

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

Lake Fairfield

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SURVEY AND MANAGEMENT SUMMARY

The Lake Fairfield fish community was surveyed from June 2008 through March 2009 using electrofishing, gill netting, and trap netting. A vegetation survey was conducted in September 2008. An access creel survey, conducted from September 2008 through February 2009, collected angler use and harvest information. This report summarizes results of these surveys and contains a management plan based on those findings.

- **Reservoir Description:** Lake Fairfield is a 2,034-acre reservoir on Big Brown Creek, Texas, a tributary of the Trinity River, providing cooling water for two 575-megawatt lignite-fired electric generation units. Bank access is adequate and two boat ramps are present, although boat access is limited during low water levels. Giant cane and cattails form a fringe in the littoral zone, around most of the lake. American lotus was present in shallow water (<4 feet deep) in the backs of the coves. Hydrilla was less abundant than in previous years.
- **Management History:** Important sport fish include sunfishes, largemouth bass, channel catfish, and red drum. Additional largemouth bass and catfish sampling were conducted every two years. Red drum stockings were conducted annually to support this popular fishery. Access creel surveys were conducted during fall and winter quarters, from September 2008 through February 2009. Fish kills periodically occur in late summer and fall due to low dissolved oxygen levels observed in isolated areas in the reservoir. Three fish kills occurred in 2008, and the number and value of fish were estimated for two of those events. The estimated number of fish killed in the two fish kills was 121,570 fish, with an estimated value of \$1,179,878.49 (Appendix B).
- **Fish Community**
 - **Prey species:** Threadfin shad and gizzard shad are present in the reservoir and electrofishing catch rates were higher than in previous surveys. Redear and bluegill sunfishes ≤ 4 inches also provide adequate prey for sport fishes.
 - **Catfishes:** The channel catfish population primarily consists of large adult fish. Little directed angling effort was observed in fall and winter creel surveys although an important fishery has been reported by state park staff and guides.
 - **Largemouth bass:** Largemouth bass were the second most sought after species by anglers at Lake Fairfield during fall and winter quarters. Electrofishing catch rate of stock size fish remained consistent and size distribution is within the target range. Body condition of largemouth bass remained good for all size classes.
 - **Crappie:** Black crappie were present in Lake Fairfield, although they do not provide a substantial fishery. No crappie were collected in trap nets in 2009.
 - **Red drum:** Red drum were abundant in the reservoir as gill net catch rates increased to a historical high. Red drum was the most popular sport fishery at Lake Fairfield during the fall/winter creel survey period.
 - **Blue tilapia:** Blue tilapia are a prohibited exotic species likely introduced in Lake Fairfield by anglers. Tilapia are harvested primarily by cast netting, and provide a substantial food fishery at Lake Fairfield. Tilapia are abundant due to elevated water temperatures in winter.
- **Management Strategies:** Conduct fall electrofishing in 2010 to assess largemouth bass population parameters and Florida largemouth bass genetics. Conduct gill netting in 2011 to assess red drum population parameters. Promote Lake Fairfield angling opportunities by way of news releases. Continue annual stockings of red drum to maintain fishery.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Fairfield from June 2008 through May 2009. 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 are presented with the 2008-2009 data for comparison where appropriate.

Reservoir Description

Lake Fairfield is a 2,032-acre reservoir on Big Brown Creek, Texas, a tributary of the Trinity River. It was constructed by TXU-Luminant to provide cooling water for the nearby Big Brown lignite-fueled power plant. Access was adequate with 2 boat ramps and bank angler access throughout the state park. Littoral habitat primarily consists of emergent vegetation such as cattails (*Typha spp.*), common reed (*Phragmites australis*), and bulrush (*Scirpus spp.*) which surround the majority of the reservoir. American lotus (*Nelumbia lutea*) is abundant the upper third of the reservoir, and in the backs of some coves. Hydrilla (*Hydrilla verticillata*) and American pondweed (*Potamogeton nodosus*) occur in isolated patches, primarily on the northwest side of the reservoir. The littoral zone consists of a variety of physical habitat types (Table 4). Low water levels at the time of survey have reduced littoral vegetation and exposed eroded shoreline. A large portion of the shore (35.3%) was eroded shoreline; and combinations consisting of bulkhead and riprap made up the remainder. Other descriptive characteristics for Lake Fairfield are found in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Ott and Bister 2005) included:

1. Continue annual stockings of red drum fingerlings and assess the fishery through biennial gill net surveys.
Action: Annual stockings of red drum were conducted each spring. Gill netting was conducted in spring of 2007 and 2009 respectively, to monitor the population.
2. Promote the quality channel catfish population and provide regulation posters to local vendors.
Action: Lake Fairfield has been featured in news releases. A creel survey was conducted in fall and winter 2008-2009, and information about the fishery and stockings has been released to the media.
3. Continue biennial electrofishing to assess largemouth bass (*Micropterus salmoides*) population; conduct electrophoresis to assess the percentage of Florida alleles.
Action: Supplemental electrofishing was conducted in 2006 to monitor the population. Stocking of Florida largemouth bass has been unnecessary at Lake Fairfield due to the high percentage of pure Florida and Florida alleles in this population.
4. Continue gill netting every other spring to assess red drum and catfish fisheries.
Action: Gill netting was conducted in spring of 2007 and 2009 respectively, to monitor red drum and catfish populations.
5. Assess access facilities maintained by Fairfield Lake State Park and make recommendations, and provide regulation signs to park staff.
Action: Low water levels in 2008 prompted the recommendation to dredge both boat ramps to maintain adequate access. Both access areas were scheduled for upgrades and additions in 2008 by the state park and are pending.
6. Monitor aquatic vegetation during routine habitat surveys, and discuss the possibility of a native plant establishment project with the controlling authority.
Action: Treatment of American lotus has been required in the swimming area of the state park, and has been conducted by TPWD Aquatic Habitat Enhancement staff. Native plant establishment has not been initiated due to low water levels.

Harvest regulation history: Sport fishes in Lake Fairfield are currently managed with statewide harvest regulations with exceptions for largemouth bass and red drum. Largemouth bass at Lake Fairfield are currently managed with an 18-inch minimum length limit, and red drum are managed with a 20-inch minimum length limit (Table 2).

Stocking history: Red drum have been stocked annually since 1984, and maintain the most popular fall and winter sport fishery at Lake Fairfield. Florida largemouth bass (*M. s. Floridanus*) were stocked from 1976-1979, and Lake Fairfield continues to maintain a productive fishery with a high percentage of Florida alleles (Table 8). Multiple attempts to stock white crappie and hybrid black x white crappie failed to establish a fishery. Palmetto bass were annually stocked in Lake Fairfield between 1975 and 1999, and established a popular fishery. Due to limitations in total hatchery production, stocking of palmetto bass at Lake Fairfield was discontinued in 2000. A complete stocking history is found in Table 3.

Vegetation/habitat history: Native emergent vegetation (common reed and cattails) form a fringe in the littoral zone around most of the lake. American lotus is typically abundant at the upstream, shallow water reaches (<4 feet deep) and in the backs of lake coves. Lotus has required herbicide treatment in the past to control plants located in the state park swimming area (Ott and Bister 2005). Hydrilla historically occupied a narrow fringe in shallow-water areas. In 2000, hydrilla covered approximately 10% of the reservoir. However, the distribution of hydrilla has naturally declined to roughly an acre in September of 2008.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 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 (# of fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). A vegetation survey was conducted in September 2008. Access creel surveys were conducted from September 2008 through February 2009. Surveys consisted of 9 creel days per quarter (4 weekdays and 5 weekend days). All survey dates were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2008).

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. For largemouth bass, ages were determined using otoliths from 13 specimens with lengths ranging from 13.0-14.6 inches. Microsatellite DNA analysis was used to determine largemouth bass genetic composition. Prior to 2005, genetic analysis was done by electrophoresis.

