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STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

Lake Raven

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SURVEY AND MANAGEMENT SUMMARY

The Lake Raven fish community was surveyed from June 2005-May 2006 using electrofishing, gill nets, and trap nets. A habitat and vegetation survey was conducted in August 2005. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake Raven is a 203-acre reservoir located in Huntsville State Park. The reservoir was repaired and re-impounded in 1956 by the Texas Parks & Wildlife Department for recreational use within the Huntsville State Park.

- **Management history:** Lake Raven has a history of producing trophy largemouth bass. The population has been managed with a catch-and-release regulation since September 1996. The regulation allows the angler to retain largemouth bass measuring $\geq$ 21 inches for weighing at a weigh station with subsequent release or, if weighing 13 pounds or more, donation into the Budweiser ShareLunker Program. Lake Raven has been included in Operation World Record, a project designed to compare growth of selectively bred ShareLunker largemouth bass fingerlings to resident bass fingerlings.

  Alligatorweed, hydrilla, and water hyacinth have all been problem exotic plants to varying degrees at different times. As a result of a chemical treatment in summer of 2001 and a subsequent stocking of triploid grass carp the following October, hydrilla is no longer a problem. Alligatorweed flea beetles were introduced in the summer of 2003 and spring of 2006. Currently alligatorweed abundance is not problematic. Water hyacinth continues to be a problem and was chemically treated in spring 2006.

- **Fish community**

  - **Prey species:** The prey fish community at Lake Raven consists primarily of threadfin shad, bluegill, and redear sunfish. Gizzard shad are also present but provide limited forage. Warmouth and spotted sunfish are also present in small numbers.

  - **Catfishes:** Blue and channel catfish are present in Lake Raven but have been poorly represented in standard monitoring samples until this year.

  - **Largemouth bass:** Largemouth bass are abundant in Lake Raven and provide high quality angling opportunities. The lake has a history of producing trophy largemouth bass. Florida largemouth bass fingerlings are periodically stocked to enhance and maintain the trophy potential of the population.

  - **Crappie:** Crappie are present but not a significant component of the fishery at Lake Raven. Trap net catches in monitoring surveys have been low. A few crappie were collected in gill nets in the spring of 2006.

- **Management strategies:** We will continue to monitor the largemouth bass population annually in the fall with electrofishing. Largemouth bass genetics will be assessed, and additional ShareLunker largemouth bass fingerlings will be stocked as part of the Operation World Record Project. Catfish and crappie populations will be monitored every 4 years by gill nets and trap nets, respectively. An access point creel survey will be conducted in the spring of 2009. We will continue to work with park personnel to assess exotic vegetation coverage and implement treatment strategies as needed.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Raven in 2005-2006. The purpose of this 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 2005-2006 data for comparison.

Reservoir Description

Lake Raven is a 203-acre reservoir located within Huntsville State Park. The drainage area for Lake Raven is approximately 1,556 square miles with rainfall in the watershed averaging 46.15 inches per year. The reservoir has a maximum depth of 28 feet, a mean depth of 6 feet, a shoreline length of 6.3 miles, and a shoreline development ratio of 2.3. Lake Raven lies within the Piney Woods Land Resource Area with Lakeland Association soils. Land use around the reservoir is recreational.

Boat and bank access are excellent. Other descriptive characteristics from Lake Raven are found in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Webb and Henson 2002) included:

1. Lake Raven bass fishery is subject to high fishing pressure.
   Action: To prevent over-exploitation, management was continued under the catch-and-release-only regulation with lakeside weigh station. Electrofishing surveys were conducted to monitor bass population in the fall of 2002, 2003, 2004, and 2005.

2. Hydrilla coverage created access problems on Lake Raven.
   Action: After chemical treatments and a stocking of triploid grass carp in 2001, the hydrilla has been significantly reduced and is no longer creating access problems.

3. The boat ramp and fishing piers are in need of repair to improve access.
   Action: Working with park staff, grant money was obtained for the construction of a new boat ramp that was completed this year. Fishing piers have also been renovated and are now open to anglers.

Harvest regulation history: Largemouth bass have been managed under a catch-and-release-only regulation since 1996. Prior to that, the fishery was under a 14-21 inch slot length limit. Other species have been managed under statewide regulations, except that channel catfish are managed under the special regulations applied to Community Fishing Lakes (Table 2).

Stocking history: Fish stockings began at Lake Raven in 1966 with the introduction of channel catfish. Periodic stockings of channel catfish continued over the next 40 years, but a self-sustaining population has never been created. Florida strain largemouth bass were first introduced in 1979 and have been stocked nine times for a total of over 57,000 fingerlings. In 2005, 5,901 ShareLunker fingerlings were stocked as part of Operation World Record, a research project designed to compare growth of selectively bred ShareLunker fingerlings to that of resident bass fingerlings. Both hybrid and triploid grass carp have been stocked for the control of aquatic vegetation. A complete stocking history is provided in Table 3.

Vegetation/habitat history: The primary habitat in Lake Raven is aquatic vegetation, both native and exotic. Hydrilla has caused severe access problems in past years but has been successfully controlled since 2002. Other problem plants included alligatorweed and water hyacinth; however,

alligatorweed is now under control. The water hyacinth persists as a problem plant and was chemically treated again in June 2006.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations) and gill 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 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 2005).

