the 2006 survey was probably the result of a small sample size.

Fisheries management plan for Walter E. Long Reservoir, Texas

Prepared – July 2011

ISSUE 1: The palmetto bass population has remained stable under the present stocking regime, probably due to low harvest at this reservoir. Still many anglers utilize this fishery.

MANAGEMENT STRATEGY
1. Continue stocking palmetto bass at a rate of 5/acre.

ISSUE 2: Presence of sub-legal palmetto bass along with large white bass in the reservoir will continue to cause confusion among harvest anglers. An effort to communicate with City of Austin park management to make them aware of the issue and establish signage at the park to help anglers identify these species was unsuccessful. Recent communication with city park officials will allow us to pursue this opportunity again.

MANAGEMENT STRATEGIES
1. Make the Walter E. Long Park Manager aware that identification of these species was a problem for anglers.
2. Provide the park manager with signage that provides information on key meristic differences between the species.

ISSUE 3: A recent creel survey revealed the popularity of the bank fishery at the city park. Catch rates for bank anglers have been poor (0.02 fish/h) due to poor access caused by the park's shallow shoreline and heavy vegetation coverage, especially around the existing pier. Several fish species were available for bank anglers, but bottom fishing techniques for these species were hindered due to submerged aquatic vegetation. A shoreline hydrographic evaluation revealed a more suitable location for the fishing pier, adjacent to deeper water further offshore within the park boundaries. This location would potentially provide better angling success for bank anglers at the park. The presence of channel catfish, palmetto bass and white bass may be of greater "harvest" interest to pier/shore anglers. A pier relocation and expansion proposal was written to present to the City of Austin in efforts to pursue this project (Appendix G).

MANAGEMENT STRATEGIES
1. Continue efforts to pursue this project with the City of Austin.

ISSUE 4: Walter E. Long Reservoir supported a diverse aquatic plant community typified by between-year variability in total and individual plant coverage. Herbicide treatments have historically been utilized by the City of Austin to control plants, especially hydrilla. However, these plants offered excellent habitat for littoral fishes (e.g., largemouth bass and sunfishes) and major changes in plant coverage had the potential to impact fish populations. Monitoring information on aquatic vegetation coverage was valuable when interpreting fisheries data.

MANAGEMENT STRATEGY
1. Continue annual aquatic vegetation monitoring.

ISSUE 5: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

ISSUE 6: Walter E. Long Reservoir has developed a good catfish population, but directed angling effort was low. The 2004 spring creel survey revealed that directed fishing effort for catfishes in general and channel catfish combined was 7.3 hours/acre, 9.8% of the total fishing effort. Angling effort was almost evenly divided between bank (53.6%) and boat anglers (46.4%).

MANAGEMENT STRATEGY

1. Promote the catfish fishery in Walter E. Long Reservoir using press releases.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule included electrofishing in 2012 and mandatory monitoring in 2014/2015 (Table 6). Additional electrofishing in 2012 is necessary to monitor largemouth bass population trends. A gill netting survey in 2013 will be used to monitor the palmetto bass population as well. Trap net sampling for white crappie was omitted on this reservoir because of low historical trap net catches and low directed angler effort for this species.

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Table 1. Characteristics of Walter E. Long Reservoir, Texas.

Characteristic	Description
Year constructed	1967
Controlling authority	City of Austin
County	Travis
Reservoir type	Power cooling
Shoreline Development Index (SDI)	3.3
Conductivity	600 umhos/cm

Table 2. Harvest regulations for Walter E. Long Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: channel catfish, hybrids and subspecies	25 (in any combination)	12 minimum
Catfish, flathead	5	18 minimum
Bass, white	25	10 minimum
Bass, palmetto	5	18 minimum
Bass: largemouth	5*	14 – 21 slot
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum

* Only one fish over 21 inches may be retained.

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

Species	**Year**	**Number**	**Life Stage**	**Mean TL (in)**
Black crappie x White crappie	1987	50,851	FRY	1.0
	1993	120,800	FRY	0.9
	1996	101,794	FRY	0.9
	Total	273,445		
Blue catfish	1967	2,200	UNK	UNK
	Total	2,200		
Channel catfish	1967	39,050	AFGL	7.9
	1986	3,595	FRY	1.0
	Total	42,645		
Flathead catfish	1969	10		UNK
	1970	35		UNK
	Total	45		
Florida Largemouth bass	1979	15,078	FGL	2.0
	1980	20,290	FGL	2.0
	1988	52,078	FRY	1.0
	1994	122,316	FGL	1.3
	1994	1,977,457	FRY	0.7
	1995	121,022	FGL	1.4
	1995	982,908	FRY	0.7
	Total	3,291,149		
Green sunfish x redear sunfish	1969	12,500		UNK
	Total	12,500		
Palmetto Bass (striped X white bass hybrid)	1978	9,950	UNK	UNK
	1979	560,000	FRY	0.4
	1982	12,787	UNK	UNK
	1986	24,112	FRY	1.0
	1988	30,120	FRY	1.0
	1989	27,554	FGL	1.9
	1991	12,258	FGL	1.8
	1992	10,087	FGL	1.5
	1993	10,000	FGL	1.5
	1994	19,600	FGL	1.9
	1995	21,710	FGL	1.4
	1996	19,800	FGL	1.7
	1997	20,400	FGL	1.8
	1998	19,980	FGL	1.7
	1999	18,247	FGL	1.5

Species	Year	Number	Life Stage	Mean TL (in)
	2000	18,369	FGL	1.5
	2002	18,162	FGL	2.1
	2004	18,260	FGL	1.6
	2005	6,073	FGL	1.5
	2006	6,070	FGL	1.8
	2007	6,740	FGL	1.8
	2008	6,733	FGL	1.5
	2009	6,345	FGL	1.5
	2010	6,667	FGL	1.7
	Total	910,024		
Red drum	1974	600	UNK	UNK
	1975	33,300	UNK	UNK
	1981	146,500	UNK	UNK
	Total	180,400		

Table 4. Survey of littoral and physical habitat types, Walter E. Long Reservoir, Texas, 1998. 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 in August, 2010.

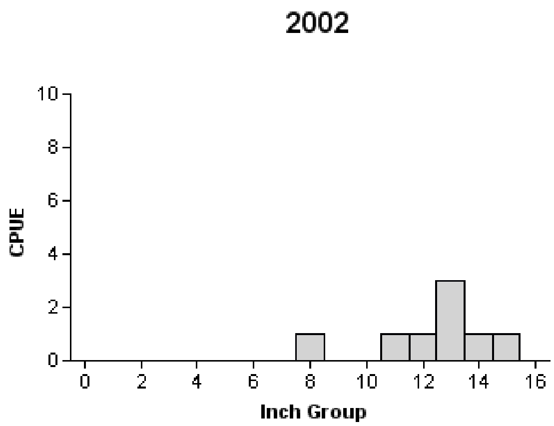
Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulrush	8.1	57		
Eroded bank	2.2	15		
Flooded terrestrial vegetation	2.0	14		
Rip rap	1.2	9		
Gravel	0.3	2		
Broken rock	0.3	2		
Concrete	<0.1	<1		
Native submerged vegetation			115.3	9.5
Native emerged vegetation			20.8	1.7
Hydrilla			10.1	0.8
Native submerged/Eurasian watermilfoil mixed			60.0	4.9

Table 5. Aquatic plants observed during aquatic vegetation surveys in Walter E. Long Reservoir, Texas, August, 2010. Surface area (acres) and percent reservoir coverage were determined for each plant species.