RESULTS AND DISCUSSION

Habitat: A comprehensive vegetation survey of the littoral zone was conducted in September 2008. Drought conditions during 2008 resulted in low water levels reducing much of the littoral vegetation. Hydrilla continued to naturally decline and covered less than 1% of the reservoir in 2008. American lotus declined throughout the survey period as a result of drought conditions. Littoral habitat consisted of small, isolated patches of pondweed and hydrilla, and a fringe of cattail and common reed surrounding the reservoir. A detailed habitat description is found in Table 4.

Creel: Directed fishing effort was highest for red drum in fall and winter creel survey quarters with 47% of all anglers targeting this species. Directed fishing effort by anglers for largemouth bass during the creel survey was 25%, and directed effort for sunfish was 16% (Table 5). Total fishing effort for all species was 19,473 hours from September 2008 through February 2009 and anglers spent estimated \$155,130 on direct expenditures (Table 6).

Prey species: Overall catch rate of all prey species declined in 2008, most likely due to a decline in water level and vegetation coverage. Electrofishing catch rate of gizzard shad was low (36/h) in 2008, and declined since 2006 (89/h); (Figure 2). More than 80% of the catch was fish below 5 inches in length, with a large number of fish available as prey. Electrofishing catch rate of threadfin shad was 17/h (Appendix A); down from 298/h in 2006 and 112/h in 2004 (Ott and Bister 2005). Sunfishes also contributed to the prey base. Electrofishing catch rate of sunfishes (<4 inches in length) was lower than previous years. The sunfish populations in Lake Fairfield consisted primarily of bluegill and redear sunfish. Bluegill and redear as large as 7 inches in length (Figures 3 & 4) were collected and represent a sport fishing opportunity. Mean W_r for bluegill and redear sunfish was >90 indicating good body condition. Directed effort for sunfish, estimated from the angler creel survey conducted September 2008 through February 2009, was 1.5 h/acre and was the third most popular fishery (Table 5).

Catfish: Lake Fairfield historically supported a low-abundant channel catfish population with poor recruitment (Ott and Bister 2005). Gill net catch rate of channel catfish in 2009 (7.2/nn) was higher than 2007 (4.0/nn) although lower than 2005 (18.4/nn); (Figure 5). Size distribution of channel catfish was skewed toward large individuals. Channel catfish <12 inches have typically been scarce in gill net surveys and were not observed in gill net surveys in 2009. Recruitment of channel catfish may be low in Lake Fairfield, or growth may be fast due to warm water temperatures in the reservoir. Blue catfish were stocked in 1971 and 1975; however, no blue catfish have been collected in subsequent surveys since 1992. Directed angling effort for catfish was not recorded during fall or winter quarter creel surveys; however, state park staff and guides report a significant catfish fishery exists in spring and summer months.

Largemouth bass: The largemouth bass population continued to provide a popular fishery. Largemouth bass were the second most sought-after species (angling effort = 2.4 h/acre; 24.7% of total effort) from September 2008 through February 2009 (Table 7). Angling catch rate of largemouth bass was 1.1/h. Electrofishing catch rate improved over 2006, and stock size was similar to 2004 (Figure 6). Reduction in recruitment may be a result of prolonged droughts and degraded littoral habitat. The average age of largemouth bass at 14 inches (range = 13.0 to 14.6 inches) was 1.2 years (N=13, range = 1-2), and mean W_r for most inch classes was ≥ 95 . Florida largemouth bass genetics continue to dominate the population. Of the 30 age-0 fish collected for microsatellite DNA analysis, 93% contained Florida largemouth bass (FLMB) alleles and 50% were pure FLMB (Table 8).

Red drum: Red drum have been stocked annually since 1984 and have become the most sought-after species at Lake Fairfield (angling effort = 4.5 h/acre; 47% of total effort) from September 2008 through February 2009 (Table 5). Angling catch rate of red drum was 0.9/h (Table 9); Thirty-one percent of fish collected by gill net were legal length or larger (Figure 8). The average age of red drum (range = 15.5 to 28.2 inches) was 2.4 years (N=16, range = 2-3),

Crappie: Crappie do not provide a substantial fishery at Lake Fairfield. Reproduction and recruitment of crappie is low and similar to other power-plant reservoirs in Texas. No directed effort for crappie was reported in 2008-2009 fall and winter creel surveys. Trap net catch rate of black crappie at Lake Fairfield has historically been low (usually less than 1/nn), and no crappie were collected in 2008.

Blue tilapia: Blue tilapia are heavily harvested by anglers at Lake Fairfield. Tilapia are not a managed sport species, yet they provide an important secondary fishery for guides and recreational fishermen. Anglers typically harvested tilapia with cast nets and less frequently by rod-and-reel and bow fishing.

Fisheries management plan for Lake Fairfield, Texas

Prepared – July 2009

ISSUE 1: Angler access is limited during low water levels.

MANAGEMENT STRATEGIES

1. Continue to work with State Park staff to improve boat launch access during low water levels.
2. Work with State Park staff to provide additional and improved bank access facilities.

ISSUE 2: American lotus has required treatment in the swimming areas and bank fishing areas. Hydrilla is present in the reservoir and may require future treatments. Native submersed vegetation continues to be scarce.

MANAGEMENT STRATEGIES

1. Continue to survey American lotus and hydrilla coverage each year and suggest treatment if needed.
2. Coordinate with state park and TXU/Luminant Energy to begin native plant establishment project.

ISSUE 3: Lake Fairfield provides a high-quality largemouth bass fishery and is very important to anglers in the area.

MANAGEMENT STRATEGY

1. Continue electrofishing every other year to monitor and evaluate populations.
2. Continue to promote the fishery through press releases.

ISSUE 4: Lake Fairfield provides a high-quality red drum fishery and is very important to anglers in the area.

MANAGEMENT STRATEGY

1. Continue gill netting every other year to monitor and evaluate populations.
2. Continue to promote the fishery through press releases.

ISSUE 5: Annual fish kills in late summer have resulted in losses of large numbers of quality fish of all species.

MANAGEMENT STRATEGY

1. Work with TXU/Luminant Energy, TPWD Kills and Spills Team, and state park staff to investigate fish kills and discuss management options.
2. Continue to investigate fish kills and disseminate information to anglers, state park staff, and TXU/Luminant Energy.

ISSUE 6: Abundant predator population may result in decreased prey population.

MANAGEMENT STRATEGIES

1. Continue supplemental red drum and largemouth bass population assessments every other year, and consider adjusting red drum stocking frequency or rate if prey density continues to decline.
2. Assess prey populations in fall 2010 to determine status of shad and sunfish populations.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional electrofishing and gill netting in 2010-2011, and mandatory monitoring in 2012-2013 (Table 10). Supplemental electrofishing survey in 2010 will be conducted to monitor largemouth bass and prey population. Supplemental gill netting in 2011 will be conducted to monitor red drum and catfish populations.

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- Ott, R. A. and T. J. Bister. 2001. Statewide freshwater fisheries monitoring and management program survey report for Lake Fairfield, 2000. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-26, Austin. 25 pp.
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- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Table 1. Characteristics of Lake Fairfield, Texas.

Characteristic	Description
Year completed	1969
Controlling authority	Luminant Energy
County	Freestone
Reservoir type	Cooling-water reservoir
Shoreline Development Index (SDI)	3.7

Table 2. Harvest regulations for Lake Fairfield, Texas.

Species	Bag Limit	Minimum-maximum length (inches)
Catfish: channel and blue, their hybrids and subspecies	25 (in any combination)	12-No limit
Catfish, flathead	5	18-No limit
Bass, largemouth	5	18-No limit
Crappie: white and black, their hybrids and subspecies	25 (in any combination)	10-No limit
Red drum	3	20-No limit

Table 3. Stocking history of Lake Fairfield, Texas. Size categories are: FRY <1 inch; FGL =1-3 inches.