An access point creel survey was begun in the spring quarter of 2005 but had to be aborted due to closure of the ramp for repairs. Creel data from the 2001 survey are reported in this document. Shoreline structural habitat and vegetation were surveyed in the summer of 2005 according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [Relative Weight (Wr)] 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 X SE of the estimate/estimate) was calculated for all CPUE statistics and for creel statistics, and SE was calculated for structural indices and IOV.

RESULTS AND DISCUSSION

Habitat: A physical habitat survey in 2005 revealed very little diversity of abiotic habitat. The shoreline is predominantly featureless with various mixed stands of native emergent and flooded terrestrial vegetation and overhanging brush. Submersed aquatic macrophytes are present in minimal quantities. A long-standing hydrilla infestation was very problematic before 2002, but after a chemical treatment and grass carp stocking in 2001, only about 1 acre of hydrilla remains. The results of the 2005 structural habitat and vegetation survey are presented in Table 4.

Creel: Largemouth bass are the most popular sport fish at Lake Raven accounting for 87% of all directed angling effort (Table 5). During the period March-May 2001 it is estimated that anglers spent over 3,500 hours seeking largemouth bass. Trip expenditures for that period were estimated to be just over $14,000 dollars (Table 6).

Prey species: Threadfin shad were the most abundant prey fish in the 2005 electrofishing survey (176.0/h). In previous years, the prey fish community has been dominated by bluegill and redear sunfish, but catch rates have greatly declined since 2002 (Figures 2 and 3). The decline of sunfish catch may be a response to declines in submersed macrophyte abundance, thus increasing vulnerability of sunfish to predation by largemouth bass. The PSD of both bluegill and redear increased from 1 and 13 respectively in 2002, to 11 and 55 respectively in 2005, indicating a shift in size structure towards a higher proportion of quality sized individuals. The concomitant increase in relative abundance of threadfin shad with the decline in sunfish abundance would be expected. We have observed similar inverse relationships between threadfin shad abundance and sunfish abundance in other reservoirs. Gizzard shad are also present, and electrofishing catch rates have changed little over the past 5 years (Figure 1).

Redear sunfish are available in good sizes for anglers (Figure 3). Individuals to 10 inches in length were observed in the 2005 electrofishing survey. The RSD-6 calculated for the 2005 sample was 65.0.

Catfishes: Blue catfish are now present in Lake Raven after stockings in 2000 and 2003. The gill net CPUE was 8.2 fish/nn in 2006. Catch rates of channel catfish were low prior to 2006 (Figure 5). After the chemical treatment in 2001, the significant reduction in hydrilla resulted in an increase in available

benthic habitat and, together with recent stockings of advanced channel catfish, is the likely reason for the apparent increase in channel catfish abundance. In the 2006 survey, channel catfish up to 27 inches were collected in the sample, and the RSD-12 of 72.0 indicates quality-sized fish are available to anglers, yet the fishery remains underutilized.

Largemouth bass: The largemouth bass population has changed little since 2004 (Figure 6). Population structural indices indicate a well-balanced population with good numbers of quality fish. Fish up to 21 inches were observed in the fall 2005 sample. Largemouth bass are in good condition with mean Relative Weight consistently at or above 100 in all length groups (Figure 6). Over 87% of the total directed effort for the spring quarter 2001 was spent seeking largemouth bass (Table 8). No harvested bass were observed during the creel period as expected with the catch-and-release regulation.

White and black crappie: Because trap nets have been ineffective, no trap nets were set in the fall of 2005. Instead, crappie captured in gill nets set in January 2006 were used to estimate population parameters. The gill net catch rate of white crappie was 6.4/nn with an RSD-10 of 28 and for black crappie those values were 2.8/nn and an RSD-10 of 29 respectively (Figures 7 and 8). This is the first time in any sample year that we have captured a significant number of crappie with any gear type. Since we have no data for comparison, valid inferences regarding management of this population are difficult to make. The spring 2001 creel indicated that crappie were being sought by anglers, and directed effort for crappies accounted for over 5% of all effort (Table 10).

Fisheries management plan for Lake Raven, Texas

Prepared – July 2006.

ISSUE 1 The largemouth bass population in Lake Raven is well-balanced and has produced trophy fish. It is currently one of the lakes involved in TPWD's Operation World Record. Since it is a small state park lake subjected to high fishing pressure, it is susceptible to over-exploitation.

MANAGEMENT STRATEGIES

1. Maintain Lake Raven under the current catch-and-release regulation for largemouth bass.
2. Conduct annual electrofishing surveys to monitor the largemouth bass and prey fish populations.
3. Conduct an access point creel survey during the period March-May 2009.
4. Continue stockings of ShareLunker Florida largemouth bass fingerlings as part of the Operation World Record Project.

ISSUE 2 Many local bass anglers are unaware of the potential for trophy largemouth bass at Lake Raven.

MANAGEMENT STRATEGIES

1. Use news releases to publicize the bass fishery at Lake Raven and its inclusion in Operation World Record.

ISSUE 3 The excellent bluegill and redear sunfish populations in Lake Raven offer a quality angling experience, yet many anglers are not aware of this opportunity. Catfishes and crappie also offer good opportunities for harvest-oriented anglers.

