

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-31

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

Dunlap Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Dunlap were surveyed in 2005 using trap nets and electrofishing and 2006 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Dunlap Reservoir is a 410-acre impoundment located on the Guadalupe River in Guadalupe County and is regulated by the Guadalupe-Blanco River Authority (GBRA). The reservoir, impounded in 1928, is used for water supply, hydroelectric generation, and recreation. The reservoir is mainstream and maintains a fairly constant water level. Substrate in the upper portion is composed primarily of rock and gravel, while the middle and lower portions of the reservoir is composed of clay, sand and silt. Habitat features consisted of boat docks, rocks, and native floating and native emergent vegetation.
- **Management History:** Important sport fish include channel catfish, largemouth bass, and crappie. The management plan from the 2002 survey report focused on nuisance aquatic vegetation and fish habitat improvement. In 1996 Texas Parks and Wildlife Department (TPWD) treated hydrilla with herbicide in conjunction with stocking triploid grass carp. The first objective from the 2002 survey report included monitoring the reservoir for the possible return of hydrilla and water hyacinth, while creating a communication pathway among homeowner groups, the GBRA and the TPWD Inland Fisheries district office. This communication pathway proved helpful in June 2004 when homeowner groups alerted GBRA and TPWD about the presence of *Hygrophila* sp., another potentially nuisance plant species that is currently present in the Comal River, upstream of Lake Dunlap. The second objective from the 2002 survey report was to enhance fish habitat by installing brushpiles under homeowners' boat docks. However, due to conflicts between anglers and recreational users this project is still being discussed.
- **Fish Community**
 - **Prey species:** Gizzard shad and bluegill continue to be the dominant prey species for most sportfish. Electrofishing catch of gizzard shad was good and approximately 85% of the gizzard shad collected were available as prey. Electrofishing catch of bluegill was lower than previous years and the majority were less than 6 inches in length.
 - **Catfishes:** Channel, blue, and flathead catfish are present in the reservoir, with channel catfish being the dominant species. Although fewer large channel catfish were collected in 2006 gill net survey, many were available to anglers.
 - **Sunfish:** Redear and redbreast sunfish reach >8 inches in length in the reservoir. Redbreast sunfish are the most abundant of the two species and have the greatest potential of providing a fishery.
 - **Black basses:** Largemouth, Guadalupe, spotted, and smallmouth bass are present in the reservoir, with largemouth being the dominant species. Largemouth bass exhibited good body condition and growth rates to legal size.
 - **Crappie:** White and black crappie are present in the reservoir, with white crappie being the dominant species. However, trap net catch rates of both crappie species were low compared to other reservoirs in the Guadalupe chain-of-lakes.
- **Management Strategies:** Continue to work with anglers, recreational users, and the GBRA to enhance fish habitat. Stock Florida largemouth bass in 2007. Continue to monitor for the return of hydrilla and water hyacinth. Obtain funding for a creel survey on this reservoir.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Dunlap in 2005-2006. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Management strategies are included to address existing problems or opportunities. Historical data is presented with the 2005-2006 data for comparison.

Reservoir Description

Lake Dunlap is a 410-acre impoundment located on the Guadalupe River in Guadalupe County and is regulated by the Guadalupe-Blanco River Authority (GBRA). The reservoir, impounded in 1928, is used for water supply, hydroelectric generation, and recreation. The reservoir is mainstream and maintains a fairly constant water level. Substrate in the upper portion is composed primarily of rock and gravel, while the middle and lower portions of the reservoir is composed of clay, sand and silt. Land around the reservoir has been heavily developed for residential use. Shoreline habitat is comprised of bulkhead and cutbank. Littoral habitat consists of native aquatic plant species, including American lotus, spatterdock, and water willow. Nuisance exotic vegetation, such as hydrilla and water hyacinth were not observed in the 2005-2006 survey period. Sparse amounts of *Hygrophila* sp., a nuisance exotic vegetation, was observed during the 2005-2006 survey period but is not expected to become problematic due to limited areas for growth. *Hygrophila* sp. has been present in the Comal River for many years and has yet to become problematic in Lake Dunlap. The public boat ramp at Lake Dunlap was closed due to construction on I-35 but it has been reopened. Access was considered inadequate due to limited shoreline access and no handicapped facilities at the boat ramp.

Management History

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

1. Monitor the reservoir for the return of hydrilla and water hyacinth and create a pathway for reporting nuisance aquatic vegetation infestations.

Action: A thorough vegetation survey was conducted every other year, with only *Hygrophila* sp. being present. Since the hydrilla treatment in 1996, GBRA has maintained an open communication pathway with the homeowner groups on Lake Dunlap. After contacting GBRA concerning this management issue, the TPWD Inland Fisheries District office was added to the contact list. This communication pathway proved helpful in the June 2004 when homeowner groups alerted GBRA and TPWD about the presence of *Hygrophila* sp.

2. Enhance fish habitat by creating brushpiles under homeowners' boat docks.

Action: Initial contact was made with GBRA concerning this issue and at the time there was support for the project. However, later there were concerns about potential conflicts between angler and other recreational user conflicts on this relatively narrow reservoir. This project was recently brought back up for consideration.

Harvest regulation history: Sportfishes in Lake Dunlap have always been managed with statewide regulations (Table 2).

Stocking history: Lake Dunlap has not been stocked since 2001 (blue catfish). Blue catfish have not created a self-sustaining fishery in this reservoir, despite prior stockings. Triploid grass carp were stocked in 1995 and 1996 for hydrilla control purposes and were sporadically observed in the reservoir. Florida largemouth bass have not been stocked since 1984. Results from the 2005 largemouth bass genetic sampling indicated that the FLMB genotype was 17%, less than the 20% threshold recommended for reservoir with a history of producing trophy largemouth bass. The current largemouth bass waterbody

record for Lake Dunlap is 14.94 pounds. Florida largemouth bass will be requested for Lake Dunlap in 2007.

