PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Walter E. Long Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Walter E. Long Reservoir were surveyed in 2014 using electrofishing and in 2015 using gill netting. Historical data are presented with the 2014 - 2015 data for comparison. 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, Hybrid Striped Bass (Palmetto Bass and Sunshine Bass), catfish species and White Bass. Palmetto Bass were stocked from 2007-2010 at a reduced rate of 5/acre to evaluate density-dependent growth and condition of the predatory fish population. Sunshine Bass were first stocked in 2014 in addition to Palmetto Bass and separately in 2015. Largemouth Bass have been managed since 1993 with a 14- to 21-inch slot-length limit. An analysis of that length limit change suggested it had been successful in increasing density and angler catch rate of bass greater than 14 inches in length. Angler harvest of sub-slot bass was not sufficient to improve growth under the slot-length limit. Florida Largemouth Bass were last stocked in 1995. Aquatic vegetation habitat surveys have been conducted annually to monitor invasive species and evaluate angler access conditions.

- **Fish Community**
  - **Prey species:** Threadfin Shad, Redbreast Sunfish, Bluegill, and Redear Sunfish were the predominant prey species. Gizzard Shad were present, but the IOV was zero. Catch rates of Redbreast Sunfish, Bluegill, Redear Sunfish, and Gizzard Shad declined.

  - **Catfishes:** Channel Catfish were the dominant catfish species present; abundance, size and body condition were good. Flathead Catfish were present in low density.

  - **Temperate Basses:** Hybrid Striped Bass and White Bass were present in the reservoir. White Bass abundance decreased during the last two surveys. In 2015, only one fish was caught. The gill netting catch rate of Hybrid Striped Bass in 2015 was higher than in previous two surveys. Legal-size (≥ 18 inches) Hybrid Striped Bass were present.

  - **Largemouth Bass:** Largemouth Bass were abundant and displayed adequate growth and body condition. Fish above the slot limit (≥ 21 inches) were present as well.

- **Management Strategies:** Based on current information, the reservoir should continue to be managed with existing regulations. Subject to availability, Hybrid Striped Bass (Palmetto Bass and/or Sunshine Bass) should continue to be stocked at 5/acre for fingerlings. Conduct additional electrofishing and gill netting surveys in 2016-2017, and general monitoring surveys with gill nets and electrofishing surveys in 2018-2019. Aquatic vegetation surveys should be conducted annually to monitor invasive species.

INTRODUCTION

This document is a summary of fisheries data collected from Walter E. Long Reservoir in 2014 - 2015. 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 fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2014-2015 data for comparison.

Reservoir Description

Walter E. Long Reservoir is a 1,269-acre stable-level (555 ft. above mean sea 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. Habitat at time of sampling consisted primarily of natural shoreline (93.9%), and native (approximately 20% of reservoir surface area) and non-native (approximately 1% of reservoir surface area) submerged vegetation. Other descriptive characteristics for Walter E. Long Reservoir are in Table 1.

Angler Access

Although the entire reservoir shoreline is owned by the City of Austin, bank access is limited to a city-operated park on the south shore. Shoreline access was good within the park boundaries. An ADA compliant fishing pier was available in the park. Two multi-lane, concrete boat ramps were located close together within the park, offering adequate boat access to the reservoir. ADA compliant parking was available. A TPWD grant was used to make repairs on one boat ramp and add the ADA compliant parking. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (De Jesus and Magnelia 2011) included:

1. Continue stocking Palmetto Bass at a rate of 5/acre.
   Action: Palmetto Bass were stocked at 5/acre in 2011 and 2014, and at 15/acre in 2013 when surplus fish were available.

2. Make City of Austin park management aware of *Morone* identification challenges for anglers and arrange for signage installation for *Morone* identification at park site.
   Action: *Morone* identification signage was installed at the park.

3. Continue efforts with the City of Austin to relocate and expand the existing fishing pier to a much more conducive site for fishing.
   Action: A request for relocating the fishing pier was denied by the City of Austin.

4. Continue annual aquatic vegetation monitoring.
   Action: Aquatic vegetation surveys were carried out every year from 2011 to 2014.

5. Post signage at access points around the reservoir and educate marina owners and the public about the problems associated with invasive species.
   Action: Aquatic invasive species signage was installed at the park. Outreach efforts regarding invasive species included social media, print media, and public presentations.

6. Promote the catfish fishery in Walter E. Long Reservoir using press releases.
   Action: The Channel Catfish fishery was promoted through print media.

Harvest regulation history: Sport fish in Walter E. Long Reservoir were managed with statewide regulations with the exception of Largemouth Bass. 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. Only one fish over 21 inches may be retained. Current regulations are found in Table 3.

Stocking history: Florida Largemouth Bass and Hybrid Striped Bass were important species which were requested and stocked. Walter E. Long Reservoir has been stocked with Palmetto Bass (female Striped Bass X male White Bass offspring) most years since 1978. However, Sunshine Bass (male Striped Bass X female White Bass offspring) were available and stocked 2014 and 2015 to maintain the Hybrid Striped Bass fishery. The complete stocking history is in Table 4.

Vegetation/habitat management history: The exotic plant hydrilla (*Hydrilla verticillata*) was present in this reservoir along with a diverse group of native aquatic plant species. 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 have not been necessary, as hydrilla coverage has not become problematic. 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. Water from the Colorado River is pumped into Walter E. Long Reservoir to maintain stable level.

METHODS

Fishes were collected by electrofishing (1.0 hour at 12, 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 Texas Parks and Wildlife Department Fishery Assessment Procedures Manual (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

A structural habitat survey was conducted in 2014. Vegetation surveys were conducted in 2011 – 2014. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2014). 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), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Hybrid Striped Bass PSD was calculated according to Dumont and Neely (2011). Index of vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics.

Ages were determined using otoliths for Largemouth Bass and Hybrid Striped Bass (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2014 and by electrophoresis for previous years.

RESULTS AND DISCUSSION

Habitat: Littoral zone structural habitat consisted primarily of natural shoreline (93.9%) (Table 5). In 2015, native vegetation covered approximately 20% of the reservoir's surface area compared to approximately 1% coverage by non-native vegetation (Table 6). Since 2011, coverage of hydrilla has remained less than 2% of the reservoir's surface area.

Prey species: Threadfin Shad, Redbreast Sunfish, Bluegill, and Redear Sunfish were the predominant prey species in 2014. The IOV for Gizzard Shad was zero, indicating that no Gizzard Shad of vulnerable size (≤ 8 inches) were available to existing predators. The IOV was also zero in 2010 and was low in 2006 (IOV = 22). Total CPUE of Gizzard Shad in 2014 (4.0/h) was lower than in the 2010 (11.3/h) and 2006 (32.0/h) surveys (Figure 1). Threadfin Shad were collected at the rate of 53.0/h in 2014, which is higher than in the 2010 (28.7/h) and 2006 (28.0/h) surveys. Total CPUE of Redbreast Sunfish in 2014 (50.0/h) was much lower than in 2010 (204.7/h) and 2006 (146.0/h). Larger fish (7 to 10 inches in length) were still present (CPUE-7 = 18.0/h), providing some fishing opportunities for panfish anglers (Figure 3). A new water body record (rod and reel) for Redbreast Sunfish was established in 2010 (1.0 pound, 10.5 inches). Total CPUE of Bluegill in 2014 (48.0/h) was much lower than that obtained in 2010 (205.3/h) and 2006 (154.0/h), but some larger fish were present (CPUE-7 = 6.0/h) (Figure 3). A new water body record (rod and reel) for Bluegill was established in 2012 (0.8 pound, 9.1 inches). Total CPUE of Redear Sunfish in 2014 (40.0/h) was similar to that obtained in 2010 (49.3/h), but lower than in 2006 (102.0/h). Nevertheless, catch rates for larger fish were very similar in 2014 (CPUE-7 = 22.0/h), 2010 (CPUE-7 = 20.0/h), and 2006 (CPUE-7 = 23.0/h) (Figure 4). A new water body record (rod and reel) for Redear Sunfish was established in 2010 (1.0 pound, 11.0 inches). In 2014, there was a noticeable decline in the abundance of Redbreast Sunfish, Bluegill, Redear Sunfish, and Gizzard Shad compared to 2010 and 2006. Electrofishing sampling efficiency may have been reduced due to increased water turbidity because of windy conditions.

