PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

Daniel Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Daniel Reservoir were surveyed in fall 2013 using electrofishing and trap netting. No gill netting was conducted in spring 2014 due to low water levels. Historical data are presented with the 2013 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:** Daniel Reservoir is a 950-acre impoundment constructed in 1948 on Gonzales Creek. The reservoir is located in Stephens County approximately 65 miles northeast of Abilene and is owned and operated by the City of Breckenridge. The reservoir provides municipal water supply for the City of Breckenridge. It was nearly dry from fall 2003 to spring 2007. After filling in June 2007, the water level began to decline and was nearly 11 feet below conservation pool in January 2014. Boat access was limited to one public boat ramp during the summer and fall of 2013 but was no longer usable by larger boats in March 2014. Bank fishing access was limited to the boat ramp area.

- **Management History:** Important sport fish include Largemouth Bass, Channel Catfish, and crappie. Previous management history included re-establishment of all sport and forage fishes by stocking fish, inform anglers of new fishing opportunities, discuss water conservation and stricter water restriction trigger points on the use of Daniel Reservoir for municipal water use with the City of Breckenridge. The most recent stockings included Florida Largemouth Bass in 2007 after the lake refilled. Angler harvest of all sport fishes has been regulated according to statewide size and bag limits.

- **Habitat:** No aquatic or semi-aquatic plants were present in 2013. The most prevalent vegetation type was flooded terrestrial brush and areas without vegetation. Riprap, cobble, boulders, and bedrock were also present.

- **Fish Community**
    - **Prey species:** Prey for sport fish were abundant and consisted primarily of Gizzard Shad, Bluegill, and Longear Sunfish. Other prey species present were Threadfin Shad, Inland Silverside, Green Sunfish, and Redear Sunfish. Prey species were of sizes that were available to most sport fish.

    - **Catfishes:** No gill net sampling was conducted due to low water level.

    - **White Bass:** No gill net sampling was conducted due to low water level. White Bass were present in the fall 2013 trap netting surveys.

    - **Largemouth Bass:** The relative abundance of Largemouth Bass has declined from 2009 to 2013. The number of Largemouth Bass below stock size has decreased since 2008 compared to 2013. Low numbers of legal-size fish were sampled in 2008, 2009, and 2013. Body conditions of Largemouth Bass have slightly improved since 2008.

    - **Crappie:** Both White and Black crappie were present in the reservoir with White Crappie being dominant. The 2013 trap net catch of White Crappie suggests large increase in relative abundance since 2009, and nearly four times the number of harvestable-sized fish were caught in 2013.

- **Management Strategies:** Survey Channel Catfish, White and Black crappie, Largemouth Bass, White Bass, and forage fish populations when water level permits. Meet with the City of Breckenridge to discuss water conservation and their plans for Daniel Reservoir as a municipal water source for the city. Advertise the excellent White Crappie fishery. Inform the public of the threat of invasive species and their impacts.

INTRODUCTION

This document is a summary of fisheries data collected from Daniel Reservoir in 2013. 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 2013 data for comparison.

Reservoir Description

Daniel Reservoir is a 950-acre impoundment constructed in 1948 on Gonzales Creek. The reservoir is located in Stephens County approximately 65 miles northeast of Abilene and is owned and operated by the City of Breckenridge. The reservoir provides municipal water for the City of Breckenridge and recreation. Land use around the reservoir is primarily agricultural. Habitat found during the time of sampling consisted of areas without vegetation and dead flooded terrestrial brush. The reservoir experiences substantial water level fluctuations. Prior to 2007, the lake was nearly dry, but the lake filled in 2007 and has steadily dropped with slight increases in water level during spring and summer rains in 2010, 2012, and 2013 (Figure 1). During January 2014, the reservoir water level was nearly 11 feet below conservation pool (CP). The U.S. Geological Survey's water level gauge was removed in January 2014. A new water level gauge will be installed between 2014-2015 and monitored by the City of Breckenridge. Other descriptive characteristics for Daniel Reservoir are in Table 1.

Angler Access

Boat access consisted of three public boat ramps near the dam, but all were out of water and unusable by March 2014. Bank angling access was limited to the boat ramp area. Additional boat ramp characteristics are presented in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from previous survey report (Dumont and Neely 2010) included:

1. Provide press releases on successful re-establishment of fisheries in Daniel Reservoir.
   Action: Popular press articles were written about Daniel Reservoir. Article topics included reservoir water levels, fish stockings, and bass fishing opportunities.
2. Continue discussion with Breckenridge staff regarding water conservation.
   Action: In July 2010, TPWD staff met with the city manager to discuss stricter water restriction trigger points and increase water conservation.

Harvest regulation history: Sport fish have always been regulated with statewide harvest regulations (Table 3).

Stocking history: The majority of fish added from previous stockings were assumed to be lost due to extremely low water levels. All fishes reintroduced in 2007 were part of the drought recovery plan. The complete stocking history is shown in Table 4.

Vegetation/habitat management history: Daniel Reservoir has no history of management for vegetation or structural habitat.