MANAGEMENT STRATEGIES

1. Publicize and promote the catfish, crappie, and sunfish fisheries through park personnel and news releases as an alternative for harvest-oriented anglers.

ISSUE 4 Exotic aquatic vegetation continues to create an access problem on Lake Raven. Although herbicide treatment and the introduction of grass carp have greatly decreased the hydrilla infestation, the plant remains in the system. Water hyacinth has the potential to limit shoreline access.

MANAGEMENT STRATEGIES

1. Continue monitoring hydrilla and water hyacinth annually.
2. Continue herbicide and bio-control treatments as needed.

SAMPLING SCHEDULE JUSTIFICATION: Annual fall electrofishing surveys will be conducted to monitor largemouth bass and prey fish populations. Annual vegetation surveys will be done to monitor exotic aquatic vegetation. We will conduct a spring quarter creel survey every four years to monitor angler catch, harvest, and expenditures. Gill net surveys every four years will be done to monitor catfish and crappie populations. Access and structural habitat surveys will also be conducted every four years **(**Table 11).

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DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

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Table 1. Characteristics of Lake Raven, Texas.

Characteristic	Description
Year constructed	1956
Controlling authority	Texas Parks and Wildlife Department
Counties	Walker (location of dam)
Reservoir type	State Park
Shoreline Development Index (SDI)	2.3
Conductivity	160 µmhos/cm

Table 2. Harvest regulations for Lake Raven, Texas.

Species	Bag Limit	Minimum-Maximum Length (inches)
Bass, largemouth	0	Catch-and-release-only*
Catfish, flathead	5	18 – No limit
Catfish, channel and blue catfish, their hybrids and subspecies	5 (in any combination)	No limit
Crappie, white and black crappie, their hybrids and subspecies	25 (in any combination)	10 – No limit

* Catch and release only for largemouth bass except that any bass 21 inches or greater caught may be retained alive in a live well, weighed at lakeside weigh station, and then immediately released or donated to the ShareLunker Program.

Table 3. Stocking history of Lake Raven, Texas. Size Categories are: FRY =<1 inch; FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

Species	Year	Number	Size
Northern pike	1974	1,160	FGL
N pike X muskellunge	1976	2,100	FGL
Blue catfish	2000	1,591	AFGL
	2003	5,157	AFGL
	Total	6,748	
Channel catfish	1966	9,900	AFGL
	1971	52,000	AFGL
	1972	57,400	AFGL
	1980	80	ADV
	1982	2,016	AFGL
	1987	21,087	AFGL
	1992	5,252	AFGL
	1996	5,250	AFGL
	1998	5,256	AFGL
	1999	5,251	AFGL
	2000	3,672	AFGL
	2001	5,253	AFGL
	2002	5,237	AFGL
	2004	2,034	AFGL
	2005	12,084	AFGL
	Total	191,772	
Black crappie	1968	30	ADL
	1970	4,120	ADV
	Total	4,150	
Florida largemouth bass	1979	10,800	FGL
	1980	338	ADL
	1987	16,850	FGL
	1991	22,487	FGL
	1996	142	ADL
	1998	952	AFGL
	2005	5,901	AFGL
	Total	57,470	
Green X redear	1968	13	ADL
	1972	300	FGL
	Total	313	
Hybrid grass carp	1989	3,038	FGL
	1990	400	ADL
	Total	3,438	
Triploid grass carp	2001	400	ADL

Table 4. Survey of littoral zone and physical habitat types, Lake Raven, Texas, 2005. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Featureless	0.1	2.1		
Featureless/ bulkhead	0.1	1.3		
Featureless/ concrete	0.1	1.6		
Featureless/ flooded terrestrial/ native emerged	0.7	10.4		
Featureless/ concrete/ native emerged/ native floating	0.2	3.7		
Featureless/ overhanging brush/ flooded terrestrial/ native emerged	0.6	9.0		
Featureless/ native emerged/ overhanging brush/ flooded terrestrial/ native floating	4.1	65.0		
Featureless/ native emerged/ overhanging brush/ flooded terrestrial/ native submerged/ native floating	0.4	6.9		
Alligatorweed/water hyacinth			65.0	27.2
Hydrilla			1.0	0.4
Native emerged			1.5	0.6

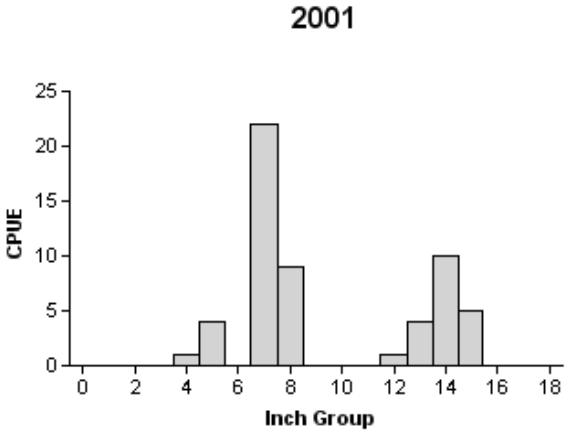
Table 5. Percent directed angler effort by species for Lake Raven, Texas, March-May 2001.