Catfishes: The gill netting catch rate for Channel Catfish was 5.2/nn in 2015, compared to 3.7/nn in 2013 and 4.5/nn in 2011. In addition, abundance of harvestable-size fish was relatively high in the last three surveys (2015: CPUE-12 = 4.9/nn, 2013: CPUE-12 = 2.9/nn, 2011: CPUE-12 = 4.0/nn); the largest fish measured 28 inches in length (Figure 5). In 2015, body condition for Channel Catfish was excellent, with all sizes averaging relative weights well above 100. A new water body record (rod and reel) for Channel Catfish was established in 2013 (6.5 pounds, 24.8 inches). This is one of the best Channel Catfish fisheries in the district. Flathead Catfish were present in low densities (0.3/nn in 2015, 2013, and 2011).

White Bass: In 2015, only one White Bass was captured by gill netting and the total gill netting catch rate was 0.1/nn. This was lower than that recorded in 2013 (0.3/nn) and 2011 (5.2/nn) (Figure 6). Walter E. Long Reservoir has historically supported a low-density White Bass population. Historical gill netting catch rates since 1991 seldom surpassed 2.2/nn, and reproductive success appeared to be inconsistent until more recent age and growth evaluations revealed more consistent recruitment in 2006 (Magnelia and De Jesus 2007). One possible explanation could be reduced interspecific competition with Palmetto Bass, which were stocked at the reduced rates since 2005. However, in 2013 the stocking rate was increased 3-fold and coincided with poor recruitment and abundance of White Bass in 2013 and 2015. This may be compounded by the fact that most Palmetto Bass (97.5%) caught by anglers are released (Magnelia and De Jesus 2007). Low water levels are known to negatively influence White Bass spawning success in some reservoirs, especially where the fish are impeded from making spawning runs into creeks (DiCenzo and Duval 2002, Lovell and Maceina 2002). However, this is less of a problem here since Walter E. Long is maintained as a stable-level reservoir.

Hybrid Striped Bass: Hybrid Striped Bass were a popular sport fish. The gill netting catch rate of Hybrid Striped Bass in 2015 was 5.9/nn which is higher than in 2013 (1.3/nn) and 2011 (4.2/nn). This is probably due in part to the higher stocking rate of Palmetto Bass in 2013 and the introduction of Sunshine Bass in 2014 (Table 4). However, catch rates of harvestable-size fish were similar (2015: CPUE-18 = 1.8/nn, 2013: CPUE-18 = 1.1/nn, 2011: CPUE-18 = 1.7/nn (Figure 7). In 2015, 31% of the adult Hybrid Striped Bass sampled exceeded 18 inches, which was lower than 2013 (80%), and 2011 (40%). Body condition

(W_r) was excellent (>100) for fish between 11 and 18 inches, and was good for fish between 20 and 23 inches (88 - 96) (Figure 7). Condition of younger fish had significantly improved in 2015 possibly due to reduced competition with White Bass as the latter has been in decline since 2013. In 2015, on average, Hybrid Striped Bass reached legal length (18 inches) by age-2 (Figure 8).

Largemouth Bass: In 2012, Walter E. Long and Sam Rayburn reservoirs tied for the title of the best overall reservoir in the state, based on a combination of small, quality and preferred-size bass caught during electrofishing surveys that year (TPWD unpublished data). In 2014, the reservoir contained a moderate-to-high density Largemouth Bass population relative to bass populations in other central Texas reservoirs. The total catch rate of Largemouth Bass was 143.0/h in 2014 compared to catch rates of 179.0/h in 2012, and 134.0/h in 2010 (Figure 9). Total CPUE in 2014 (143.0/h) was lower than the reservoir average (171.1/h) since the start of the slot length limit (September 1, 1993) (De Jesus and Magnelia 2011). In 2014, the electrofishing catch rate of Largemouth Bass greater than 14 inches (CPUE-14 = 81.0/h) was similar to that obtained in 2012 (88.0/h), but greater than in 2010 (56.0/h). The CPUE-14 for the 2014 and 2012 surveys was higher than the post-slot length limit mean CPUE-14 of 59.5/hour (De Jesus and Magnelia 2011). In 2014, the CPUE-21 was 1.0/h compared to 6.0/h in 2012 and 1.3/h in 2010. On average, Largemouth Bass in Walter E. Long Reservoir reached 14 inches between ages 2 and 3 (Figure 10) which is about average compared to values for the Edwards Plateau ecological area (Prentice 1987). Mean relative weight for the majority of fish was good (≥90). The reservoir was last stocked with Florida Largemouth Bass in 1995. Florida Largemouth Bass influence in 2014 was 86.0% (Table 6).

Fisheries management plan for Walter E. Long Reservoir, Texas

Prepared – July 2015.

ISSUE 1: The Hybrid Striped Bass population supported a popular fishery and has remained relatively stable under the 5/acre stocking regime.

MANAGEMENT STRATEGIES

1. Continue stocking Palmetto Bass fingerlings and/or Sunshine Bass fry at rates equivalent to 5/acre.

2. To evaluate the 5-fish per acre stocking regime, gill netting effort was increased to 15 net-nights to ensure a good sample size. Data has since shown the fishery can be sustained at the lower stocking rate. Future gill net surveys should revert to 10 net-nights of effort which is recommended for this size of reservoir under normal circumstances.

ISSUE 2: The City of Austin is currently considering a number of proposals that could have implications for the management of the fishery. The least impactful of these may be the proposal to build a golf course adjacent to the reservoir (Appendix E). More significantly, the City is examining the feasibility of using the reservoir as "off-channel storage". In this scenario, water from the reservoir would be used in emergencies to maintain environmental flows in the Colorado River. Fluctuating water levels in the reservoir can affect fish populations, and angler access. In addition, the operation of the power plant would be affected and consequently, the thermal regime of the reservoir.

MANAGEMENT STRATEGY

1. Keep abreast of proposals that affect the management of the reservoir and provide input to minimize impact to the fishery.

ISSUE 3: Walter E. Long Reservoir supported a diverse aquatic plant community. Herbicide treatments have historically been utilized by the City of Austin to control plants, especially hydrilla. Monitoring information on aquatic vegetation coverage was valuable when interpreting fisheries data.

MANAGEMENT STRATEGY

1. Continue annual aquatic vegetation surveys.

ISSUE 4: Walter E. Long Reservoir has a Channel Catfish population that offers good opportunities for boat and bank anglers.

MANAGEMENT STRATEGY

1. Continue to promote the Channel Catfish fishery using print and social media.

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. The threat of zebra mussel infestation in Georgetown Reservoir has been elevated due to their recent establishment in a reservoir within the Brazos River watershed. Belton Reservoir has been confirmed to have zebra mussels and poses a significant threat to nearby Stillhouse Hollow Reservoir which supplies water to Georgetown Reservoir.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Visually inspect rocks along the shoreline of the reservoir to confirm presence or absence of zebra mussels.
3. Establish a zebra mussel monitoring program to target adults and veligers.
4. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
5. Educate the public about invasive species through the use of media and the internet.
6. Make a speaking point about invasive species when presenting to constituent and user groups.
7. 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 been developing a reputation for trophy Smallmouth Buffalo angling opportunities. The Austin area hosts three quality Common Carp/Smallmouth Buffalo fisheries that attract anglers from around the nation and overseas. This reservoir is usually visited as a side trip by tournament anglers that fish the Carp Anglers Group Austin Team Championships to seek trophy-size Smallmouth Buffalo. The current rod and reel water body record weighed 62.31 pounds. Catch-and-release fishing, utilizing European techniques originally designed for catching Common Carp from the bank, is the most common style of fishing. Space for bank angling is limited to the park and access can be impeded in certain areas by emergent vegetation along the shoreline.

MANAGEMENT STRATEGIES

1. Consult with City of Austin, Lower Colorado River Authority, and Smallmouth Buffalo anglers to develop a plan to clear selected areas to provide additional bank access.
2. Promote the reservoir as a trophy Smallmouth Buffalo destination in Texas via applicable media outlets

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional electrofishing in 2016 and gill netting in 2017, and mandatory monitoring with electrofishing and gill nets in 2018/2019 (Table 7). An additional electrofishing survey in 2016 is necessary to maintain consistent data for trend information on the Largemouth Bass fishery. Additional gill netting is necessary to monitor the Hybrid Striped Bass and Channel Catfish populations.