Vegetation/habitat history: Vegetation at Lake Dunlap is comprised of native floating vegetation, native emergent vegetation, and sparse amounts of *Hygrophila* sp., an exotic species. Prior to 1996, Lake Dunlap had a severe hydrilla problem. Through herbicide treatments and the introduction of triploid grass carp, hydrilla was no longer present in the reservoir as of 2005. Water hyacinth was also present in Lake Dunlap prior to 1996 but has not been observed since.

A habitat enhancement project has been discussed with GBRA concerning the limited littoral habitat at Lake Dunlap. While there was initial support for the habitat enhancement project, concerns about conflicts between angler and other recreational user groups surfaced, delaying the project.

Hygrophila sp., an exotic and potentially nuisance species, was documented actively growing in Lake Dunlap in 2004. This plant has been present in the Comal River (upstream of Lake Dunlap) for many years. *Hygrophila* sp. fragments begin appearing in Lake Dunlap during the summer and were probably linked to tubing activities in the Comal River during this same time period. Although this species has become established in Lake Dunlap, it is not expected to cause any access problems due to the limited areas for growth.

METHODS

Fishes were collected by electrofishing (1.0 hour at 12 5-minute stations), trap nets (5 net nights at 5 stations), and gill nets (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 and gill nets as the number of fish caught in one net set overnight (fish/nn). A habitat/vegetation survey was conducted in July 2005. 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).

Genetic composition of largemouth bass was determined by using Micro-satellite DNA analysis in 2005 and by electrophoresis for previous years.

A littoral zone/physical habitat survey was conducted in July 2005.

Sampling statistics (CPUE for various length categories) and structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)] and condition indices [relative weight (W_t)] were calculated for target fishes according to Anderson and Neumann (1996). The Index of Vulnerability (IOV) was calculated for gizzard shad according to DiCenzo et. al. (1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Mean age at length data for largemouth bass ages was determined using otoliths from 13 individuals between 13 and 14.9 inches total length.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted bulkhead, cutbank, native floating vegetation (spatterdock), native emergent vegetation (water willow), and an exotic vegetation, *Hygrophila* sp. (Table 4). Total vegetation coverage for Lake Dunlap was 7.1%.

Prey species: Electrofishing catch rates for gizzard shad, threadfin shad, and bluegill were 100.0/h, 3.0/h, and 66.0/h, respectively. Total CPUE of gizzard shad was similar to 2001 (115.0/h) and higher than 2003 (40/h) (Figure 1). The IOV for gizzard shad for 2005 was 85, also similar to 2001 (83) and higher than in 2003 (20) (Figure 1). The 2005 IOV value indicated that a high percentage (85%) of the gizzard shad sampled were suitable prey for most predatory fishes. Total CPUE for bluegill was lower than 2001 (149/h) and 2003 (113/h) (Figure 2). However, the majority of bluegill were deemed available to most

predators.

Blue catfish: The gill net catch rate for blue catfish in 2006 was 0.4/nn, similar to 1998 (0.6/nn) and 2002 (0.4/nn) (Figure 3). Despite several blue catfish stockings, total CPUE remains low.

Channel catfish: The gill net catch rate for channel catfish was 7.0/nn, similar to both 1998 (8.0/nn) and 2002 (10.0/nn) (Figure 4). The percentage of legal size channel catfish remains high, as reflected by a PSD of 33. Mean relative weights of stock size and greater channel catfish reflect above-average condition, with most W_r values over 120 (Figure 4).

Redbreast sunfish: The electrofishing catch rate for redbreast sunfish was 137.0/h, similar to 2001 (125.0/h) but less than 2003 (228.0/h) (Figure 5). Redbreast sunfish, greater than 8 inches total length, continue to be collected from Lake Dunlap, however, there are no creel data to measure angling effort and catch and harvest rates for this potential fishery.

Redear sunfish: The electrofishing catch rate for redear sunfish was 13.0/h, similar to 2003 (8.0/h) but lower than 2001 (25.0/h) (Figure 6). Redear sunfish also reach respectable sizes in Lake Dunlap but electrofishing catch rates remain low compared to other *Lepomis* spp.

Largemouth bass: The electrofishing catch rate for largemouth bass in 2005 was 73.0/h, lower than 2001 (93.0/h) but higher than 2003 (61.0/h) (Figure 7). PSD increased substantially in 2005 (70) from 2001 (38) and 2003 (39) (Figure 7). Mean age of largemouth bass at 14 inches (range 13.0 to 14.9 inches) was 2.7 years (N=13; range 1-3). Mean relative weights indicated condition of largemouth bass was good in 2006 despite decreased catch rates of primary prey species, as W_r values were near 100 for most size classes (Figure 8). Genetics sampling indicated a 66% frequency of Florida largemouth bass alleles in Lake Dunlap, with 17% of the population having Florida largemouth bass genotypes (Table 5).

White crappie: No white crappie were collected during the 2005 standard trap net survey. Total CPUE of white crappie from Lake Dunlap has been historically low (Figure 8). A non-standard trap net survey (biologist selected sites) was conducted at the same time as the standard trap net survey (randomly selected sites). Four white crappie were collected from the non-standard trap net survey.

Fisheries management plan for Lake Dunlap, Texas

Prepared – July 2006.

