PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-4

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

Stillhouse Hollow Reservoir

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TABLE OF CONTENTS

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Stillhouse Hollow Reservoir were surveyed in 2013 using electrofishing and in 2014 with gill netting. Historical data are presented with the 2013-2014 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Stillhouse Hollow Reservoir is a 6,430 acre reservoir located in Bell County, Texas. The impoundment was created in 1968 and is operated by the United States Army Corps of Engineers (USACE). Primary water uses include municipal water supply and recreation. Water levels were 10 to 12 feet below conservation pool (622msl) during 2013 and 2014 sampling. Habitat features mainly consisted of natural shorelines.

- **Management History:** Sport fishes in Stillhouse Hollow Reservoir have always been managed with statewide regulations. Important sport fish include Largemouth and Smallmouth Bass. The management plan from the 2009 survey report included forming a partnership with the USACE to introduce native vegetation into the reservoir and post invasive species signage at access points throughout the reservoir. Low reservoir levels have prevented native vegetation plantings since the last report. However, Invasive species signage was posted at all access points during summer 2013. Additionally, annual surveys were conducted for noxious vegetation (i.e., Hydrilla), annual stocking requests were made for Smallmouth Bass and Smallmouth Bass recruitment was evaluated with data from the most recent electrofishing survey.

- **Fish Community**
  - **Prey species:** Forage consists primarily of Bluegill, Green Sunfish, Longear Sunfish, Redear Sunfish, and Gizzard Shad. Most were collected at catch rates near historical averages.

  - **Catfishes:** Channel Catfish were collected in good numbers, and most individuals were in good condition.

  - **White Bass:** White Bass catch rates were well above the historical averages, and individuals up to 13 inches were observed.

  - **Black basses:** The Smallmouth Bass catch rate was poor, with only 4 individuals collected during fall 2013 electrofishing. The Largemouth Bass catch rate was above the historical average, the population was balanced, and condition was good.

  - **White Crappie:** White Crappie are present in the reservoir in low numbers.

- **Management Strategies:** Continue managing Stillhouse Hollow Reservoir with existing regulations. Conduct general monitoring with electrofishing and gill netting in 2017- 2018. Conduct aquatic vegetation and access surveys during summer 2017. Continue efforts to educate the public about invasive species and zebra mussel issues and protect the reservoir from zebra mussel introductions. Continue stocking Smallmouth Bass, and seek opportunities to plant native aquatic vegetation.

INTRODUCTION

This document is a summary of fisheries data collected from Stillhouse Hollow Reservoir in 2013-2014. 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 is presented with the 2013-2014 data for comparison.

Reservoir Description

Stillhouse Hollow Reservoir is a 6,430 acre reservoir located in Bell County, Texas. The impoundment was created in 1968 and is operated by the USACE. Primary water uses include flood control, municipal water supply and recreation. The reservoir has a shoreline length of 58 miles, a mean depth of 37.0 feet, and a maximum depth of 107.0 feet. Water levels were 10 to 12 feet below conservation pool (622msl) during 2013 and 2014 sampling. The reservoir is classified as oligotrophic based on chlorophyll a (1.6 mg/m^3) and total phosphorous (15.7 mg/m^3). Fish habitat at the time of sampling consisted mainly of rocky shorelines, flooded timber and dead trees and stumps. Native aquatic plants were sparse. Hydrilla coverage was previously significant yet minimal during this sampling period.

Angler Access

Stillhouse Hollow Reservoir has four public boat ramps and no private boat ramps. Overall, boat and bank access to the reservoir are good, though handicap facilities remain poor. All boat ramps were usable as of the date of this report, but floating boat docks were out of the water. See Table 2 for additional boat ramp characteristics. Shoreline access is limited to the public boat ramp and camping areas.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Tibbs and Baird 2010) included:

1. Monitor hydrilla coverage annually and share information with the USACE and other interested parties.
   Action: Hydrilla coverage has been surveyed annually (Table 6). Survey data are shared with the USACE and interested constituents.
2. Continue requesting Smallmouth Bass stockings annually. Perform a bass-only electrofishing survey to determine potential recruitment from recent Smallmouth Bass stockings.
   Action: Smallmouth Bass have been requested annually since 2010 for Stillhouse Hollow, and 23,242 fingerlings were stocked in 2011. A bass-only electrofishing survey was conducted in spring 2013.
3. Form a partnership with the USACE and interested constituents to introduce native vegetation into the reservoir. Request appropriate species of native vegetation from The Freshwater Fishery Center's (TFFC's) aquatic vegetation nursery and/or grow appropriate species in the Waco Wetland nursery. Use partners to plant vegetation when appropriate. Monitor the spread/growth of native vegetation plantings annually pending observations; review the program at the end of the next report writing and make recommendations.
   Action: TPWD partnered with the Stillhouse Hollow USACE and constituents to introduce native vegetation into the reservoir. A variety of plants were requested from the TFFC aquatic plant nursery in 2011 and 2012, and those plants have been propagated at the Waco Wetlands aquatic plant nursery ever since. Low reservoir elevations in Stillhouse Hollow have prevented the introduction of these species to date.
4. Cooperate with the USACE to post appropriate invasive species signage at access points throughout the reservoir. Educate marina owners about invasive species and provide with posters and literature, etc. so that they can educate their customers. Educate the public about

invasive species through the use of media and the internet. Make a speaking point about invasive species when presenting to constituents. Keep track of (i.e., map) all existing and future inter-basin water transfer routes to facilitate potential invasive species management responses.

Action: Invasive species signage was posted at Stillhouse Hollow access points during summer 2013. District biologists have made a speaking point about invasive species, how to prevent their spread, and potential effects on Stillhouse Hollow Reservoir while speaking to constituent groups (i.e., Central Texas Flyrodders, Legacy Outfitters, and Brazos River Sportsman's Club). Inter-basin water transfers are a permanent fixture in this report now and will be updated appropriately.

Harvest regulation history: Sportfishes in Stillhouse Hollow Reservoir have always been managed with statewide regulations (Table 3).

Vegetation/habitat management history: No vegetation/habitat management actions have been necessary on Stillhouse Hollow Reservoir, despite the discovery of Hydrilla in 1995. Hydrilla has been monitored annually since its discovery. Hydrilla coverage was high in 2006 (19%; 1,216 acres). Only trace amounts of hydrilla were observed in 2009 and 2010, although the 2009 report incorrectly listed coverage at 3%. In 2011, coverage topped 24% (1,549 acres) due to rapidly decreasing water levels during the growing season. High water in 2012 reduced coverage back to trace amounts. Hydrilla coverage and structural habitat was measured in 2013 using side scan sonar, but those data were unable to be processed because critical software was unavailable. Because Hydrilla has never posed a threat to access and control efforts would be extremely unlikely, Stillhouse Hollow Reservoir fits the definition of a Tier III infestation, and Hydrilla will be monitored every 4 years in the future.

Stocking history: Largemouth Bass were first introduced to Stillhouse Hollow in 1968. Walleye and Palmetto Bass fisheries were attempted during the 70s and early 80s; however, those efforts were abandoned. Florida Largemouth Bass were then stocked in 1993 and 1994. Smallmouth Bass were introduced in 1974 and stocked through 1977. The program was revitalized in 1992, and Smallmouth Bass were stocked through 2000. The loss of hatchery brood fish curtailed stockings from 2001 through 2008, though stocking requests were maintained. Nearly 80,000 fingerling Smallmouth Bass were stocked in 2009, and 23,242 Smallmouth Bass fingerlings were stocked in 2011 (Table 4).