Species	Year	Number	Size
Channel catfish	1969	<u>25,000</u>	
		25,000	
Palmetto bass	1975	25,000	
	1977	23,985	
	1979	24,500	
	1982	25,422	FGL
	1986	35,650	FRY
	1987	49,025	FGL
	1988	49,226	FGL
	1991	36,700	FRY
	1992	36,265	FGL
	1993	21,200	FGL
	1994	37,100	FGL
	1995	43,100	FGL
	1996	35,285	FGL
	1997	35,441	FGL
	1998	22,647	FGL
	1999	<u>35,625</u>	FGL
		536,171	
Largemouth bass	1970	250,000	FGL
		<u>250,000</u>	
Florida largemouth bass	1975	123,100	FGL
	1976	122,500	FGL
	1977	130,000	FGL
	1979	<u>129,145</u>	FGL
		504,745	
White crappie	1985	87,601	FGL
	1986	29,450	FGL
	1987	<u>353,439</u>	FGL
		470,490	
Black x white crappie	1993	117,650	FGL
	1994	118,177	FGL
	1995	<u>249,208</u>	FGL
		485,035	
Nile perch	1983	<u>1,310</u>	
		1,310	

Stocking history of Lake Fairfield, Texas, continued.

Species	Year	Number	Size
Red drum	1984	235,455	FGL
	1985	283,700	FGL
	1986	217,323	FGL
	1987	473,340	FGL
	1991	515,751	FGL
	1992	245,118	FGL
	1993	217,923	FGL
	1994	253,280	FGL
	1995	231,523	FGL
	1996	266,633	FGL
	1997	158,890	FGL
	1999	222,340	FGL
	2000	276,602	FGL
	2001	287,820	FGL
	2002	21,938	FGL
	2003	385,367	FGL
	2004	7,125	FGL
	2005	208,440	FGL
	2006	2,439	FGL
	2007	423,732	FGL
	2008	<u>207,102</u>	FGL
		5,141,841	

Table 4. Structural habitat survey was conducted in 2000 (Ott and Bister 2001). Vegetation survey was conducted in 2008. 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
Bulkhead with boat docks ¹	0.05	0.2		
Bulkhead ¹	0.16	0.6		
Concrete ¹	0.60	2.2		
Eroded shoreline ¹	9.70	35.3		
Rip rap ¹	0.44	1.6		
Hydrilla			3	<1
Pondweed			4	<1
Bullrush			trace	
Cattail			33	1.6
Common reed			31	1.5
American lotus			95	4.7

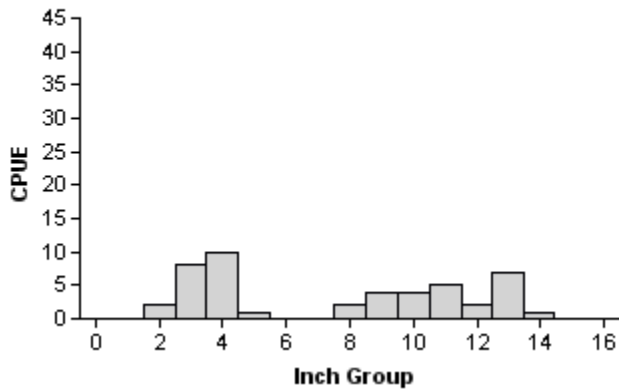
¹ Structural habitat features.

Table 5. Percent directed angler effort by species for Lake Fairfield, Texas, December 2002 through February 2003 and September 2008 through February 2009.

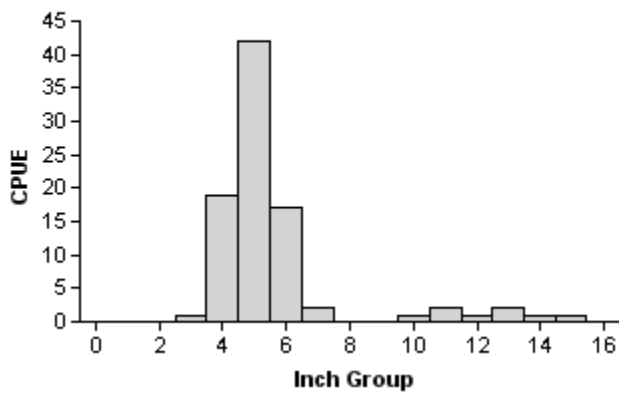
Species	Year	Year
	Winter 02-03	Fall 08-Winter 09
Red drum	5	46.6
Largemouth bass	78	24.7
Sunfish	1.6	15.9
Catfish	14	0
Anything	1	12.7

Table 6. Total fishing effort (h) for all species and total directed expenditures at Lake Fairfield, Texas, September 2008 through February 2009.

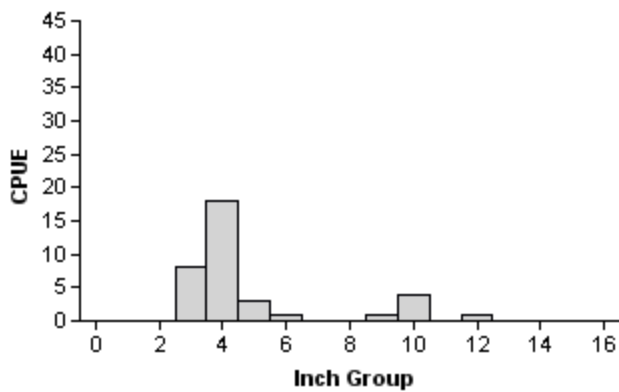
Creel Statistic	Year
	Fall 08 - Winter 09
Total fishing effort (hours)	19,473
Total directed expenditures	\$155,130

Gizzard shad**2004**

Effort = 1.0
 Total CPUE = 46.0 (39; 46)
 Stock CPUE = 25.0 (37; 25)
 IOV = 45.7 (17.7)

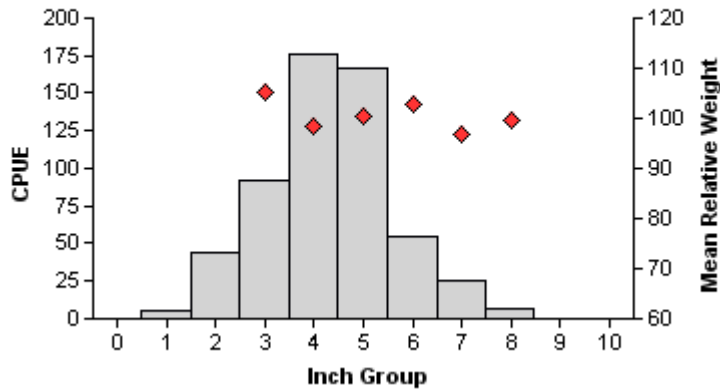
2006

Effort = 1.0
 Total CPUE = 89.0 (25; 89)
 Stock CPUE = 10.0 (36; 10)
 IOV = 91.0 (4.4)

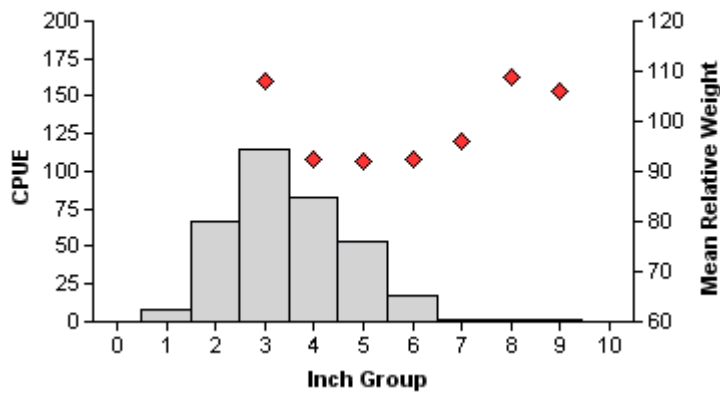
2008

Effort = 1.0
 Total CPUE = 36.0 (26; 36)
 Stock CPUE = 6.0 (30; 6)
 IOV = 83.3 (5.3)

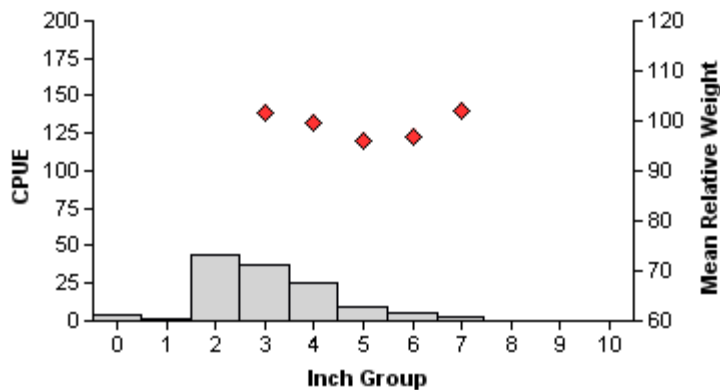
Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Fairfield, Texas, 2004, 2006, and 2008.