Species	Year
	2001
Crappies	5.3
Sunfishes	3.8
Largemouth bass	87.5
Anything	3.5

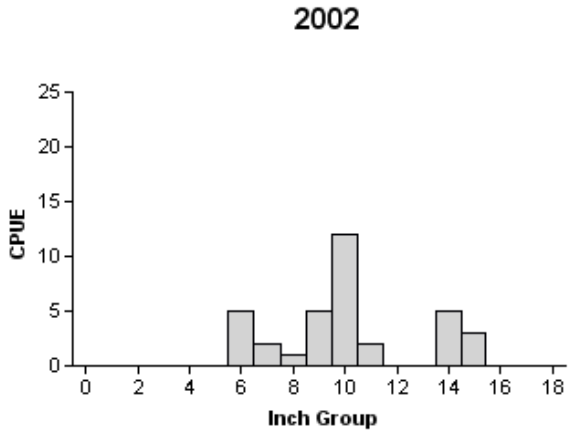
Table 6. Total fishing effort (h) for all species and total directed expenditures at Lake Raven, Texas, March – May 2001.

Creel Statistic	Year
	2001
Total fishing effort (h)	4,042
Total directed expenditures	$14,147

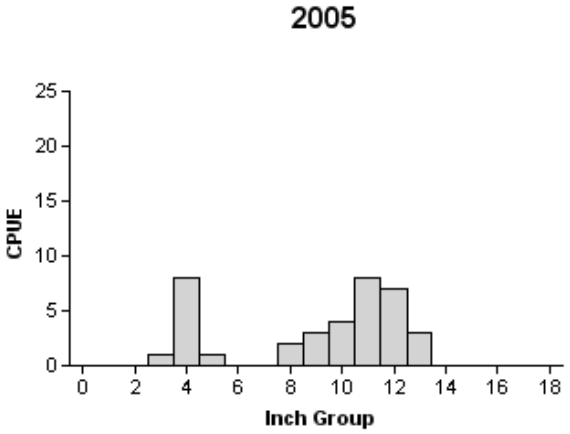
Gizzard Shad



Effort =	1.0
Total CPUE =	56.0 (46; 56)
Stock CPUE =	51.0 (44; 51)
PSD =	39.0 (0.2)
IOV =	48.21 (0.14)



Effort =	1.0
Total CPUE =	35.0 (33; 35)
Stock CPUE =	30.0 (35; 30)
PSD =	33.0 (0.15)
IOV =	20.0 (0.05)

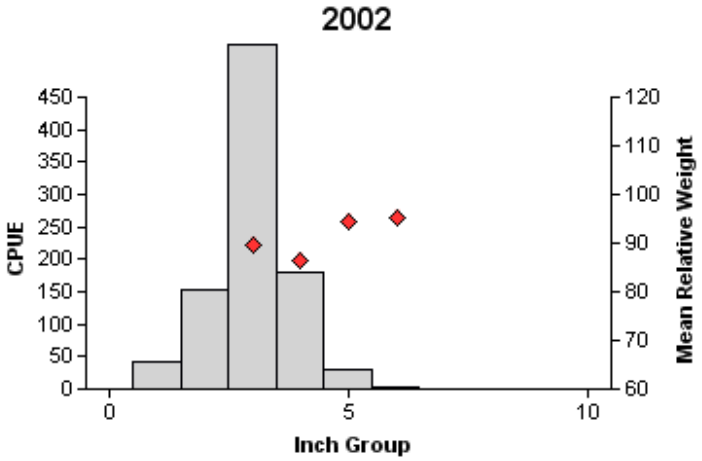


Effort =	1.0
Total CPUE =	37.0 (24; 37)
Stock CPUE =	27.0 (32; 27)
PSD =	67.0 (0.15)
IOV =	24.39 (0.11)

Figure 1. Number of gizzard shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Raven, Texas, 2001, 2002, and 2005.

Bluegill

Effort =	1.0
Total CPUE =	242.0 (27; 242)
Stock CPUE =	99.0 (24; 99)
PSD =	5.0 (0.02)
RSD-6 =	5.0 (0.02)

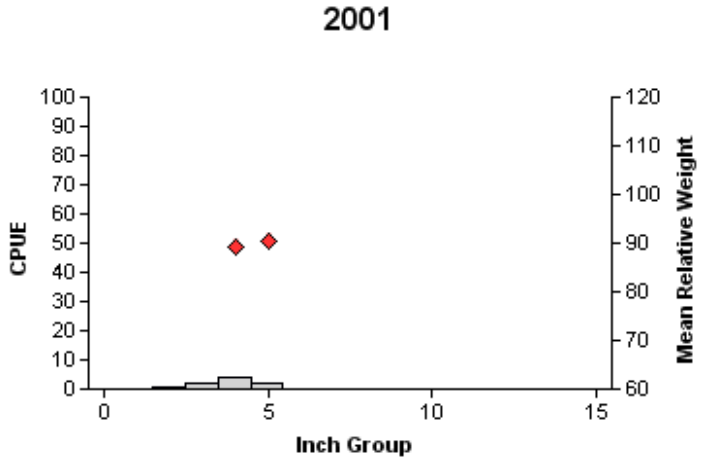


Effort =	1.0
Total CPUE =	940.0 (20; 940)
Stock CPUE =	746.0 (21; 746)
PSD =	1.0 (0.00)
RSD-6 =	1.0 (0)