Water Transfer: Stillhouse Hollow Reservoir's primary purpose is flood control; other important functions are municipal water supply and recreation. There are currently three permanent pumping stations on the reservoir. The first is operated by the Brazos River Authority (BRA) and transfers untreated water to Lake Georgetown to be used for municipal water supply. The other two are operated by the town of Kempner and Central Texas Water Supply, both of which pull water from the lake, treat it, and deliver it for use as municipal water. There is a proposal to install a pumping station on Belton Reservoir, and pump untreated water directly to Stillhouse Hollow, thereby increasing the water transfer capabilities of Stillhouse Hollow. Also at this time, a fourth pumping station is being studied and considered that would provide municipal water from Stillhouse Hollow to the City of Killeen. Neither of these proposals has been approved to date, and the discovery of zebra mussels in Belton will certainly play a role in future water transfer projects.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18, 5-min stations) and gill netting (10 net nights at 10 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 [TPWD, Inland Fisheries Division, (unpublished manual revised 2011)].

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). 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. Fish aging became optional in 2004, and no new age and growth data were collected from the 2013/2014 survey. The most recent age and growth information for Stillhouse Hollow Reservoir can be found in Tibbs and Baird (2006).

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures [TPWD, Inland Fisheries Division, (unpublished manual revised 2011)]. Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2012 and electrophoresis for previous years.

The source for water level data was the United States Geological Survey (USGS 2014).

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of natural and rocky shorelines. Structural habitat was surveyed in summer 2010 and a survey was also conducted with side scan sonar during summer 2012 (Tables 5 and 6).

Creel: No creels were conducted during this survey period.

Prey species: Gizzard Shad were collected by fall electrofishing at 26.0/h, which was higher than the historical average of 22.0/h (Appendix B). The IOV for Gizzard Shad was very poor, and only 10% of Gizzard Shad were available to existing predators as forage (Figure 2). Other important forage species collected were Bluegill (125.0/h; Figure 3), Green Sunfish (83.0/h), Longear Sunfish (39.0/h) and Redear Sunfish (29.0/h). Panfish seldom reach preferred size classes in Stillhouse Hollow Reservoir.

Catfishes: Channel Catfish were collected with gill nets at 2.3/nn in 2014 (Figure 4). This catch rate equates to 23 collected individuals and was similar to the historical average of 2.8/h (Appendix B). Proportional size distribution was high, indicating a population skewed toward larger individuals, although some recruitment was evident. Nearly all of the Channel Catfish sampled were legal size, and some approached the preferred size category of 24 inches (Figure 4). Body condition was good (Figure 4).

Two Blue Catfish were collected during spring 2014 gill netting, although this species has never been stocked into Stillhouse Hollow Reservoir. Flathead Catfish exist in low density.

White Bass: White Bass were collected with gill nets at 8.4/nn in 2014 (Figure 5). This catch rate equates to 84 collected individuals and is the highest catch on record. Proportional size distribution was high, indicating a population skewed toward larger individuals, although some recruitment was evident. Nearly all of the White Bass sampled were legal size, and some approached the preferred size category of 12 inches. Body condition was good (Figure 5).

Black basses: Smallmouth Bass were collected by fall electrofishing at 4.0/h in 2013 (Figure 6). This catch rate equates to 6 collected individuals. Proportional size distribution was low, illustrating a sample dominated by smaller individuals. Body condition varied by size class (Figure 6). Smallmouth Bass were also collected by electrofishing at 4.7/h in spring 2013 during a bass-only survey and one individual over 17” was collected at that time (Figure 7).

Largemouth Bass were collected by electrofishing at 91.3/h in 2013 (Figure 8). This catch rate equates to 137 collected individuals and was similar to the historical average of 82.0/h (Appendix B). Proportional size distribution was good, illustrating a balanced population. The proportion of individuals 14-inches and larger was 16, indicating fair numbers of harvestable bass for anglers. Body condition was good (Figure 8). Largemouth Bass genetics were analyzed in 2013 and showed good Florida influence (71%) (Table

7). Largemouth Bass were also collected by electrofisher at 55.3/h in spring, 2013 during a bass-only survey (Figure 9).

Crappies: White and Black Crappie exist in the reservoir in low numbers. Trap netting became optional gear in 2009, and has not been used to sample crappie at Stillhouse Hollow Reservoir since that time. However White and Black Crappie were collected with gill nets in spring 2014 at 0.5/nn and 0.1/nn respectively (Appendix A).

Fisheries management plan for Stillhouse Hollow Reservoir, Texas

Prepared – July 2014

ISSUE 1: 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*), found in adjacent Lake Belton in 2013, 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 maintain appropriate signage at access points around the reservoir.
2. Hire 2 interns to distribute zebra mussel information and conduct boater surveys and inspections an average of 1 weekend per month at Stillhouse Park ramp and Dana Park ramp. These interns will also work on Lake Belton 3 weekends per month to help prevent zebra mussel transport from the source.
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 constituents.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species management responses.

ISSUE 2: Smallmouth Bass catch rates remain low (4.7/hr in spring 2013; 4.0/hr in fall 2013) but have increased since 2009, possibly due to stockings in 2009 and 2011. Natural reproduction has been documented in the reservoir, but appears insufficient to maintain a quality fishery.

MANAGEMENT STRATEGY

1. Continue requesting Smallmouth Bass stockings annually.
2. Evaluate the success of Smallmouth Bass stockings during the 2017 fall electrofishing survey.

ISSUE 3: Stillhouse Hollow Reservoir has never supported much native vegetation. Planting of native vegetation may improve habitat in the reservoir. Various partnerships have allowed for the creation and maintenance of the Waco wetlands aquatic plant nursery, which could serve as a source for these plantings.

MANAGEMENT STRATEGIES

1. Continue partnerships with the USACE and interested constituents/user groups to introduce native vegetation into the lake.
2. Propagate plants at the Waco nursery and/or request appropriate species of native vegetation from the TFFC aquatic plant nursery. Work with partners and other volunteers to maintain and plant vegetation when reservoir water levels allow.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes general monitoring with electrofishing and gill netting in 2017 and 2018, and aquatic vegetation and access surveys in summer 2017 (Table 8).