Bluegill**2004**

Effort = 1.0
 Total CPUE = 571.0 (33; 571)
 Stock CPUE = 522.0 (35; 522)
 PSD = 17 (3.8)

2006

Effort = 1.0
 Total CPUE = 350.0 (29; 350)
 Stock CPUE = 275.0 (27; 275)
 PSD = 9 (2.4)

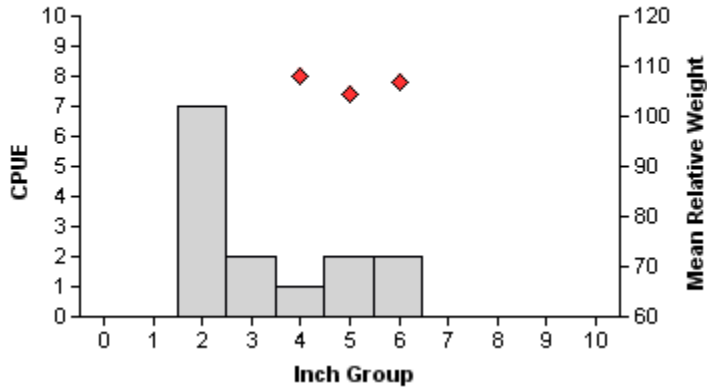
2008

Effort = 1.0
 Total CPUE = 129.0 (25; 129)
 Stock CPUE = 80.0 (25; 80)
 PSD = 11 (3.2)

Figure 3. Number of bluegill caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Fairfield, Texas, 2004, 2006, and 2008.

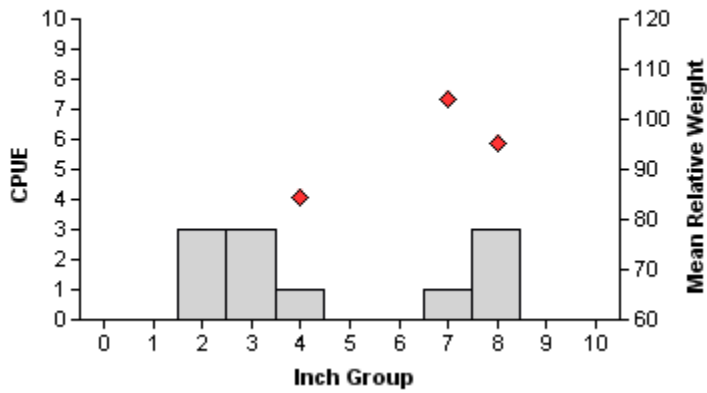
Redear sunfish

2004



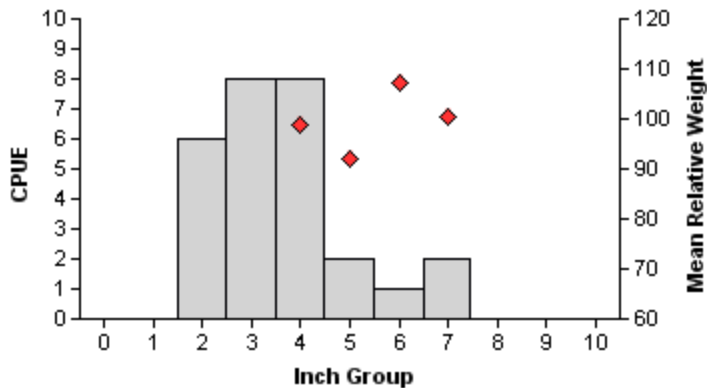
Effort = 1.0
 Total CPUE = 14.0 (53; 14)
 Stock CPUE = 5.0 (69; 5)
 PSD = 0 (169.7)
 RSD-P = 0 (0)

2006



Effort = 1.0
 Total CPUE = 11.0 (58; 11)
 Stock CPUE = 5.0 (62; 5)
 PSD = 80 (21.3)
 RSD-P = 0 (0)

2008



Effort = 1.0
 Total CPUE = 27.0 (30; 27)
 Stock CPUE = 13.0 (42; 13)
 PSD = 15 (5.8)
 RSD-P = 0 (0)

Figure 4. Number of redeer sunfish caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Fairfield, Texas, 2004, 2006, and 2008.

Sunfish

Table 7. Creel survey statistics for sunfish at Lake Fairfield from September 2008 through February 2009, where total catch per hour is for anglers targeting all sunfish, and total harvest is the estimated number of sunfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	Fall 08-Winter 09
Directed effort (h)	3,065 (57)
Directed effort/acre	1.5 (57)
Total catch per hour	0.64 (62)
Total harvest	6,174 (227)
Harvest/acre	3 (227)
Percent legal released	71

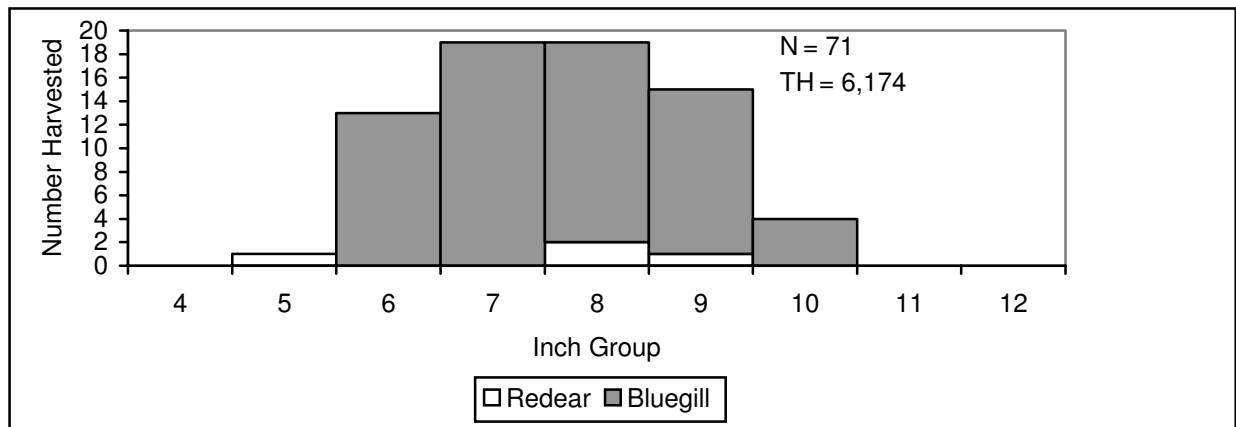


Figure 7. Length frequency of harvested redear and bluegill sunfish observed during creel surveys at Lake Fairfield, Texas, September 2008 through February 2009 all anglers combined. N is the total number of sunfish observed during the angler creel survey. TH is the estimated number of harvested sunfish.