Water transfer: Daniel Reservoir provides municipal water supply for the City of Breckenridge. A water usage plan was established during the winter of 2013-2014 to mix 15 % Daniel Reservoir water with 85% Hubbard Creek Reservoir water for the City of Breckenridge. Modifications of water pumping from the reservoir may be made based on water levels of Daniel Reservoir and Hubbard Creek Reservoir. A surface water pump will remove the water from Daniel Reservoir and will be pumped directly to a water treatment plant for city use. No interbasin transfers are known to exist.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-minute stations) and trap netting (5 net nights at 5 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 trap netting, 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.

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 Largemouth Bass (N=29) for Florida Largemouth Bass (FLMB) genetic influence in 2013.

In August 2013, vegetation composition was determined by assessing the presence or absence of plant species at each of 100 random stations distributed throughout the reservoir and each of 50 random stations along the shoreline. Shoreline stations were sampled to increase the likelihood of encountering all aquatic and semi-aquatic plants present in the reservoir. Vegetation was identified at or below the waterline and marked as “1” for present or “0” for absent. “No vegetation” classification was assigned to any area with no vegetation. Shoreline and main reservoir points were analyzed separately. Percent occurrence (% = [# stations present / total stations sampled] X 100) and associated 95% confidence intervals were calculated for native and exotic plant species. No structure survey was conducted during the 2013-2014 since structural features have not changed since the 2009 sampling period.

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

RESULTS AND DISCUSSION

Habitat: Water level during the 2013 survey at the time of vegetation sampling was 9.5 feet below CP. Prior to the August 2013 survey, vegetation and habitat were last surveyed in 2009 (Dumont and Neely 2010). Most of the vegetation throughout the reservoir consisted of dead flooded terrestrial brush in 2013 (63%) and 2009 (76%). The most prevalent vegetation type was dead flooded terrestrial brush located on the eastern side of the reservoir. In some areas of the reservoir, no vegetation was observed. No aquatic or semi-aquatic plants were found in 2013, but Illinois pondweed and american lotus were present in 2009 (Table 5).

Prey species: Prey species primarily consisted of Gizzard Shad, Bluegill, and Longear. Sunfish, The most recent electrofishing catch rates of Gizzard Shad were high and variable from 507.0/h in 2008, 971.0/h in 2009, and 627.0/h in 2013. As IOV was above 80 for all three surveys, most Gizzard Shad were adequately sized prey for most predators (Figure 2). Bluegill CPUE was lower in 2013 (78.0/h) compared to 2009 (323.0/h; Figure 3). Size structure of Bluegill consisted of fish 1-6 inches in length, and most were adequate prey size for sport fish (Figure 3). Longear Sunfish CPUE increased from 11.0/h (RSE=75) in 2008, 29.0/h (RSE=45) in 2009 to 152.0/h (RSE=50) in 2013. Other prey species included Threadfin Shad, Inland Silverside, Green Sunfish, and Redear Sunfish (Appendix A). Survey results indicated abundant prey species for sport fish and that availability of prey should not be a limiting factor to the growth and condition of sport fish in the reservoir.

Channel Catfishes: A spring gill net survey was not conducted in 2014 because of low water level.

White Bass: No White Bass had been observed in Daniel Reservoir prior to 2013, and no White Bass have been stocked into Daniel Reservoir. However, White Bass were collected in trap nets in fall 2013. A spring gill netting survey was not conducted in 2014 because of low water level.

Largemouth Bass: Electrofishing CPUE for Largemouth Bass was 34.0/h in 2013, which was lower than in 2009 (187.0/h) and 2008 (175.0/h; Figure 4). There was also a corresponding decline in electrofishing CPUE of stock-size Largemouth Bass (Figure 4). Declines in CPUE of Largemouth Bass may be attributed to declines in water level. In 2013, relative abundance of legal-sized Largemouth Bass increased slightly to 11.0/h from 3.0/h reported in 2008. Body condition of Largemouth Bass improved slightly for the majority of inch groups sampled in 2013 compared to 2009. Average relative weight in 2013 ranged from 106 to 118, indicating ample forage was available for Largemouth Bass. Introgression of FLMB into the population was 70%; whereas, 31% of the fish were identified as FLMB genotype (Table 6).

White Crappie: Trap net CPUE of White Crappie was much higher in 2013 (130.4/nn) than the rates reported in 2011 (33.8/nn) and 2009 (19.4/nn). Catch per unit effort of harvestable-size White Crappie in 2013 (CPUE-10 = 75.2/nn) was greater than in 2011 (CPUE-10=5.9/nn) and 2009 (CPUE-10=8.1/nn; Figure 5). Proportional size distribution of White Crappie increased in 2013 (PSD=93) since the 2011 survey (PSD=53), but was similar to the 2009 survey (PSD=89; Figure 5).

Black Crappie: Trap netting catch of Black Crappie was low at Daniel Reservoir during the 2009, 2011, and 2013 surveys. Specifically, the catch rate of Black Crappie in 2009 was 13.7/nn and decreased to 1.5/nn in 2011 and remained low at 0.2/nn in 2013 (Figure 6). Black Crappie do not support the bulk of the available crappie fisheries; whereas, White Crappie in the reservoir offer anglers excellent opportunities to catch legally harvestable-sized fish.

Fisheries management plan for Daniel Reservoir, Texas

Prepared – July 2014

ISSUE 1: Historically, Daniel Reservoir produced excellent White Crappie and Largemouth Bass populations. These populations along with the forage populations may be adversely affected if there are decreases in water level. The modification to the municipal water pump system at Daniel Reservoir has been approved. A surface water pump is being installed and will have the capability to completely drain all the water from the reservoir. Municipal water uses in combination with drought-induced fluctuating water levels could be detrimental for fisheries.

