

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-2

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2011 Survey Report

Whitney Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish Populations in Whitney Reservoir were surveyed in 2011 using an electrofisher and in 2012 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Whitney Reservoir is a 23,200-acre impoundment of the Brazos River, in Bosque and Hill Counties. Water levels were 15 feet below conservation pool (533) during 2011 electrofisher surveys and full pool during 2012 gill net surveys. Fish habitat at the time of sampling was dominated by natural, rock, and bluff shorelines. Boat access (14 ramps) on the reservoir is excellent, but there are currently no handicap-specific facilities.
- **Management history:** Important sport fish include striped bass, white bass, largemouth bass, white crappie, and catfish. All have been affected by nearly annual, toxic golden alga blooms since 2001. Efforts to mitigate these losses have included collection of biannual fisheries data, annual striped bass stockings, and smallmouth bass stocking requests. The management plan from the 2007 survey report included continuing all associated golden alga work, performing a tier IV age and growth sample on largemouth bass, requesting smallmouth bass stockings annually, and conducting vegetation/habitat surveys during summer 2011.
- **Fish Community**
 - **Prey species:** Threadfin and gizzard shad were collected near historical average rates. Other forage species included bluegill, redear sunfish, longear sunfish, warmouth, and green sunfish.
 - **Catfishes:** Blue catfish were collected at high rates whereas channel catfish were collected below historical averages. Body condition was average.
 - **Temperate basses:** White and striped bass were collected at rates similar to their historical averages. Body condition was fair for white bass and good for striped bass.
 - **Black basses:** Largemouth bass catch rates were above the historical average. Although the size structure indicated a balanced population, few legal-sized fish were observed in the sample. Condition was generally good.
 - **Crappies:** Crappie were not surveyed with trap nets in 2011.
- **Management Strategies:** Continue managing Whitney Reservoir with statewide regulations, and continue annual stocking requests for smallmouth bass and striped bass. Conduct standard electrofisher and gill net sampling in fall 2015 and spring 2016 respectively, and supplemental gill net sampling in spring 2014.

INTRODUCTION

This document is a summary of fisheries data collected from Whitney Reservoir in 2011-2012. 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 with the 2011-2012 data for comparison.

Reservoir Description

Whitney Reservoir is an impoundment of the Brazos River, in Bosque and Hill Counties. The reservoir is used for flood control, electrical power production, and recreation. The 23,200-acre impoundment has a drainage area of 17,656 square miles, a storage capacity of 554,203 acre-feet, and a shoreline length of 225.0 miles. Mean and maximum depths are 27 and 108 feet respectively. Water levels were 15 feet below conservation pool (533) during 2011 electrofisher surveys and at full pool during 2012 gill net surveys (Figure 1). Fish habitat at the time of sampling was dominated by natural, rock, and bluff shorelines. Bank fishing is good and boat access (14 ramps) on the reservoir is excellent, but there are currently no handicap-specific facilities. Further information about Whitney Reservoir and its facilities can be obtained by visiting the Texas Parks and Wildlife Department's web site at www.tpwd.state.tx.us and navigating within the fishing link.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Baird and Tibbs 2007) included:

1. Continuing working with others to develop management strategies to combat golden alga.
Action: District 2B has sampled Whitney every two years since 2001 with electrofisher and gill nets, and fishery monitoring information has been shared with numerous groups working with golden alga. Additionally, district 2B has aided in collecting and transporting water quality samples, estimating fish kill numbers, updating and monitoring fishing reports on the TPWD website and presenting golden alga information to appropriate user groups.
2. Continuing standard monitoring surveys and additional monitoring surveys if needed (i.e., if a major fish kill occurs and warrants supplemental monitoring).
Action: Standard surveys were conducted in 2003, 2004, 2007, 2008, 2011, and 2012. Additional surveys were performed in 2005, 2006, 2009, and 2010.
3. Considering a tier IV age and growth sample for largemouth bass if sufficient numbers exist in the reservoir in 2011 to document the affects of golden alga on survival of largemouth bass.
Action: A tier IV age and growth survey was not conducted in fall 2011 because of low water levels and low catch rates.
4. Requesting stocking of affected sport fish species if necessary.
Action: Stocking requests are made annually for striped bass and smallmouth bass, which are two sport fish species often affected by golden alga. Other species affected by golden alga are requested as needed.
5. Continue requesting smallmouth bass for stockings.
Action: Smallmouth bass are requested annually, although not always stocked due to insufficient production. However, an estimated 208,366 smallmouth bass fingerlings were stocked in 2010 and 2011.
6. Conducting a vegetation/habitat survey in summer of 2011.
Action: Aquatic vegetation and physical habitat surveys were conducted in summer 2011 and winter 2012; those data are included in this report.

Harvest regulation history: Sportfishes in Whitney Reservoir are currently managed with statewide regulations. The current harvest regulations are listed in Table 2.

Stocking history: Whitney Reservoir received annual stockings of striped bass from 2000 through 2010, and smallmouth bass stockings in both 2010 and 2011. The complete stocking history is in Table 3.

Vegetation/habitat history: A full vegetation survey was conducted in summer 2011 and no vegetation was found. No noxious species of vegetation have been identified in the reservoir to date.

Zebra mussel samplers: Zebra mussel samplers were deployed in Whitney Reservoir during winter 2010. Pipe samplers were placed at Lake Whitney Marina near mid-reservoir, and Harbormasters Marina on the lower end of the reservoir. Marina owners were instructed on sampler locations, and how to inspect samplers for zebra mussels. Samplers were last inspected and re-built during winter 2012. To date, no zebra mussels have been observed in Whitney Reservoir.

Water Transfer: Whitney Reservoir was constructed for flood control, water supply, and hydropower production. There are currently no major raw water intake stations on the reservoir. However, the Brazos River Authority has water rights and a contract with the Corps of Engineers to use approximately 50,000 acre-feet of water per year from the reservoir. Currently, this water is released through the dam to meet water supply needs downstream. There is also a proposal to install a raw water intake station on Whitney Reservoir to be used by the city of Cleburne for municipal purposes. If constructed, the City of Cleburne could withdraw up to 10,000 acre-feet of water per year from the lake. This volume of water is relatively small in comparison to the size of Whitney Reservoir and represents only about six inches of depth when the lake is full.