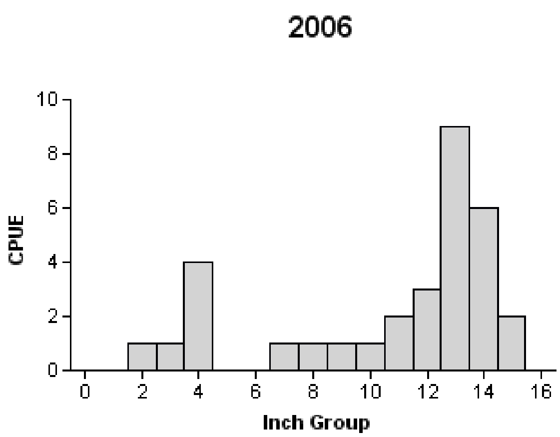
Common Name	Scientific name	Acres	% coverage
American lotus	*Nelumbo lutea*	1.0	0.1
Bulrush	*Scripus* sp.	19.8	1.6
Muskgrass	*Chara* sp.	44.2	3.6
Coontail	*Ceratophyllum demersum*	29.5	2.4
Illinois pondweed	*Potamogeton illinoensis*	40.1	3.3
Hydrilla	*Hydrilla verticillata*	10.1	0.8
Eel grass	*Vallisneria americana*	1.5	0.1
Mixed 1*		52.6	4.3
Mixed 2**		7.4	0.6
	Total	206.2	16.8

*Coontail, muskgrass, Eurasian watermilfoil (*Myriophyllum spicatum*)
** Coontail, muskgrass, Illinois pondweed, Eurasian watermilfoil

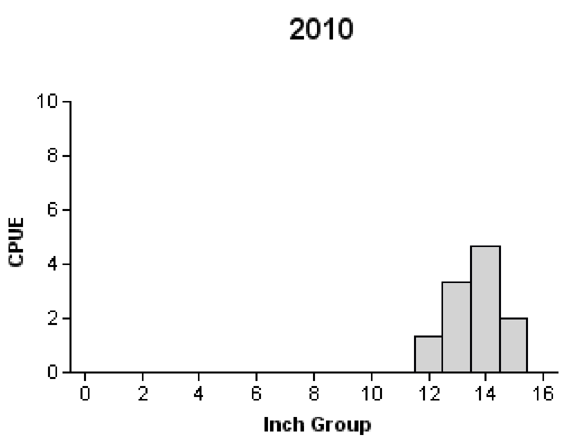
Gizzard Shad



Effort = 1.0
Total CPUE = 8.0 (53; 8)
IOV = 0 (0)



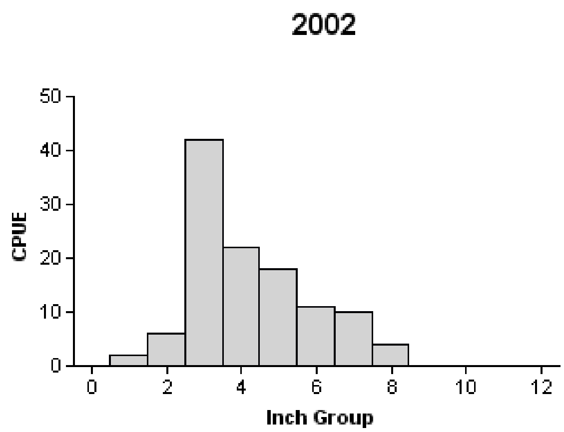
Effort = 1.0
Total CPUE = 32.0 (26; 32)
IOV = 22 (7)



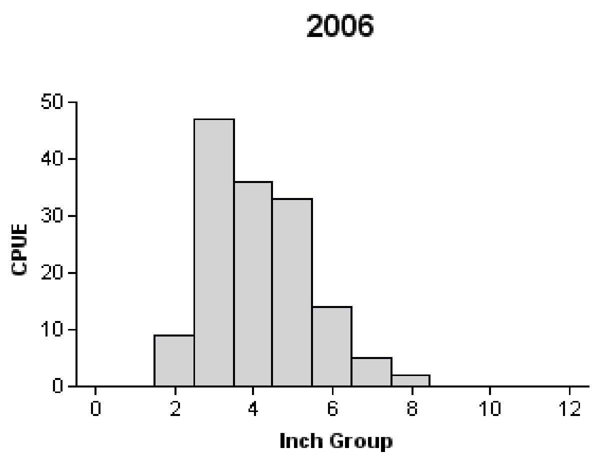
Effort = 1.5
Total CPUE = 11.3 (26; 17)
IOV = 0 (0)

Figure 1. Number of gizzard shad caught per hour (CPUE) population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2002, 2006 and 2010.

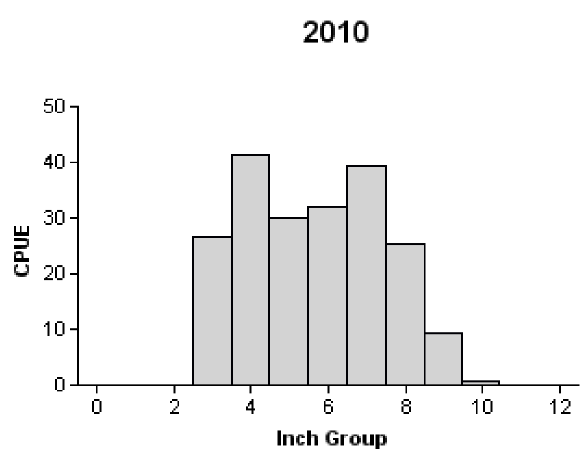
Redbreast Sunfish



Effort = 1.0
Total CPUE = 115.0 (26; 115)
CPUE-7 = 14.0 (45; 14)
PSD = 23 (7.6)



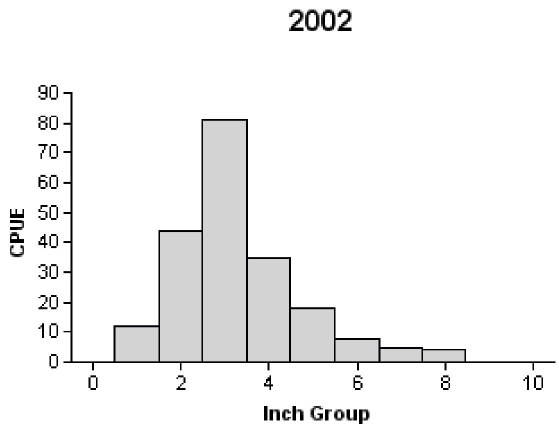
Effort = 1.0
Total CPUE = 146.0 (39; 146)
CPUE-7 = 7.0 (49; 7)
PSD = 15 (3.1)



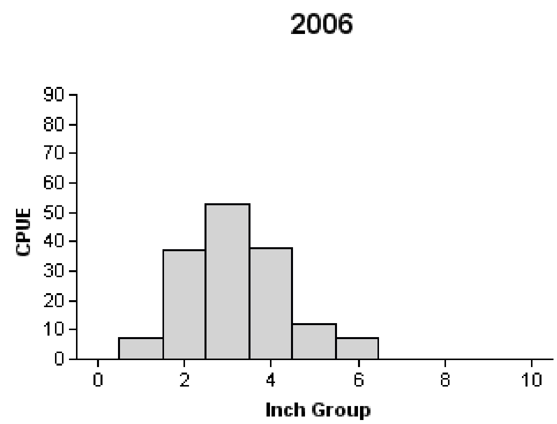
Effort = 1.5
Total CPUE = 204.7 (27; 307)
CPUE-7 = 74.7 (35; 112)
PSD = 52 (13.5)

Figure 2. Number of redbreast sunfish caught per hour (CPUE) population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2002, 2006 and 2010.

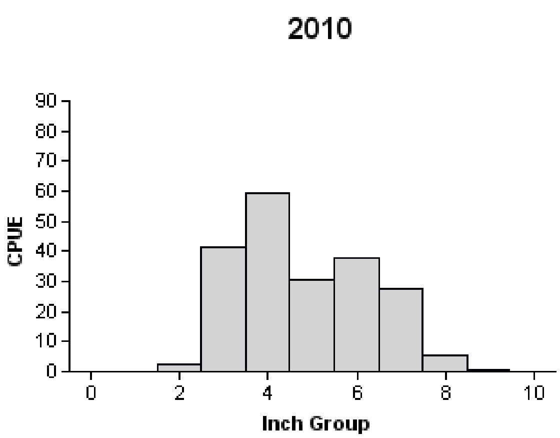
Bluegill



Effort = 1.0
Total CPUE = 207.0 (21; 207)
CPUE-7 = 9.0 (33; 9)
PSD = 11 (3.6)



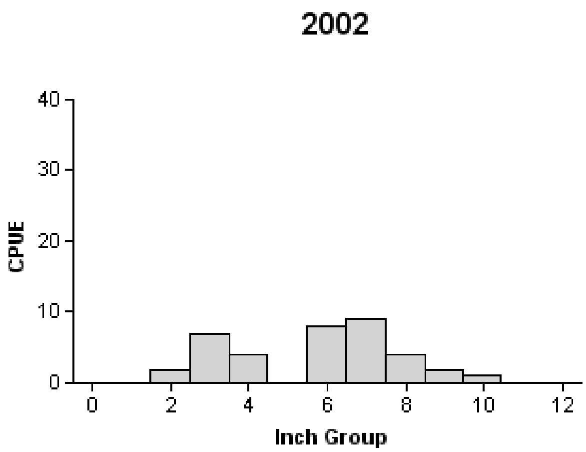
Effort = 1.0
Total CPUE = 154.0 (34; 154)
CPUE-7 = 0.0 (0; 0)
PSD = 6 (2.2)