MANAGEMENT STRATEGIES

1. Discuss the benefits of water conservation of fishing at Daniel Reservoir with the City of Breckenridge. Highlight the Largemouth Bass and White Crappie fisheries and explain how these fish populations are influenced by lake levels.
2. Reinitiate discussions with the City of Breckenridge regarding water use plans for Daniel Reservoir and request modifications on the plans to blend the reservoir's water with Hubbard Creek Reservoir.
3. Determine a conservation and access threshold elevation at which the reservoir could be managed to allow controlling authority operations as well as to provide adequate angler access and ample littoral/structural habitat to persist.
4. Continue to monitor fish populations with standard survey methods to determine any changes in relative abundance, growth, and size structure that may correlate with water level fluctuations.

ISSUE 2: Daniel Reservoir has multiple boat ramps that are unusable during periods of low water levels. No boat ramps were usable as of winter 2013.

MANAGEMENT STRATEGIES

1. Meet with the City of Breckenridge to discuss the potential of a low-water ramp-improvement/extension project and provide information about the Boating Access Grant and partnership program. During periods with low water levels as faced during this survey period, extension of the low-water public boat ramp would be feasible because of adequate slope and access to the lake bed.

ISSUE 3: Daniel Reservoir has an excellent White Crappie population with large numbers of harvestable-sized fish with good body condition.

MANAGEMENT STRATEGIES

1. Write popular press articles on White Crappie fishing at Daniel Reservoir and distribute to newspapers in the surrounding cities within proximity to Daniel Reservoir.
2. Advertise White Crappie fishing opportunities at Daniel Reservoir through online social media.

ISSUE 4: 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 were significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the

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

SAMPLING SCHEDULE JUSTIFICATION:
If water levels are adequate, sampling will be conducted for sport fishes and habitat, vegetation, and access surveys will be conducted. Biennial electrofishing will be conducted for Largemouth Bass monitoring of relative abundance, size structure, and body conditions; prey fish will be sampled during the fall 2017 electrofishing event. Biennial gill netting will be conducted to monitor relative abundance, size structure, and body conditions for White Bass. Tandem hoop netting will be conducted in summer 2017 to monitor relative abundance, size structure, and body condition for Channel Catfish. Biennial trap netting will be conducted to monitor relative abundance, size and age structure, and body condition for White and Black crappie. A vegetative habitat and access survey will be conducted in 2017. The proposed sampling schedule is in Table 7.

LITERATURE CITED

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, third edition. American Fisheries Society, Bethesda, Maryland.

DiCenzo, V.J., M.J. Maceina, and M.R.Stimpert. 1996. Relationships between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Dumont, S. C., and B.C. Neely. 2010. Statewide freshwater fisheries monitoring and management program survey report for: Daniel Reservoir, 2009. Texas Parks and Wildlife Department, Federal Aid In Sport Fish Restoration, Grant F-30-R, Performance Report, Austin, Texas.

Guy, C. S., R. M. Neuman, 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

United States Geological Survey (USGS). 2014. National water information system: Web interface. Available: http://waterdata.usgs.gov/tx/nwis (July 2014).