Reservoir capacity: Whitney Reservoir was impounded in 1951. A US Army Corps of Engineers resurvey conducted in 1959 calculated the reservoir's capacity at conservation pool (533 feet above mean sea level) to be 627,100 acre-feet with a surface area of 23,560 acres. A volumetric survey was conducted by the Texas Water Development Board (TWDB) on Whitney in 2005. This survey found a volume of 554,203 acre-feet and a surface area of 23,200 acres at conservation pool elevation. The difference in the surveys indicates an 11.6% decrease in volume and 1.4% decrease in surface area. Additional information can be found at the following web link:
http://www.twdb.state.tx.us/hydro_survey/Whitney2005/Whitney2005FinalReport.pdf

METHODS

Fishes were collected by electrofisher (2 hours at 24 5-min stations), and gill nets (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). Trap netting was not conducted. All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD)], as defined by Guy et al. (2007), and condition indices [relative weights (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. No age and growth was conducted in 2011-2012. Source for water level data was the United States Geological Survey (USGS) website.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of natural, rock, and bluff shoreline. Aquatic vegetation and physical habitat surveys were conducted in summer 2011 and winter 2012 (Table 4).

Creel: No creels were performed on Whitney Reservoir in the last four years.

Prey species: Threadfin and gizzard shad were collected by electrofisher at 49.5/h and 101.0/h respectively in 2011, and these catch rates are near the historical averages for both species. The Index of vulnerability (IOV) for gizzard shad was good as 79% of the population was available to existing predators as forage. Other important forage species collected were bluegill (133.5/h), redear sunfish (12.5/h), longear sunfish (16.0/h), green sunfish (0.5/h), and warmouth (0.5/h). Panfish often reach preferred size classes in Whitney (Figures 2 and 3; Appendices A and B).

Catfishes: Blue catfish were collected with gill nets at 3.1/nn in 2012; this catch rate equates to 47 collected individuals, and is the highest catch rate on record. Proportional size distribution values have varied over the past three surveys indicating unstable recruitment, growth, or mortality. Most blue catfish observed were between 12 and 17 inches, and few approached the preferred size category of 30 inches. Body condition was good (Figure 4; Appendices A and B).

Channel catfish were collected with gill nets at 2.2/nn in 2012; this catch rate equates to 33 collected individuals, and is well below the historical average. Proportional size distribution values varied in the past, but currently indicate a balanced population. None of the sampled channel catfish approached the preferred size category of 24 inches. Body condition was average for most size classes, and excellent for the upper size classes (Figure 5; Appendices A and B).

The flathead catfish population is low density with only two individuals collected (Appendix A and B).

Temperate basses: White bass were collected with gill nets at 3.4/nn in 2012; this catch rate equated to 51 collected individuals, and was similar to the historical average for the species. The PSD for white bass has been consistently high over the past three surveys. Body condition was fair (Figure 6; Appendices A and B).

Striped bass were collected with gill nets at 1.5/nn in 2012; this catch rate equated to 22 collected individuals, and was below the historical average for the species. The drop in catch rate from 2010 to 2012 can be attributed to severe golden alga fish kills in both 2010 and 2012 (2010 gill net sampling was conducted before the 2010 kill while 2012 gill net sampling was conducted after the 2012 kill). Despite the varying catch rates, PSD values for the past two surveys have remained good indicating a balanced population. Body condition was good across all size classes (Figure 7; Appendices A and B).

Black basses: Largemouth bass were collected by electrofisher at 75.0/h in 2011; this catch rate equates to 150 collected individuals, and was higher than the historical average. Proportional size distribution was fair (32), reflecting a drop in catch rate of bass in the quality size category and larger. The proportion of individuals 14-inches and larger was 12, indicating some harvestable bass for anglers including a few individuals at or near 20 inches. Body condition was good to excellent. Florida largemouth bass influence has remained relatively constant as Florida alleles were estimated at 58% in 2007 (Figure 8; Table 5; Appendices A and B).

Smallmouth bass still exist in the reservoir at low density, and only two individuals were collected during fall 2011. Golden alga has definitely affected the population, however monitoring data show smallmouth bass numbers began to decline prior to the discovery of golden alga in the reservoir. Additionally, hatchery brood stocks were devastated by golden alga in 2001 and production numbers are currently much lower than they were historically. Smallmouth bass require supplemental stockings in Whitney due

to low natural recruitment, so they continue to be requested on an annual basis. Future electrofisher surveys will determine if smallmouth bass have been stocked in appropriate numbers to rebuild this important sport fishery (Appendices A and B).

Crappies: Trap nets became an optional gear in 2009, and were not used during this survey period.

Fisheries management plan for Whitney Reservoir, Texas

Prepared – July 2012.

ISSUE 1: Golden alga fish kills have occurred nearly annually since 2001, yet monitoring data show steady or improving catch rates for most forage species and many sport fishes including largemouth bass.

MANAGEMENT STRATEGY

1. Discontinue the supplemental electrofishing surveys.
2. Continue requesting annual stockings of striped bass at 15/acre.

ISSUE 2: The once prized smallmouth bass fishery in Whitney Reservoir is struggling.

MANAGEMENT STRATEGY

1. Continue requesting smallmouth bass for stocking.
2. Continue brood fish procurement from Belton Reservoir to help rebuild the smallmouth bass hatchery program

ISSUE 3: 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 when they become available.
2. Educate the public about invasive species through the use of media and the internet when appropriate.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.
5. Continue maintaining and monitoring zebra mussel samplers.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes standard electrofisher and gill net sampling in fall 2015 and spring 2016 respectively, and supplemental gill net sampling in spring 2014.

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- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional Size Distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7):348.