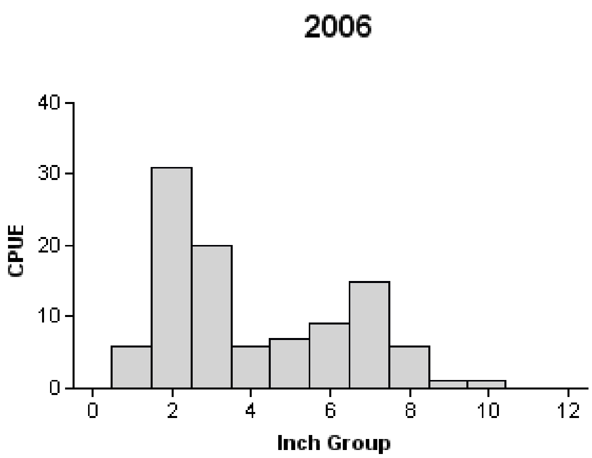
Effort = 1.5
Total CPUE = 205.3 (15; 308)
CPUE-7 = 33.3 (20; 50)
PSD = 35 (6.4)

Figure 3. Number of bluegill caught per hour (CPUE) population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2002, 2006 and 2010.

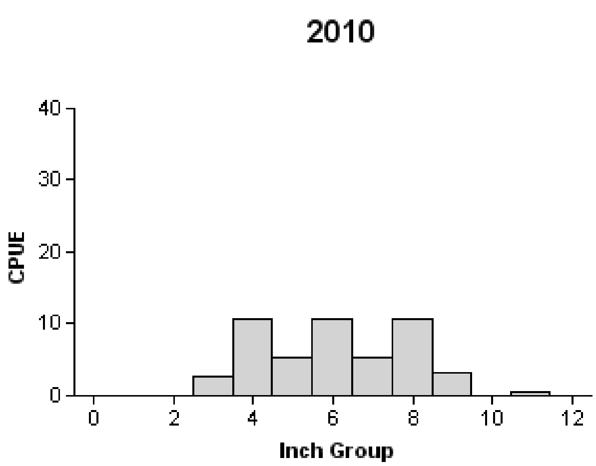
Redear Sunfish



Effort = 1.0
Total CPUE = 37.0 (24; 37)
CPUE-7 = 16.0 (35; 16)
PSD = 57 (13.6)



Effort = 1.0
Total CPUE = 102.0 (40; 102)
CPUE-7 = 23.0 (24; 23)
PSD = 51 (7.8)

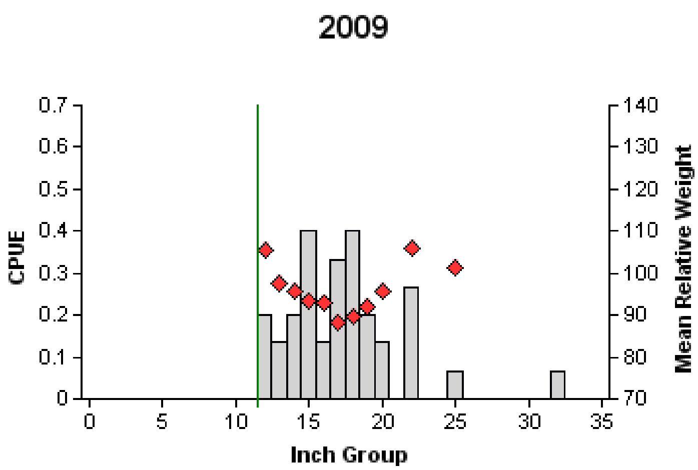


Effort = 1.5
Total CPUE = 49.3 (26; 74)
CPUE-7 = 20.0 (29; 30)
PSD = 43 (8.5)

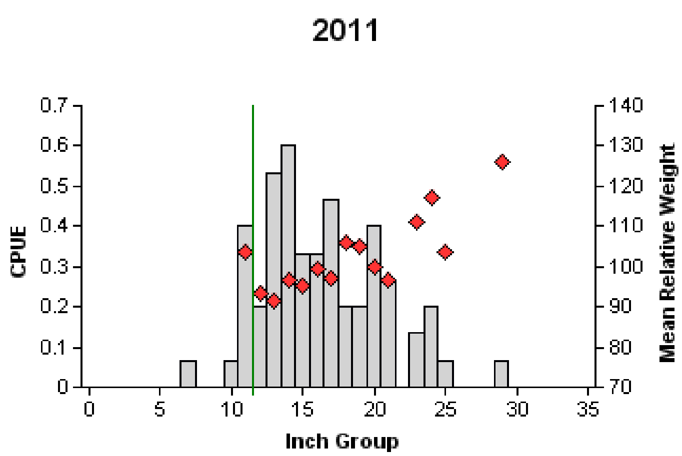
Figure 4. Number of redear sunfish caught per hour (CPUE) population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2002, 2006 and 2010.

Channel Catfish

Effort =	15.0
Total CPUE =	2.5 (32; 38)
Stock CPUE =	1.4 (29; 21)
CPUE-12 =	1.3 (30; 20)
PSD =	62 (12.9)
PSD-12 =	95 (4.8)



Effort =	15.0
Total CPUE =	2.5 (30; 38)
Stock CPUE =	2.5 (30; 38)
CPUE-12 =	2.5 (30; 38)
PSD =	63 (7.8)
PSD-12 =	100 (0)

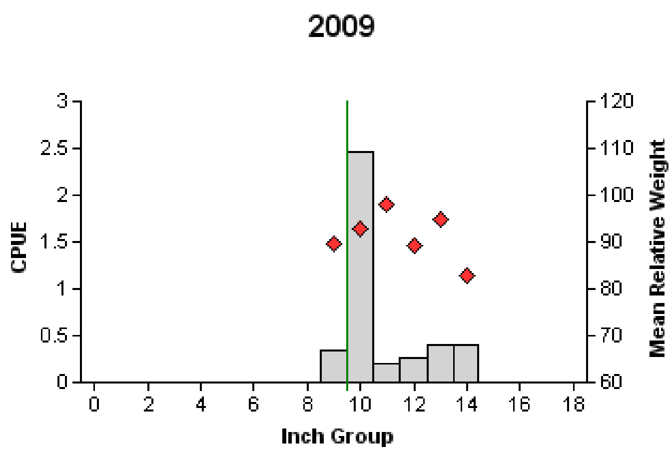


Effort =	15.0
Total CPUE =	4.5 (24; 68)
Stock CPUE =	4.4 (24; 66)
CPUE-12 =	4.0 (24; 60)
PSD =	53 (7.1)
PSD-12 =	91 (3.6)

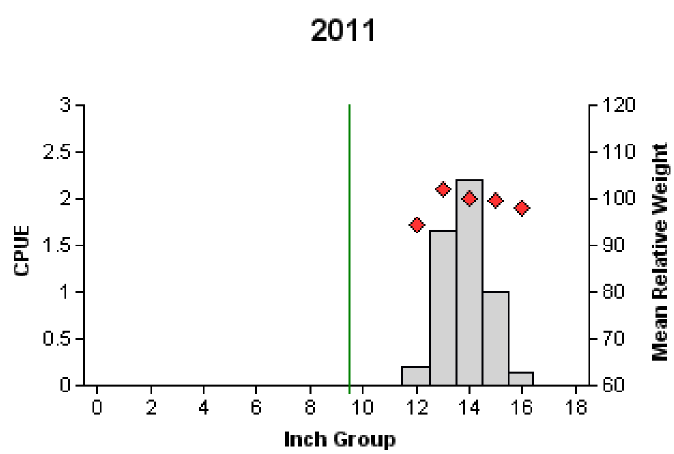
Figure 5. Number of channel catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2007, 2009 and 2011. Vertical line represents minimum length limit at the time of sampling.