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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	Tributary
Shoreline Development Index	3.3
Conductivity	729 µS/cm

Table 2. Boat ramp characteristics for Walter E. Long Reservoir, Texas, September 2014. This is a stable-level Reservoir (conservation level is 555 feet above mean sea level).

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft.)	Condition
Walter E. Long Metro. Park	30.284356 -97.607122	Y	50	NA	Good

Table 3. Harvest regulations for Walter E. Long Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Hybrid Striped	5	18-inch minimum
Bass, Largemouth	5[a]	14- to 21-inch slot
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

[a] Only one fish over 21 inches may be retained.

Table 4. Stocking history of Walter E. Long Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), 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 Bass 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

Species	Year	Number	Life Stage	Mean TL (in)
	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
	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
	2011	6,449	FGL	1.5
	2013	19,438	FGL	1.8
	2014	7,609	FGL	1.5
	Total	943,520		
Red Drum	1974	600	UNK	UNK
	1975	33,300	UNK	UNK
	1981	146,500	UNK	UNK
	Total	180,400		
Sunshine Bass (White Bass x Striped Bass hybrid)	2014	6,723	FGL	1.5
	2015	75,000	FRY	0.2
	Total	81,723		

Table 5. Survey of structural habitat types, Walter E. Long Reservoir, Texas, 2014. Shoreline habitat-type units are in miles.

Habitat type	Estimate	% of total
Natural Shoreline	14.18 miles	93.9
Rocky Shoreline	0.55 miles	3.0
Bulkhead	0.32 miles	2.1
Bulkhead/Piers/Docks	0.50 miles	1.0

Table 6. Survey of aquatic vegetation, Walter E. Long Reservoir, Texas, 2011, 2012, 2013, and 2014. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2011	2012	2013	2014
Native submersed				
Coontail (CT)	107.3 (8.8)	129.2 (10.7)	101.9 (8.4)	92.2 (7.6)
American pondweed (AP)		11.8 (<1)	6.0 (<1)	
Illinois pondweed (IP)				2.7 (<1)
Water stargrass (WS)				2.3 (<1)
Southern naiad (SN)	51.0 (4.2)	21.7 (1.8)		
Chara (C)	17.1 (1.4)	10.6 (<1)		
SN / A P			3.6 (<1)	
CT / C	6.6 (<1)		3.6 (<1)	
SN / C		0.4 (<1)		
IP / WS				3.3 (<1)
IP/CT/WS/SN				0.7 (<1)
Native floating-leaved				
American Lotus	8.31 (<1)	20.2 (1.7)	17.0 (1.4)	6.7 (<1)
Native emergent				
Bulrush	19.8 (1.6)	19.8 (1.6)	19.8 (1.6)	106.2 (8.7)
Non-native				
Slender naiad			0.7 (<1)	
Eurasian milfoil / CT / C	3.6 (<1)			
Hydrilla (Tier I)*	6.1 (<1)	12.7 (1.1)	1.9 (<1)	6.6 (<1)
Hydrilla / IP				0.9 (<1)
Hydrilla / IP/ CT/ WS				1.1 (<1)
Hydrilla / SN/ CT			6.6 (<1)	
Hydrilla / AP		3.6 (<1)		
Hydrilla / SN		6.6 (<1)	0.4 (<1)	

*Tier I is Immediate Response

Gizzard Shad

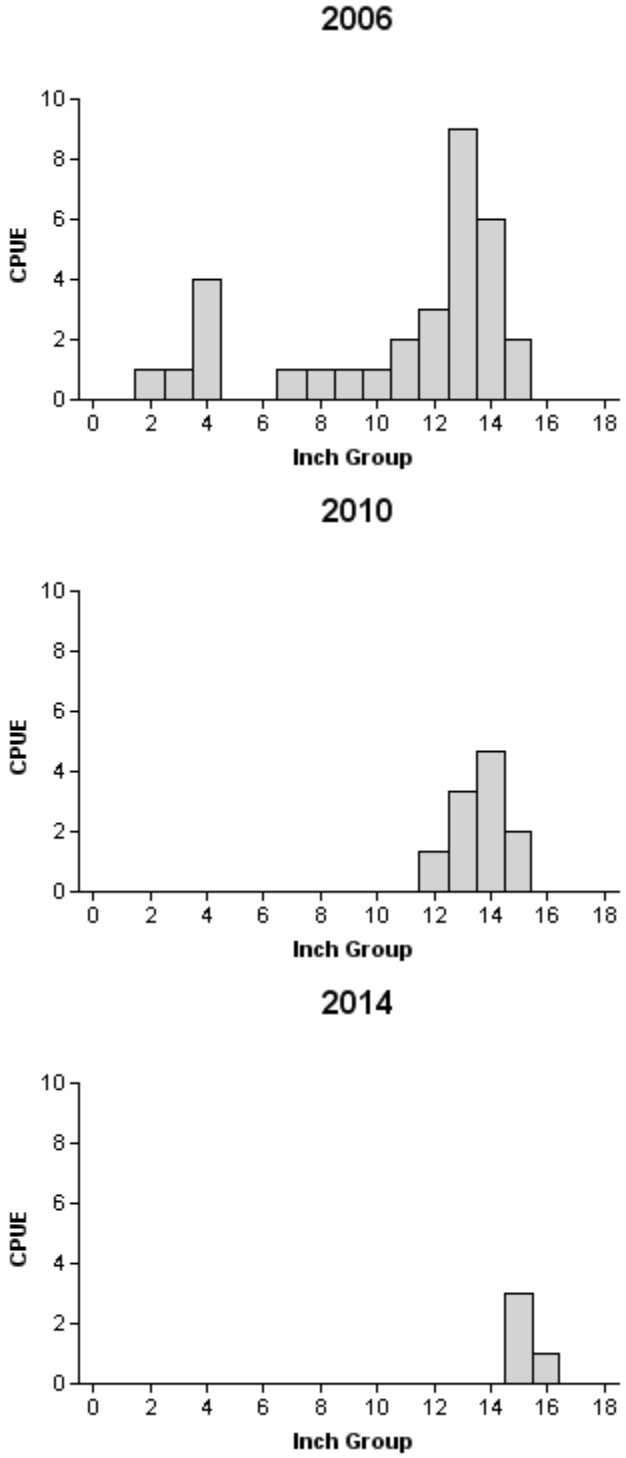
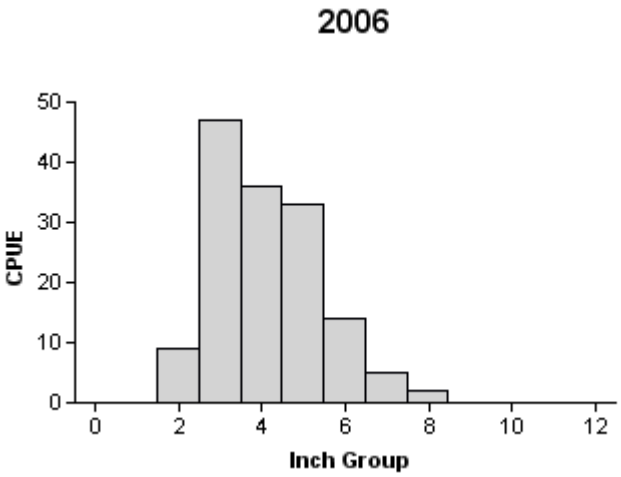
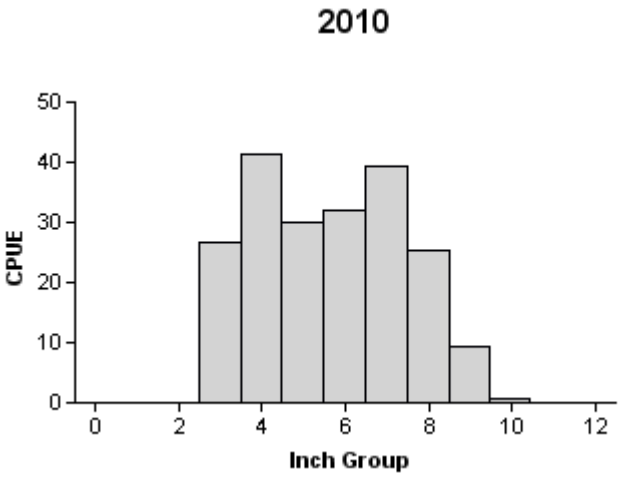


Figure 1. Number of Gizzard Shad caught per hour (CPUE) population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2006, 2010 and 2014.