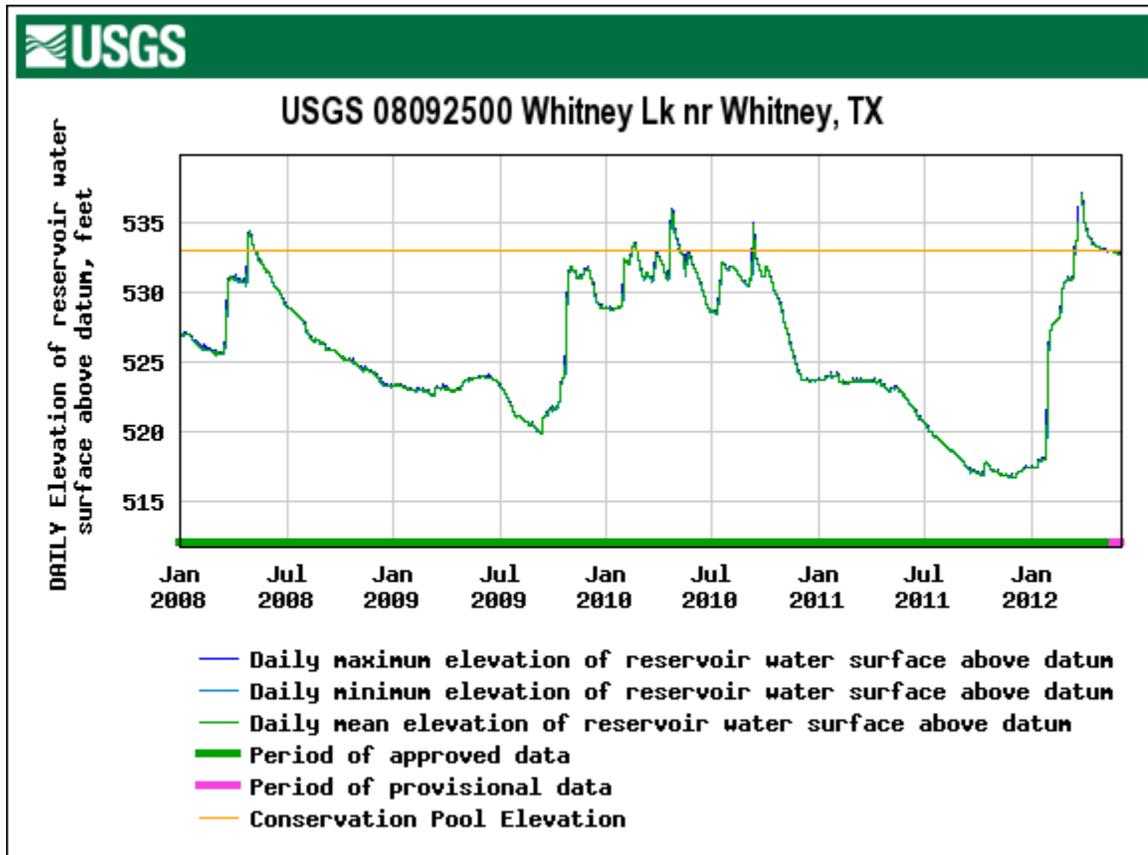


Figure 1. Daily mean water levels for Whitney Reservoir from January 1, 2008 through June 1, 2012. Conservation pool level is 533 feet above mean sea level. Figure from USGS website.

Table 1. Characteristics of Whitney Reservoir, Texas.

Characteristic	Description
Year Constructed	1951
Controlling authority	U.S. Army Corps of Engineers
Counties	Bosque and Hill
Reservoir type	Mainstem
Shoreline Development Index (SDI)	10.5
Conductivity	1,800 umhos/cm

Table 2. Harvest regulations for Whitney Reservoir.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish, Blue	25 (in any combination)	12 - No Limit
Catfish, Channel	25 (in any combination)	12 - No Limit
Catfish, Flathead	5	18 - No Limit
Bass, White	25	10 - No Limit
Bass, striped	5	18 - No Limit
Bass: largemouth, smallmouth, and spotted ¹	5	14 - No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

¹ There is no minimum length limit on spotted bass.

Table 3. Stocking history of Whitney 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)
Blue catfish	1966	8,000	UNK	UNK
	Total	8,000		
Bluegill	2005	13,747	AFGL	2.1
	Total	13,747		
Channel catfish	1970	61,000	AFGL	7.9
	Total	61,000		
Florida Largemouth bass	1985	204,099	FGL	2.0
	1986	151,900	FRY	1.0
	2003	760,159	FGL	1.5
	2004	589,978	FGL	1.7
	Total	1,706,136		
Largemouth bass	1966	280,000	UNK	UNK
	1968	250,000	UNK	UNK
	1969	350,000	FRY	0.7
	1971	220,000	UNK	UNK
	Total	1,100,000		
Smallmouth bass	1983	65,400	UNK	UNK
	1984	235,505	FGL	2.0
	1985	162,976	FGL	2.0
	1985	39,167	FRY	1.0
	1986	24,435	FGL	2.0
	1986	124,700	FRY	1.0
	1992	29,253	FGL	1.3
	1994	262,402	FGL	1.2
	1995	40,670	FGL	1.3
	1996	333,282	FGL	1.3
	1997	714,665	FGL	1.2
	1998	353,100	FGL	1.2
	1999	351,302	FGL	1.3
	2000	589,849	FGL	1.4
	2004	5,609	FGL	1.9
2010	73,644	FGL	1.6	
2011	134,722	FGL	1.5	
Total	3,540,681			
Striped bass	1973	267,711	FGL	1.7

Species	Year	Number	Life Stage	Mean TL (in)
	1974	229,291	FGL	1.7
	1975	17,090	UNK	UNK
	1976	232,123	UNK	UNK
	1984	351,581	FGL	2.0
	1985	172,115	FRY	1.0
	1986	354,130	FGL	1.7
	1987	121,525	FGL	2.0
	1987	237,232	FRY	1.0
	1988	235,900	FRY	1.0
	1989	235,923	FGL	1.2
	1990	240,219	FGL	1.4
	1991	331,827	FGL	1.3
	1992	123,161	FGL	1.2
	1994	448,490	FGL	1.2
	1995	237,566	FGL	1.2
	1996	113,057	FGL	1.3
	1997	235,226	FGL	1.2
	1998	145,768	FGL	1.3
	1999	236,400	FGL	1.5
	2000	476,600	FGL	1.5
	2001	1,400,000	FRY	0.8
	2002	353,587	FGL	1.6
	2003	223,892	FGL	1.7
	2004	84,184	FGL	1.5
	2005	332,999	FGL	1.7
	2006	322,532	FGL	1.9
	2007	495,015	FGL	1.6
	2008	332,262	FGL	1.8
	2009	543,846	FGL	1.8
	2010	148,055	FGL	1.7
	2010	415,763	FRY	0.2
	Total	9,695,070		