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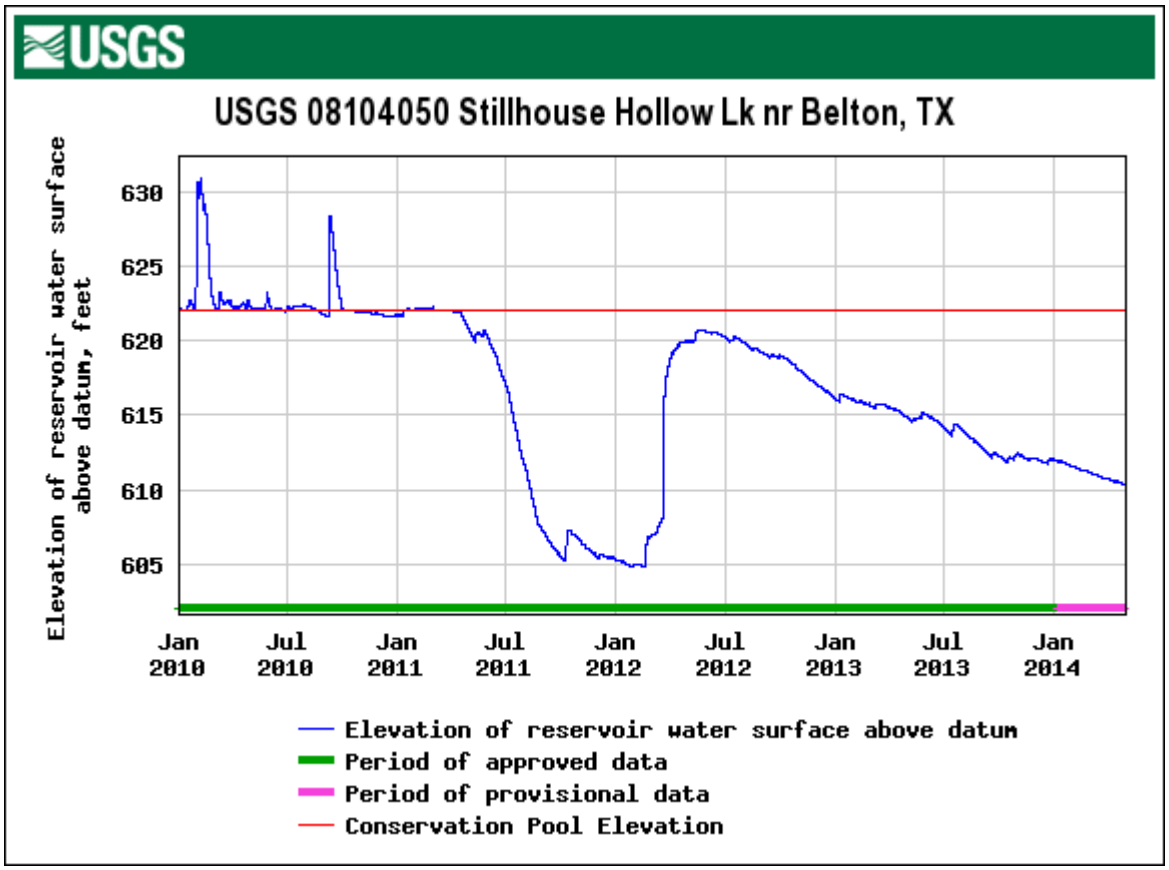


Figure 1. Daily mean water levels for Stillhouse Hollow Reservoir, from January 1, 2010 through May 1, 2014. Conservation pool level (622 feet above mean sea level).

Table 1. Characteristics of Stillhouse Hollow Reservoir, Texas.

Characteristic	Description
Year Constructed	1968
Controlling authority	United States Army Corps of Engineers
Counties	Bell
Reservoir type	Mainstem
Shoreline Development Index (SDI)	5.2
Conductivity	490 umhos/cm

Table 2. Boat ramp characteristics for Stillhouse Hollow Reservoir, Texas, 2013. Latitude and longitude are in decimal degrees.

Boat ramp	Latitude; Longitude	Public?	Parking capacity	Condition
Stillhouse Park	31.038344 ºN -97.533717 ºW	Y	43 trailers, 56 vehicles	4 lanes; Good
Dana Peak	31.029200 ºN -97.599019 ºW	Y	37 trailers	4 lanes; Good
Cedar Gap	31.01445 ºN -97.650369 ºW	Y	54 trailers, 15 vehicles	1 lane; Good
Union Grove	31.007217 ºN -97.608453 ºW	Y	18 trailers, 19 vehicles	4 lanes; Good

Table 3. Harvest regulations for Stillhouse Hollow Reservoir, Texas 2013.

Species	Bag Limit	Length limit (inches)
Catfish: Channel and Blue	25 (any combination)	12” minimum
Catfish, Flathead	5	18” minimum
Bass, White	25	10” minimum
Bass: Largemouth and Smallmouth	5[a]	14” minimum
Bass, Spotted	5[a]	No minimum
Crappie: White and Black	25 (any combination)	10” minimum

[a] Daily bag limit for Largemouth Bass, Spotted Bass and Smallmouth Bass = 5 fish in any combination.

Table 4. Stocking history of Stillhouse Hollow, 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)
Channel Catfish	1968	322,800	AFGL	7.9
	Total	322,800		
Flathead Catfish	1968	2,000		UNK
	Total	2,000		
Florida Largemouth Bass	1993	322,026	FGL	1.2
	1994	321,167	FGL	1.2
	Total	643,193		
Largemouth Bass	1968	735,000	FRY	0.7
	Total	735,000		
Palmetto Bass (striped X White Bass hybrid)	1978	39,225	UNK	UNK
	1982	54,527	UNK	UNK
	Total	93,752		
Smallmouth Bass	1974	129,000	UNK	UNK
	1975	65,000	UNK	UNK
	1976	125,000	UNK	UNK
	1977	100,000	UNK	UNK
	1986	471	ADL	10.7
	1992	58	ADL	10.7
	1992	35,249	FGL	1.3
	1993	141,055	FGL	1.3
	1994	161,043	FGL	1.2
	1997	160,766	FGL	1.0
	1999	97,048	FGL	1.4
	2000	159,026	FGL	1.5
	2009	10,175	AFGL	5.5
	2009	69,866	FGL	1.4
	2011	23,242	FGL	1.9
	Total	1,276,999		
Walleye	1974	150,000	FRY	0.2
	1975	126,240	FRY	0.2
	1976	100,000	FRY	0.2
	Total	376,240		

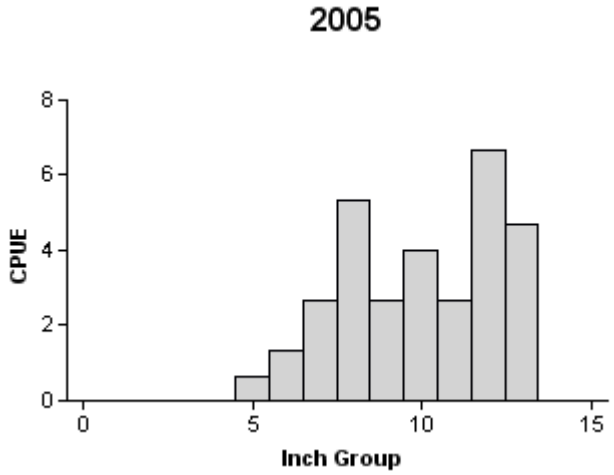
Table 5. Survey of structural habitat types, Stillhouse Hollow Reservoir, Texas, 2010. Shoreline habitat type units are in miles.

Habitat type	Estimate	% of total
Bulk heading	0.11 miles	0.17
Boat docks/piers	0.01 miles	0.02
Natural	30.0 miles	47.8
Rock bluff	1.85 miles	2.9
Rocky shoreline (rocks > 4”)	24.34 miles	38.7
Gravel shoreline (rocks < 4”)	6.51 miles	10.4

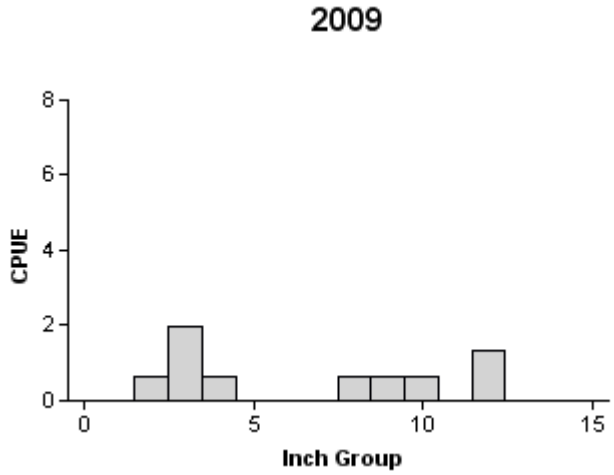
Table 6. Survey of aquatic vegetation, Stillhouse Hollow Reservoir, Texas, 2010 – 2013. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2010	2011	2012	2013
Non-Native (Hydrilla)	trace	1549 (24.1)	trace	No estimate