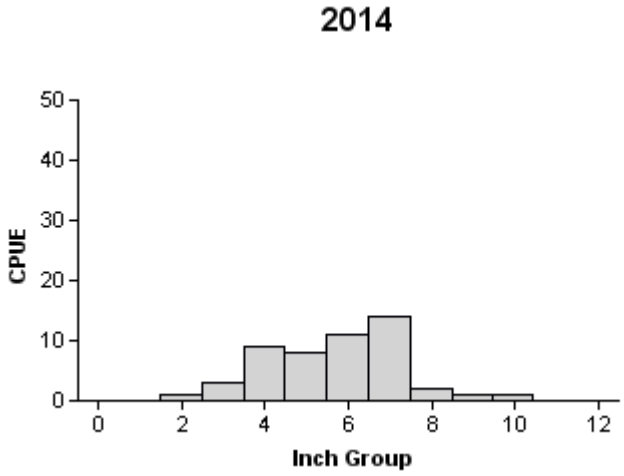
Redbreast Sunfish



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



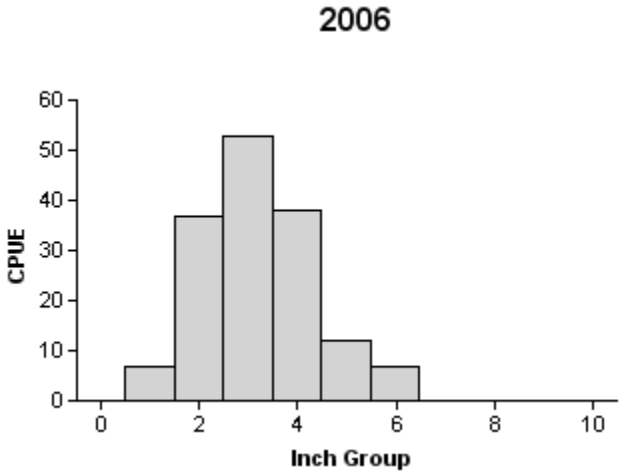
Effort = 1.5
Total CPUE = 204.7 (27; 307)
CPUE-7 = 74.7 (35; 112)
PSD = 52 (13.5)



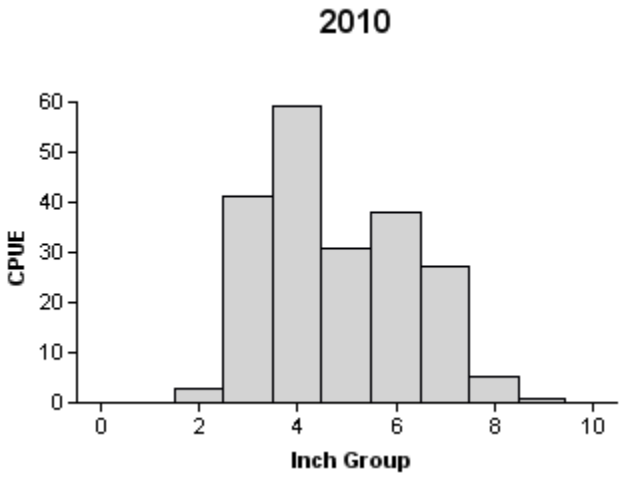
Effort = 1.0
Total CPUE = 50.0 (59; 50)
CPUE-7 = 18.0 (52; 18)
PSD = 59 (8)

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, 2006, 2010 and 2014.

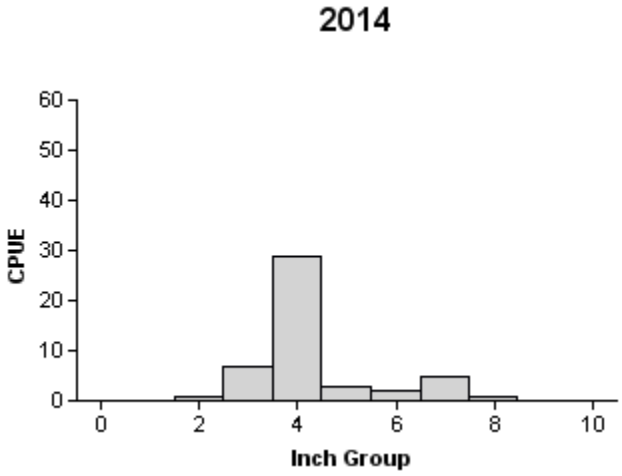
Bluegill



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



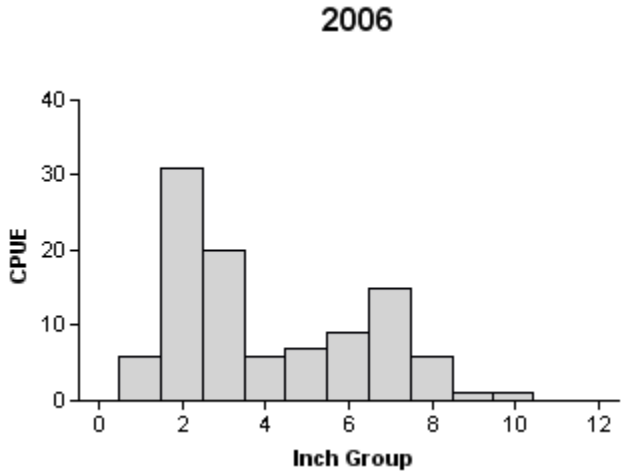
Effort = 1.5
Total CPUE = 205.3 (15; 308)
CPUE-7 = 33.3 (20; 50)
PSD = 35 (6.4)



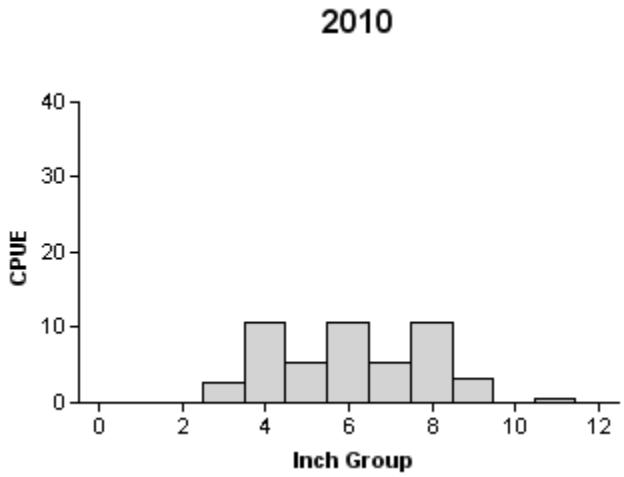
Effort = 1.0
Total CPUE = 48.0 (32; 48)
CPUE-7 = 6.0 (39; 6)
PSD = 17 (4.2)

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, 2006, 2010 and 2014.

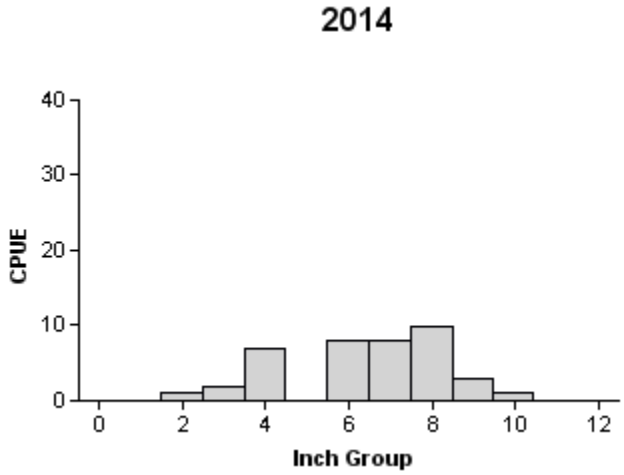
Redear Sunfish



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)



Effort = 1.0
Total CPUE = 40.0 (38; 40)
CPUE-7 = 22.0 (29; 22)
PSD = 59 (13.7)

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, 2006, 2010 and 2014.