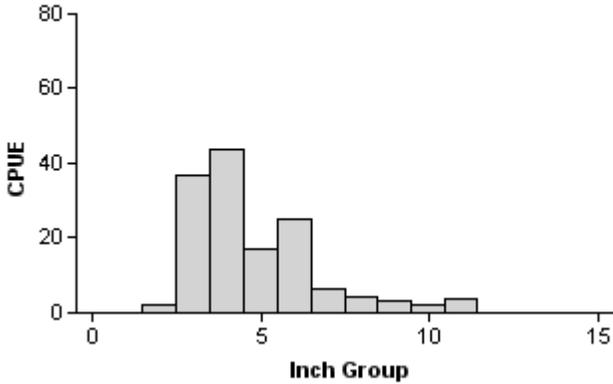
Table 4. Survey of littoral zone and physical habitat types, Whitney Reservoir, Texas, 2011-2012. Linear shoreline distance (miles) and percent of linear shoreline distance was recorded for each habitat type greater than one percent; otherwise noted as trace. Percent of total shoreline distance is blank for boat docks/piers because they were dually coded with adjacent habitat; counts are given instead. Survey was conducted using 2010 NAIP, 1-meter resolution satellite imagery.

Shoreline habitat type	Shoreline Distance	
	Miles	Percent of total
Natural shoreline	78.5	54.9
Rock shoreline	41.8	29.3
Rock bluff	21.2	14.9
Bulkhead	1.2	0.9
Boat docks/piers		N=183

Gizzard Shad

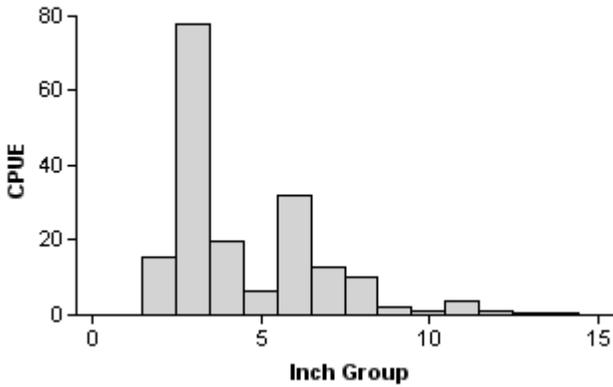
2007

Effort = 2.0
 Total CPUE = 144.0 (24; 288)
 Stock CPUE = 19.5 (43; 39)
 IOV = 91 (5.3)



2009

Effort = 2.0
 Total CPUE = 183.0 (25; 366)
 Stock CPUE = 31.5 (25; 63)
 IOV = 90 (3.9)



2011

Effort = 2.0
 Total CPUE = 101.0 (25; 202)
 Stock CPUE = 32.5 (33; 65)
 IOV = 79 (3.6)

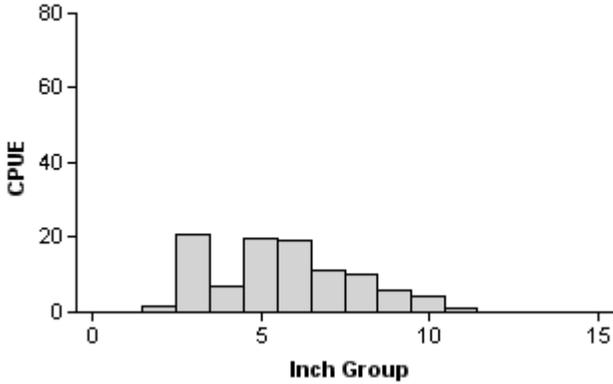
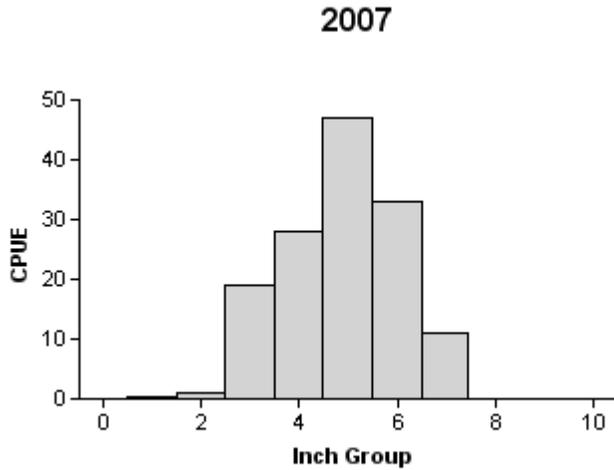
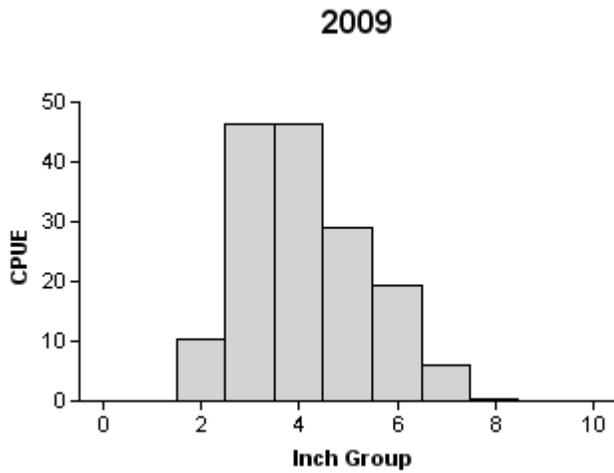


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Whitney Reservoir, Texas, 2007, 2009, and 2011.