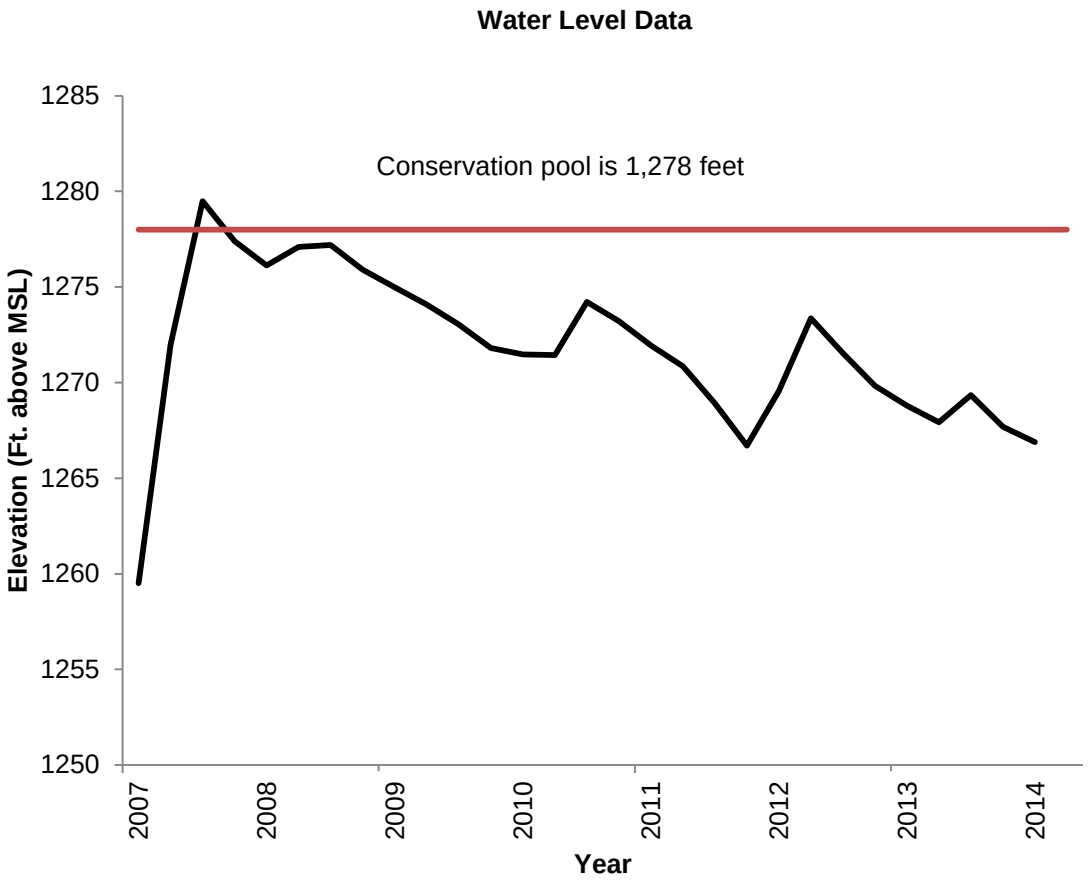


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Daniel Reservoir, Texas. Conservation pool elevation is 1,278 feet above mean sea level, shown in red. Lake bottom is located approximately at 1,250 feet above mean sea level. Dead pool is approximately at 1,250 feet above mean sea level.

Table 1. Characteristics of Daniel Reservoir, Texas.

Characteristic	Description
Year constructed	1948
Controlling authority	City of Breckenridge
County	Stephens
Reservoir type	Tributary: Brazos River basin
Shoreline Development Index	2.6
Conductivity (µmhos/cm)	340-370
Access: Boat	Poor – 1 ramp
Bank	Poor
Handicapped	None

Table 2. Boat ramp characteristics for Daniel Reservoir, Texas. Reservoir elevation at time of survey was 1,268 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
1	32.647706 -98.870361	Y	5	Unknown	Out of water; No extension possible
2	32.645731 -98.871233	Y	5	1,266	Almost out of water; Extension may be possible
3	32.645272 -98.873733	Y	5	Unknown	Out of water; No extension possible

Table 3. Harvest regulations for Daniel Reservoir, Texas.

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

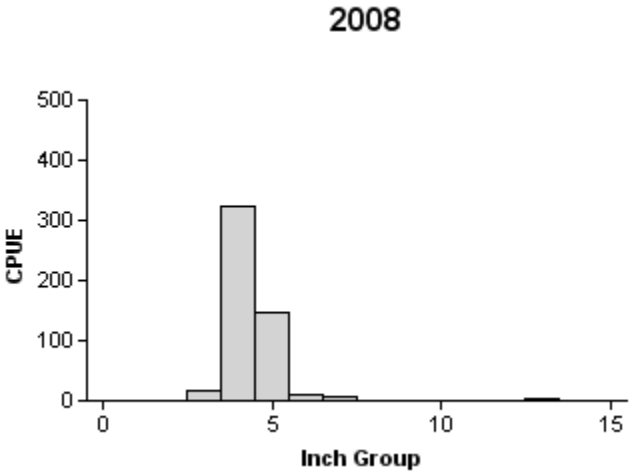
Table 4. Stocking history of Daniel Reservoir, Texas. Size categories were: FRY = < 1 inch; FGL = fingerling 1-3 inches; ADL = adults.

Species	Year	Number	Size
Gizzard Shad	2007	200	ADL
Threadfin Shad	2007	100	ADL
Channel Catfish	2007	90,314	FGL
Inland Silverside	2007	200	ADL
Bluegill	2007	200	ADL
	2007	89,679	FGL
	Total	89,879	
Florida Largemouth Bass	1983	48,072	FGL
	1991	95,000	FGL
	1995	95,785	FGL
	1997	95,502	FGL
	2007	233,338	FRY
	2007	46,777	FGL
	Total	614,474	
White Crappie	2007	40	ADL

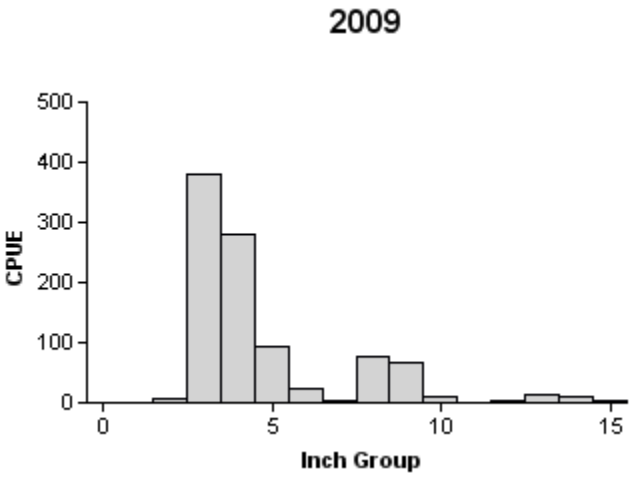
Table 5. Comparison of the percent occurrence and associated 95% confidence levels for vegetation species sampled at randomly selected stations throughout the reservoir (N=100 in 2013 and N=95 in 2009) and along the shoreline (N=50 in 2013) in Daniel Reservoir, 2009 and 2013.