White Bass

Effort =	15.0
Total CPUE =	1.9 (27; 29)
Stock CPUE =	1.9 (27; 29)
CPUE-10 =	1.9 (27; 29)
PSD =	100 (0)



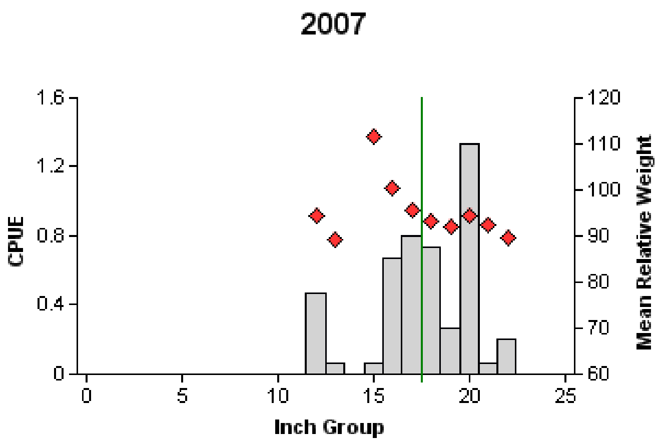
Effort =	15.0
Total CPUE =	4.1 (19; 61)
Stock CPUE =	4.1 (19; 61)
CPUE-10 =	3.7 (19; 56)
PSD =	100 (0)



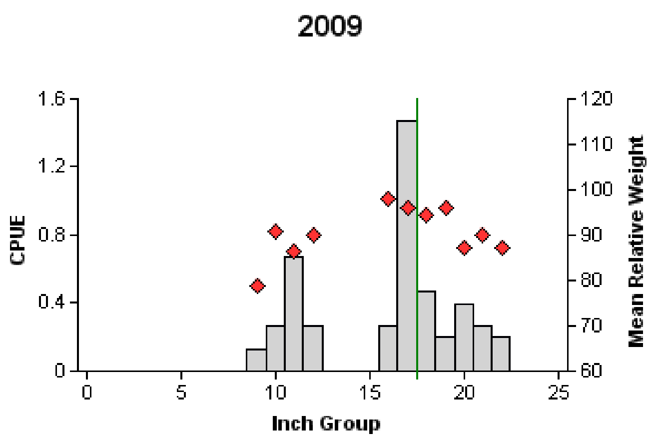
Effort =	15.0
Total CPUE =	5.2 (18; 78)
Stock CPUE =	5.2 (18; 78)
CPUE-10 =	5.2 (18; 78)
PSD =	100 (0)

Figure 6. Number of white bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2007, 2009 and 2011. Vertical line represents minimum length limit at the time of sampling.

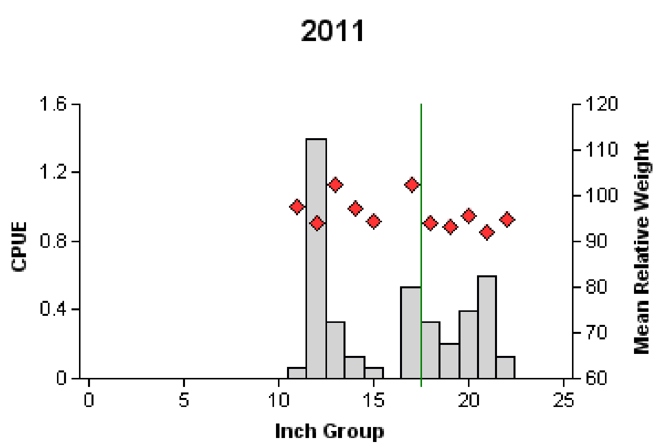
Palmetto Bass



Effort =	15.0
Total CPUE =	4.7 (25; 70)
CPUE-18 =	2.6 (29; 39)
PSD =	100 (0)
PSD-18 =	56 (8.7)

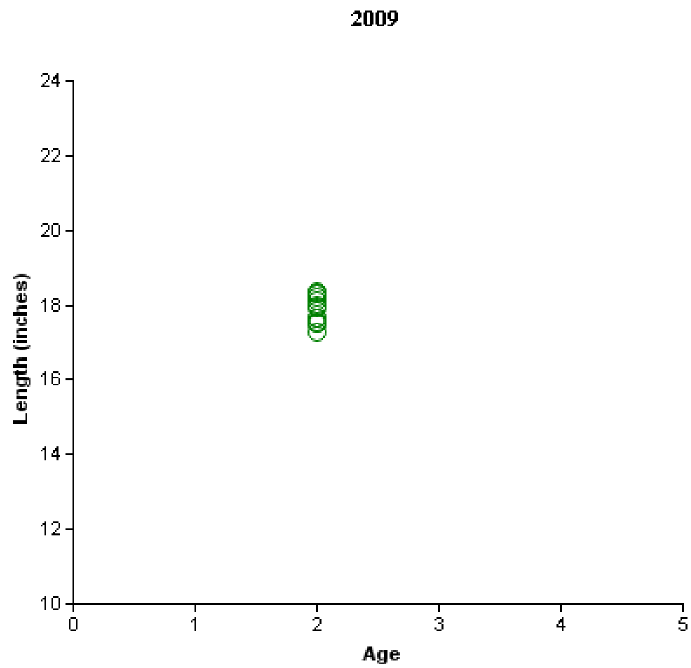


Effort =	15.0
Total CPUE =	4.6 (33; 69)
CPUE-18 =	1.6 (35; 24)
PSD =	77 (5.2)
PSD-18 =	35 (6.4)



Effort =	15.0
Total CPUE =	4.2 (26; 63)
CPUE-18 =	1.7 (40; 25)
PSD =	98 (1.7)
PSD-18 =	40 (11.9)

Figure 7. Number of palmetto bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2007, 2009 and 2011. Vertical line represents minimum length limit at the time of sampling.



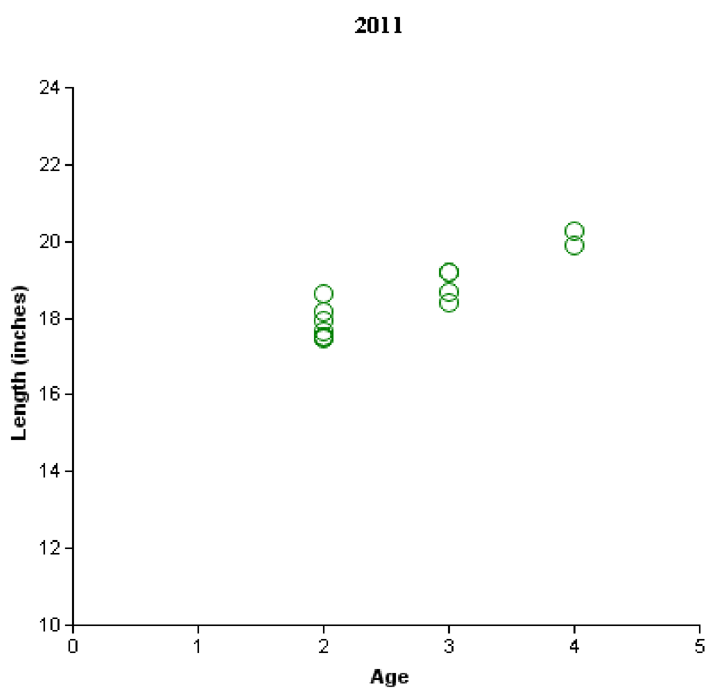
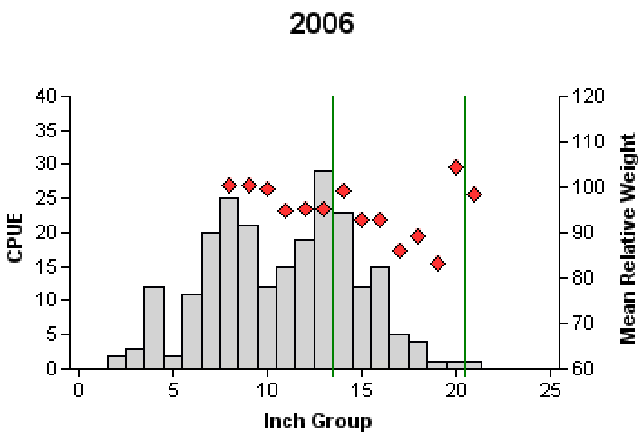
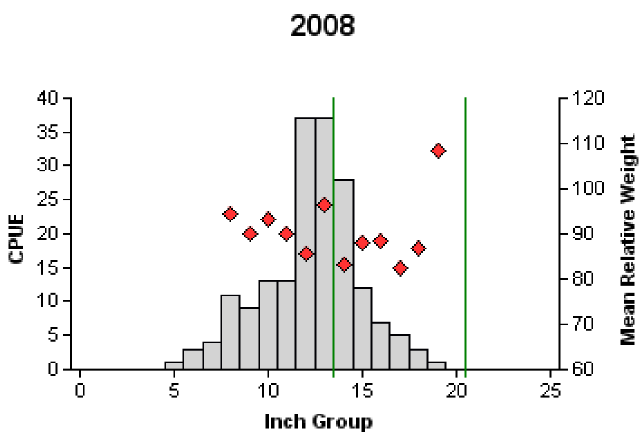


Figure 8. Length at age for palmetto bass collected gill netting, Walter E. Long Reservoir, March 2009 (N = 13) and January 2011 (N = 13).