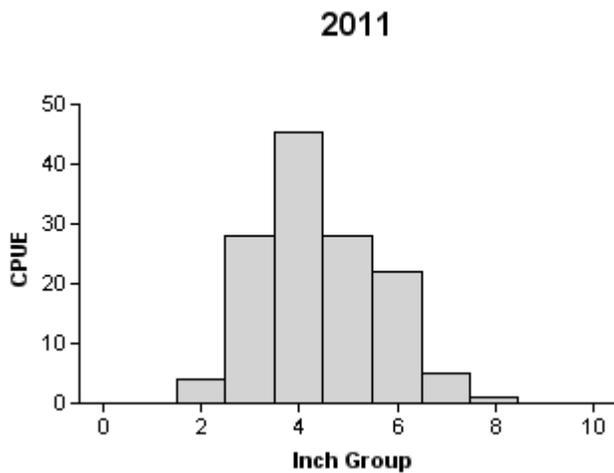
Bluegill



Effort = 2.0
 Total CPUE = 139.5 (26; 279)
 Stock CPUE = 138.0 (26; 276)
 PSD = 32 (7.3)



Effort = 2.0
 Total CPUE = 158.5 (25; 317)
 Stock CPUE = 148.0 (25; 296)
 PSD = 18 (4.8)

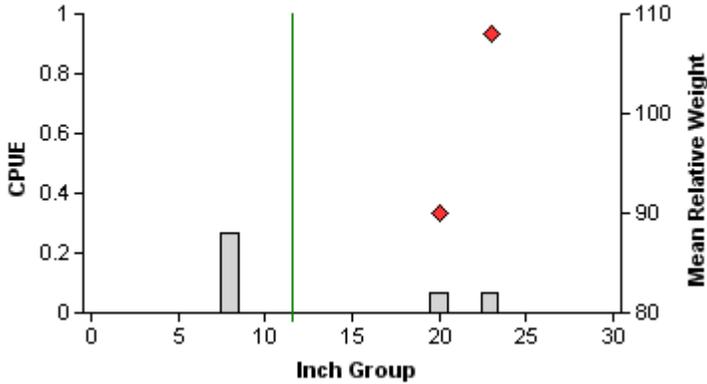


Effort = 2.0
 Total CPUE = 133.5 (22; 267)
 Stock CPUE = 129.5 (22; 259)
 PSD = 22 (3.3)

Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Whitney Reservoir, Texas, 2007, 2009, and 2011.

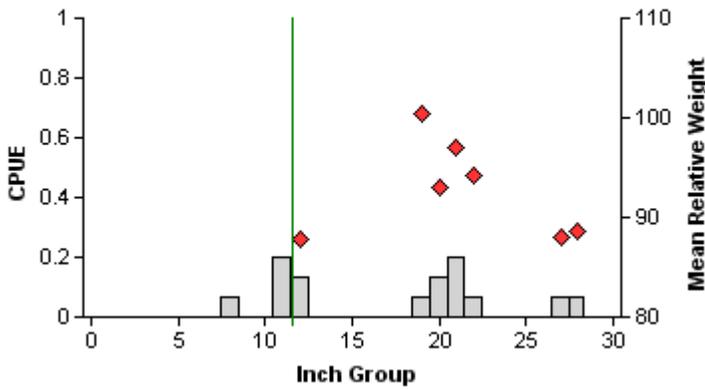
Blue Catfish

2008



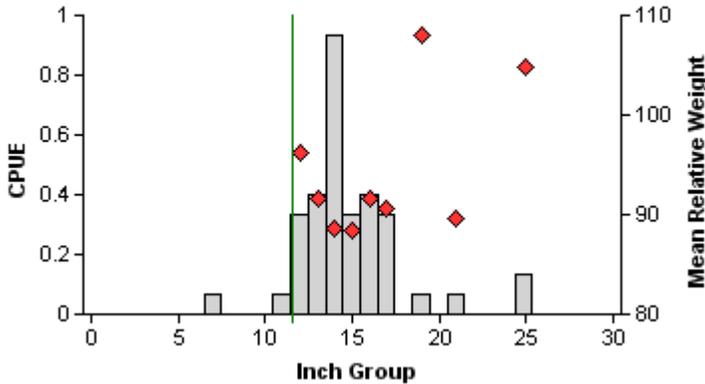
Effort = 15.0
 Total CPUE = 0.4 (53; 6)
 Stock CPUE = 0.1 (68; 2)
 PSD = 100 (0)
 PSD-12 = 100 (0)

2010



Effort = 15.0
 Total CPUE = 1.0 (40; 15)
 Stock CPUE = 0.7 (39; 11)
 PSD = 73 (15.4)
 PSD-12 = 100 (0)

2012

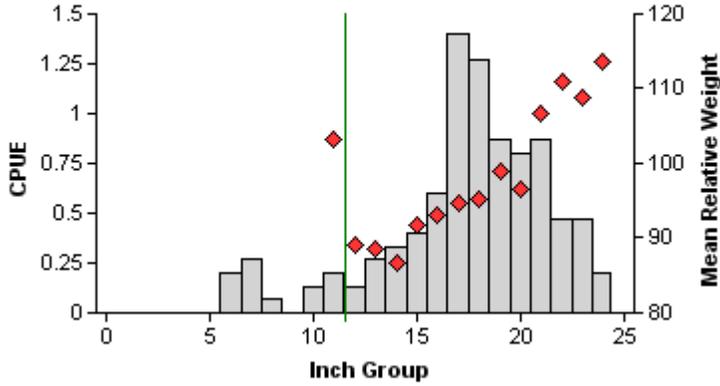


Effort = 15.0
 Total CPUE = 3.1 (27; 47)
 Stock CPUE = 3.0 (27; 45)
 PSD = 7 (3.7)
 PSD-12 = 100 (0)

Figure 4. Number of blue catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Whitney Reservoir, Texas, 2008, 2010, and 2012.