Vegetation	Percent Occurrence 2009 Throughout the Reservoir	Percent Occurrence 2013 Throughout the Reservoir	Percent Occurrence 2013 Shoreline
Dead flooded Terrestrial brush	75.8 (8.6)	62.5 (13.7)	69.6 (18.8)
No Vegetation	24.2 (8.6)	37.5 (13.7)	30.4 (18.8)
Black Willow	13.7 (6.9)	0 (0)	0 (0)
Smartweed	1.1 (2.1)	0 (0)	0 (0)
Illinois Pondweed	3.2 (3.5)	0 (0)	0 (0)
American Lotus	4.2 (4.0)	0 (0)	0 (0)

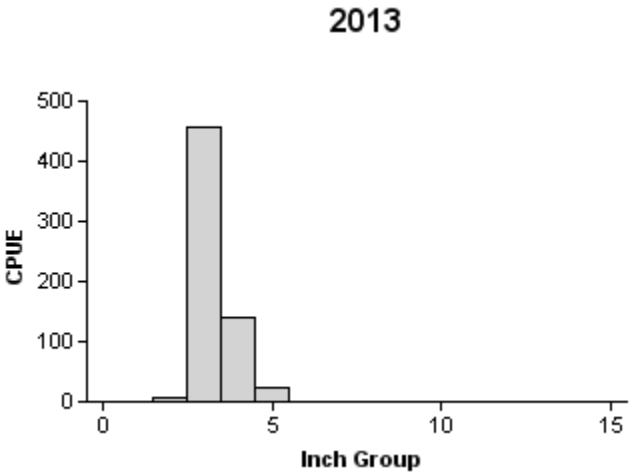
Gizzard Shad



Effort = 1.0
Total CPUE = 507.0 (16; 507)
IOV = 99 (1)



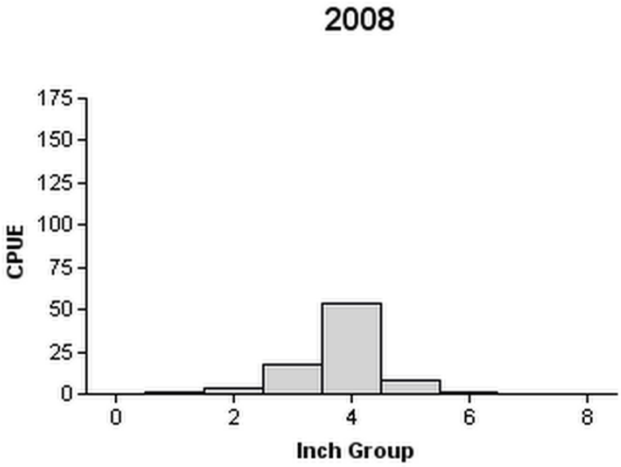
Effort = 1.0
Total CPUE = 971.0 (15; 971)
IOV = 81 (7)



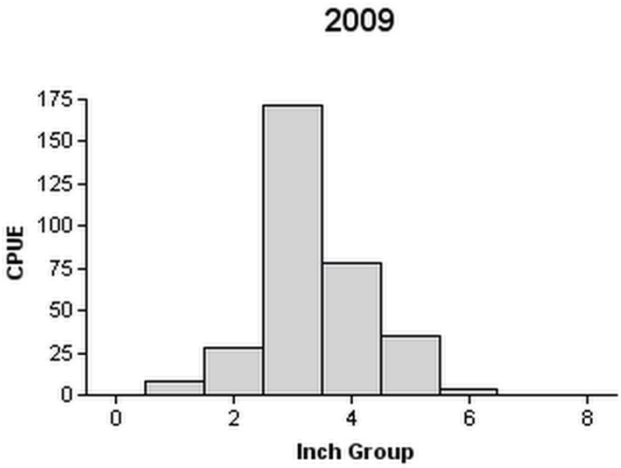
Effort = 1.0
Total CPUE = 627.0 (19; 627)
IOV = 97 (1)

Figure 2. Comparison of the 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, Daniel Reservoir, Texas, 2008, 2009, and 2013.

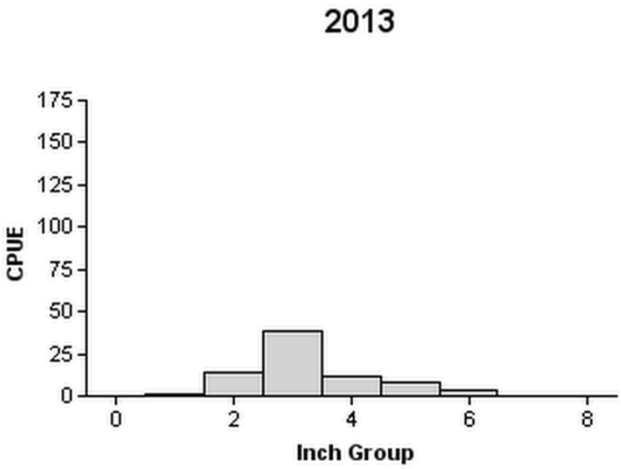
Bluegill



Effort =	1.0
Total CPUE =	86.0 (18; 86)
Stock CPUE =	81.0 (19; 81)
PSD =	1 (1)