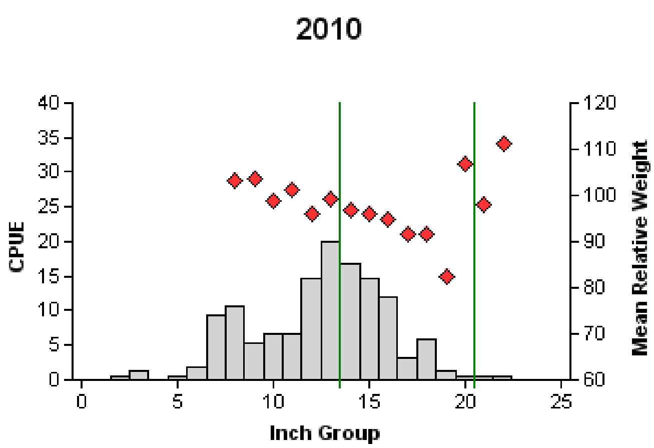
Largemouth Bass



Effort =	1.0
Total CPUE =	233.0 (11; 233)
Stock CPUE =	183.0 (11; 183)
CPUE-14 =	62.0 (10; 62)
CPUE-21 =	1.0 (100; 1)
PSD =	60 (4.6)



Effort =	1.0
Total CPUE =	184.0 (10; 184)
Stock CPUE =	176.0 (11; 176)
CPUE-14 =	56.0 (23; 56)
CPUE-21 =	0.0 (0; 0)
PSD =	74 (4.3)



Effort =	1.5
Total CPUE =	134.0 (12; 201)
Stock CPUE =	120.0 (12; 180)
CPUE-14 =	56.0 (12; 84)
CPUE-21 =	1.3 (69; 2)
PSD =	76 (3.4)

Figure 9. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2006, 2008 and 2010. Vertical lines represent slot length limit at the time of sampling.

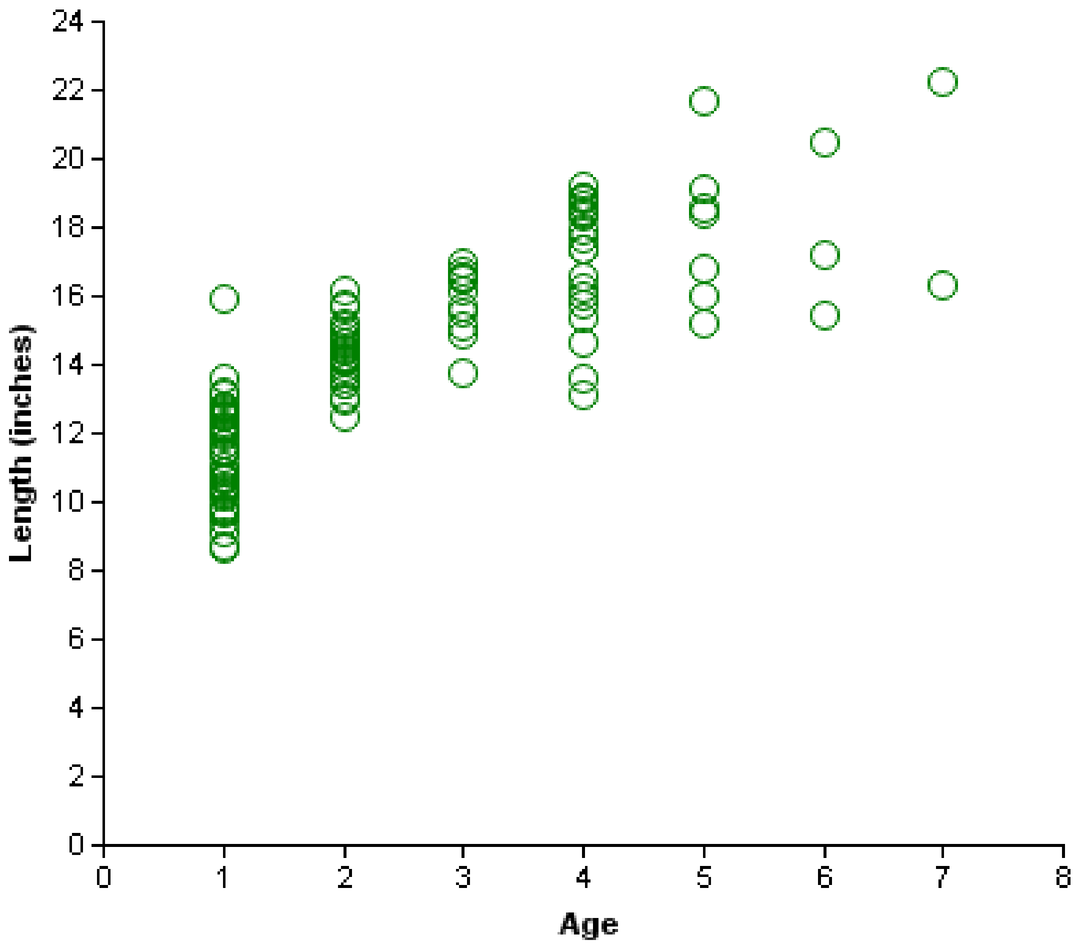


Figure 10. Length at age for largemouth bass collected by electrofishing at Walter E. Long Reservoir, Texas, October 2010 (N = 134). Age 0 fish omitted from graph.

Table 6. Proposed sampling schedule for Walter E. Long Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2011-Spring 2012					A		
Fall 2012-Spring 2013	A		A		A		
Fall 2013-Spring 2014					A		
Fall 2014-Spring 2015	S		S		S	S	S

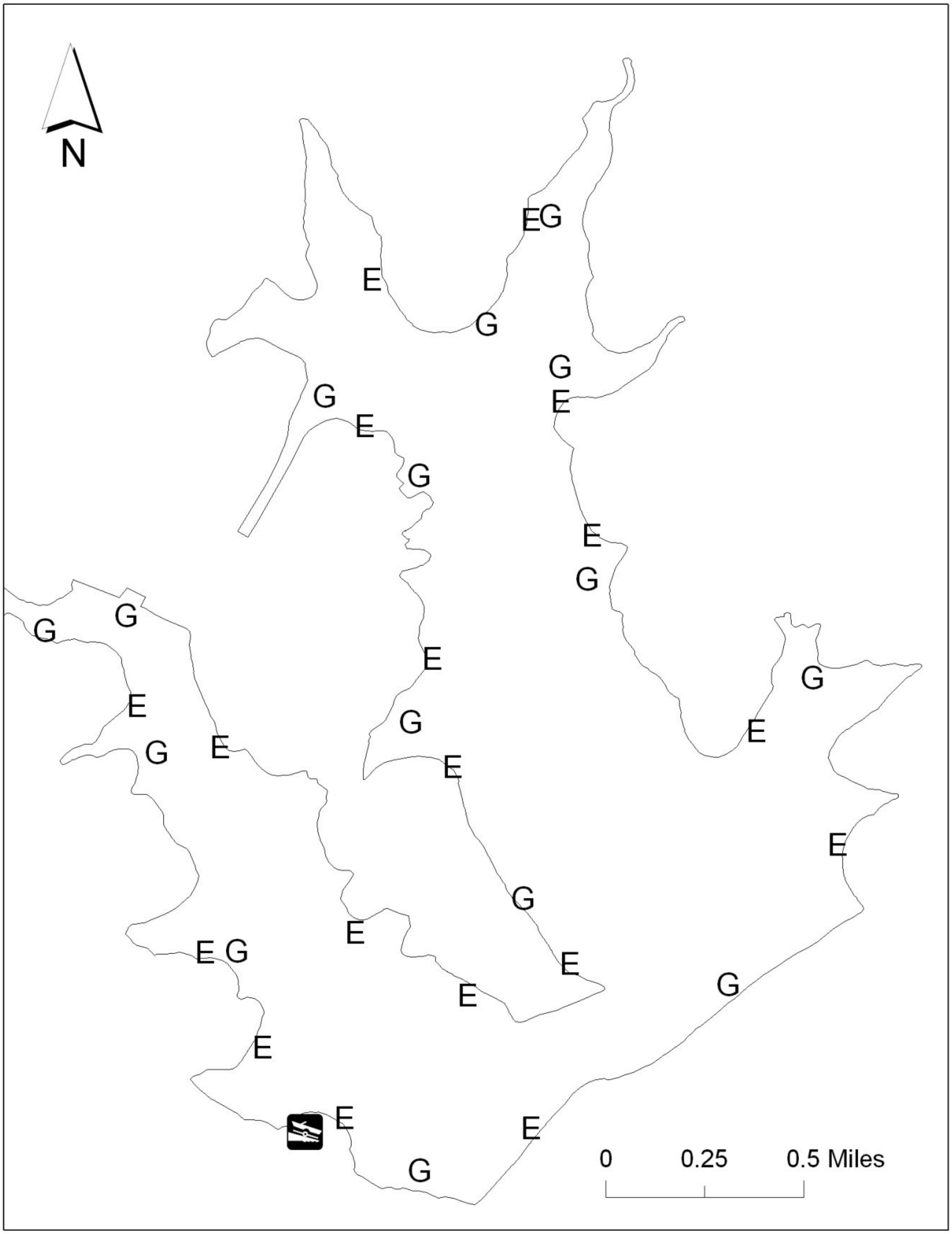
APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Walter E. Long Reservoir, Texas, 2010-2011.