Channel Catfish

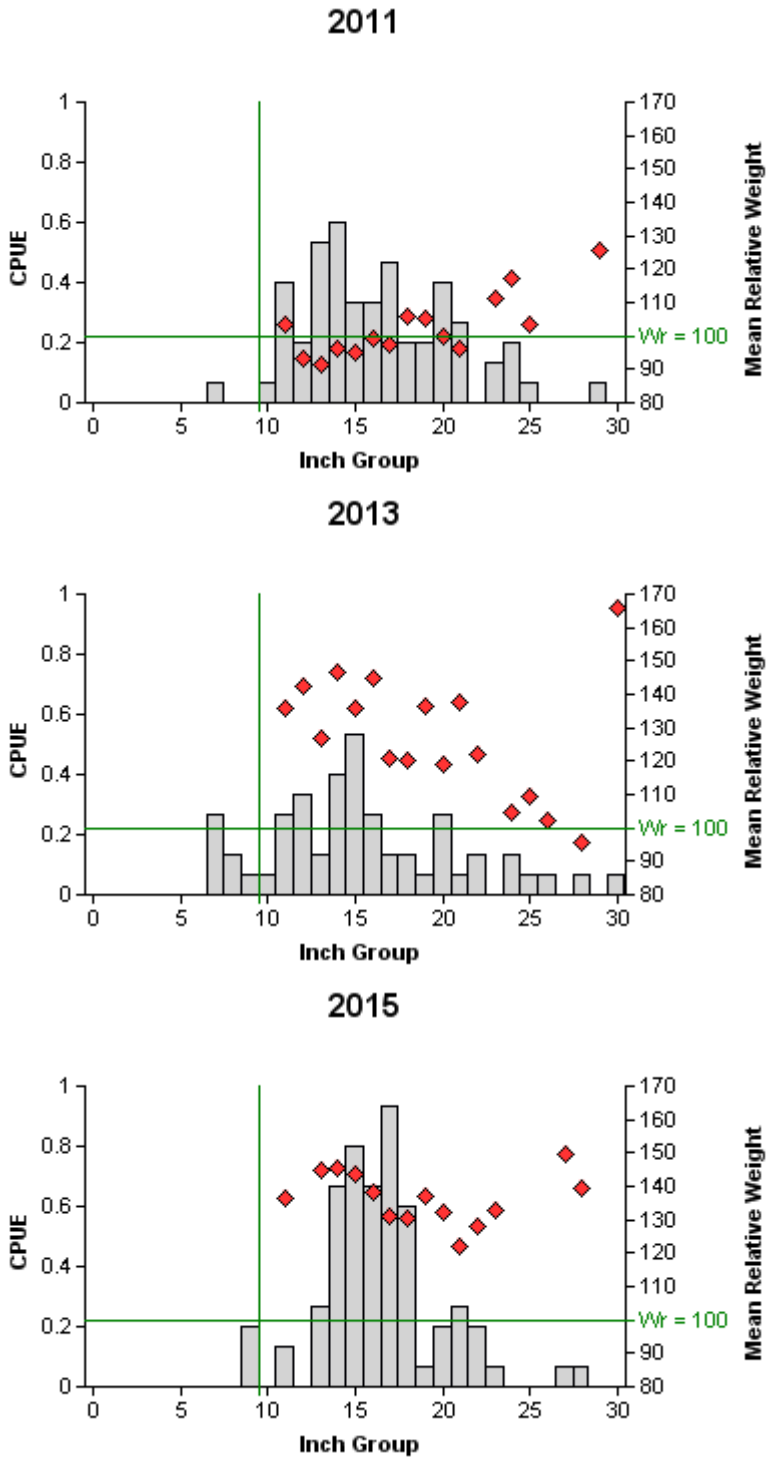


Figure 5. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2011, 2013 and 2015. Vertical line represents minimum length limit at the time of sampling.

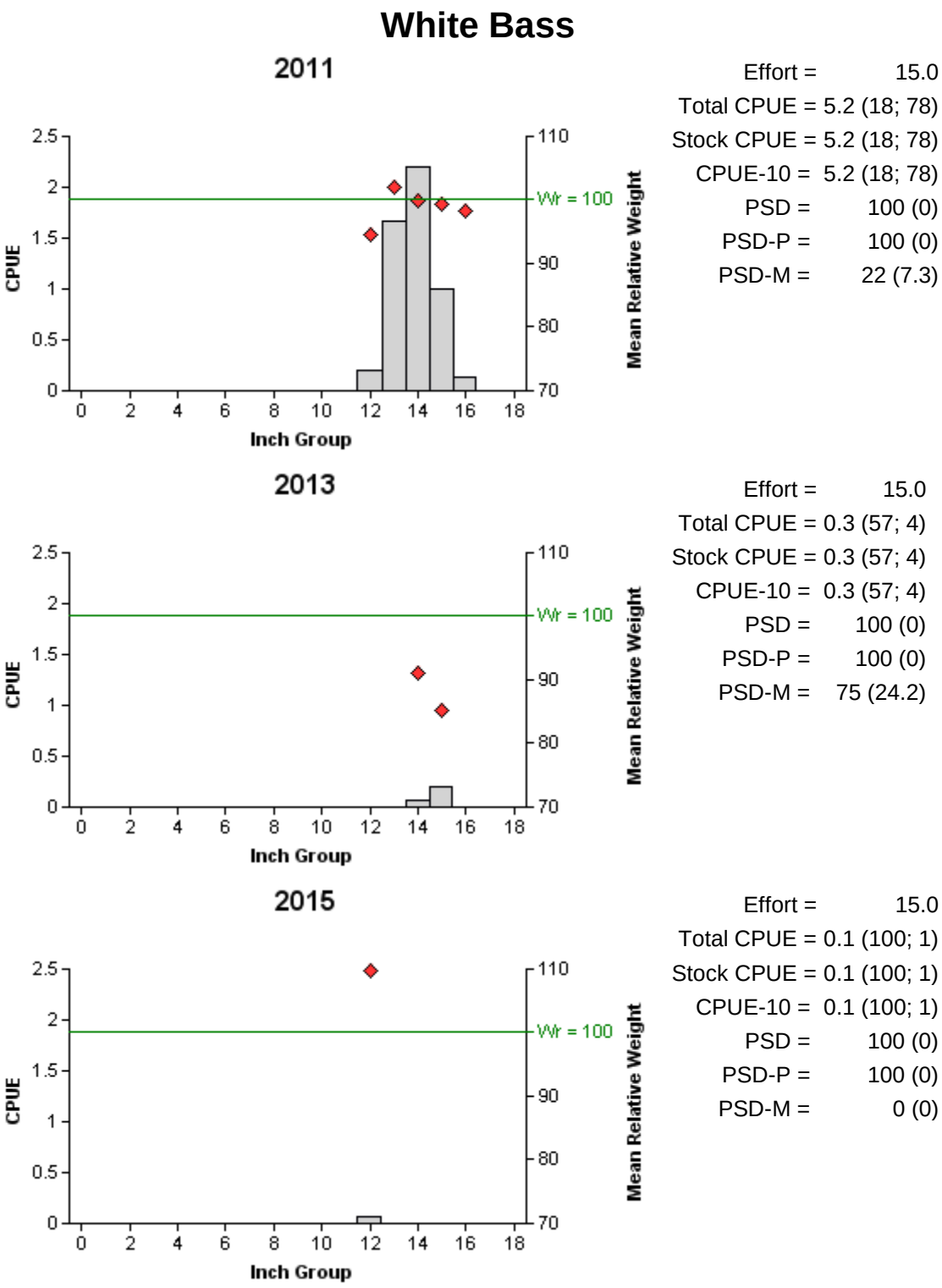


Figure 6. Number of White Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter Long Reservoir, Texas, 2011, 2013 and 2015. Vertical lines represent minimum length limit at the time of sampling.