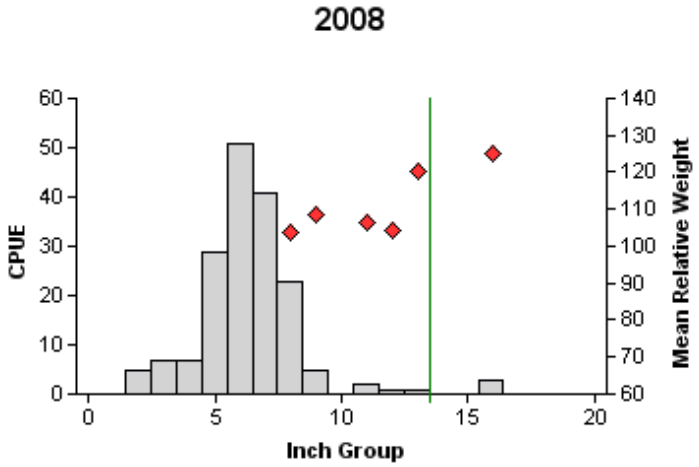
Effort =	1.0
Total CPUE =	323.0 (23; 323)
Stock CPUE =	287.0 (22; 287)
PSD =	1 (1)



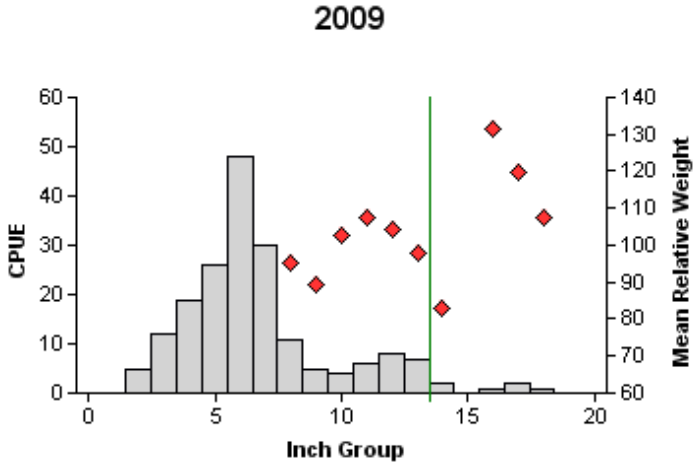
Effort =	1.0
Total CPUE =	78.0 (35; 78)
Stock CPUE =	63.0 (35; 63)
PSD =	6 (3)

Figure 3. Comparison of the 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, Daniel Reservoir, Texas, 2008, 2009, and 2013.

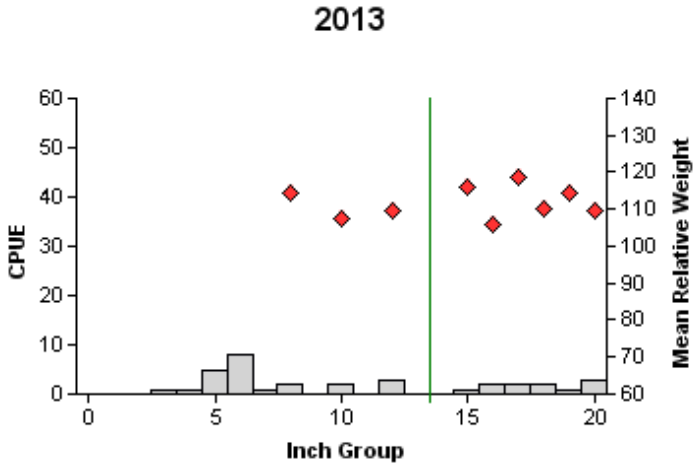
Largemouth Bass



Effort =	1.0
Total CPUE =	175.0 (19; 175)
Stock CPUE =	35.0 (16; 35)
CPUE-14 =	3.0 (52; 3)
PSD =	14 (7)



Effort =	1.0
Total CPUE =	187.0 (21; 187)
Stock CPUE =	47.0 (29; 47)
CPUE-14 =	6.0 (46; 6)
PSD =	45 (8)