Species	Electrofishing		Gill Netting	
	CPUE	N	CPUE	N
Gizzard shad	11.3	17		
Threadfin shad	28.7	43		
Inland silverside	3.3	5		
Channel catfish			4.5	68
Flathead catfish			0.3	5
White bass			5.2	78
Palmetto Bass (striped X white bass hybrid)			4.2	63
Redbreast sunfish	204.7	307		
Bluegill	205.3	308		
Redear sunfish	49.3	74		
Redspotted sunfish	6.7	10		
Largemouth bass	134.0	201		
Blue tilapia	1.3	2		

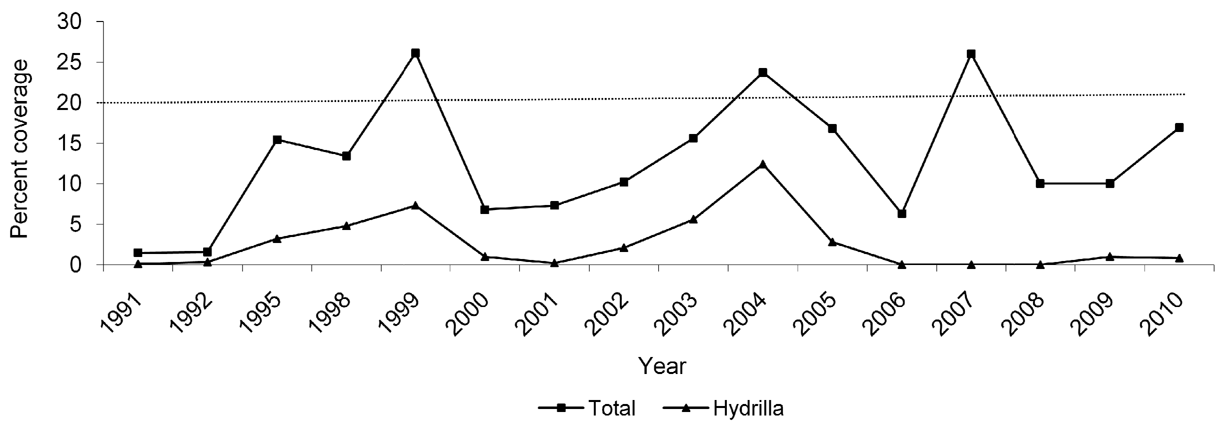
APPENDIX B

Location of sampling sites, Walter E. Long Reservoir, Texas, 2010-2011. Gill net and electrofishing stations are indicated by G and E, respectively.



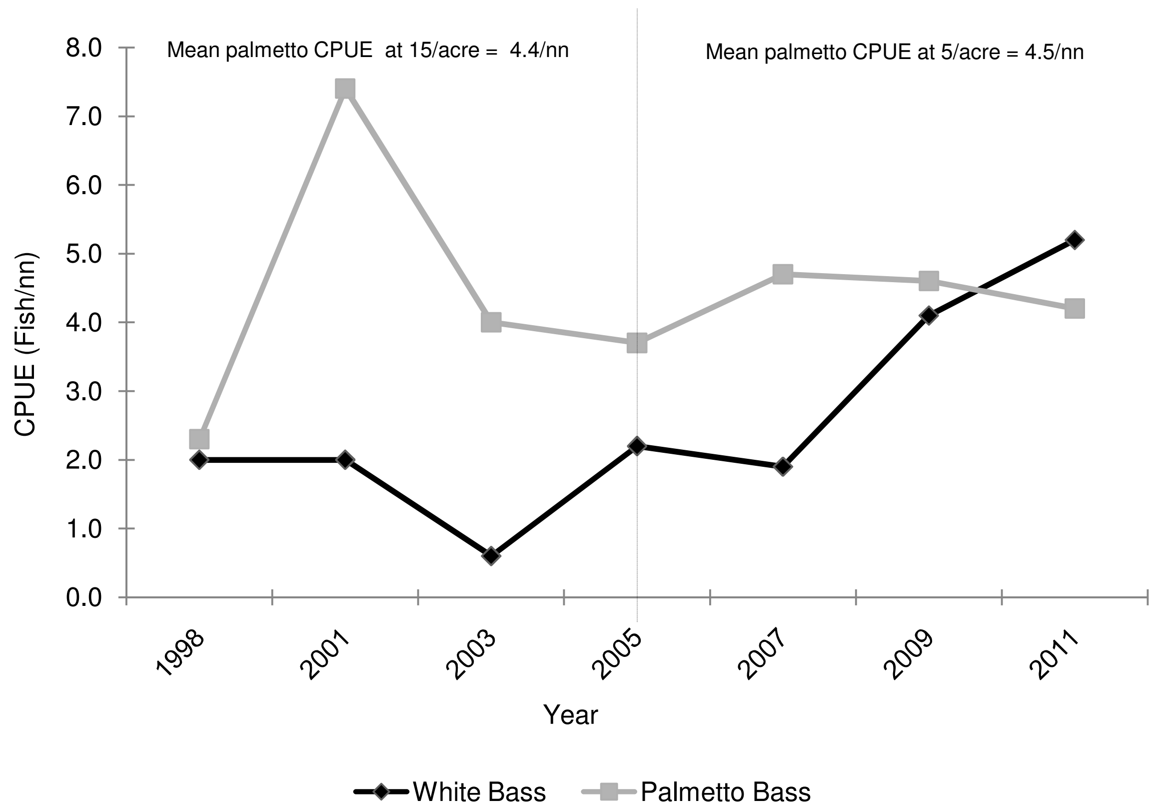
APPENDIX C

Percent total aquatic vegetation and hydrilla *Hydrilla verticillata* coverage from 1991 to 2010 at Walter E. Long Reservoir, TX. Total coverage includes all aquatic plant species. Total aquatic vegetation coverage within the range of 10 to 40% was considered optimal for growth and survival of phytophilic fish (Dibble et al. 1996) and for largemouth bass recruitment and standing crop (>20% total coverage) (Durocher et al. 1984).