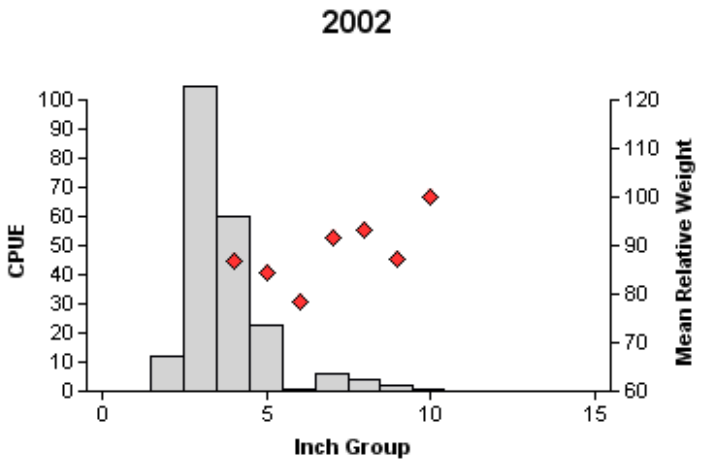
Effort =	1.0
Total CPUE =	102.0 (14; 102)
Stock CPUE =	91.0 (13; 91)
PSD =	11.0 (0.06)
RSD-6 =	11.0 (0.06)

Figure 2. Number of bluegill caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Raven, Texas 2001, 2002, and 2005.

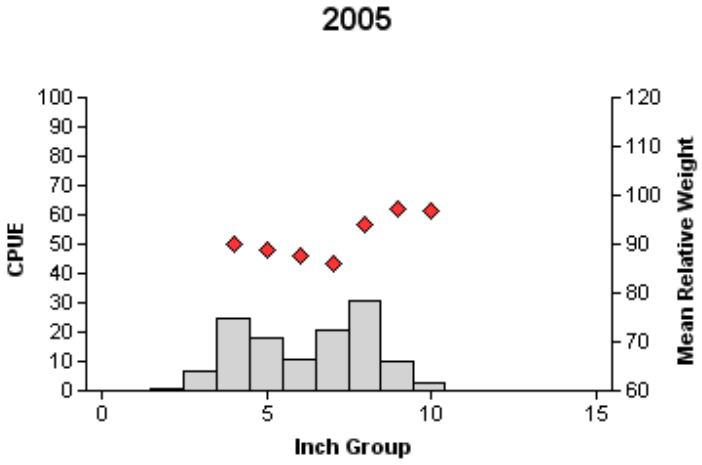
Redear Sunfish



Effort =	1.0
Total CPUE =	9.0 (14; 9)
Stock CPUE =	6.0 (40; 6)
PSD =	0.0 (0.65)
RSD-6 =	0.0 (0)



Effort =	1.0
Total CPUE =	214.0 (21; 214)
Stock CPUE =	97.0 (25; 97)
PSD =	13.0 (0.08)
RSD-6 =	14.0 (0.09)



Effort =	1.0
Total CPUE =	127.0 (14; 127)
Stock CPUE =	119.0 (15; 119)
PSD =	55.0 (0.07)
RSD-6 =	65.0 (0.07)

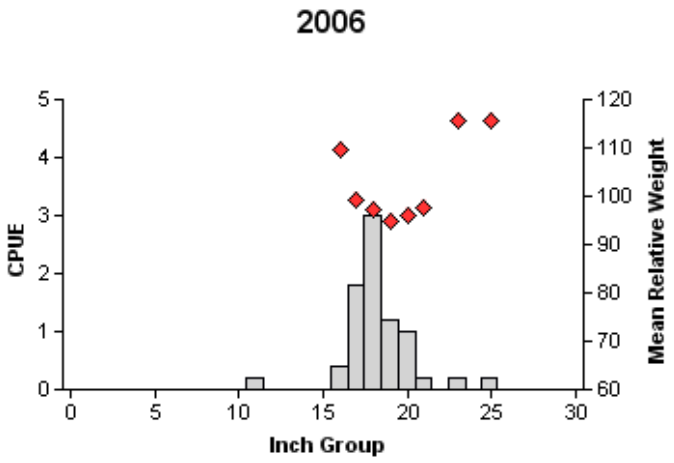
Figure 3. Number of redear sunfish caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Raven, Texas, 2001, 2002, and 2005.

Sunfishes

Table 7. Creel survey statistics for sunfishes at Lake Raven from March through May 2001, where total catch per hour is for anglers targeting sunfishes and total harvest is the estimated number of sunfishes harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2001
Directed effort (h)	151.6 (103.9)
Directed effort/acre	0.74 (103.9)
Total catch per hour	1.06 (n/a)
Harvest/acre	0.00
Total harvest	0.0
Percent legal released	100