ISSUE 1: Habitat in Lake Dunlap consists of aquatic vegetation (spatterdock and water willow) and boat docks and piers, encompassing approximately 10% of the total reservoir. GBRA was contacted about a habitat enhancement project involving Christmas trees being placed under piers and boat docks. At first there was support for the project, however, conflicts between angler and other recreational user groups surfaced, delaying the project. The main focus of this concern was that wakes from recreational boaters could potentially wash anglers' boats into the piers and boat docks, damaging anglers' boats and the homeowners' piers and boat docks. The reservoir is narrow enough that wakes from recreational boats are capable of causing such damage.

MANAGEMENT STRATEGIES

1. Meet with GBRA to regain support for the habitat enhancement project.
2. Schedule a meeting with homeowner, angler, and recreational user groups to discuss the habitat enhancement project in the fall 2006.
3. Write and distribute press releases concerning habitat enhancement projects.

ISSUE 2: The FLMB genotype at Lake Dunlap has fallen below the 20% threshold for reservoirs with a history of producing trophy largemouth bass. Largemouth bass reach trophy status in Lake Dunlap as evidenced by the 14.94 pound waterbody record for this reservoir.

MANAGEMENT STRATEGIES

1. Stock FLMB at a stocking rate of 100/acre in 2007. Results of the 2005 genetic data were received too late for the 2006 stocking request. However, if FLMB become available in 2006 then a request will be made for these fish.
2. Monitor success of FLMB stocking through routine genetic sampling two years after the first stocking.

ISSUE 3: Nuisance aquatic vegetation, hydrilla and water hyacinth, caused access and recreational problems in the reservoir in the mid-1990s. Hydrilla and water hyacinth have not been observed in the reservoir since 1996. *Hygrophila* sp. colonies were documented in the reservoir in 2004.

MANAGEMENT STRATEGIES

1. Continue to monitor the reservoir for the possible return of hydrilla, water hyacinth, and *Hygrophila* sp. and implement control measures as necessary.
2. Continue to maintain open pathway of communication among TPWD, GBRA, and homeowner groups.

ISSUE 4: There are currently no creel data for Lake Dunlap. This reservoir has redear and redbreast sunfish that reach greater than 8 inches total length but there is no data to quantify angling effort and both catch and harvest rates of these two species. Additionally, Guadalupe bass are present in this reservoir and angling effort, catch and harvest data would be important for this endemic species.

MANAGEMENT STRATEGY

1. Obtain funding for a university to conduct an annual creel survey on Lake Dunlap, in order to gather information on all targeted fish species, especially redear and redbreast sunfish and Guadalupe bass.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes routine electrofishing and trap netting in the fall 2007, electrofishing, trap netting, gill netting in 2009-2010 in order to monitor the sport fisheries, and a Federal Aid report will be prepared in 2010 (Table 6).

LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques 2nd 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.
- Elder, H., and J. Findeisen. 2002. Statewide freshwater fisheries monitoring and management program survey report for Lake Dunlap, 2001. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Table 1. Characteristics of Lake Dunlap, Texas.

Characteristic	Description
Year constructed	1928
Controlling authority	Guadalupe-Blanco River Authority
County	Guadalupe
Reservoir type	Mainstream
Shoreline Development Index	2.25
Conductivity	450-550 umhos/cm
Access: Boat	Good, 1 Public ramp
Bank	Poor, limited due to private property
Handicapped	Poor, none

Table 2. Harvest regulations for Lake Dunlap, Texas.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 – No Limit
Catfish, flathead	5	18 – No Limit
Bass, white	25	10 – No Limit
Bass, striped	5	18 – No Limit
Bass, palmetto	5	18 – No Limit
Bass, largemouth	5	14 – No Limit
Bass, spotted and Guadalupe	5 (in any combination)	No Limit – No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	No Limit – No Limit

Table 3. Stocking history of Lake Dunlap, Texas. Size categories are: FGL = 1-3 inches and ADL = adults.

Year	Number	Size
<u>Blue catfish</u>		
1988	16	ADL
1995	41,000	FGL
1996	34,400	FGL
1997	41,553	FGL
2001	34,308	FGL
Species Total	151,277	
<u>Channel catfish</u>		
1968	2,000	FGL
1973	6,000	FGL
Species Total	8,000	
<u>Coppernose bluegill</u>		
1983	15,000	FGL
<u>Florida largemouth bass</u>		
1966	8,400	FGL
1967	10,000	FGL
1984	20,200	FGL
Species Total	38,600	
<u>Triploid grass carp*</u>		
1995	25	ADL
1996**	3	ADL
Species Total	28	

* Radio-tagged fish

** Replace dead radio-tagged fish

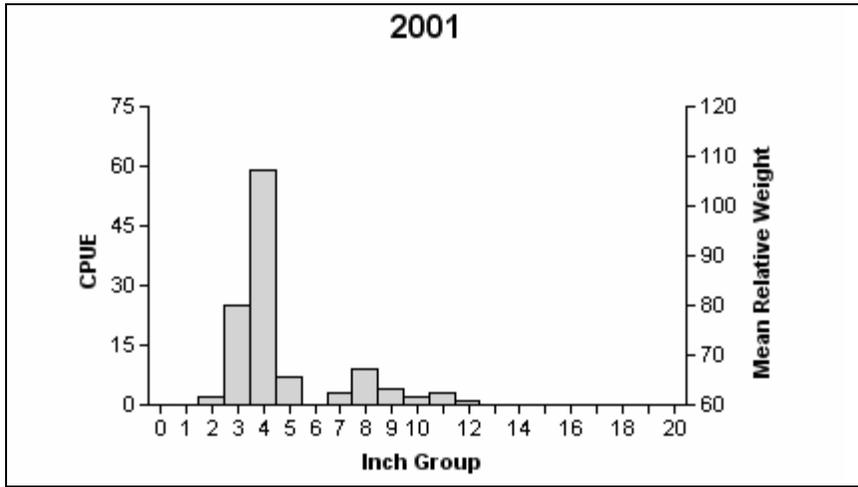
Table 4. Survey of littoral zone and physical habitat types, Lake Dunlap, Texas, 2005. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead	8.67	51.9		
Concrete	0.07	0.4		
Cutbank	7.98	47.7		
Total	16.72	100		
Boat docks	6.89	41.2		
Native emergent ^a	0.36	2.2	0.02	< 0.01
Native floating ^b	4.21	25.2	29.09	7.09
<i>Hygrophila</i>	Sparse	< 0.1	< 0.01	<0.01