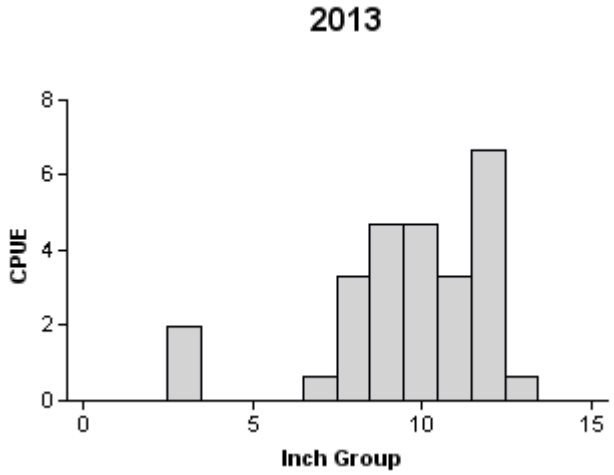
Gizzard Shad



Effort = 1.5
Total CPUE = 30.7 (41; 46)
Stock CPUE = 28.7 (42; 43)
IOV = 15 (7.1)



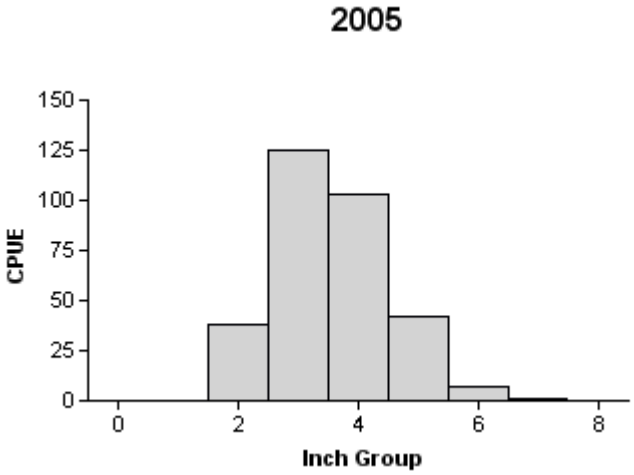
Effort = 1.5
Total CPUE = 6.7 (36; 10)
Stock CPUE = 3.3 (49; 5)
IOV = 50 (21.8)



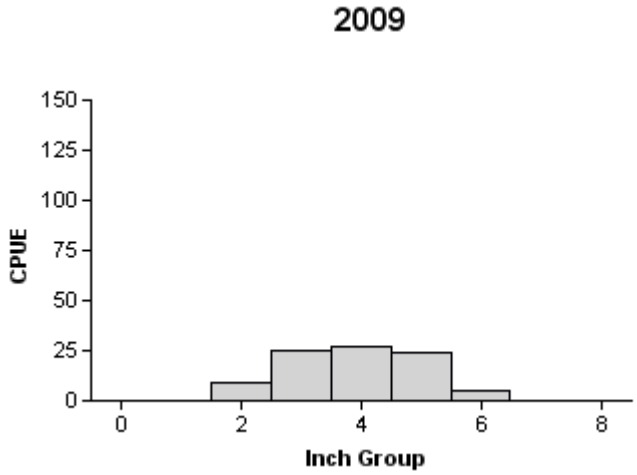
Effort = 1.5
Total CPUE = 26.0 (39; 39)
Stock CPUE = 24.0 (38; 36)
IOV = 10 (3.6)

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, Stillhouse Hollow Reservoir, Texas, 2005, 2009, and 2013.

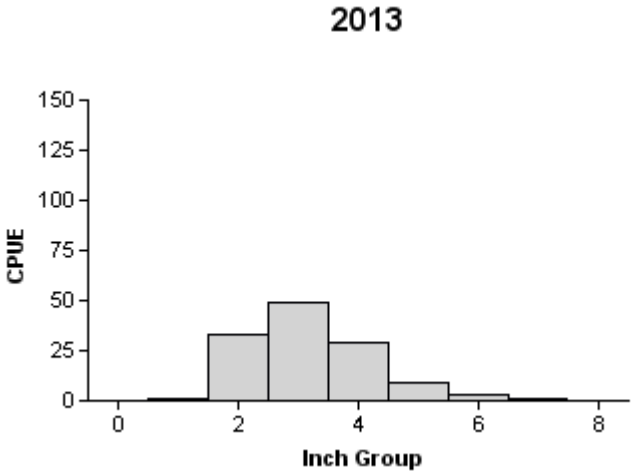
Bluegill



Effort = 1.5
Total CPUE = 316.7 (20; 475)
Stock CPUE = 278.7 (22; 418)
PSD = 3 (1)



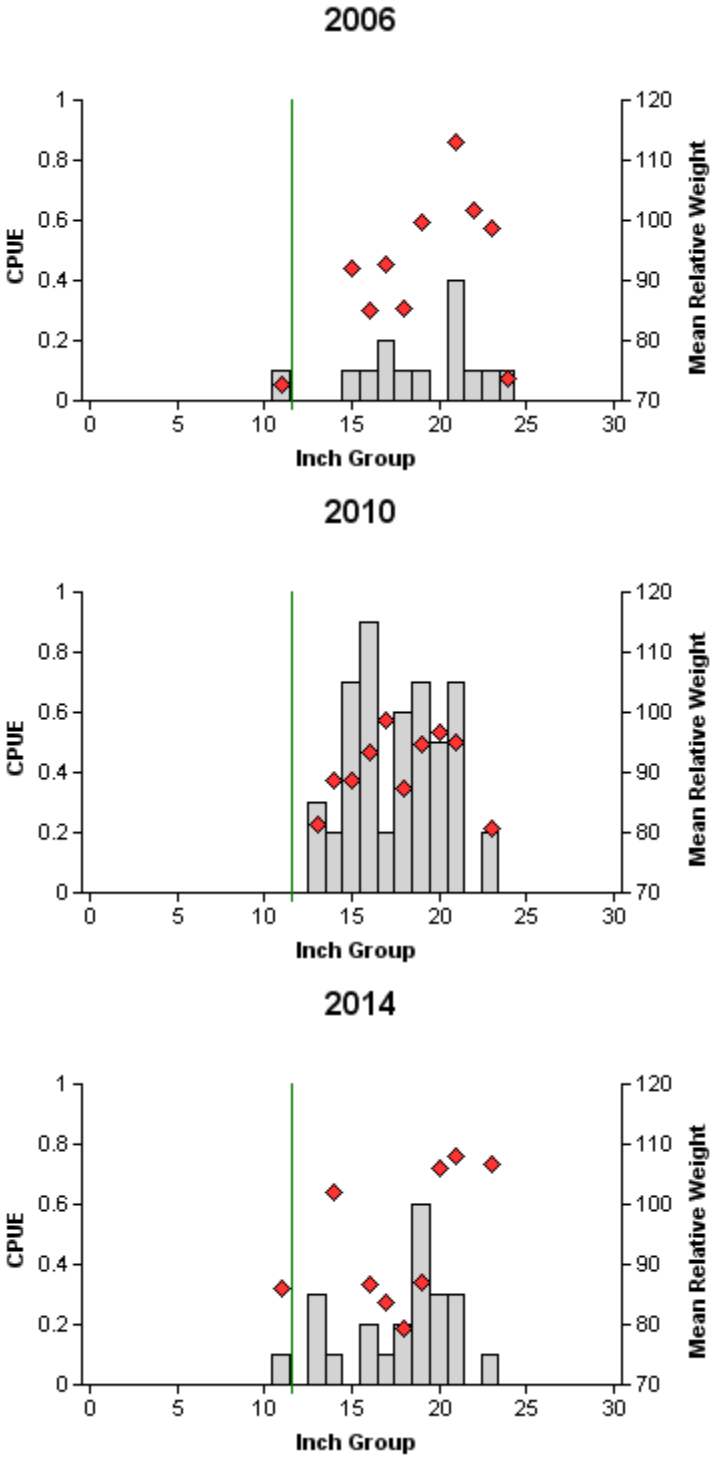
Effort = 1.5
Total CPUE = 90.7 (30; 136)
Stock CPUE = 81.3 (31; 122)
PSD = 7 (2.7)



Effort = 1.5
Total CPUE = 124.7 (20; 187)
Stock CPUE = 90.7 (22; 136)
PSD = 4 (1.6)

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, Stillhouse Hollow Reservoir, Texas, 2005, 2009, and 2013.