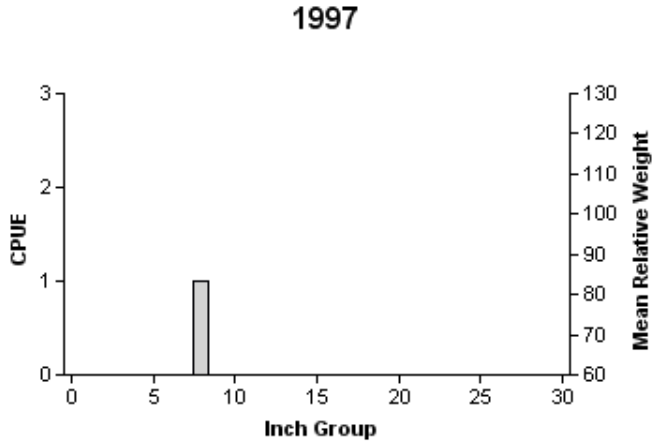
Blue Catfish



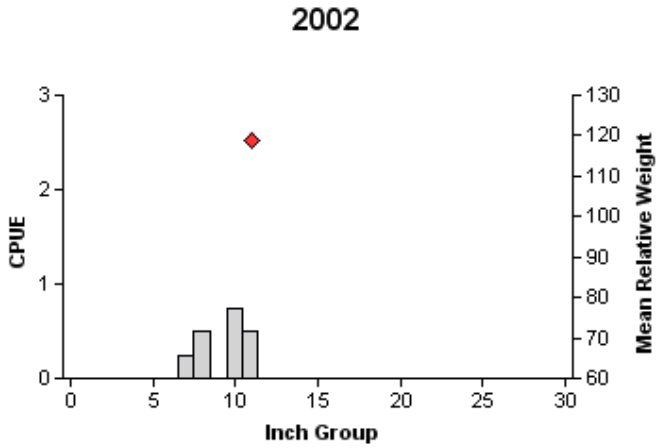
Effort =	5.0
Total CPUE =	8.2 (14; 41)
Stock CPUE =	8.0 (13; 40)
PSD =	20.0 (0.04)
RSD-12 =	100.0 (0)

Figure 4. Number of blue catfish caught per net night (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net survey, Lake Raven, Texas, 2006. No blue catfish were captured in the 1997 and 2002 surveys.

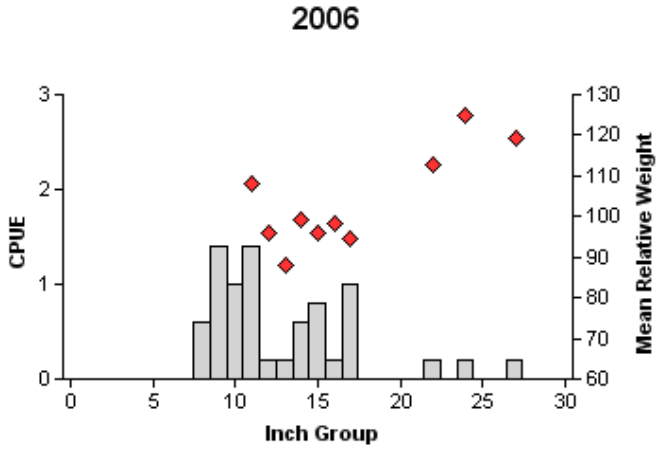
Channel Catfish



Effort =	5.0
Total CPUE =	1.0 (100; 1)
Stock CPUE =	0.0 (0; 0)
PSD =	0.0 (1.0)
RSD-12 =	0.0 (0)



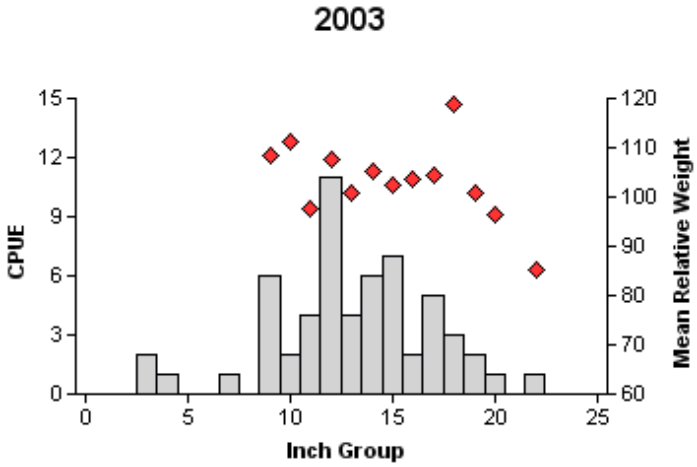
Effort =	4.0
Total CPUE =	2.0 (68; 8)
Stock CPUE =	0.5 (100; 2)
PSD =	0.0 (3.6)
RSD-12 =	0.0 (0)



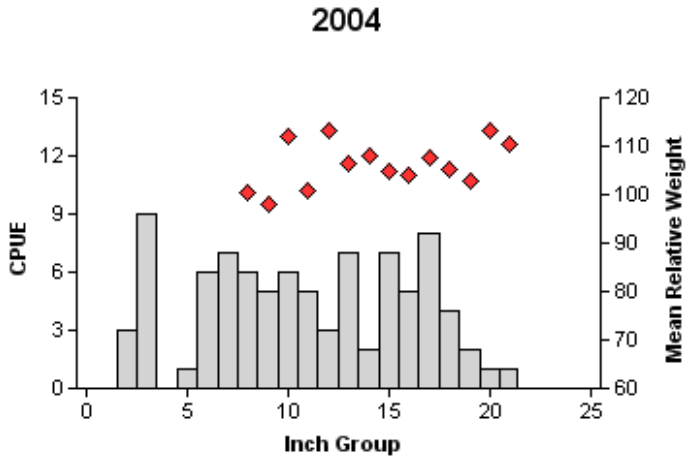
Effort =	5.0
Total CPUE =	8.0 (58; 40)
Stock CPUE =	5.0 (66; 25)
PSD =	36.0 (0.1)
RSD-12 =	72.0 (0.1)

Figure 5. Number of channel catfish caught per net night (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Raven, Texas, 1997, 2002, and 2006.