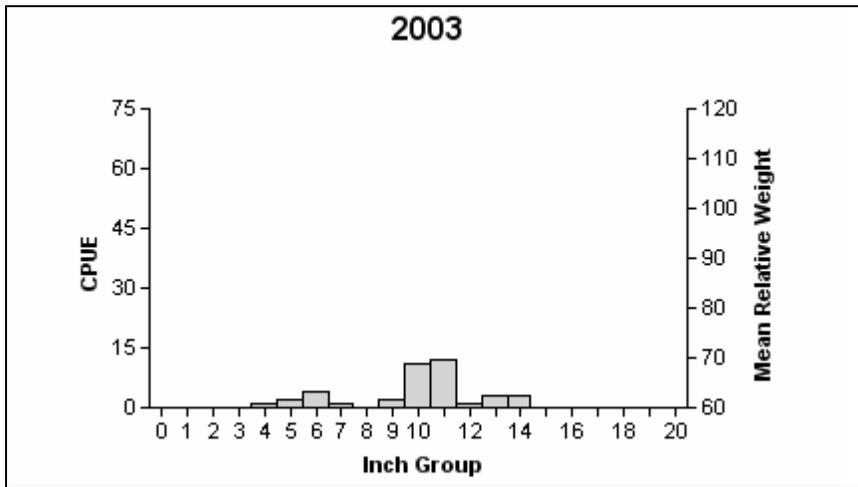
^a Water willow

^b Spatterdock

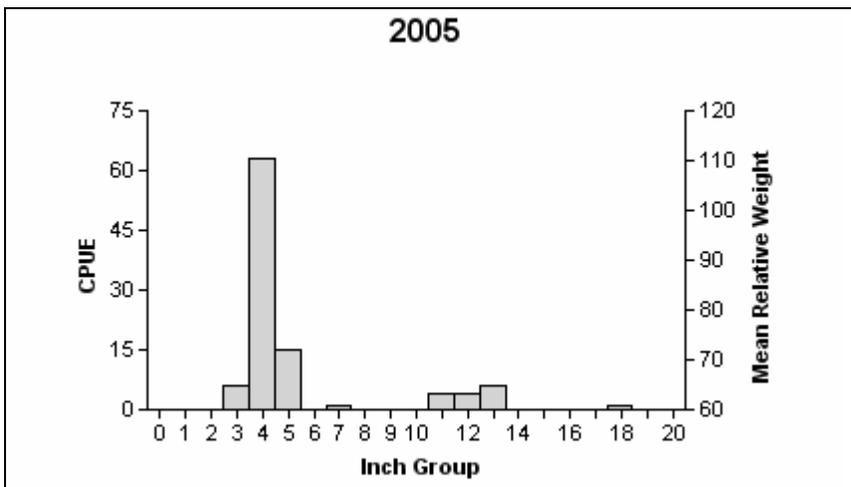
Gizzard Shad



Effort = 1.0
 Total CPUE = 115.0 (25; 115)
 IOV = 83 (0.05)



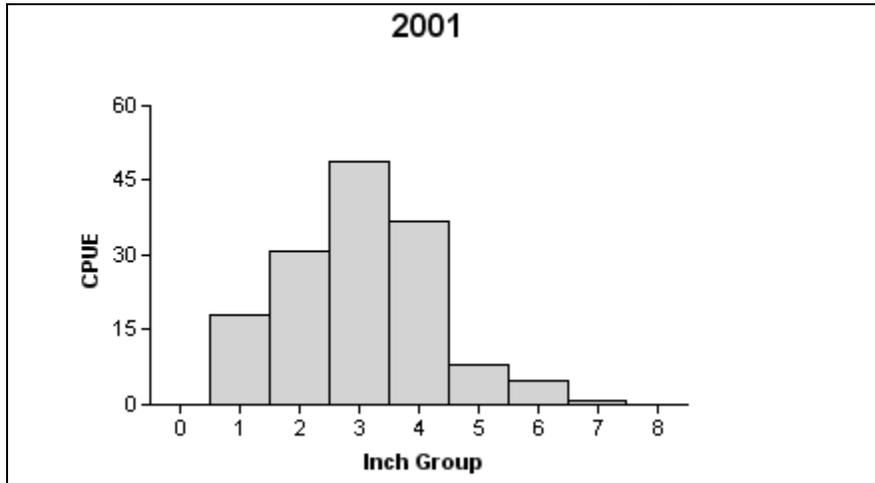
Effort = 1.0
 Total CPUE = 40.0 (32; 40)
 IOV = 20 (0.12)