Channel Catfish



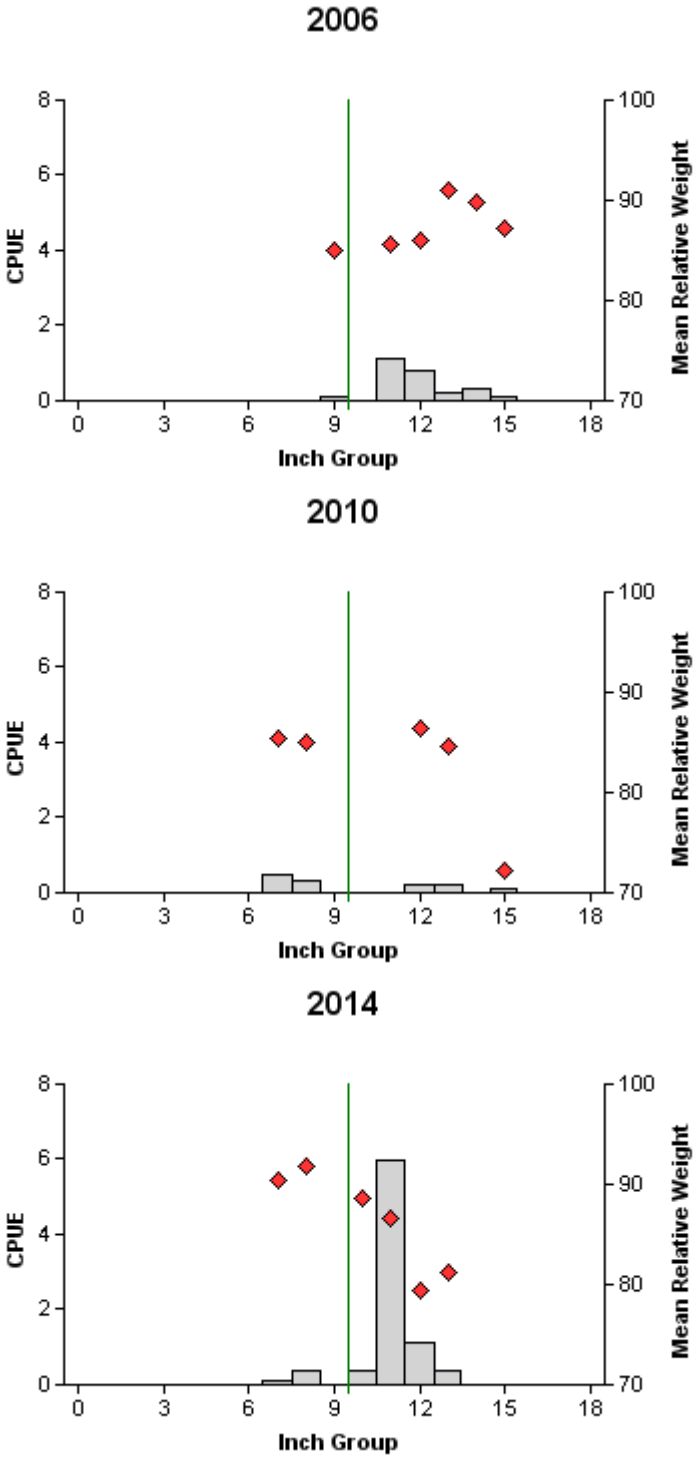
Effort = 10.0
Total CPUE = 1.4 (36; 14)
Stock CPUE = 1.4 (36; 14)
PSD = 86 (7)
PSD-12 = 93 (5.4)

Effort = 10.0
Total CPUE = 5.0 (20; 50)
Stock CPUE = 5.0 (20; 50)
PSD = 76 (7.4)
PSD-12 = 100 (0)

Effort = 10.0
Total CPUE = 2.3 (28; 23)
Stock CPUE = 2.3 (28; 23)
PSD = 78 (6.7)
PSD-12 = 96 (4)

Figure 4. 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, Stillhouse Hollow Reservoir, Texas, 2006, 2010, and 2014. Minimum length limit represented by vertical line.

White Bass



2006
Effort = 10.0
Total CPUE = 2.6 (60; 26)
Stock CPUE = 2.6 (60; 26)
PSD = 100 (0)
PSD-10 = 96 (1.7)

2010
Effort = 10.0
Total CPUE = 1.3 (46; 13)
Stock CPUE = 1.3 (46; 13)
PSD = 38 (25.3)
PSD-10 = 38 (25.3)

2014
Effort = 10.0
Total CPUE = 8.4 (44; 84)
Stock CPUE = 8.4 (44; 84)
PSD = 94 (4.8)
PSD-10 = 94 (4.8)

Figure 5. 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, Stillhouse Hollow Reservoir, Texas, 2006, 2010, and 2014. Minimum length limit represented by vertical line.