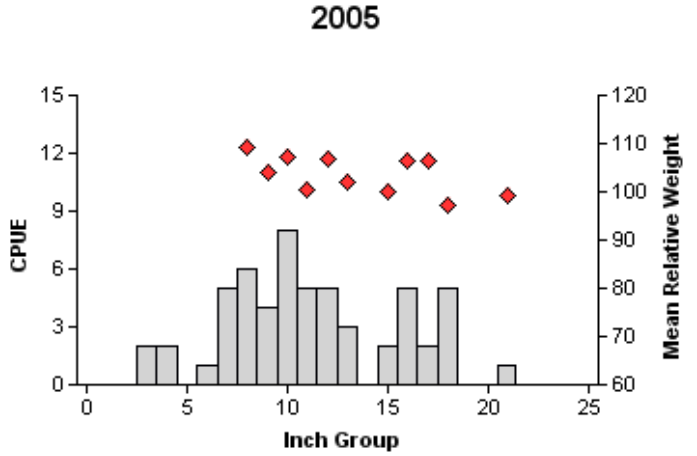
Largemouth Bass



Effort =	1.0
Total CPUE =	58.0 (12; 58)
Stock CPUE =	54.0 (11; 54)
PSD =	78.0 (0.04)
RSD-P =	39.0 (0.06)



Effort =	1.0
Total CPUE =	88.0 (15; 88)
Stock CPUE =	62.0 (19; 62)
PSD =	65.0 (0.05)
RSD-P =	45.0 (0.05)



Effort =	1.0
Total CPUE =	56.0 (12; 56)
Stock CPUE =	46.0 (15; 46)
PSD =	50.0 (0.08)
RSD-P =	33.0 (0.06)

Figure 6. Number of largemouth bass caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Raven, Texas, 2003, 2004, and 2005.

Largemouth Bass

Table 8. Creel survey statistics for largemouth bass at Lake Raven from March through May 2001, where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

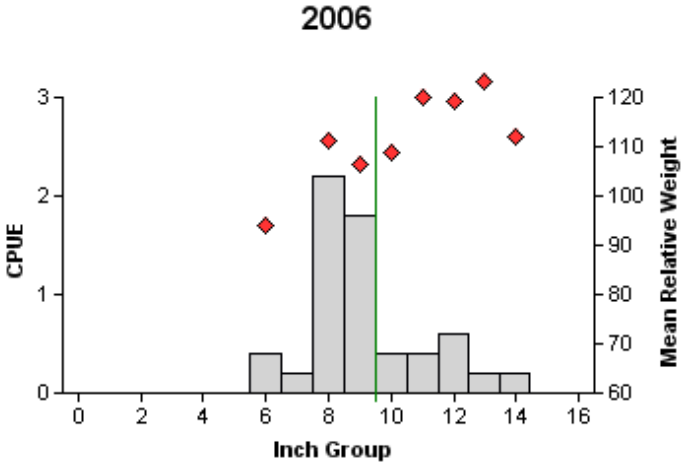
Creel Survey Statistic	Year
	2001
Directed effort (h)	3,536 (22.9)
Directed effort/acre	17.42 (22.9)
Total catch per hour	0.49 (21.7)
Harvest/acre	0.00
Total harvest	0.0
Percent legal release	n/a

Largemouth Bass

Table 9. Results of genetic analysis of largemouth bass collected by fall electrofishing at Lake Raven, Texas, 1994, 1997, 2001, and 2005. The 2006 data are age-0 largemouth bass collected in a spring sample. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB.

		Genotype					
Year	Sample size	FLMB	F1	Fx	NLMB	% FLMB alleles	% pure FLMB
1994	18	3	6	3	1	55.8	16.7
1997	39	14	4	21	0	76.0	35.9
2001	15	3	2	10	0	71.7	20.0
2005	19	2	2	6	0	77.1	10.0
2006	59	49	0	10	0	96.7	3.3

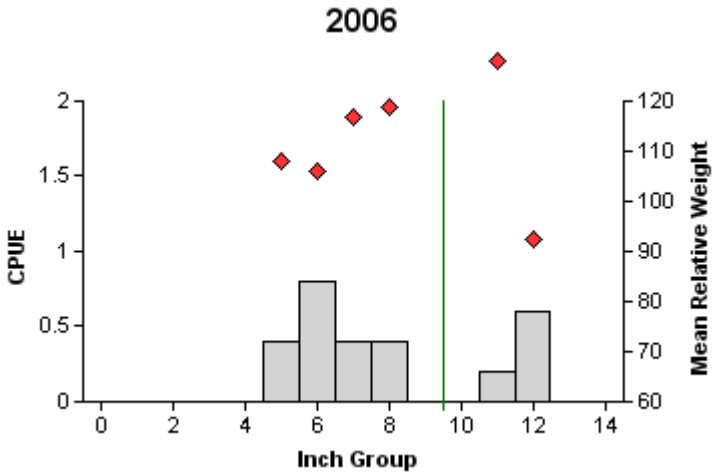
White Crappie



Effort =	5.0
Total CPUE =	6.4 (22; 32)
Stock CPUE =	6.4 (22; 32)
PSD =	91.0 (0.02)
RSD-10 =	28.0 (0.16)

Figure 7. Number of white crappie caught per net night (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net survey, Lake Raven, Texas, 2006. Vertical line represents minimum length limit at time of survey.