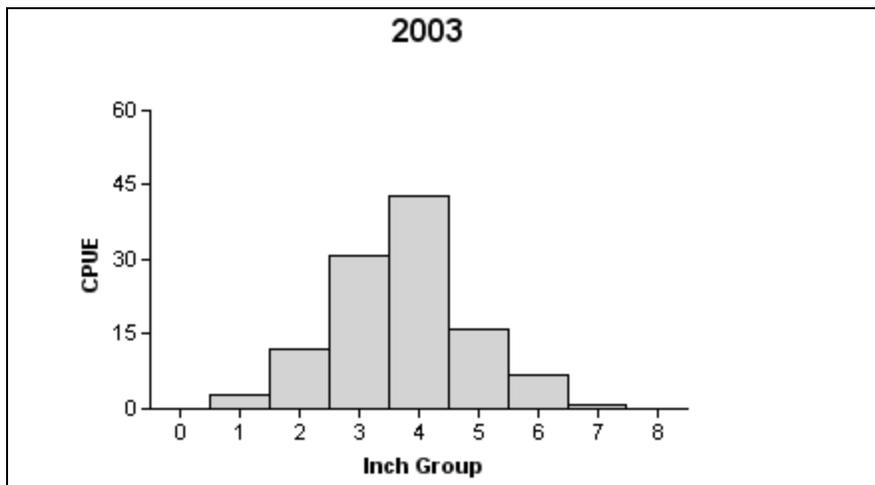
Effort = 1.0
 Total CPUE = 100.0 (30; 100)
 IOV = 85 (0.06)

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 Dunlap, Texas, 2001, 2003, and 2005.

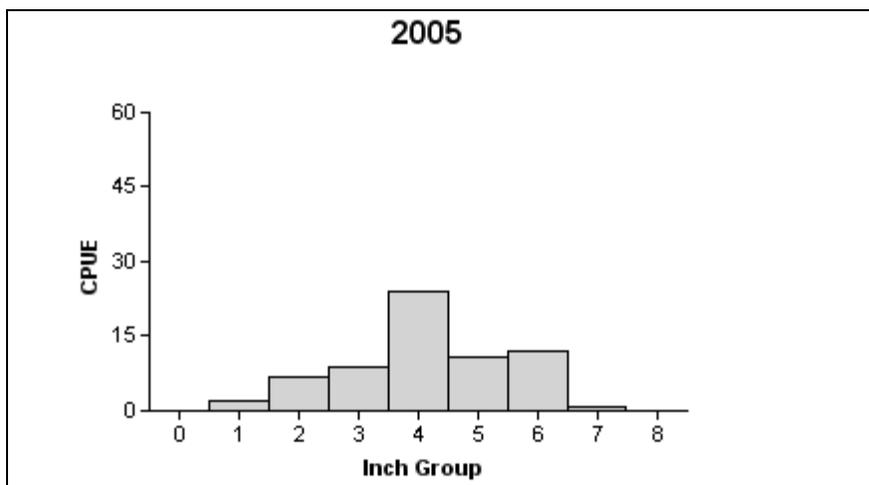
Bluegill



Effort = 1.0
 Total CPUE = 149.0 (16; 149)
 PSD = 6 (0.02)



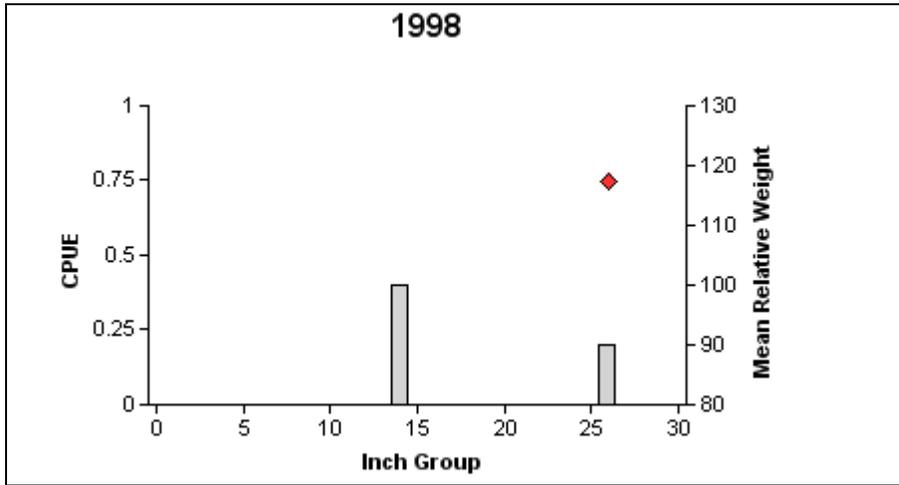
Effort = 1.0
 Total CPUE = 113.0 (19; 113)
 PSD = 8 (0.03)



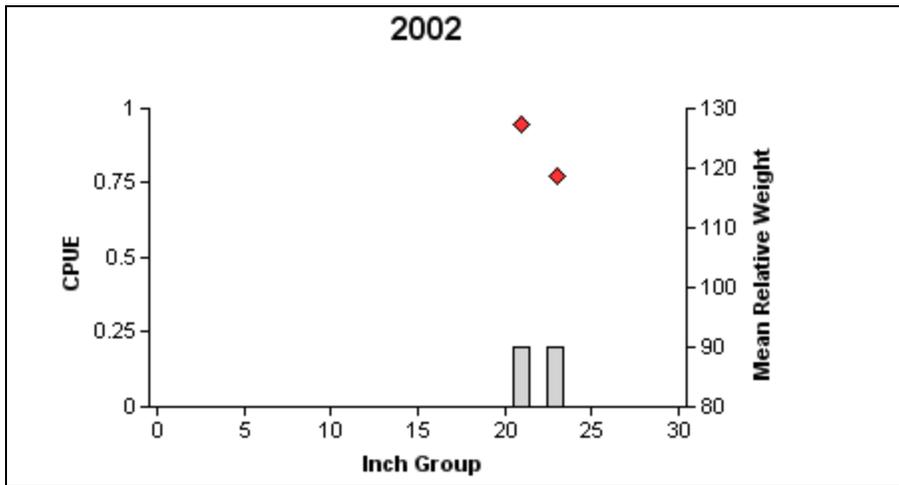
Effort = 1.0
 Total CPUE = 66.0 (31; 66)
 PSD = 23 (0.05)

Figure 2. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for fall electrofishing surveys, Lake Dunlap, Texas, 2001, 2003, and 2005.