Hybrid Striped Bass

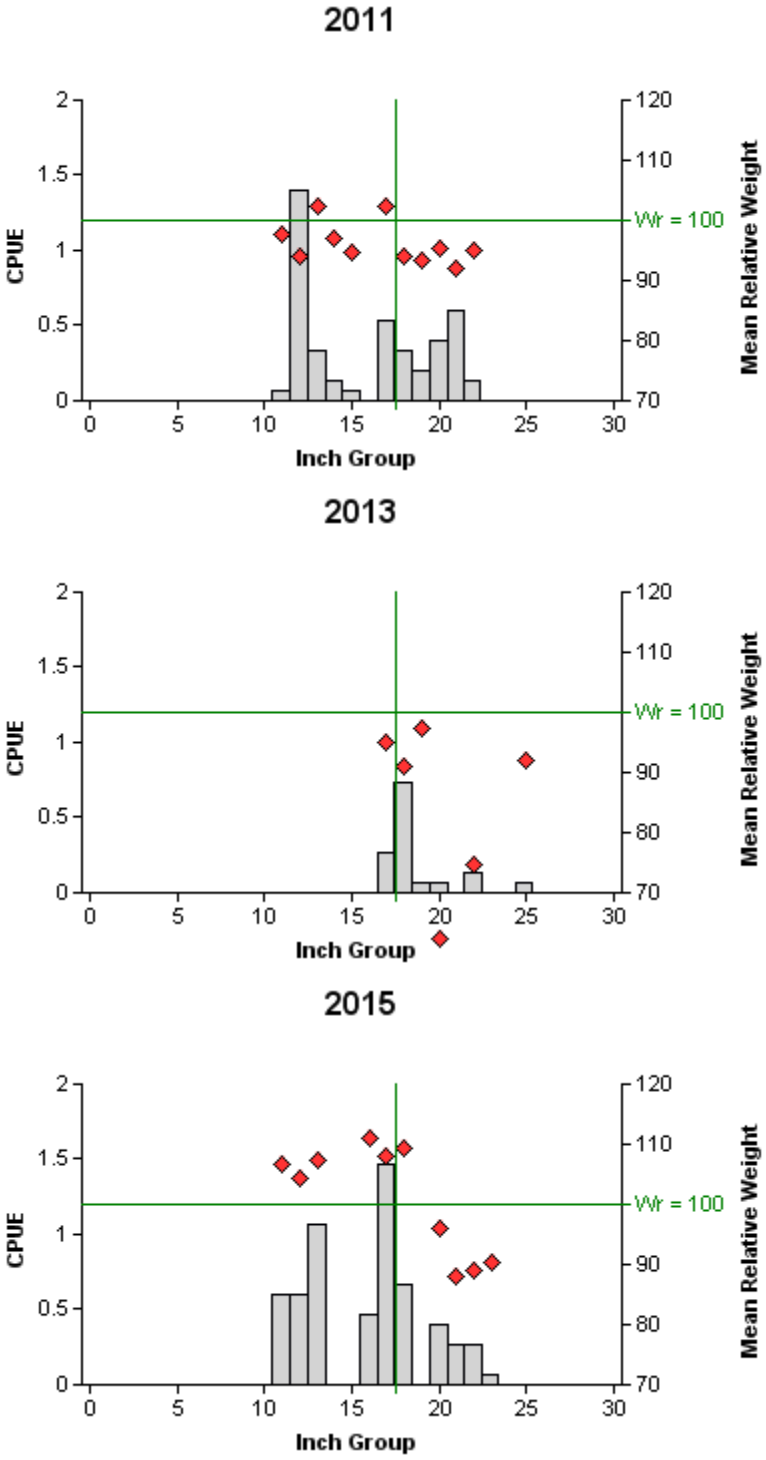


Figure 7. Number of Hybrid Striped Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2011, 2013 and 2015. Vertical line represent minimum length limit at the time of sampling.

Hybrid Striped Bass

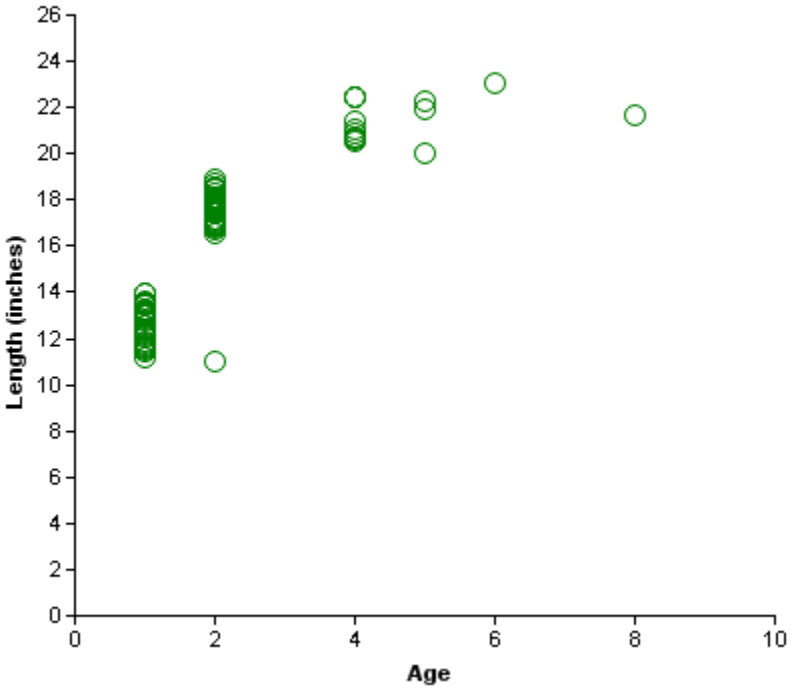
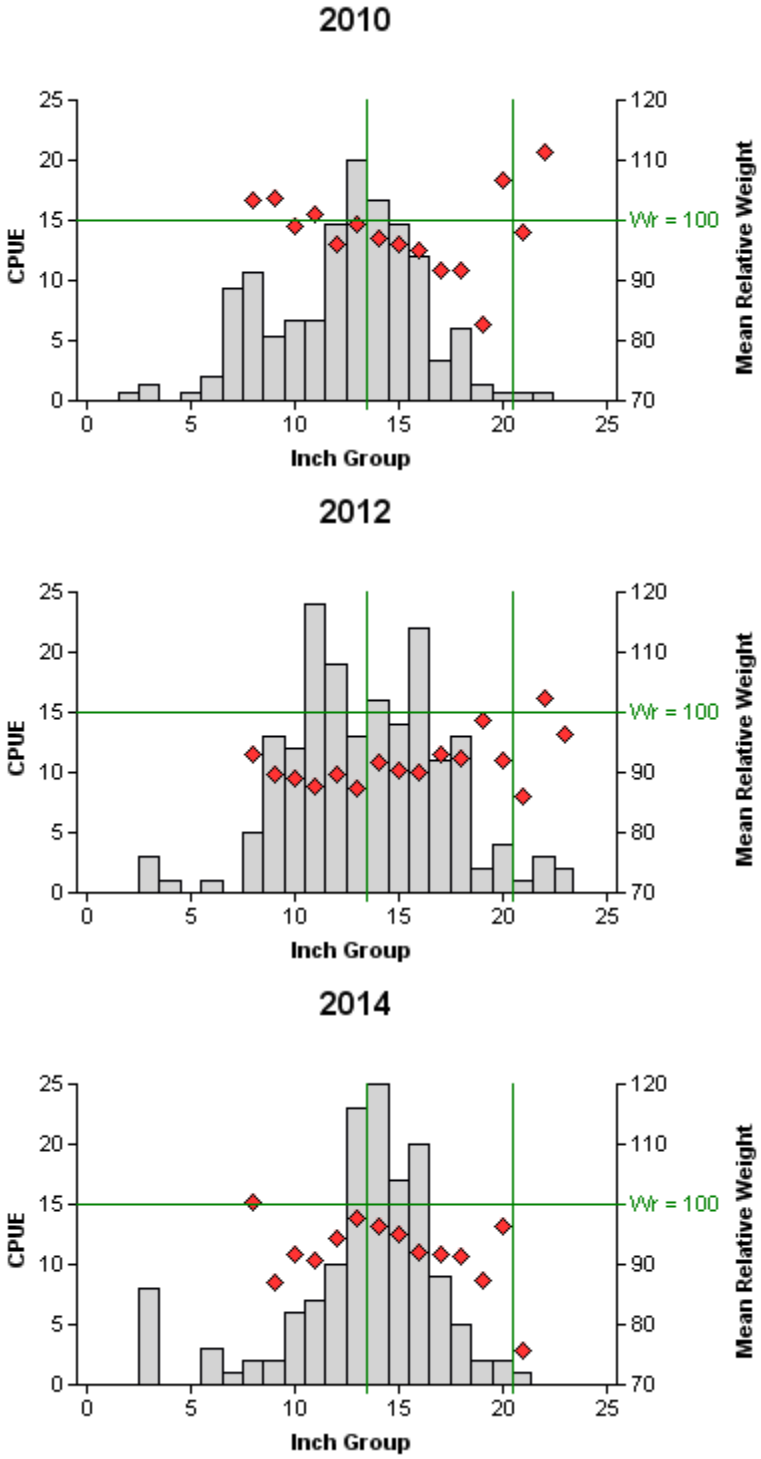


Figure 8. Length at age for Hybrid Striped Bass (n=88) collected from gill nets at Walter E. Long Reservoir, Texas, March 2015.