Black Crappie



Effort =	5.0
Total CPUE =	2.8 (65; 14)
Stock CPUE =	2.8 (65; 14)
PSD =	43.0 (0.12)
RSD-10 =	29.0 (0.08)

Figure 8. Number of black crappie caught per net night (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net survey, Lake Raven, Texas, 2006. Vertical line represents minimum length limit at time of survey.

Table 10. Creel survey statistics for crappies (species combined) at Lake Raven, Texas, from March through May 2001, where total catch per hour is for anglers targeting crappies and total harvest is the estimated number of crappies harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year 2001
Directed effort (h)	212 (87.9)
Directed effort/acre	1.04 (87.9)
Total catch per hour	0.0
Harvest/acre	0.0
Total harvest	0.0
Percent legal released	100

Table 11. Proposed sampling schedule for Lake Raven, Texas. Gill netting surveys are conducted in the spring while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

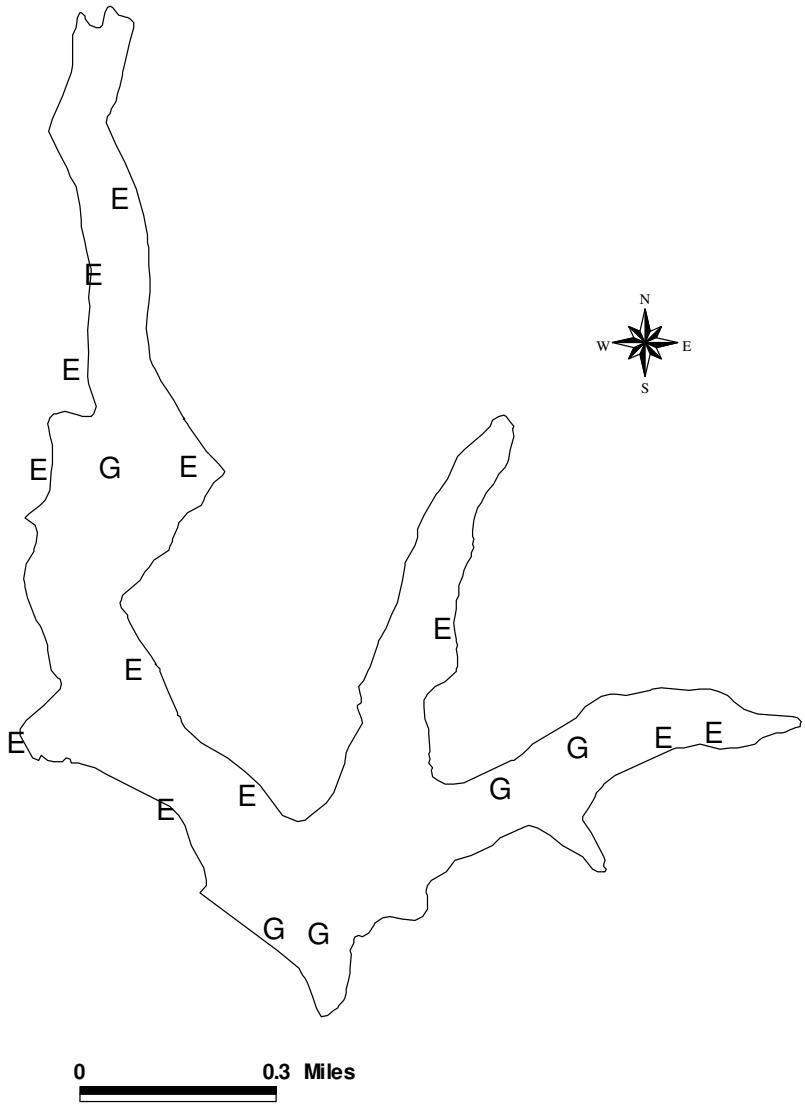
Survey Year	Electrofishing	Gill Net	Creel Survey	Vegetation Survey	Habitat Survey	Access Survey	Report
June 2006-May 2007	A			A			
June 2007-May 2008	A			A			
June 2008-May 2009	A		A	A			
June 2009-May 2010	S	S		S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Raven, Texas, 2005-2006.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard shad			37	37.0
Threadfin shad			176	176.0
Golden shiner			2	2.0
Inland silverside			3	3.0
Blue catfish	41	8.2		
Channel catfish	40	8.0		
Warmouth			6	6.0
Bluegill			102	102.0
Redear sunfish			127	127.0
Largemouth bass			56	56.0
White crappie	32	6.4	1	1.0
Black crappie	14	2.8	16	16.0

APPENDIX B



Location of sampling sites, Lake Raven, Texas, 2005-2006. Gill net and electrofishing stations are indicated by G and E, respectively. A trap net survey was not conducted in 2005.