Channel catfish

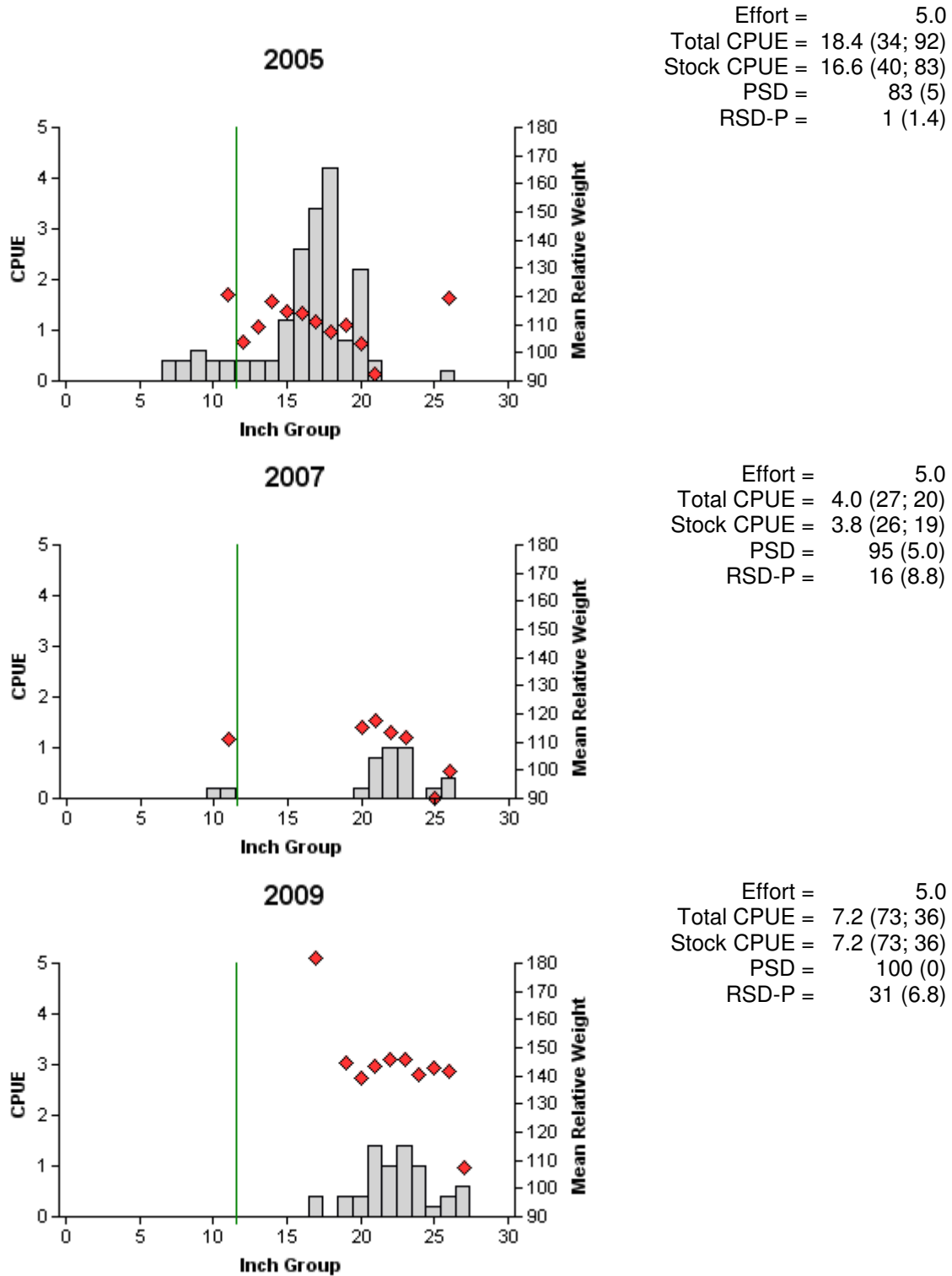
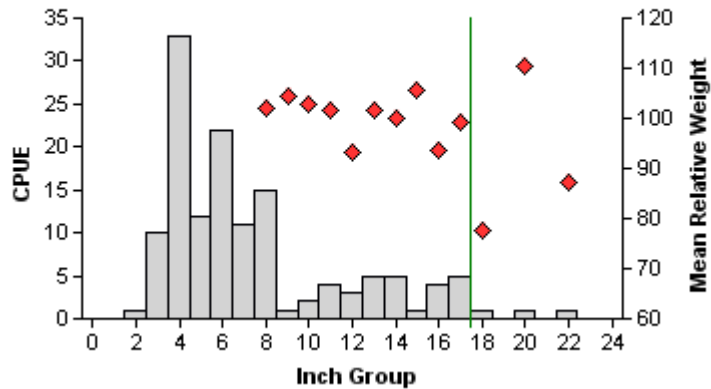


Figure 5. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Fairfield, Texas, 2005, 2007, and 2009. Vertical line represents length limit at time of survey.

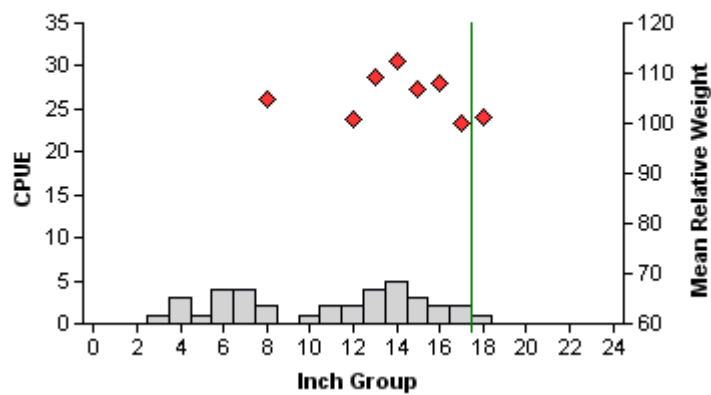
Largemouth bass

2004



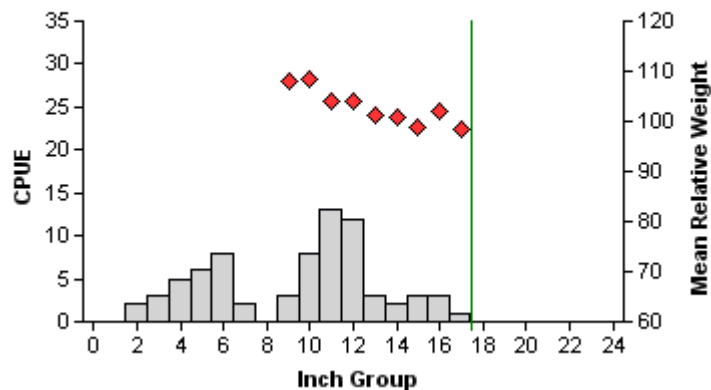
Effort = 1.0
 Total CPUE = 137.0 (24; 137)
 Stock CPUE = 48.0 (24; 48)
 PSD = 54 (8.5)
 RSD-P = 27 (6.2)

2006



Effort = 1.0
 Total CPUE = 37.0 (35; 37)
 Stock CPUE = 24.0 (50; 24)
 PSD = 79 (11.3)
 RSD-P = 33 (7.9)

2008



Effort = 1.0
 Total CPUE = 74.0 (34; 74)
 Stock CPUE = 48.0 (40; 48)
 PSD = 50 (9.1)
 RSD-P = 15 (5.9)

Figure 6. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Fairfield, Texas, 2004, 2006, and 2008. Vertical line represents length limit at time of survey.