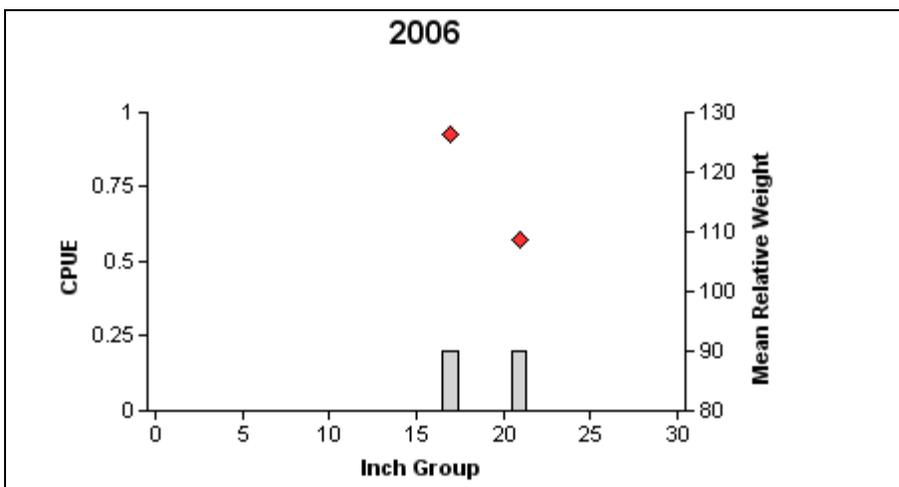
Blue Catfish



Effort = 5.0
 Total CPUE = 0.6 (100; 3)



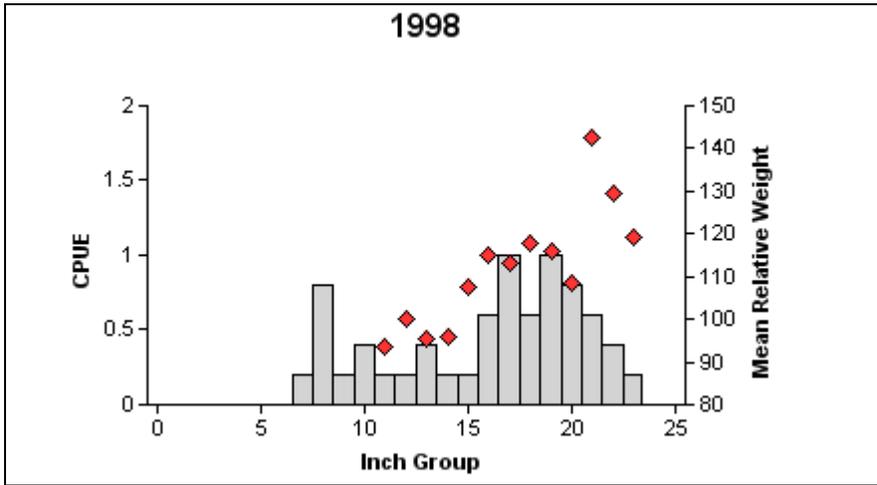
Effort = 5.0
 Total CPUE = 0.4 (100; 2)



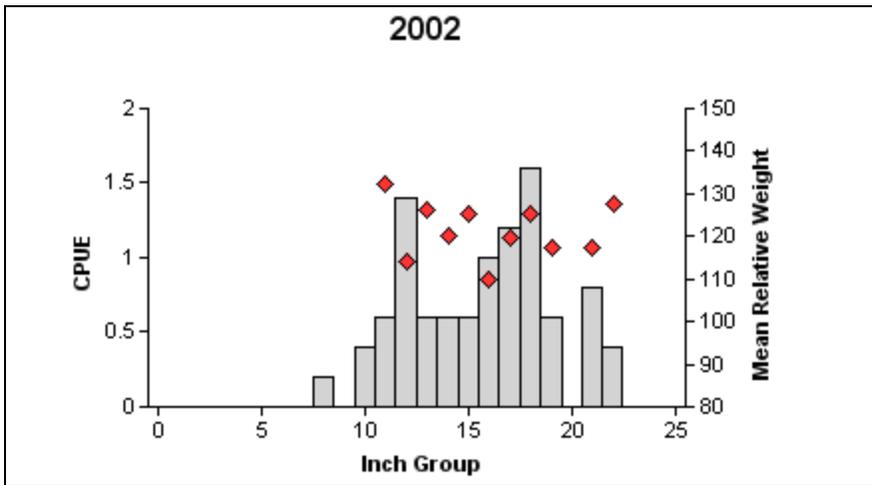
Effort = 5.0
 Total CPUE = 0.4 (100; 2)

Figure 3. Number of blue catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for population indices are in parentheses) for spring gill net surveys, Lake Dunlap, Texas, 1998, 2002, and 2006.