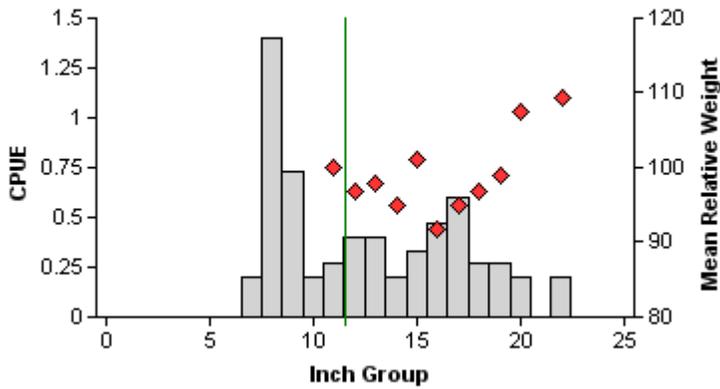
Channel Catfish

2008



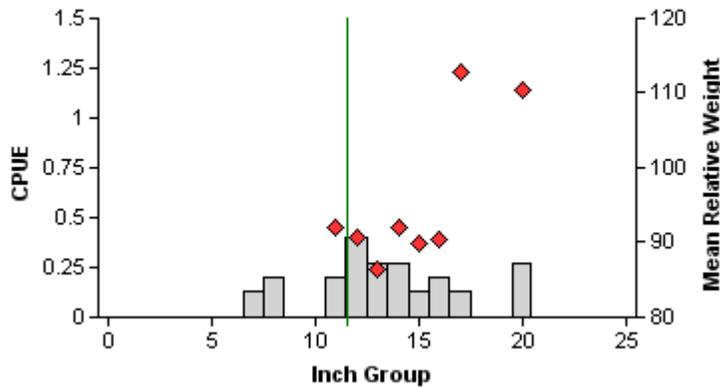
Effort = 15.0
 Total CPUE = 8.9 (20; 134)
 Stock CPUE = 8.3 (21; 124)
 PSD = 84 (4.8)
 PSD-12 = 98 (1.4)

2010



Effort = 15.0
 Total CPUE = 6.1 (18; 92)
 Stock CPUE = 3.6 (29; 54)
 PSD = 56 (11.3)
 PSD-12 = 93 (4.3)

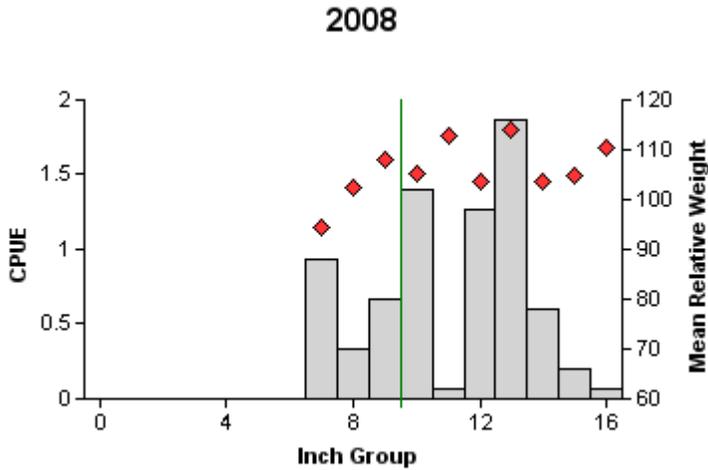
2012



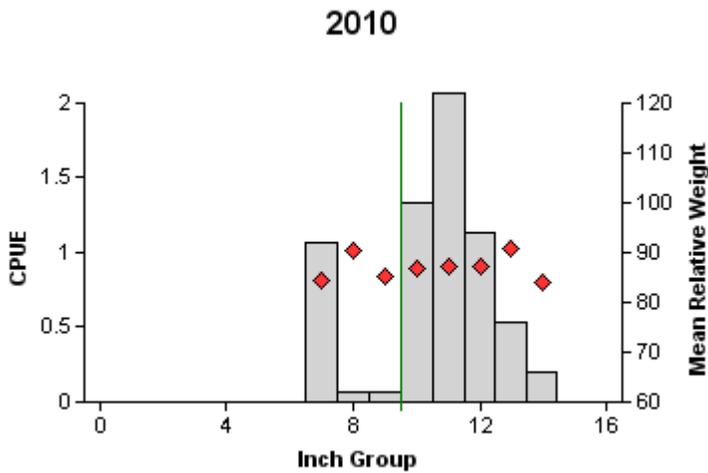
Effort = 15.0
 Total CPUE = 2.2 (33; 33)
 Stock CPUE = 1.9 (29; 28)
 PSD = 32 (12.5)
 PSD-12 = 89 (5.5)

Figure 5. Number of channel catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Whitney Reservoir, Texas, 2008, 2010, and 2012.

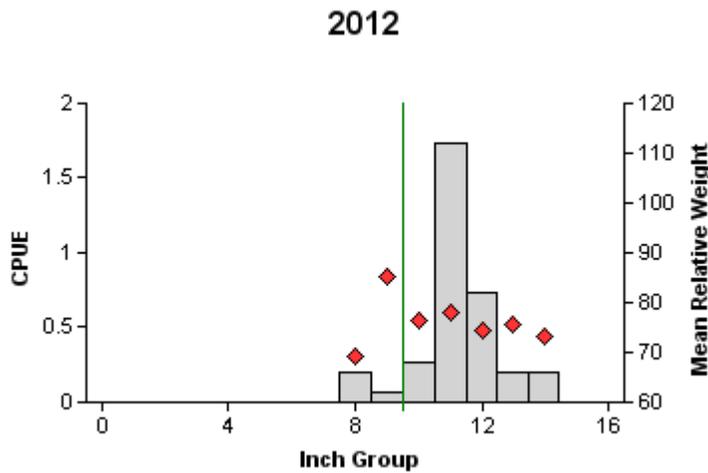
White Bass



Effort = 15.0
 Total CPUE = 7.4 (24; 111)
 Stock CPUE = 7.4 (24; 111)
 PSD = 83 (4.6)
 PSD-10 = 74 (5)



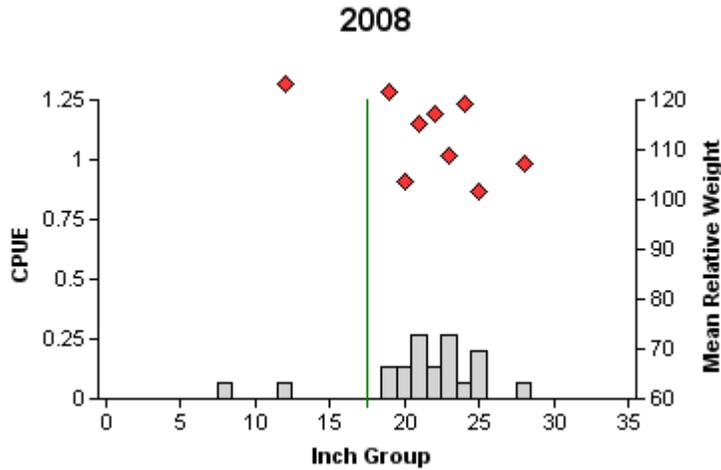
Effort = 15.0
 Total CPUE = 6.5 (46; 97)
 Stock CPUE = 6.5 (46; 97)
 PSD = 82 (5.8)
 PSD-10 = 81 (5.6)