Largemouth Bass



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)
PSD-P =	33 (3.7)

Effort =	1.0
Total CPUE =	179.0 (9; 179)
Stock CPUE =	174.0 (9; 174)
CPUE-14 =	88.0 (12; 88)
CPUE-21 =	6.0 (39; 6)
PSD =	69 (4.4)
PSD-P =	41 (6)

Effort =	1.0
Total CPUE =	143.0 (17; 143)
Stock CPUE =	131.0 (17; 131)
CPUE-14 =	81.0 (16; 81)
CPUE-21 =	1.0 (100; 1)
PSD =	87 (3.1)
PSD-P =	43 (4.9)

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, 2010, 2012, and 2014. Vertical lines represent slot length limit at the time of sampling.

Largemouth Bass

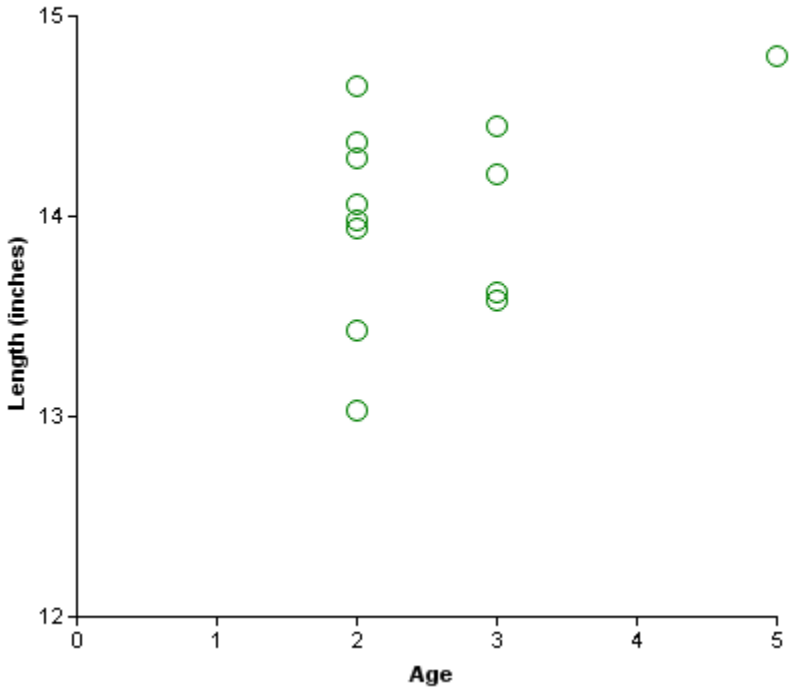


Figure 10. Length at age for Largemouth Bass (n=13) collected by electrofishing at Walter E. Long Reservoir, Texas, November 2014.

Table 6. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Walter E. Long Reservoir, Texas, 2002, 2006, and 2014. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

		Number of fish				
Year	Sample size	FLMB	Intergrade	NLMB	% FLMB alleles	% FLMB
2002	29	8	21	0	71.7	27.6
2006	30	5	25	0	84.0	17.0
2014	30	7	23	0	86.0	23.3

Table 7. Proposed sampling schedule for Walter E. Long Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall (except where noted). Standard survey denoted by S and additional survey denoted by A.

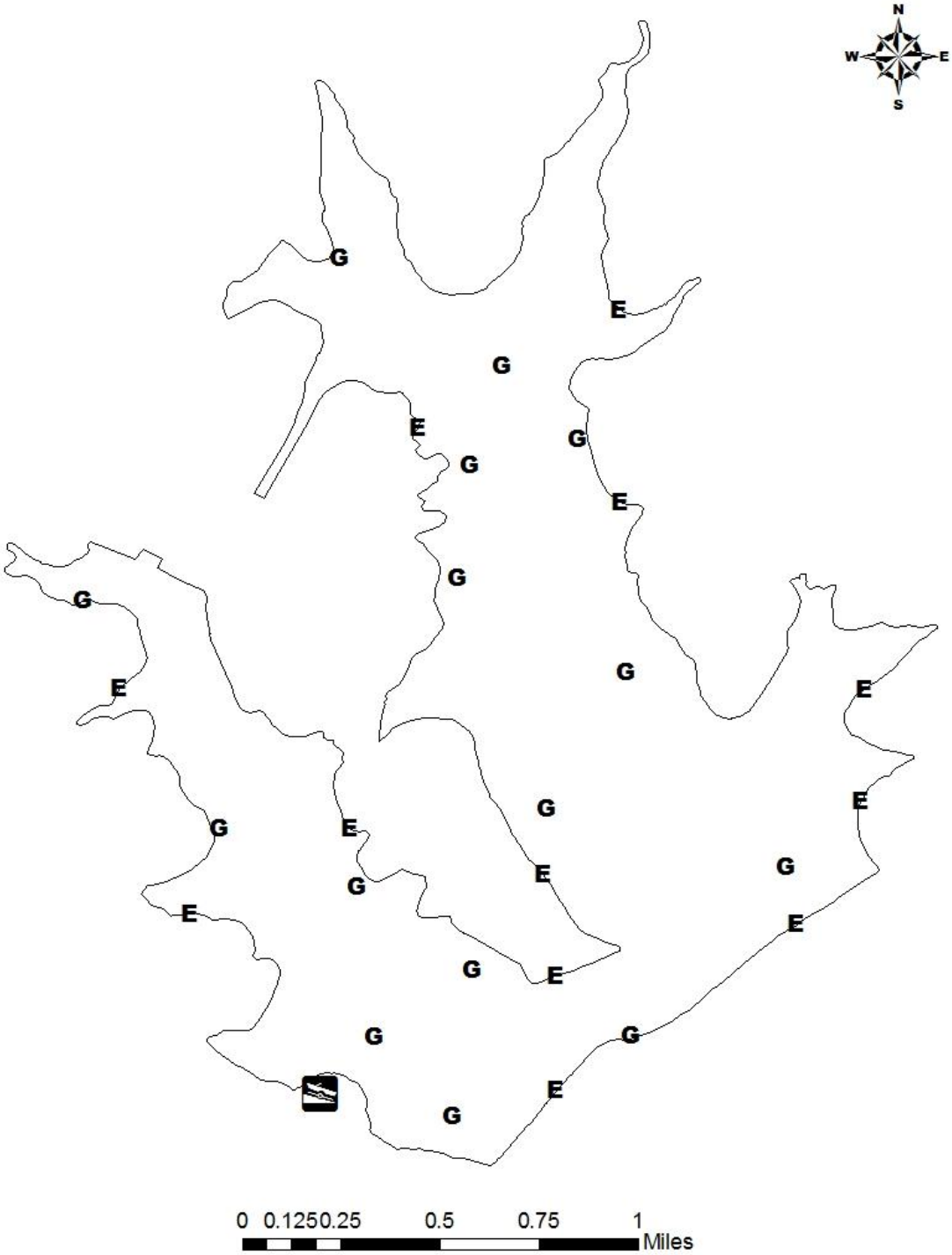
Survey year	Electrofish Fall(Spring)	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2015-2016					A			
2016-2017	A		A		A			
2017-2018					A			
2018-2019	S		S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Walter E. Long Reservoir, Texas, 2014-2015. Sampling effort was 15 net nights for gill netting and 1 hour for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			4	4.0
Threadfin Shad			53	53.0
Inland Silverside			40	40.0
Channel Catfish	78	5.2		
Flathead Catfish	5	0.3		
White Bass	1	0.1		
Hybrid Striped Bass	88	5.9		
Redbreast Sunfish			50	50.0
Bluegill			48	48.0
Redear Sunfish			40	40.0
Redspotted Sunfish			12	12.0
Largemouth Bass			143	143.0
Hybrid Sunfish			2	2.0