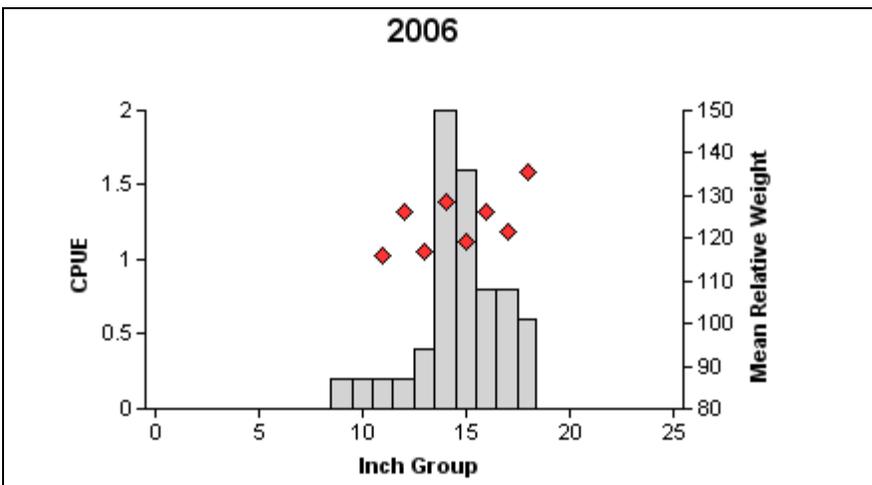
Channel Catfish



Effort = 5.0
 Total CPUE = 8.0 (27; 40)
 PSD = 81 (0.05)



Effort = 5.0
 Total CPUE = 10.0 (24; 50)
 PSD = 60 (0.16)



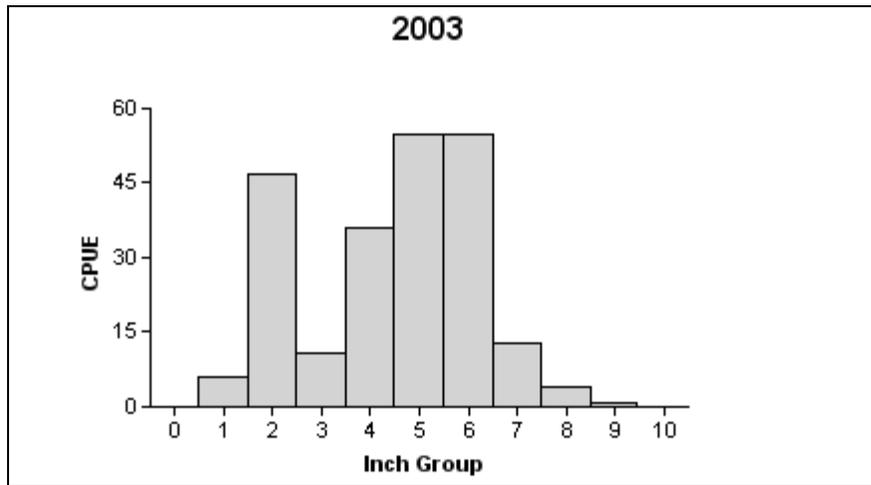
Effort = 5.0
 Total CPUE = 7.0 (24; 35)
 PSD = 33 (0.09)

Figure 4. Number of catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for population indices are in parentheses) for spring gill net surveys, Lake Dunlap, Texas, 1998, 2002, and 2006.

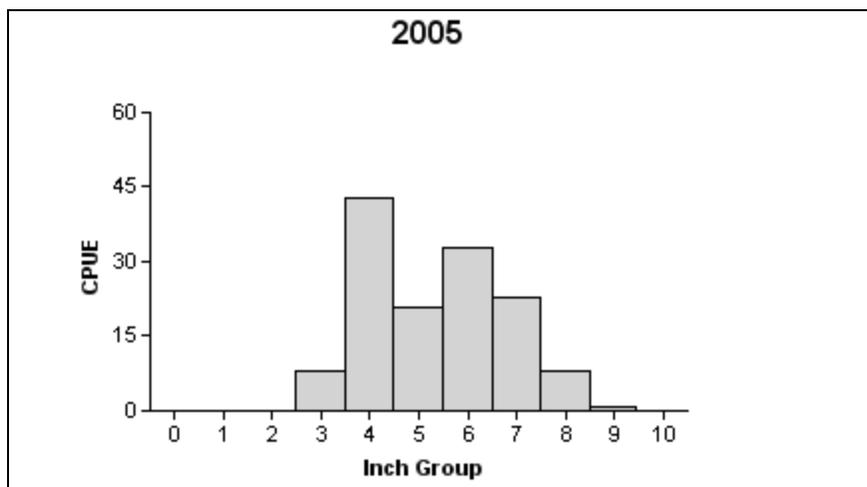
Redbreast Sunfish



Effort = 1.0
 Total CPUE = 125.0 (30; 125)
 PSD = 22 (0.05)