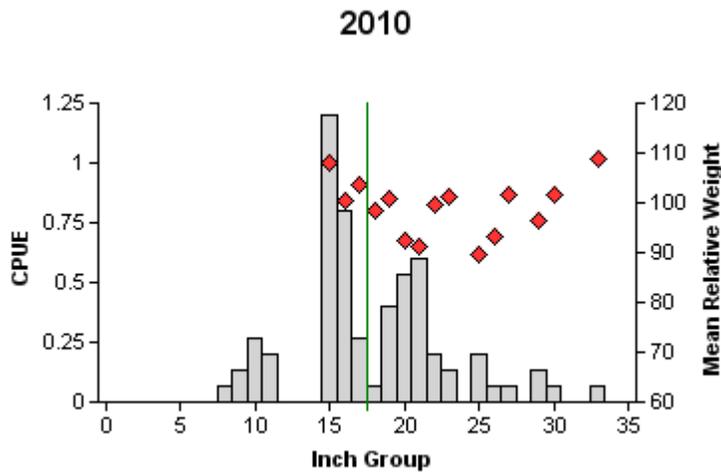
Effort = 15.0
 Total CPUE = 3.4 (22; 51)
 Stock CPUE = 3.4 (22; 51)
 PSD = 94 (4.3)
 PSD-10 = 92 (4.6)

Figure 6. Number of white bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Whitney Reservoir, Texas, 2008, 2010, and 2012.

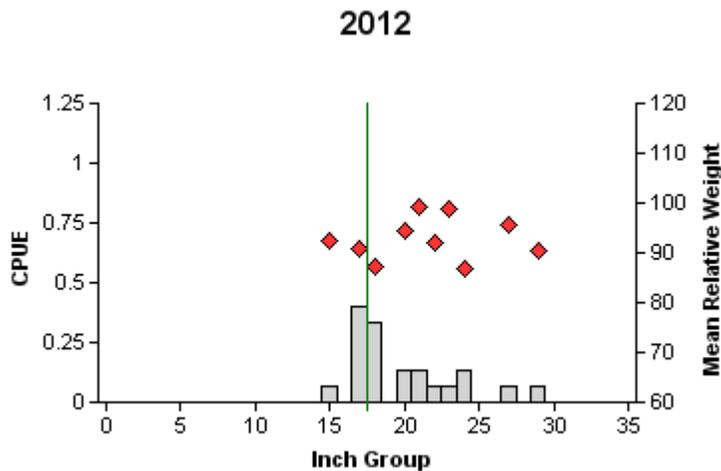
Striped Bass



Effort = 15.0
 Total CPUE = 1.4 (33; 21)
 Stock CPUE = 1.3 (32; 20)
 PSD = 85 (6.9)
 PSD-18 = 95 (4.5)



Effort = 15.0
 Total CPUE = 5.5 (23; 82)
 Stock CPUE = 4.8 (23; 72)
 PSD = 43 (9.9)
 PSD-18 = 53 (11.3)

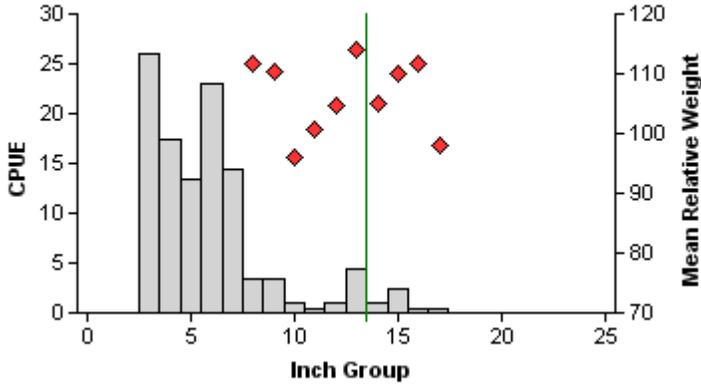


Effort = 15.0
 Total CPUE = 1.5 (44; 22)
 Stock CPUE = 1.5 (44; 22)
 PSD = 45 (16.1)
 PSD-18 = 73 (7)

Figure 7. Number of striped bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Whitney Reservoir, Texas, 2008, 2010, and 2012.

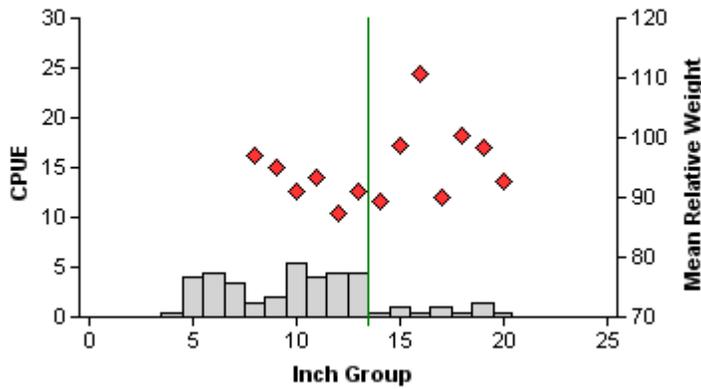
Largemouth Bass

2007



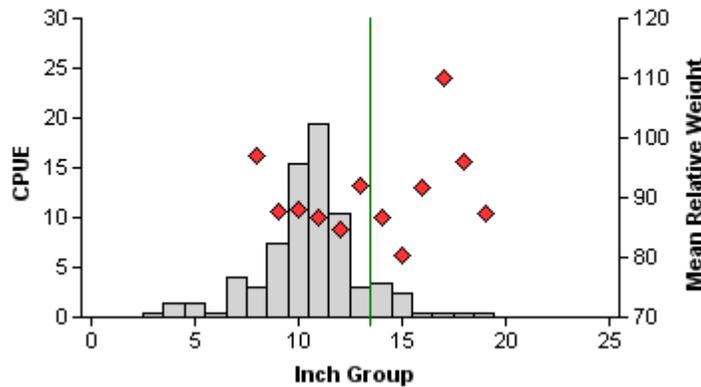
Effort = 2.0
 Total CPUE = 113.0 (17; 226)
 Stock CPUE = 18.5 (30; 37)
 PSD = 54 (7.1)
 PSD-14 = 24 (7.3)

2009



Effort = 2.0
 Total CPUE = 40.0 (26; 80)
 Stock CPUE = 27.5 (26; 55)
 PSD = 53 (6.3)
 PSD-14 = 20 (6.5)

2011



Effort = 2.0
 Total CPUE = 75.0 (29; 150)
 Stock CPUE = 67.0 (28; 134)
 PSD = 32 (4.5)
 PSD-14 = 12 (4.2)

Figure 8. Number of largemouth bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Whitney Reservoir, Texas, 2007, 2009, and 2011.