Largemouth bass

Table 7. Creel survey statistics for largemouth bass at Lake Fairfield from September 2008 through February 2009, where total catch per hour is for anglers targeting all 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
	Fall 08-Winter 09
Directed effort (h)	4,821 (37)
Directed effort/acre	2.4 (37)
Total catch per hour	0.85 (53)
Total harvest	211 (112)
Harvest/acre	0.1 (112)
Percent legal released	59

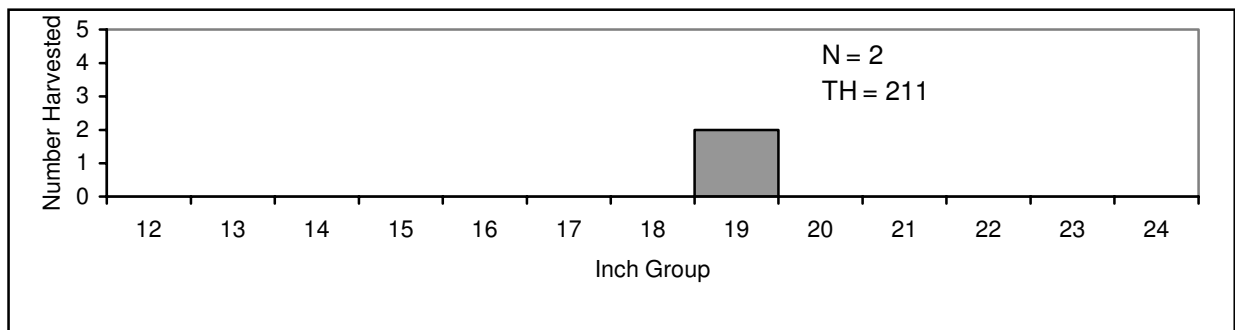


Figure 7. Length frequency of harvested largemouth bass observed during creel surveys at Lake Fairfield, Texas, September 2008 through February 2009 all anglers combined. N is the total number of largemouth bass observed during the angler creel survey. TH is the estimated number of harvested largemouth bass.

Table 8. Results of genetic analysis of largemouth bass collected by fall electrofishing at Lake Fairfield, Texas, 1999, 2000, 2002, 2004, and 2008. 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. Samples collected between 1999 and 2004 were analyzed by electrophoresis.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
1999	30	19	1	10	0	88.3	63.3
2000	30	20	1	9	0	90.8	66.7
2002	30	9	3	16	0	77.6	28.8
2004	30	16	2	9	0	86.0	59.3
2008	30	15	0	13	2	93.0	50.0

Red Drum

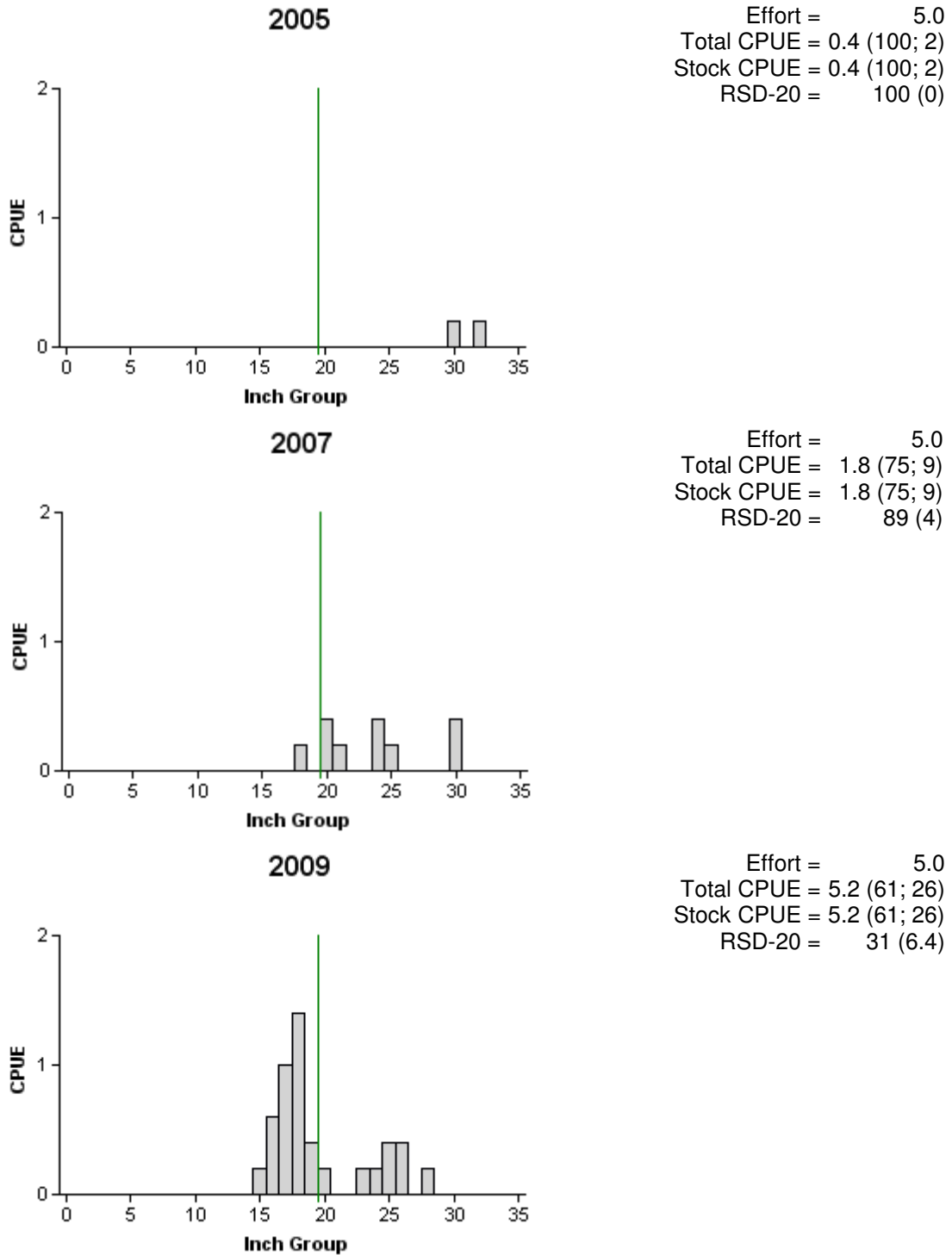


Figure 8. Number of red drum caught per net night (CPUE, bars), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Fairfield, Texas, 2005, 2007, and 2009. Vertical line represents length limit at time of survey.

Red Drum

Table 9. Creel survey statistics for Red Drum at Lake Fairfield September 2008 through February 2009, where total catch per hour is for anglers targeting red drum and total harvest is the estimated number of red drum harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	Fall 08-Winter 09
Directed effort (h)	9,081(39)
Directed effort/acre	4.5(39)
Total catch per hour	0.88(39)
Total harvest	1,329 (94.5)
Harvest/acre	0.65 (94.5)
Percent legal released	0

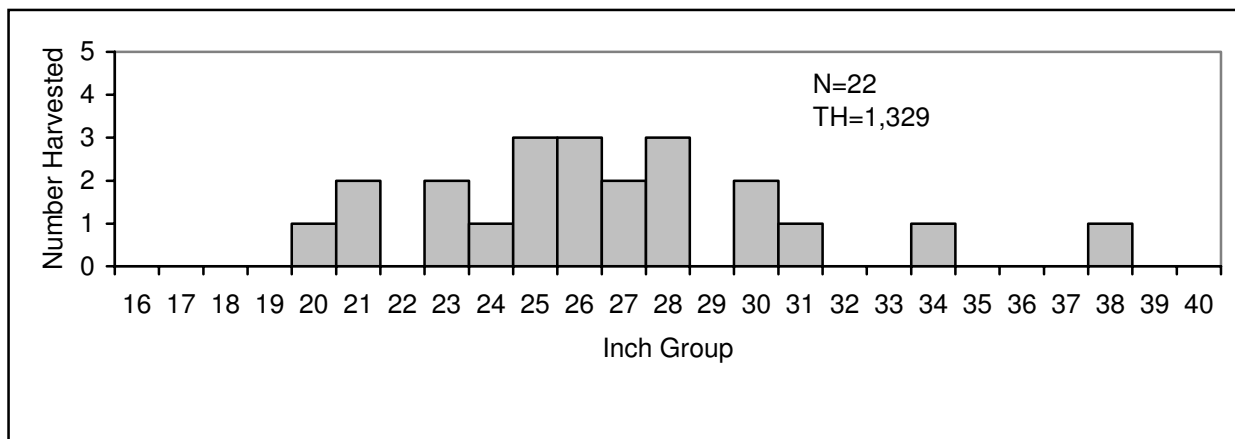


Figure 9. Length frequency of harvested red drum observed during creel surveys at Lake Fairfield, Texas, September 2008 through February 2009, all anglers combined. N is the number of harvested red drum observed during creel surveys, and TH is the total estimated harvest for the creel period.