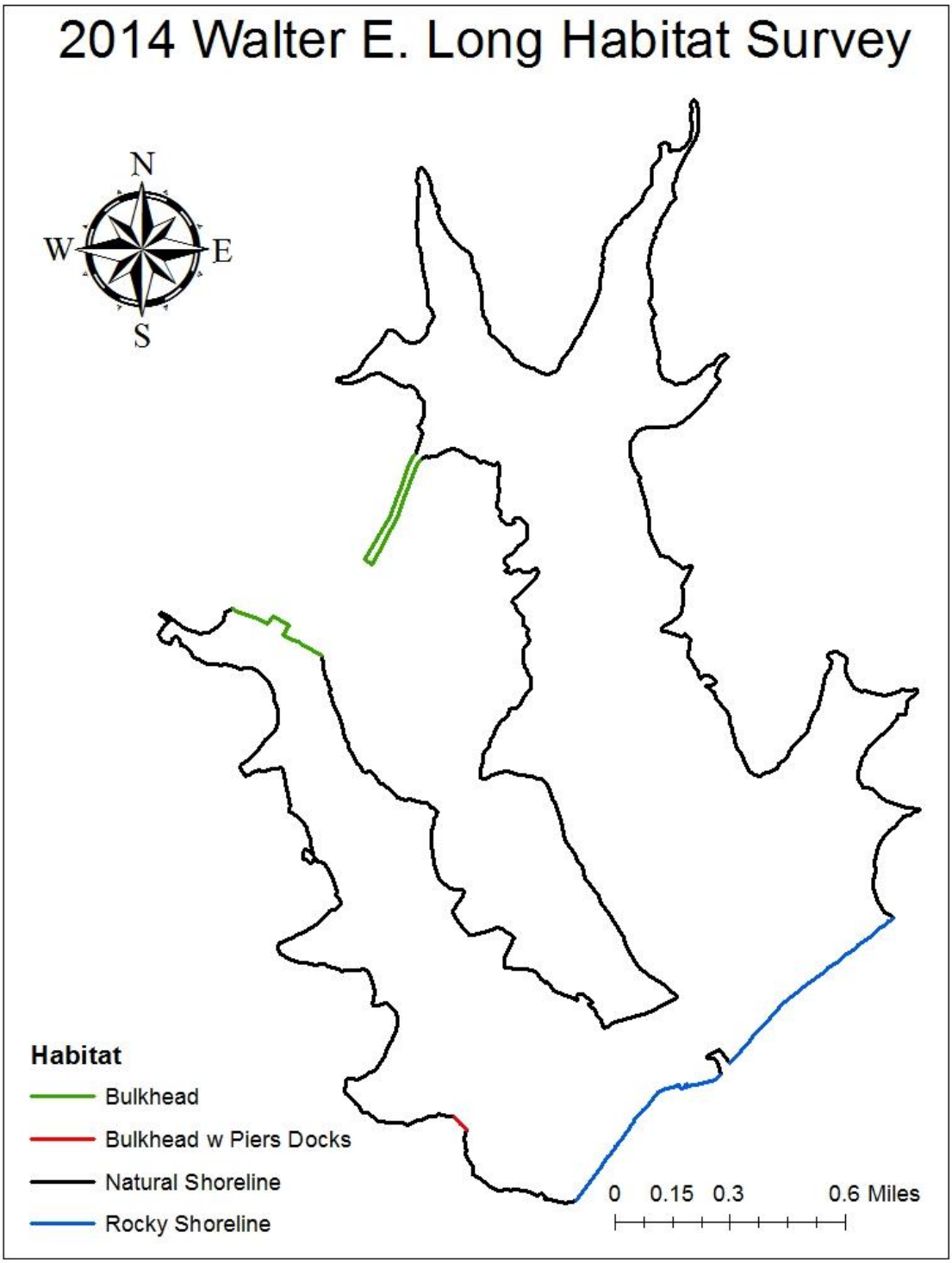
APPENDIX B



Location of sampling sites, Walter E. Long Reservoir, Texas, 2014-2015. Gill net and electrofishing stations are indicated by G and E respectively. The public boat ramp is indicated by the symbol. This is a stable-level reservoir (555 ft. above msl).

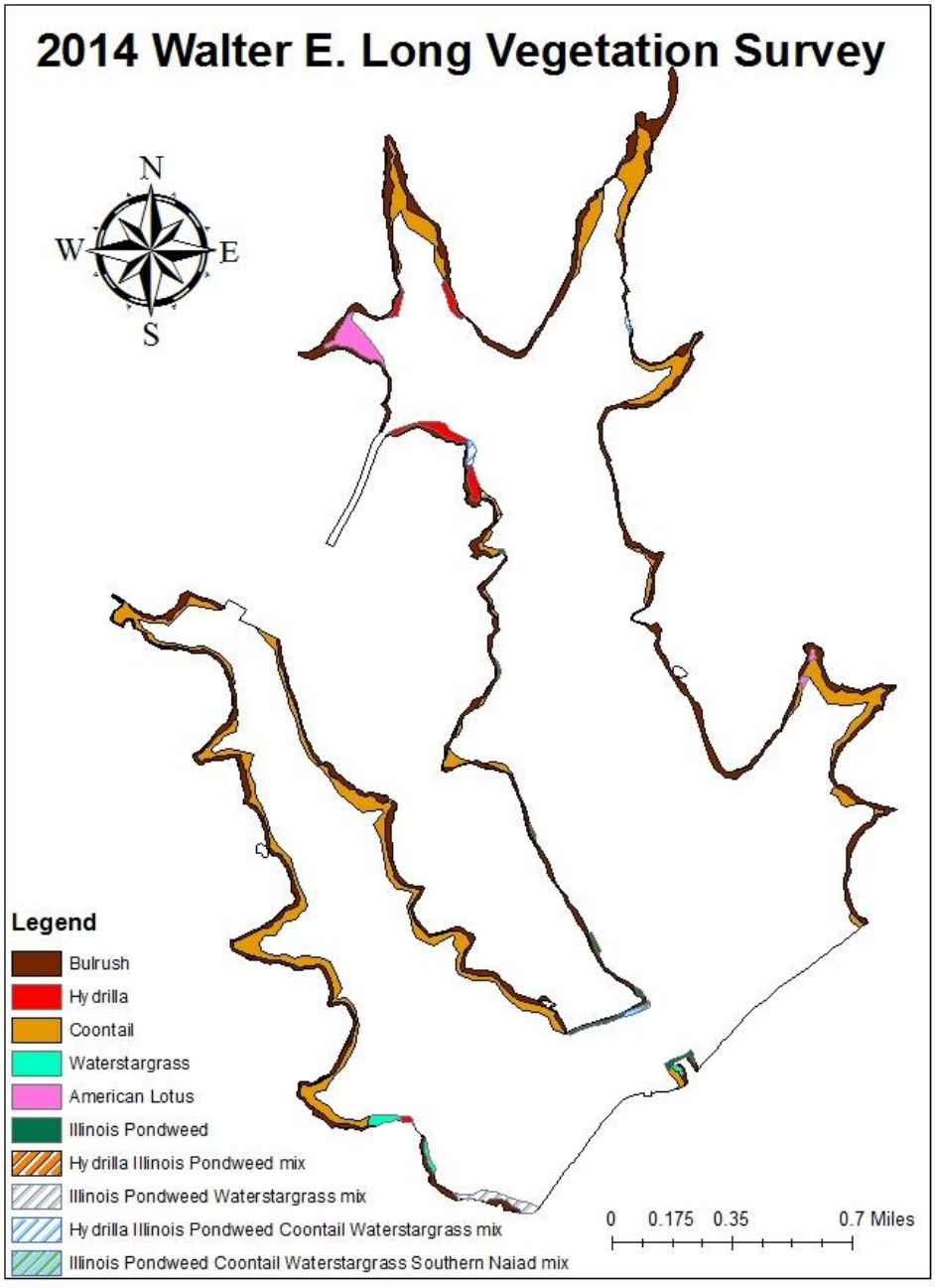
APPENDIX C

Structural habitat survey map for Walter E. Long Reservoir, Texas, September 2014.



APPENDIX D

Aquatic vegetation survey coverage map for Walter E. Long Reservoir, Texas, September 2014.



APPENDIX E

Location of proposed new golf course at Walter E. Long Reservoir.