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Whitney Reservoir, Texas, 2001, 2005, and 2007. Analysis conducted in 2004 or earlier are based on allozyme testing, while later analyses are based on microsatellite DNA testing. Genetic information was not collected during the 2011 electrofishing season. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, Hybrid = bass with both FLMB and NLMB alleles.

Year	Sample size	Genotype			% FLMB alleles	% Northern alleles
		%FLMB	%Hybrid	%NLMB		
2001	30	10	83	7	54	46
2005	26	4	96	0	49	51
2007	30	0	97	3	58	42

Table 6. Proposed sampling schedule for Whitney Reservoir, Texas. Gill net surveys are conducted in the spring, vegetation and access surveys are conducted in the summer, and electrofisher and trap net surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

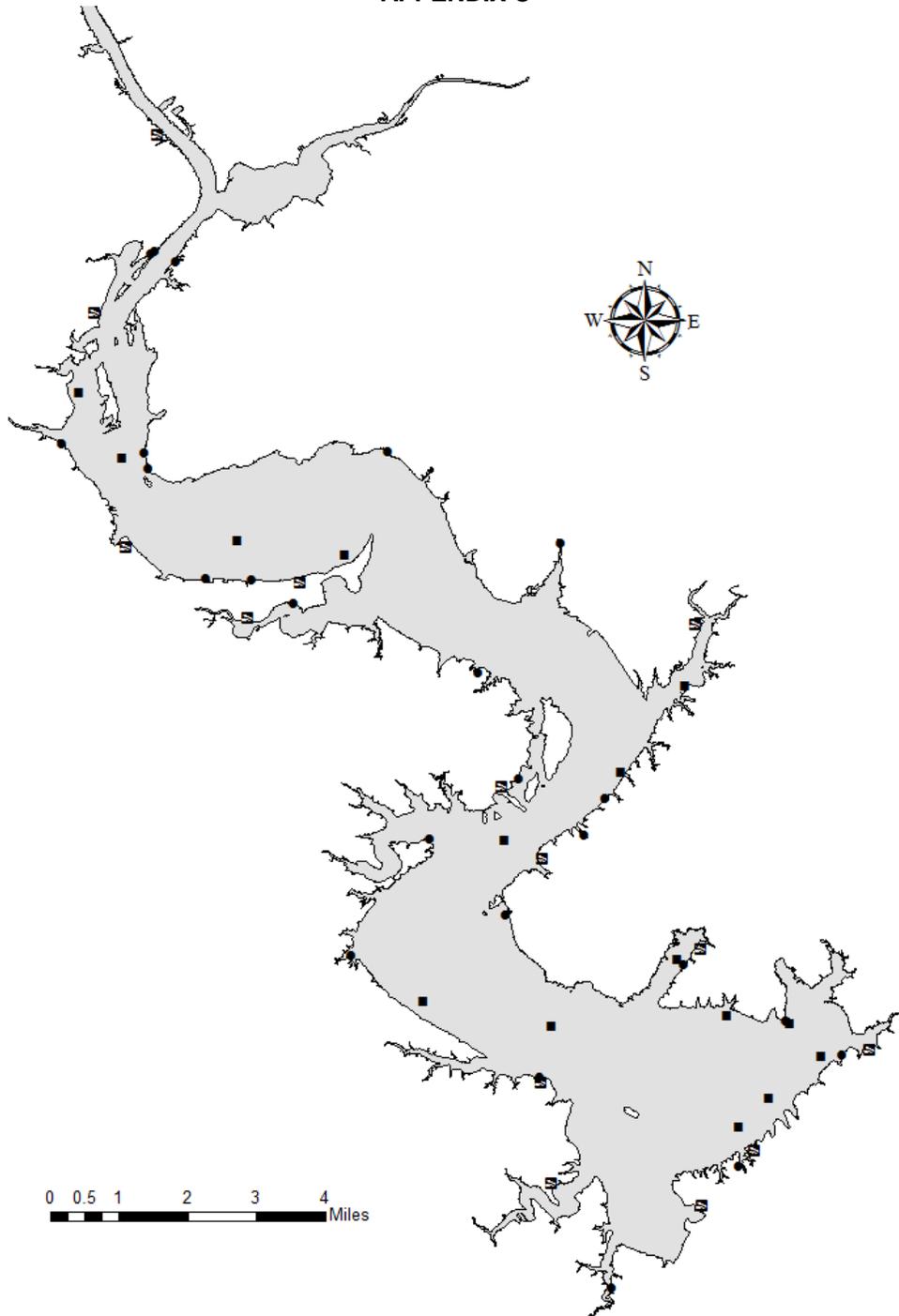
Survey Year	Electrofisher	Trap Net	Gill Net	Vegetation Survey	Access Survey	Creel Survey	Report
Fall 2012-Spring 2013							
Fall 2013-Spring 2014			A				
Fall 2014-Spring 2015							
Fall 2015-Spring 2016	S		S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Whitney Reservoir, Texas, 2011-2012.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard shad			202	101.0
Threadfin shad			99	49.5
Blue catfish	47	3.1		
Channel catfish	33	2.2		
Flathead catfish	2	0.1		
White bass	51	3.4		
Striped bass	22	1.5		
Green sunfish			1	0.5
Warmouth			1	0.5
Bluegill			267	133.5
Longear sunfish			16	8.0
Redear sunfish			25	12.5
Spotted bass			0	0.0
Smallmouth bass			2	1.0
Largemouth bass			150	75.0

APPENDIX C



Location of sampling sites, Whitney Reservoir, Texas, 2011-2012. Electrofisher and gill net stations are indicated by circles and squares respectively. Water levels were 15 feet below conservation pool (533) during 2011 electrofisher surveys and full pool during 2012 gill net surveys.