Smallmouth Bass

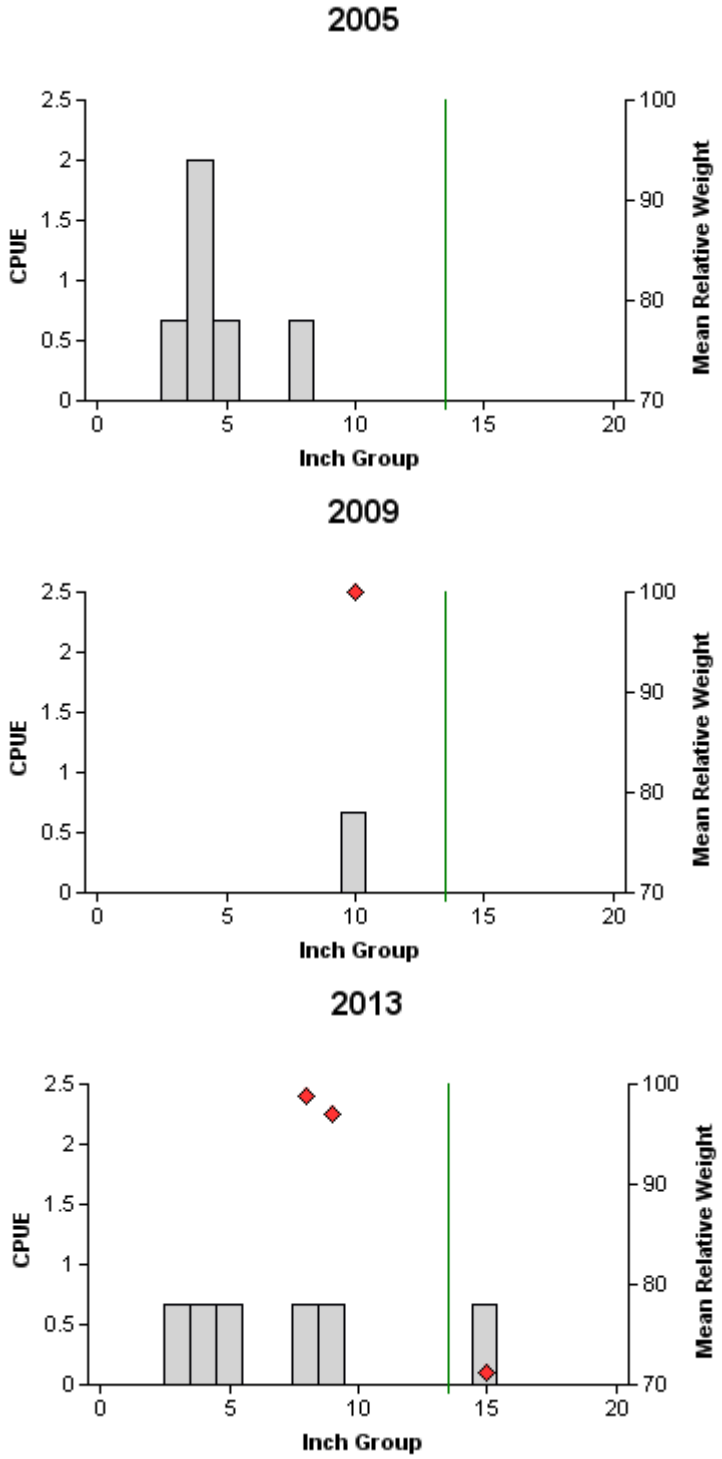
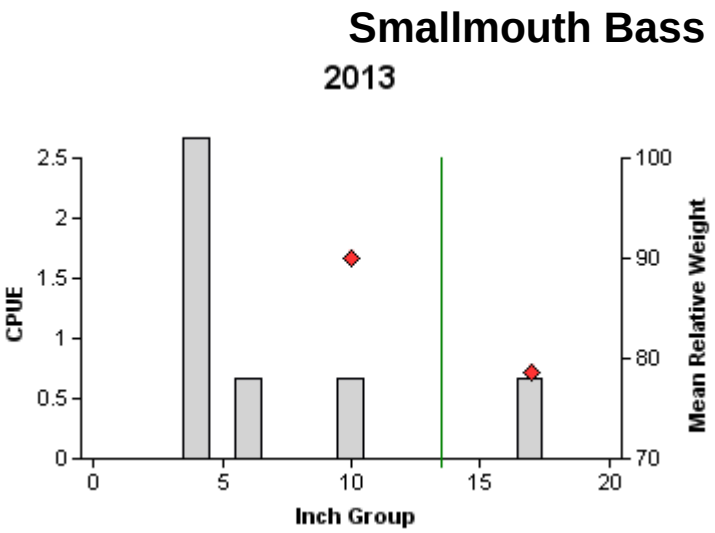


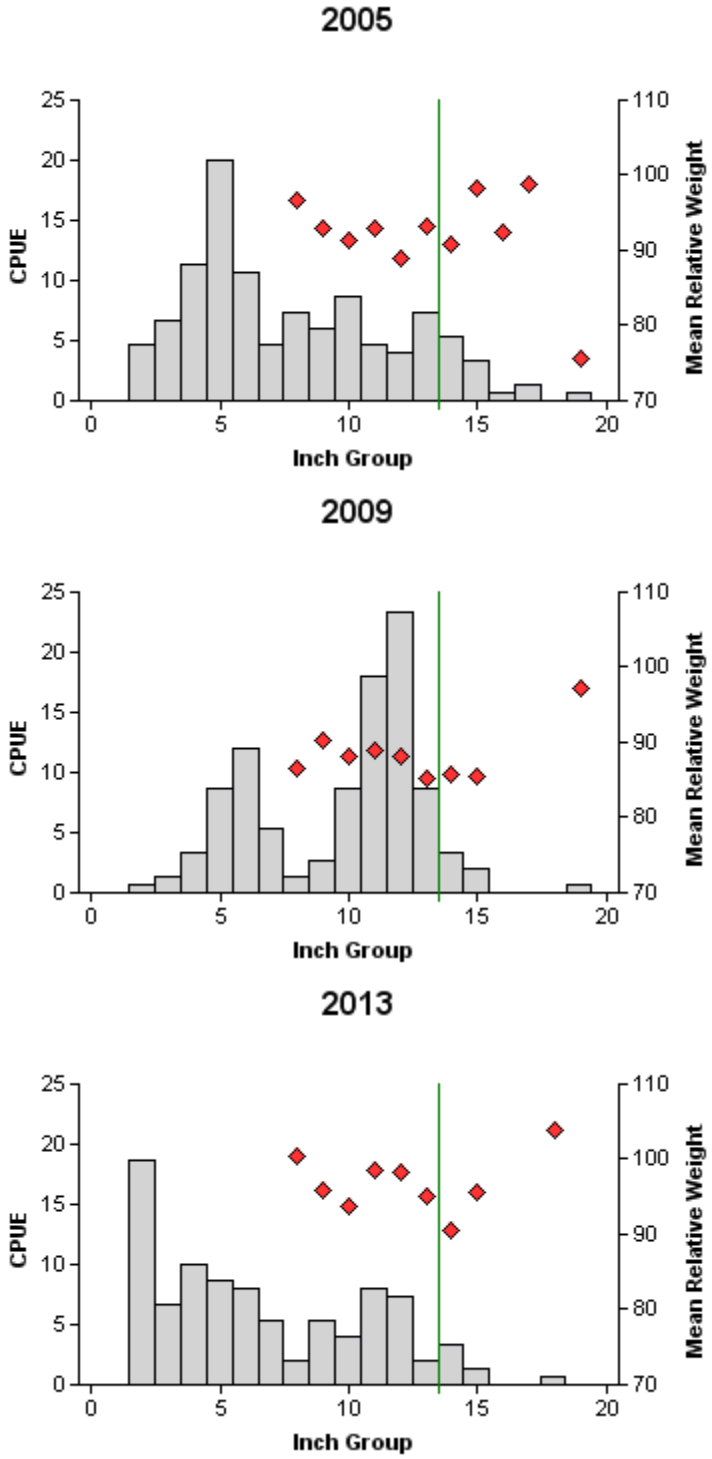
Figure 6. Number of Smallmouth Bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas, 2005, 2009, and 2013. Minimum length limit represented by vertical line.



Effort = 1.5
Total CPUE = 4.7 (56; 7)
Stock CPUE = 1.3 (69; 2)
PSD = 50 (36.4)
PSD-14 = 50 (36.4)

Figure 7. Number of Smallmouth Bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring electrofishing, Stillhouse Hollow Reservoir, Texas, 2013. Minimum length limit represented by vertical line.

Largemouth Bass

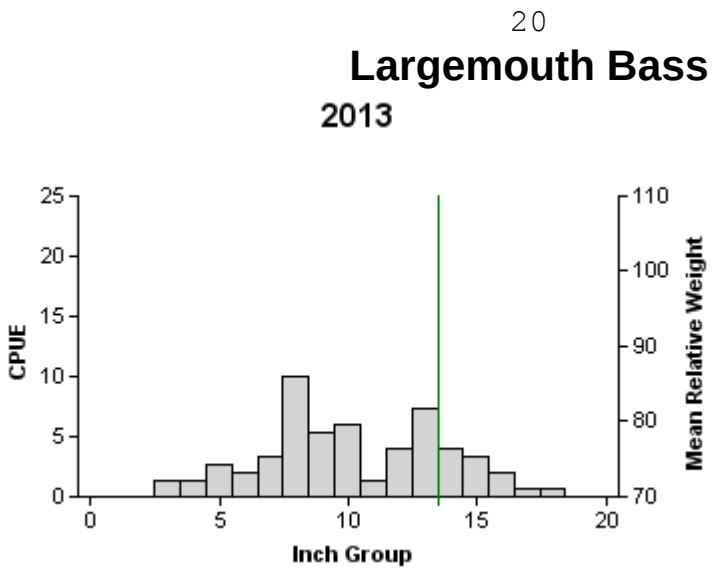


Effort =	1.5
Total CPUE =	107.3 (18; 161)
Stock CPUE =	49.3 (18; 74)
PSD =	46 (7.4)
PSD-14 =	23 (5.3)

Effort =	1.5
Total CPUE =	100.0 (15; 150)
Stock CPUE =	68.7 (15; 103)
PSD =	55 (4.4)
PSD-14 =	9 (3.4)

Effort =	1.5
Total CPUE =	91.3 (18; 137)
Stock CPUE =	34.0 (34; 51)
PSD =	43 (6.6)
PSD-14 =	16 (6.2)

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, Stillhouse Hollow Reservoir, Texas, 2005, 2009, and 2013. Minimum length limit represented by vertical line.