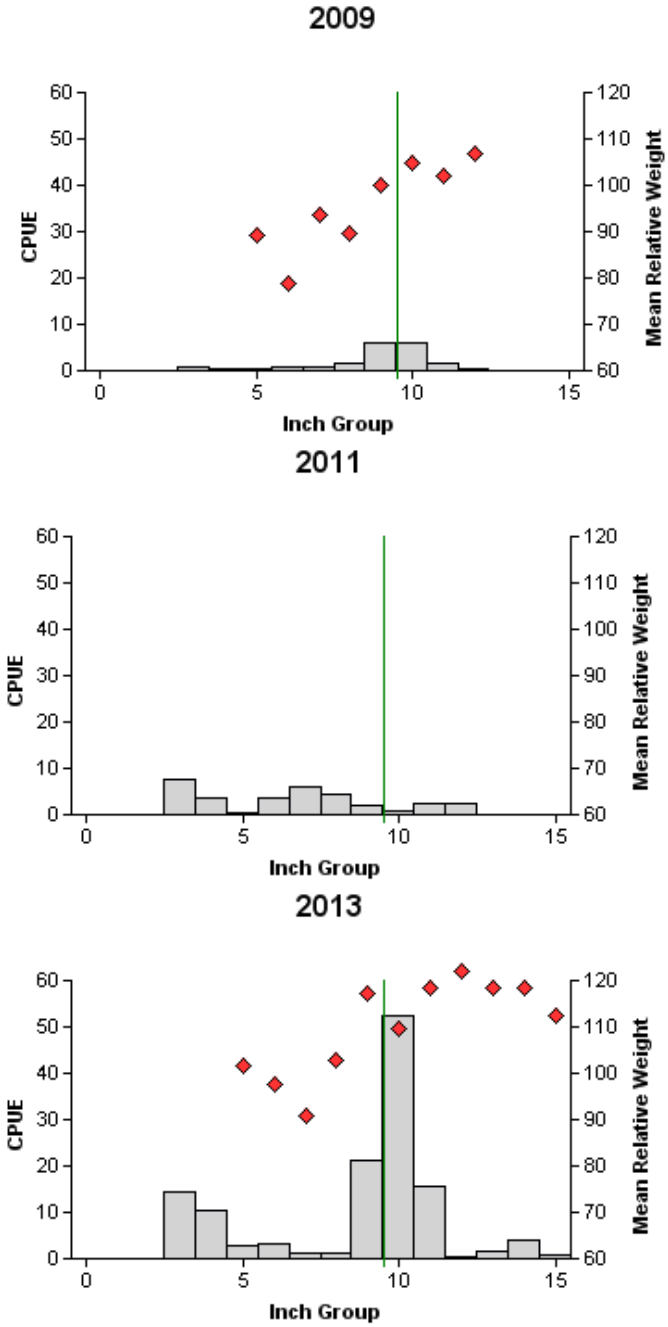
Effort =	1.0
Total CPUE =	34.0 (35; 34)
Stock CPUE =	18.0 (36; 18)
CPUE-14 =	11.0 (43; 11)
PSD =	78 (11)

Figure 4. Comparison of the 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, Daniel Reservoir, Texas, 2008, 2009, and 2013. Vertical line denotes 14-inch minimum length limit.

Table 6. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Daniel Reservoir, Texas, 2013. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by with micro-satellite DNA analysis.

		Number of fish				
Year	Sample Size	FLMB	Intergrade	NLMB	% FLMB alleles	% FLMB genotype
2013	29	9	20	0	70	31

White Crappie



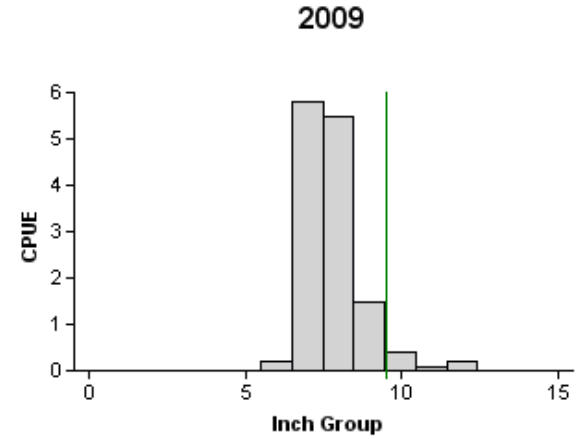
Effort =	10.0
Total CPUE =	19.4 (19; 194)
Stock CPUE =	18.1 (19; 181)
CPUE-10 =	8.1 (20; 81)
PSD =	89 (3)

Effort =	10.0
Total CPUE =	33.8 (23; 338)
Stock CPUE =	22.7 (19; 227)
CPUE-10 =	5.9 (37; 59)
PSD =	53 (8)

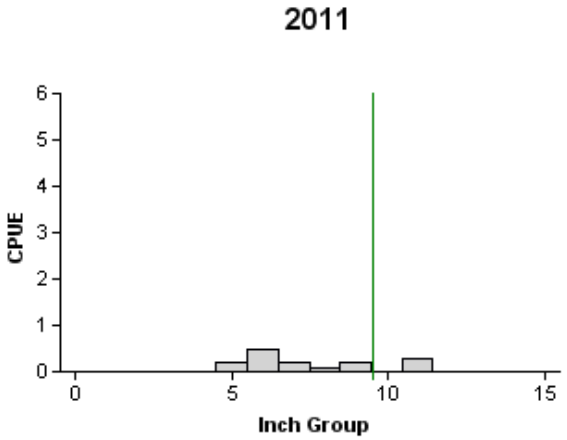
Effort =	5.0
Total CPUE =	130.4 (21; 652)
Stock CPUE =	105.4 (25; 527)
CPUE-10 =	75.2 (27; 376)
PSD =	93 (4)

Figure 5. Comparison of the number of White Crappie 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 fall trap netting surveys, Daniel Reservoir, Texas, 2009, 2011, and 2013. Vertical line denotes 10-inch minimum length limit.

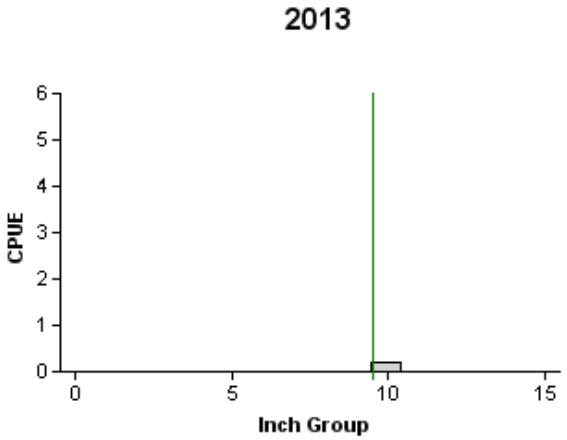
Black Crappie



Effort =	10.0
Total CPUE =	13.7 (38; 137)
Stock CPUE =	13.7 (38; 137)
CPUE-10 =	0.7 (43; 7)
PSD =	56 (6)