Red Drum

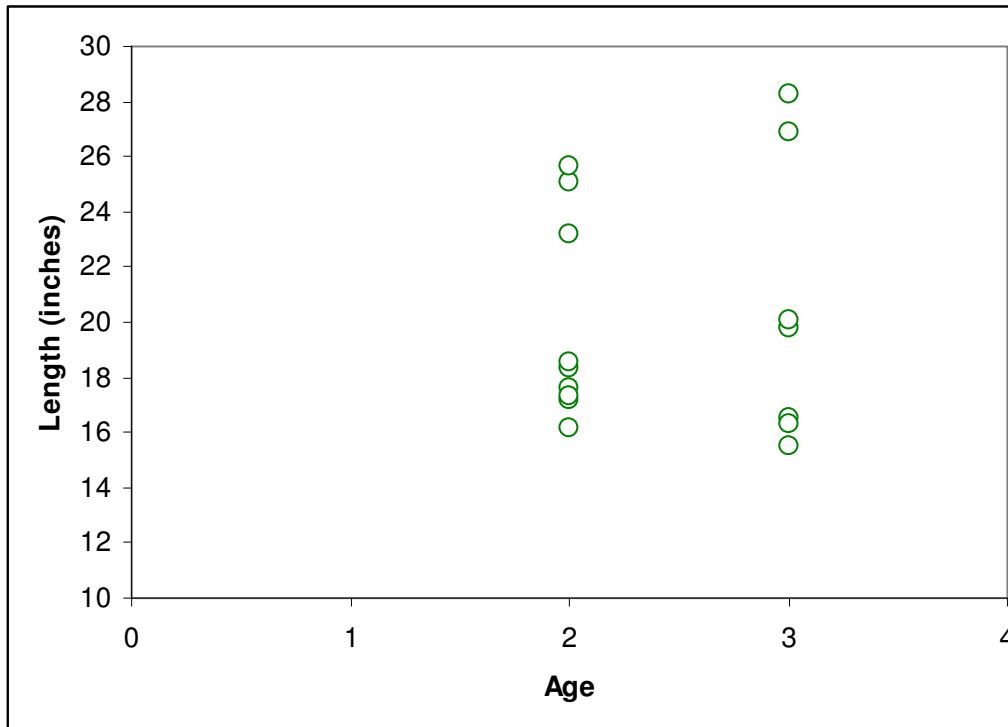


Figure 10. Length-at-age (inches) at time of capture for red drum, collected by gill netting, Lake Fairfield, Texas, February 2009.

Table 10. Proposed sampling schedule for Lake Fairfield, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey Year	Electrofisher	Gill Net	Habitat	Creel	Report
2009-2010					
2010-2011	A	A			
2011-2012					
2012-2013	S	S	S	A	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Fairfield, Texas, 2008-2009.

Species	Gill netting		Trap netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					36	36
Threadfin shad					17	17
Channel catfish	37	7.4				
Flathead catfish	1	0.2				
Bluegill					129	129
Longear sunfish					4	4
Redear sunfish					27	27
Spotted sunfish					1	1
Largemouth bass					74	74
Red drum	26	5.2				

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APPENDIX B

Actual and Expanded Counts of Lake Fairfield Fish Kill 9/04/2008. Actual count is total number of fish observed in samples. Expanded count is the total estimated fish killed in reservoir.

Common Name	Scientific Name	Length (Inches)	Actual Count	Expanded Count
Gizzard Shad	<i>Dorosoma cepedianum</i>	7	1	5
Gizzard Shad	<i>Dorosoma cepedianum</i>	9	2	10
Gizzard Shad	<i>Dorosoma cepedianum</i>	10	4	20
Gizzard Shad	<i>Dorosoma cepedianum</i>	11	3	18
Gizzard Shad	<i>Dorosoma cepedianum</i>	12	1	5
Threadfin Shad	<i>Dorosoma petenense</i>	1	50	334
Threadfin Shad	<i>Dorosoma petenense</i>	4	1	5
Channel Catfish	<i>Ictalurus punctatus</i>	12	1	5
Channel Catfish	<i>Ictalurus punctatus</i>	18	5	26
Channel Catfish	<i>Ictalurus punctatus</i>	20	3	15
Channel Catfish	<i>Ictalurus punctatus</i>	22	2	10
Spotted Gar	<i>Lepisosteus oculatus</i>	24	1	7
Bluegill	<i>Lepomis macrochirus</i>	1	295	1,506
Bluegill	<i>Lepomis macrochirus</i>	2	95	485
Bluegill	<i>Lepomis macrochirus</i>	3	6	31
Bluegill	<i>Lepomis macrochirus</i>	4	50	255
Bluegill	<i>Lepomis macrochirus</i>	5	6	30
Bluegill	<i>Lepomis macrochirus</i>	6	18	92
Bluegill	<i>Lepomis macrochirus</i>	7	14	78
Bluegill	<i>Lepomis macrochirus</i>	8	39	207
Bluegill	<i>Lepomis macrochirus</i>	9	32	175
Bluegill	<i>Lepomis macrochirus</i>	10	3	15
Largemouth Bass	<i>Micropterus salmoides</i>	4	1	5
Largemouth Bass	<i>Micropterus salmoides</i>	7	1	5
Largemouth Bass	<i>Micropterus salmoides</i>	8	2	10
Largemouth Bass	<i>Micropterus salmoides</i>	10	2	10
Largemouth Bass	<i>Micropterus salmoides</i>	11	1	5
Largemouth Bass	<i>Micropterus salmoides</i>	12	7	36
Largemouth Bass	<i>Micropterus salmoides</i>	14	4	20
Largemouth Bass	<i>Micropterus salmoides</i>	15	2	10
Largemouth Bass	<i>Micropterus salmoides</i>	16	2	10
Largemouth Bass	<i>Micropterus salmoides</i>	18	7	38
Flathead Catfish	<i>Pylodictis olivaris</i>	30	1	7
Red Drum	<i>Sciaenops ocellatus</i>	12	1	5
Red Drum	<i>Sciaenops ocellatus</i>	14	2	10
Red Drum	<i>Sciaenops ocellatus</i>	20	2	10
Red Drum	<i>Sciaenops ocellatus</i>	24	107	546
Red Drum	<i>Sciaenops ocellatus</i>	25	18	92
Red Drum	<i>Sciaenops ocellatus</i>	26	44	225
Red Drum	<i>Sciaenops ocellatus</i>	28	57	291
Red Drum	<i>Sciaenops ocellatus</i>	29	2	10
Red Drum	<i>Sciaenops ocellatus</i>	30	156	796
Red Drum	<i>Sciaenops ocellatus</i>	32	205	1,046
Red Drum	<i>Sciaenops ocellatus</i>	34	6	31