Effort = 1.5
Total CPUE = 55.3 (11; 83)
Stock CPUE = 44.7 (14; 67)
PSD = 49 (6.2)
PSD-14 = 24 (3.9)

Figure 9. 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 spring electrofishing, Stillhouse Hollow Reservoir, Texas, 2013. Minimum length limit represented by vertical line.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Stillhouse Hollow Reservoir, Texas, 2002, 2003, 2005, and 2013. 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	30	4	25	1	56	13.3
2003	30	4	25	1	63	13.3
2005	30	2	28	0	60	6.7
2013	27	1	26	0	71	3.7

Table 8. Proposed sampling schedule for Stillhouse Hollow Reservoir, Texas. Survey period is June through May. 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	Electrofish Fall(Spring)	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2014-2015								
2015-2016								
2016-2017								
2017-2018	S		S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Stillhouse Hollow Reservoir, Texas, 2013-2014. Sampling effort was 10 net nights for gill netting and 1.5 hours for electrofishing.

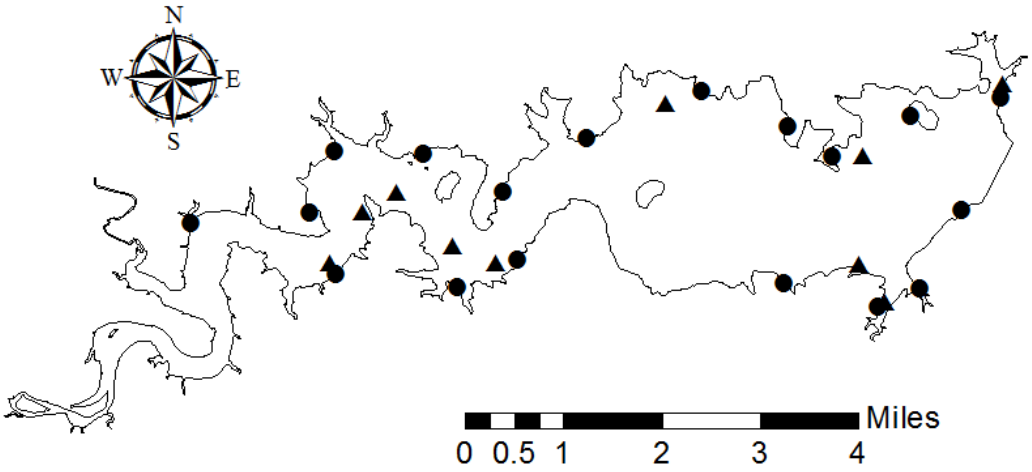
Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			39	26.0
Threadfin Shad			2	1.3
Channel Catfish	23	2.3		
Blue Catfish	2	0.2		
Flathead Catfish	3	0.3		
White Bass	84	8.4		
Bluegill			187	124.7
Longear Sunfish			58	38.7
Redear Sunfish			43	28.7
Green Sunfish			124	82.7
Warmouth			1	0.7
Orangespotted Sunfish			1	0.7
Smallmouth Bass			6	4.0
Spotted Bass			1	0.7
Largemouth Bass			137	91.3
Black Crappie	1	0.1		
White Crappie	5	0.5		

APPENDIX B

Historical catch rates (CPUE) of targeted species by gear type for standard surveys on Stillhouse Hollow Reservoir, Texas, 2003 to present. All stations were randomly selected. Electrofishing stations were shocked with a 5.0 Smith-Root GPP (Gas Powered Pulsator) until 2010, after which a 7.5 Smith-Root GPP was used. Species averages are in bold. Gill net catches of White Crappie are marked with an (*), and do not contribute to historical averages for crappie.

Gear	Species	1998	2001	2002	2003	2005	2006	2009	2010	2013	2014	Avg.
Electrofisher												
	Largemouth Bass	102	41	64	68	107		100		91		**82**
	Smallmouth Bass	20	0	1	4	4		1		6		**5**
	Spotted Bass	1	1			1				1		**1**
	Gizzard Shad	40	20		5	31		7		26		**22**
	Threadfin Shad	7				5		1		1		**2**
	Bluegill Sunfish	257	149		146	317		91		125		**181**
	Redear Sunfish	39	25		32	39		3		29		**28**
	Longear Sunfish	30	44		25	46		24		39		**35**
	Green Sunfish	17	27		26	150		14		83		**53**
	Warmouth	1			1	7		1		1		**2**
Gill nets												
	Blue Catfish	0		0			0		0		0.2	**<0.1**
	Channel Catfish	5		1			1		5		2	**2.8**
	Flathead Catfish	0.5		0.2			0.7		0.2		0.3	**0.4**
	White Bass	2		0.6			3		1		8	**2.9**
	White Crappie									0.5*		
	Black Crappie									0.1*		
Trap nets												
	White Crappie	3	1			3						**2.3**
	Black Crappie											**0**

APPENDIX C



Location of sampling sites, Stillhouse Hollow Reservoir, Texas, 2013-2014. Electrofishing and gill netting stations are indicated by circles and triangles respectively. Water level was approximately 10' low during fall electrofishing and 11' low during spring gill netting.

APPENDIX D

Figures 1 through 4 represent summaries of data collected during June, 2012 as part of a habitat and access assessment for all BRA reservoirs. Data was collected using Hummingbird Side scan imaging and processed using ArcView and Dr. Depth. These figures were part of Appendix G-5 in the BRA operating plan titled “Operating guidelines to manage impacts on fisheries from reservoir level fluctuations” (2012).

Figure 1. Elevation specific littoral zone (< 12 ft. water depth) coverage in Stillhouse Hollow Reservoir, Texas, for upper, middle, and lower reservoir reaches and all reaches combined.