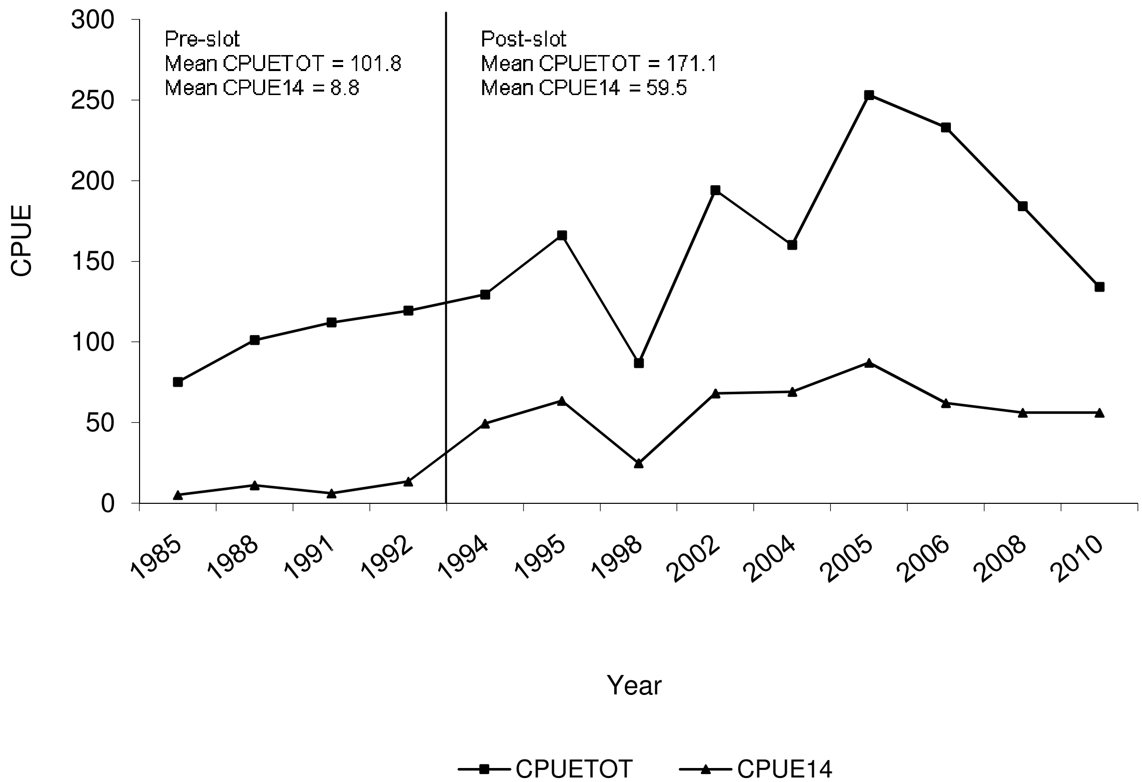
APPENDIX D

Total catch rate (fish/nn) for palmetto bass and white bass collected in gill nets, Walter E. Long Reservoir, spring 1998 to 2011. Reduced stocking rates of palmetto bass (5/acre) initiated in 2005, indicated by vertical line.



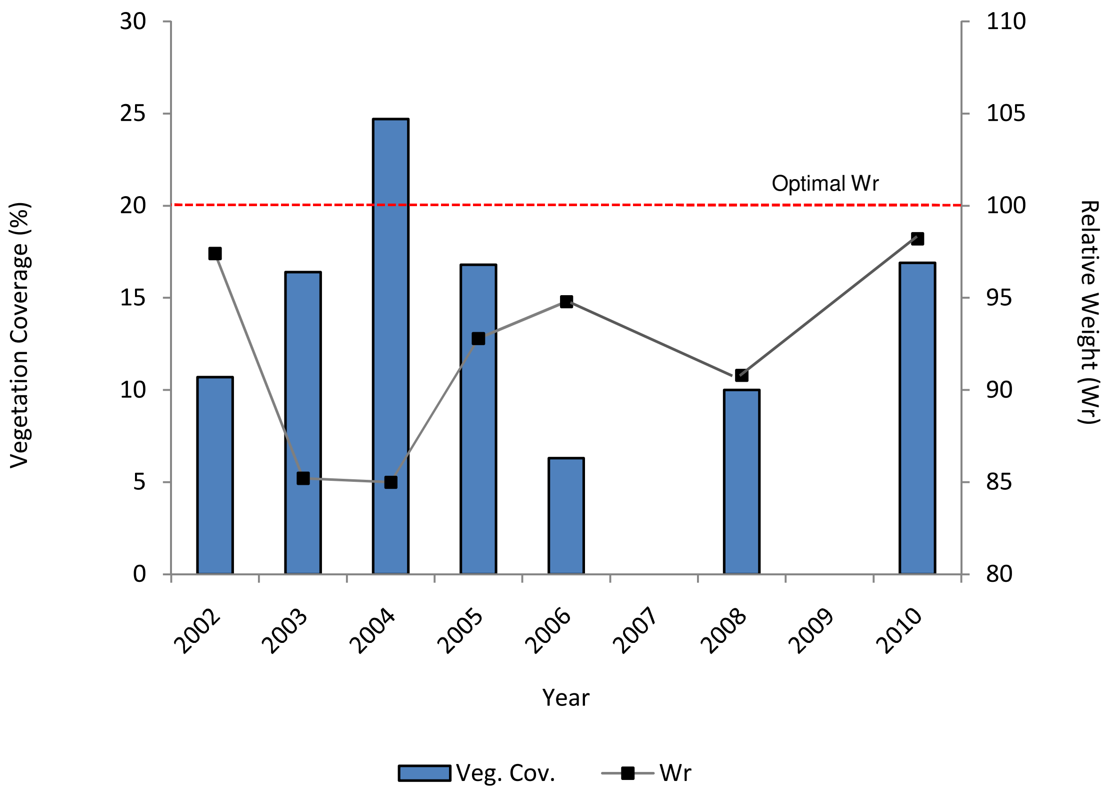
APPENDIX E

Total catch rate (CPUETOT) and catch rate of individuals longer than 14 inches (CPUE14) for largemouth bass collected in fall electrofishing surveys, Walter E. Long Reservoir 1985 to 2010. A slot length limit for largemouth bass was implemented on September 1, 1993 (vertical line). Mean electrofishing catch rates (pre and post slot length limit) are also included. Catch rates expressed in fish/h.



APPENDIX F

Mean relative weight (Wr) values for largemouth bass compared total vegetation coverage (%) for all largemouth bass collected in fall electrofishing surveys Walter E. Long Reservoir, TX, 2002 through 2010. A relative weight value of 100 is considered optimal (indicated by horizontal line).



APPENDIX G

Walter E. Long Reservoir Pier Relocation Project Plan

Proposed by: Marcos J. De Jesus and Steve Magnelia, Texas Parks and Wildlife Department (TPWD) Inland Fisheries Division, District 2C.

Date: January 28, 2011

Goal: Relocate the existing Walter E. Long Park fishing pier to an alternate location, accessible to deeper water. The relocation should improve angler catch rates and provide a better quality fishing experience for park anglers.

Need: The shoreline along the city park at Walter E. Long Reservoir is the only bank fishing access available on this reservoir. Unfortunately, most of the shoreline is annually inundated by dense stands of aquatic vegetation (Figure 1). This decreases fishing effectiveness for bank and pier anglers to the point where few fish are caught by bank anglers (Magnelia and De Jesus 2007). The public fishing pier is currently located in a poor location for fishing along the park shoreline (Figure 2). The fishing pier was installed in a relatively shallow location within an area of gently sloping bottom contour (Figure 2). The area within casting distance of the pier is annually inundated with dense stands of aquatic vegetation (Figure 1). It is also not within casting distance of any significant deep water contour break (Figure 2). Steep contour breaks with access to deep water are frequently used by game fish. Access to these types of locations improves the chances for catches. A need exists to relocate and extend the fishing pier. A more suitable location for fishing has been identified within the park using the most current bottom contour information (Navionics™ 2010). A similar project to improve catch rates for bank anglers was recommended by TPWD in the 2007 Fisheries Management Plan for the reservoir (Magnelia and De Jesus 2007), which generally stated the following regarding bank angling at the city park:

> "The bank fishery at the city park was popular, providing thirty-three percent of the reservoirs total fishing effort. However, catch rates for bank anglers were extremely low (0.02/h). Channel catfish and palmetto bass (annually stocked) were abundant. These species could be targeted by bank anglers. Explore techniques for improving catch rates for bank anglers at the city park."

Project Objectives:

1) Relocate the existing fishing pier to the east side of the city park to a pre-determined location accessible to deep water.

2) Extend the fishing pier gangway 60 feet by adding additional segment(s) to increase the pier length to approximately 115 feet.

3) Improve angler catch rates by allowing anglers casting access to a deep water contour break.

4) Improve angler catch rates by allowing anglers the opportunity to fish an area relatively free of dense aquatic vegetation.

Plan:

Previous requests by TPWD to control aquatic vegetation along the city park shoreline have been denied by the City of Austin because much of the aquatic vegetation is native species. In coordination with the City of Austin Parks and Recreation Department, we propose relocating and extending the existing fishing pier at Walter E. Long City Park. TPWD has examined the most current bottom contour information along the city park shoreline and determined the best relocation site for the fishing pier. The new site would allow anglers casting access to a deep water contour break, where game fish are most likely to be present (Figure 2). Funds to move and extend the fishing pier would need to be provided by the City of

Austin.
Estimated Cost:

Estimated cost is $20,630.00 (See appendix for complete details).