Effort =	10.0
Total CPUE =	1.5 (30; 15)
Stock CPUE =	1.5 (30; 15)
CPUE-10 =	0.3 (71; 3)
PSD =	40 (11)



Effort =	5.0
Total CPUE =	0.2 (100; 1)
Stock CPUE =	0.2 (100; 1)
CPUE-10 =	0.2 (100; 1)
PSD =	100 (0)

Figure 6. Comparison of the number of Black Crappie caught per net night (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Daniel Reservoir, Texas, 2009, 2011, and 2013. Vertical line denotes 10-inch minimum length limit.

Table 7. Proposed sampling schedule for Daniel Reservoir, Texas. Survey period is June through May. Gill netting is conducted in the spring, tandem hoop netting is conducted in the summer, and electrofishing and trap netting surveys are conducted in the fall. Habitat and access surveys are conducted in the summer. Standard surveys are denoted by S and additional surveys are denoted by A.

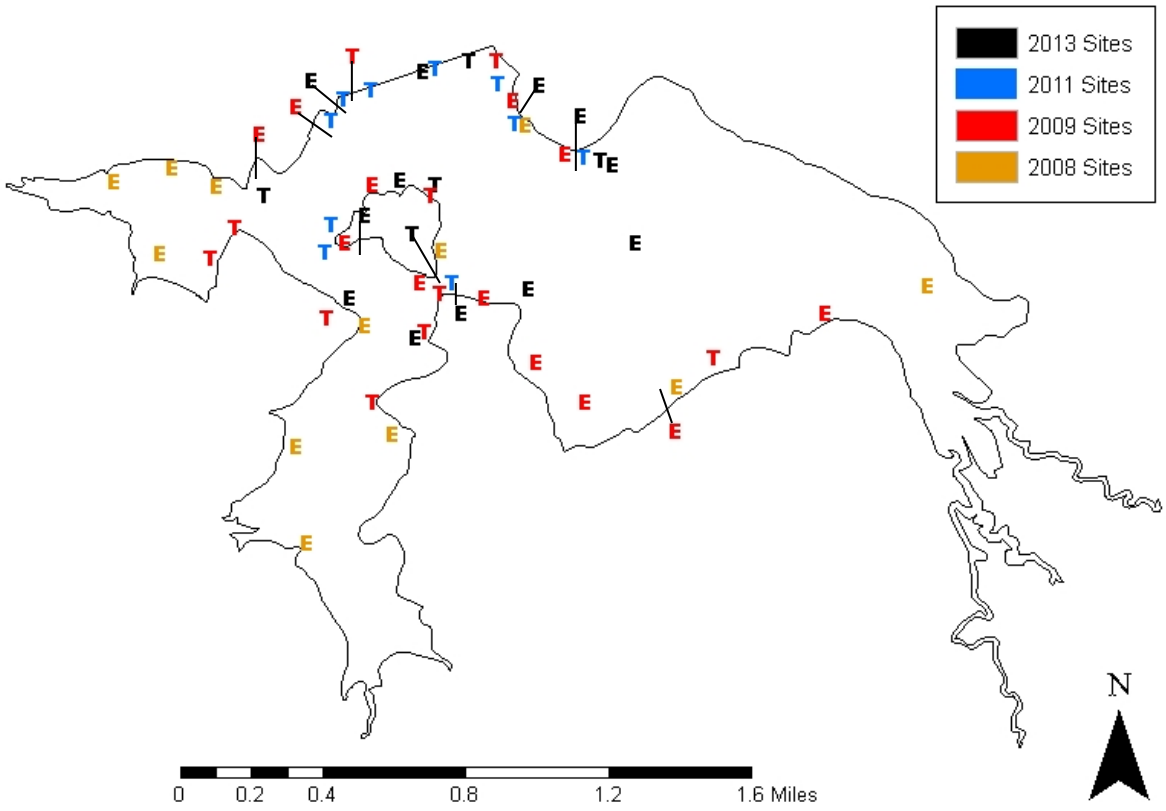
Survey year	Electrofishing	Trap netting	Tandem Hoop Nets	Gill netting	Habitat	Access	Creel survey	Report
2014-2015								
2015-2016	A	A		A				
2016-2017								
2017-2018	S	S	S	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Daniel Reservoir, Texas, 2013. Sampling effort was 1 hour for electrofishing and 5 net nights for trap netting.

Species	Electrofishing		Trap netting	
	N	CPUE	N	CPUE
Gizzard Shad	647	647.0		
Threadfin Shad	29	29.0		
Inland Silverside	3	3.0		
White Bass			12	2.40
Green Sunfish	26	26.0		
Bluegill	78	78.0		
Longear Sunfish	152	152.0		
Redear Sunfish	1	1.0		
Largemouth Bass	34	34.0		
White Crappie			652	130.4
Black Crappie			1	0.2

APPENDIX B



Map of Daniel Reservoir, Texas sampling sites, 2008-2014. Trap netting and electrofishing stations are indicated by T and E, respectively. The lake fluctuated between 2-11 feet below conservation pool from 2008-2013.