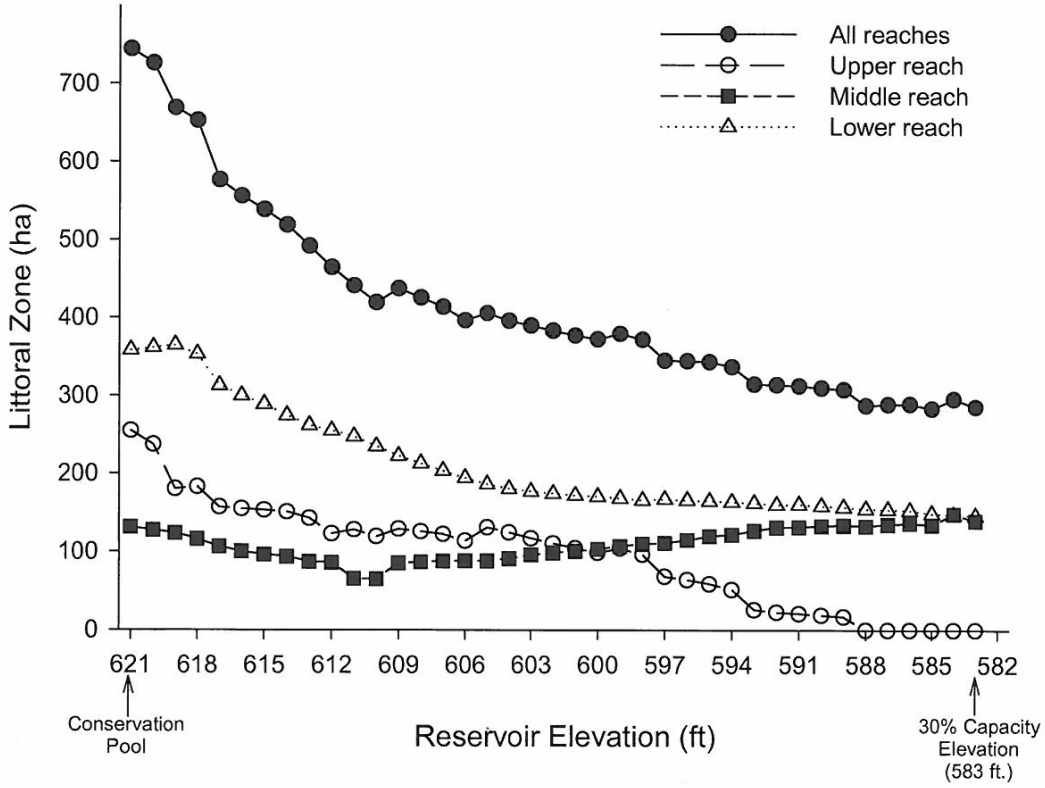


Figure 2. Elevation specific littoral zone (< 12 ft. water depth) coarse substrate availability in Stillhouse Hollow Reservoir, Texas.

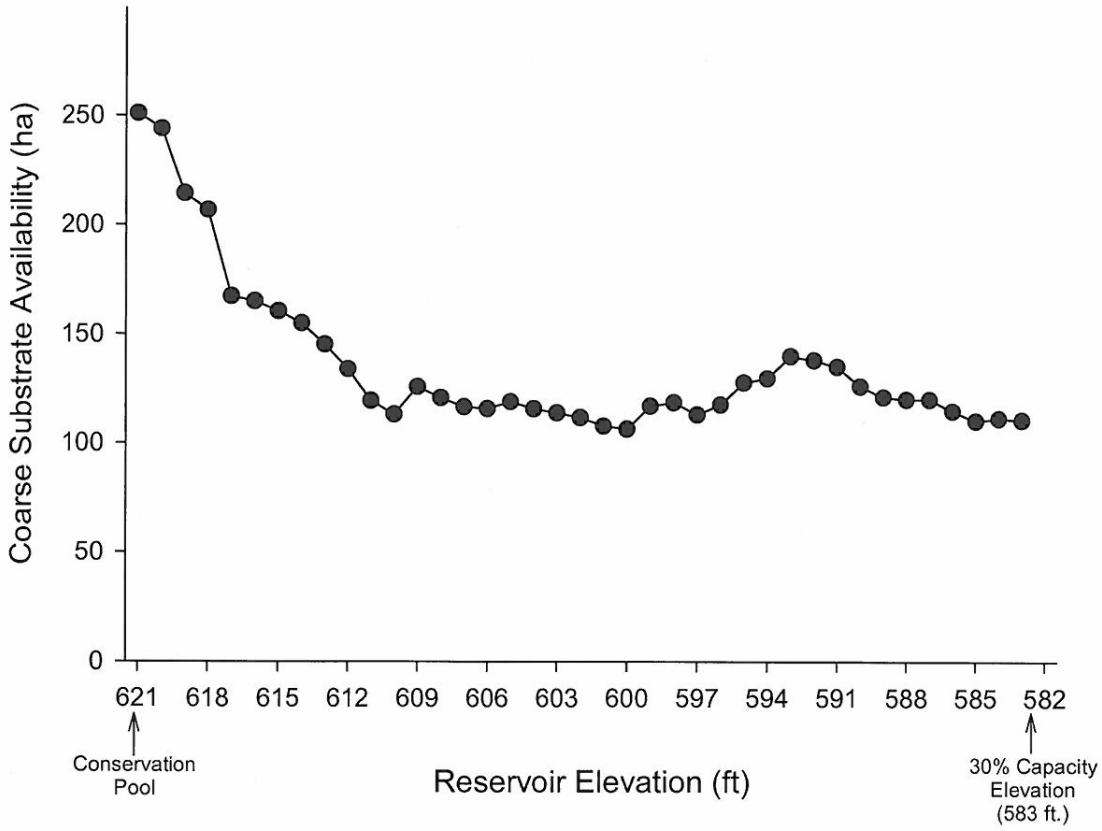


Figure 3. Elevation specific littoral zone (< 12 ft. water depth) woody habitat availability in Stillhouse Hollow Reservoir, Texas. Woody habitat was defined as one inundated standing tree, downed tree, or brush pile attractor.

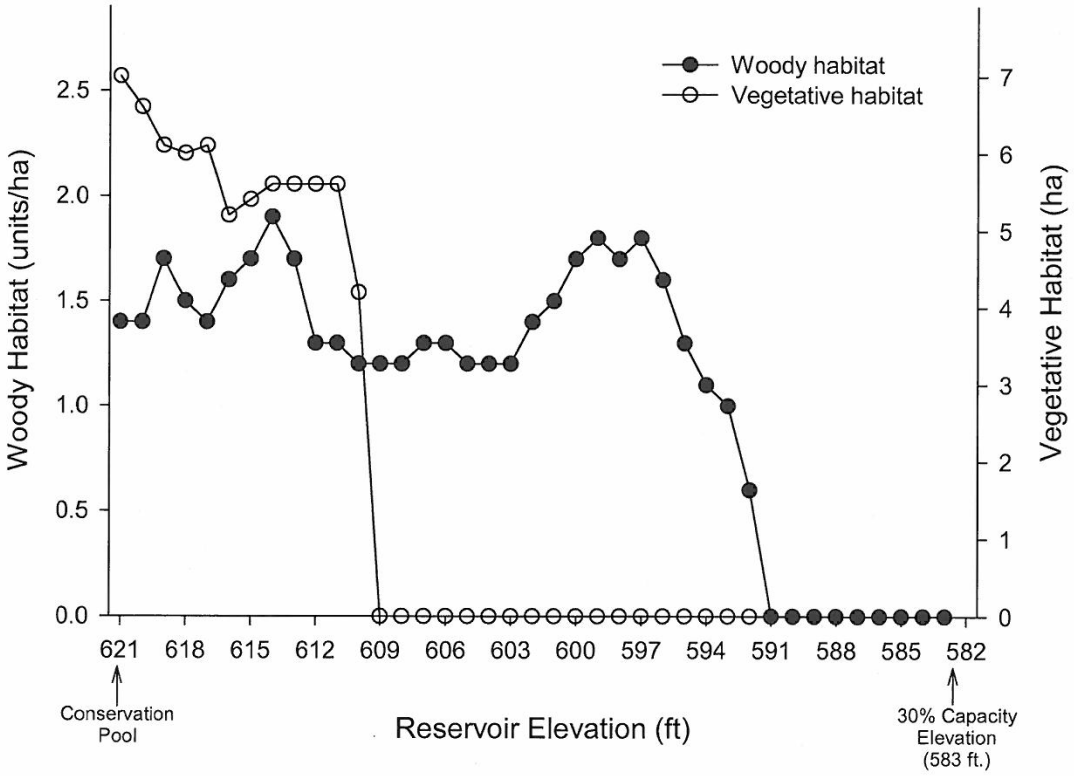


Figure 4. Elevation specific boat accessibility in Stillhouse Hollow Reservoir, Texas. The number of usable boat launches provided above each bar.