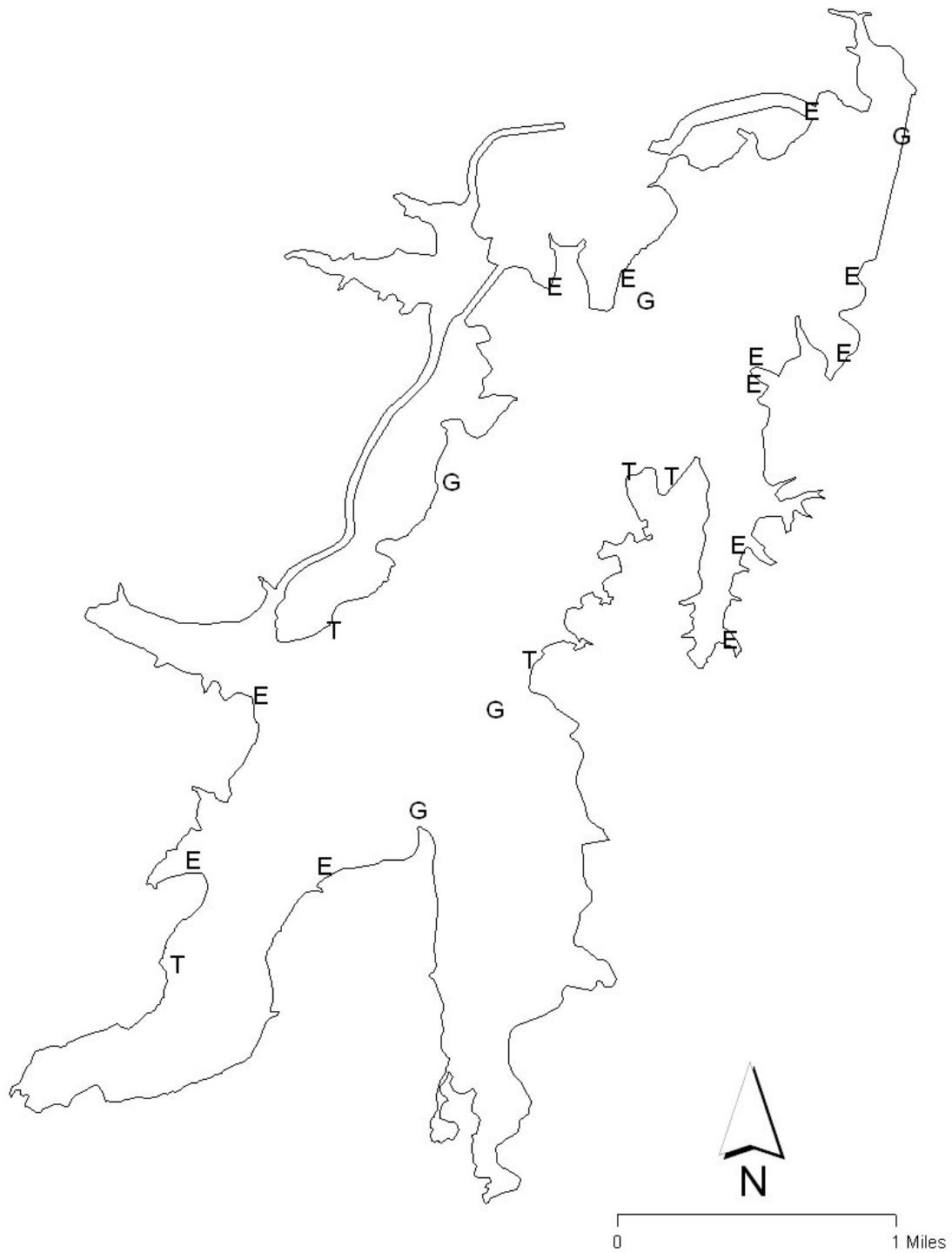
Actual and Expanded Counts of 9/04/2008 Lake Fairfield Fish Kill, continued.

Red Drum	<i>Sciaenops ocellatus</i>	36	37	189
Red Drum	<i>Sciaenops ocellatus</i>	38	14	71
Red Drum	<i>Sciaenops ocellatus</i>	40	65	331
Red Drum	<i>Sciaenops ocellatus</i>	42	10	50
Red Drum	<i>Sciaenops ocellatus</i>	44	3	15
Blue Tilapia	<i>Tilapia aurea</i>	8	1	5
Blue Tilapia	<i>Tilapia aurea</i>	10	1	5
Blue Tilapia	<i>Tilapia aurea</i>	12	14	73
Blue Tilapia	<i>Tilapia aurea</i>	13	1	5
Blue Tilapia	<i>Tilapia aurea</i>	14	10	51
Event Total Killed:		1,418	7,347	
Estimated Value:				\$1,138,435.45

Actual and Expanded Counts of Lake Fairfield Fish Kill 10/17/2008. Actual count is total number of fish observed in samples. Expanded count is the total estimated fish killed in reservoir.

Common Name	Scientific Name	Length (Inches)	Actual Count	Expanded Count
Common Carp	<i>Cyprinus carpio</i>	22	1	9
Gizzard Shad	<i>Dorosoma cepedianum</i>	8	20	182
Gizzard Shad	<i>Dorosoma cepedianum</i>	11	3	27
Gizzard Shad	<i>Dorosoma cepedianum</i>	13	36	329
Gizzard Shad	<i>Dorosoma cepedianum</i>	14	13	118
Gizzard Shad	<i>Dorosoma cepedianum</i>	15	1	9
Threadfin Shad	<i>Dorosoma petenense</i>	2	6,632	60,440
Threadfin Shad	<i>Dorosoma petenense</i>	3	5,571	50,770
Blue Catfish	<i>Ictalurus furcatus</i>	21	3	27
Blue Catfish	<i>Ictalurus furcatus</i>	22	6	55
Blue Catfish	<i>Ictalurus furcatus</i>	23	1	9
Blue Catfish	<i>Ictalurus furcatus</i>	24	32	292
Channel Catfish	<i>Ictalurus punctatus</i>	19	10	91
Channel Catfish	<i>Ictalurus punctatus</i>	22	7	64
Bluegill	<i>Lepomis macrochirus</i>	3	15	137
Bluegill	<i>Lepomis macrochirus</i>	4	28	255
Bluegill	<i>Lepomis macrochirus</i>	5	6	55
Bluegill	<i>Lepomis macrochirus</i>	6	17	154
Bluegill	<i>Lepomis macrochirus</i>	7	6	55
Bluegill	<i>Lepomis macrochirus</i>	8	11	100
Bluegill	<i>Lepomis macrochirus</i>	9	15	137
Bluegill	<i>Lepomis macrochirus</i>	10	3	27
Redear Sunfish	<i>Lepomis microlophus</i>	1	1	9
Redear Sunfish	<i>Lepomis microlophus</i>	3	7	64
Redear Sunfish	<i>Lepomis microlophus</i>	4	10	91
Redear Sunfish	<i>Lepomis microlophus</i>	5	2	18
Redear Sunfish	<i>Lepomis microlophus</i>	7	15	137
Redear Sunfish	<i>Lepomis microlophus</i>	3	25	228
Redear Sunfish	<i>Lepomis microlophus</i>	5	1	9
Redear Sunfish	<i>Lepomis microlophus</i>	6	4	36
Redear Sunfish	<i>Lepomis microlophus</i>	8	1	9
Largemouth Bass	<i>Micropterus salmoides</i>	5	1	9
Largemouth Bass	<i>Micropterus salmoides</i>	7	1	9
Largemouth Bass	<i>Micropterus salmoides</i>	11	2	18
Largemouth Bass	<i>Micropterus salmoides</i>	13	2	18
Largemouth Bass	<i>Micropterus salmoides</i>	14	1	9
Largemouth Bass	<i>Micropterus salmoides</i>	15	1	9
Largemouth Bass	<i>Micropterus salmoides</i>	16	1	9
Largemouth Bass	<i>Micropterus salmoides</i>	19	1	9
Largemouth Bass	<i>Micropterus salmoides</i>	21	2	18
Flathead Catfish	<i>Pylodictis olivaris</i>	22	1	9
Blue Tilapia	<i>Tilapia aurea</i>	14	3	27
Blue Tilapia	<i>Tilapia aurea</i>	15	15	136
Event Total Killed:			12,534	114,223
Estimated Value:				\$41,443.04

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APPENDIX C



Location of sampling sites, Lake Fairfield, Texas, 2008-2009. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and E, respectively.