Expected Benefits:

Bank anglers, which tend to be harvest oriented, would benefit from this relocation. Hybrid striped bass, which are stocked annually by TPWD, white bass and catfish species are abundant in the reservoir and would be more easily accessible to pier anglers at the proposed new pier location. We expect angler catch rates to increase as a result of the re-location. .

Literature Cited:

Magnelia, S.J. and M.J. De Jesus. 2007. Statewide freshwater fisheries monitoring and management program survey report for Walter E. Long Reservoir, 2006. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-32, Austin, TX. 36 pp.

Navionics 2010. Navionics NavPlanner 2. Version 4.5. Fugawi Corporation, Toronto, Canada.

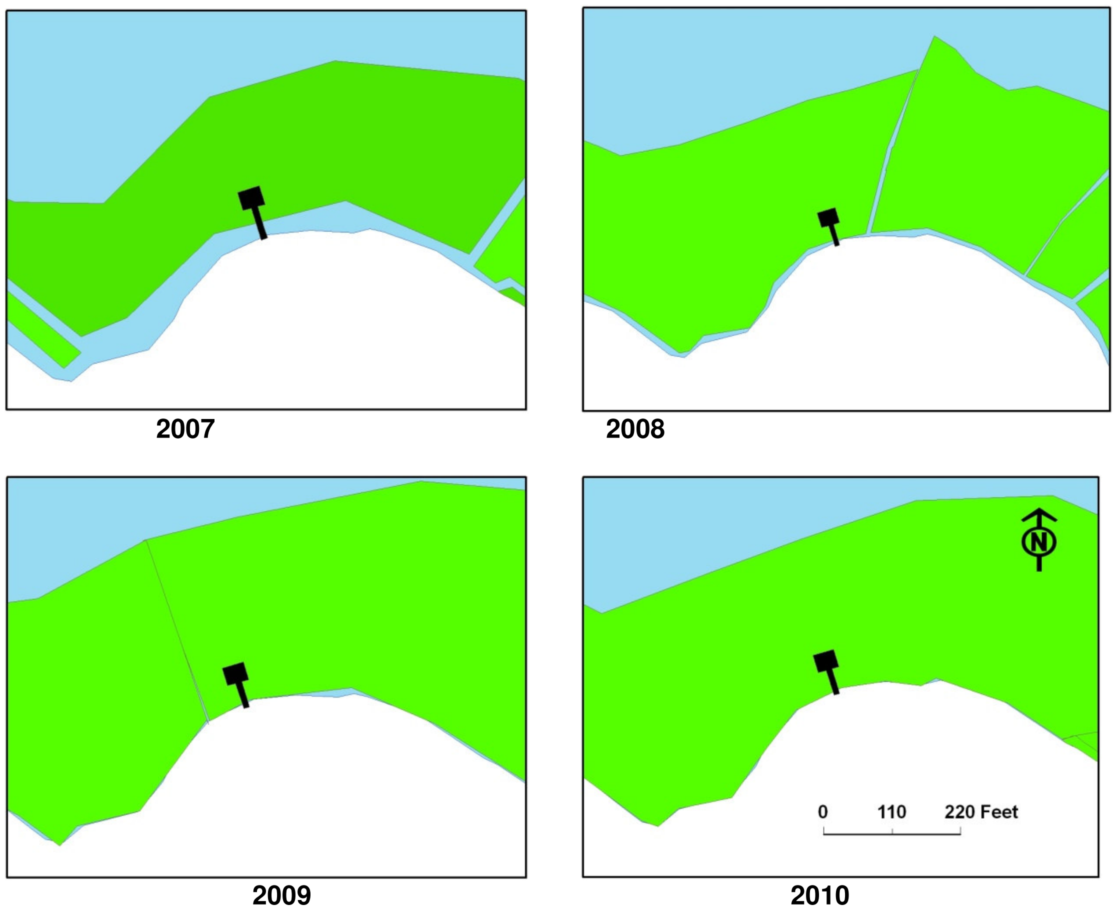


Figure 1. Partial aquatic vegetation outline for Walter E. Long Reservoir along the city park shoreline from TPWD aquatic vegetation surveys conducted during summer 2007, 2008, 2009 and 2010. Green denotes vegetation, blue denotes open water, white denotes park shoreline, and the pier is pictured in black.

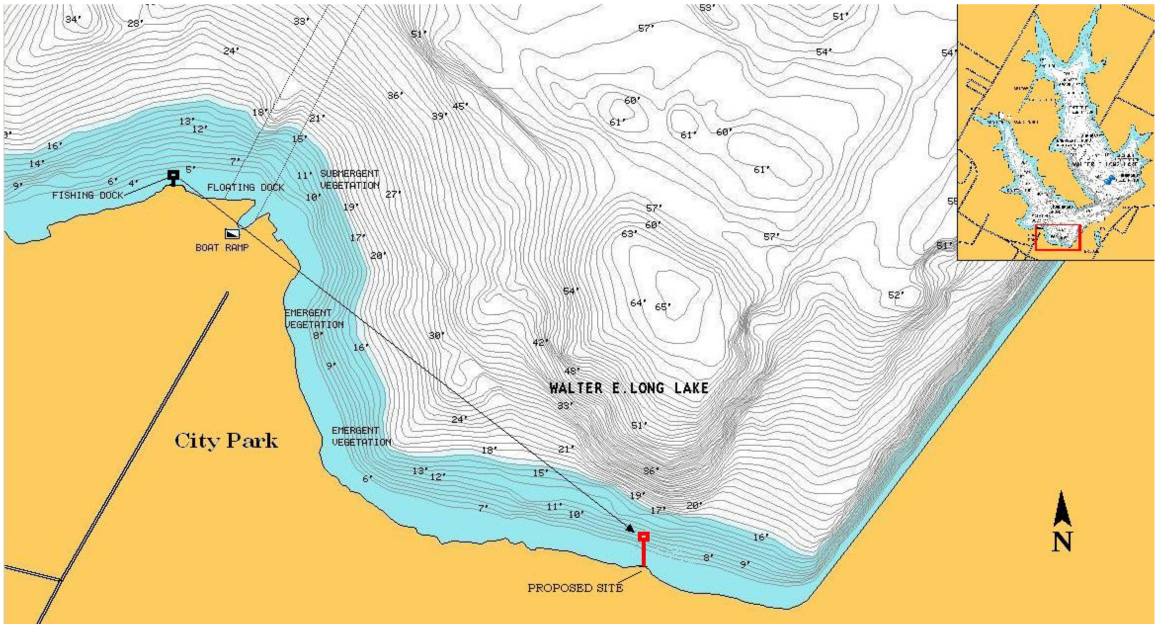


Figure 2. Proposed relocation site for the extended fishing pier at Walter E. Long Reservoir City Park. Black pier symbol indicates current location and red pier symbol indicates proposed relocation site. Bottom contour information provided by Navionics™. Pier symbols are not drawn to scale, but reference exact locations and proximity to deep-water drop-offs.

Appendix

FLOATING DOCK SUPPLY
931 Wood Meadows
New Braunfels, Texas 78130
Office: (830) 629-9171

Walter E. Long Reservoir **Date: 1/25/11**

Decker Lake Fishing Pier Extension ~ Repositioning

Dock Description
Overall dimensions: 24 ft. wide by 114 feet long

A 4 ft. wide x 60 ft. long ADA access bridge extension connecting to existing 4 ft. wide by 30 ft. long bridge and 24ft. x 24 ft. fishing pier.

Scope:

Floating Docks Mfg. Co. will manufacture and deliver dock sections. Docks will come bolted together in the largest shippable units unattached to frames. Flotation will ship unattached to frames. Floating Dock Supply will be responsible for unloading components, assembly and installation of dock sections. Remove and reposition and re-anchor existing fishing pier in alternate deeper water location.

Bridge:
Addition:

4 ft. wide 60 ft. long.
"H" float
Rollers and tread plate shoe
Hinge pin assembly to existing bridge

Decking: Lumber

Flotation: Rotational molded polyethylene encased flotation.

Anchoring
(2) 5 in. flat anchor sleeves
(2) 16 ft. ~ 4 in. Galvanized schedule 40 tapered anchor pipes
250 feet of 1/2 in. stainless cable - clamps / thimbles / turnbuckles / shackles
Install (2) new dead man shore anchors at new pier location.

Delivered & installed: $ 20,630

Owner's Initials: ________

Fax: (830)629-2526
Cell: (830) 708-2530
www.floatingdocksupply.com
docktored@floatingdocksupply.com