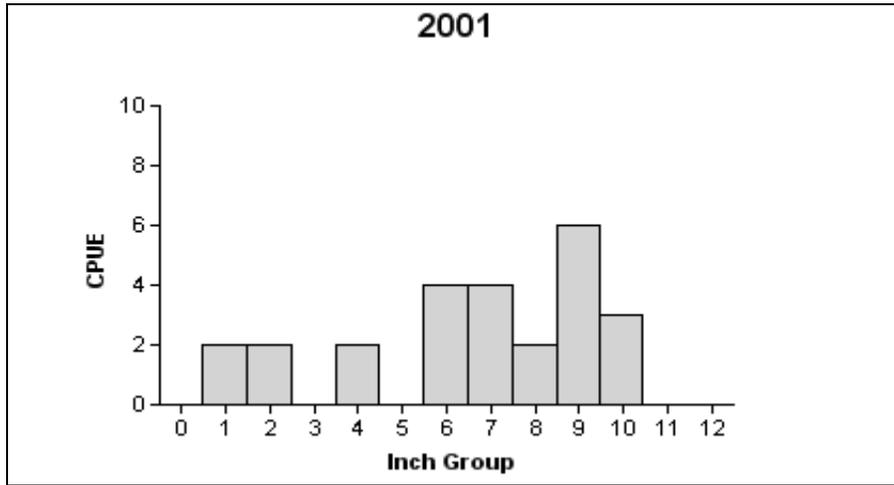
Effort = 1.0
 Total CPUE = 228.0 (21; 228)
 PSD = 42 (0.04)



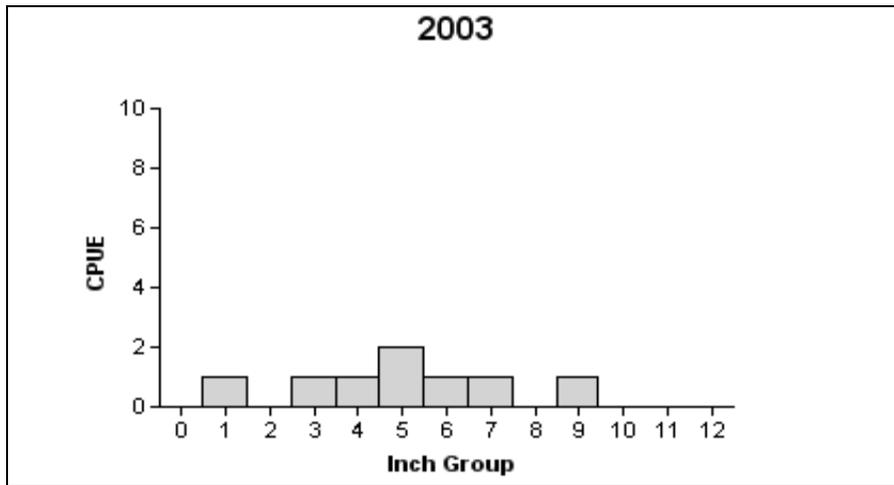
Effort = 1.0
 Total CPUE = 137.0 (29; 137)
 PSD = 47 (0.06)

Figure 5. Number of redbreast sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for fall electrofishing surveys, Lake Dunlap, Texas, 2001, 2003, and 2005.

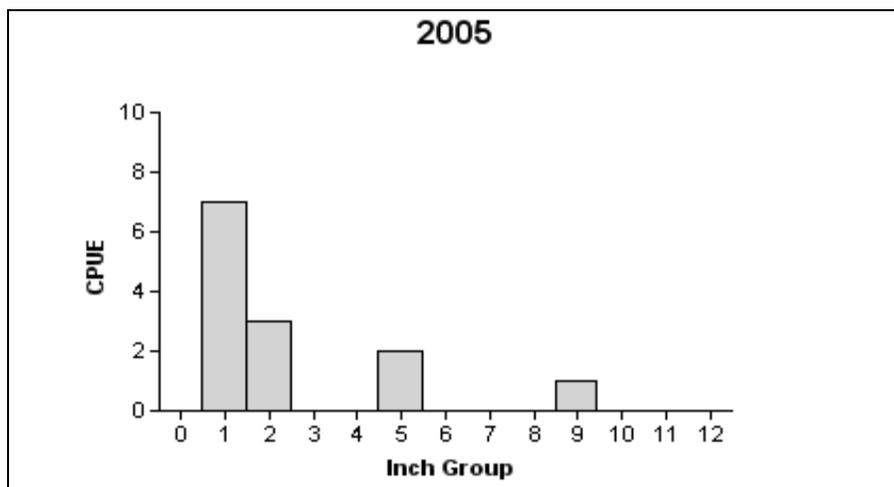
Redear Sunfish



Effort = 1.0
 Total CPUE = 25.0 (33; 25)
 PSD = 71 (0.15)



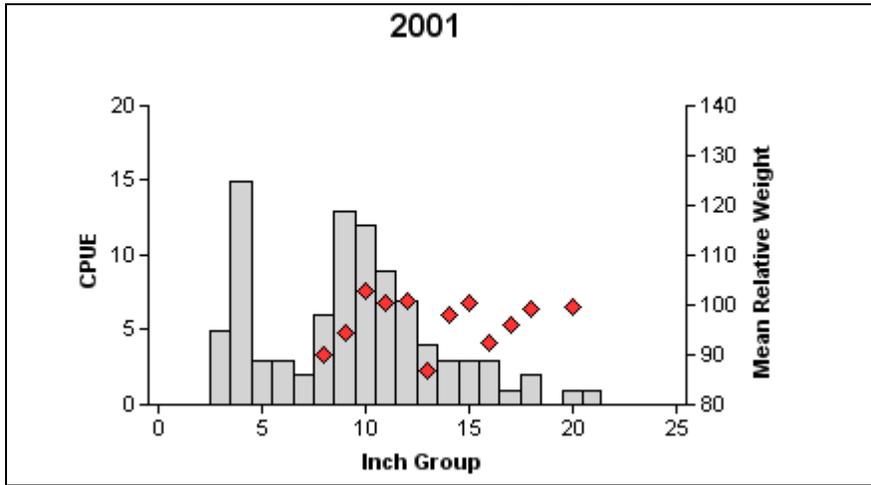
Effort = 1.0
 Total CPUE = 8.0 (21; 8)
 PSD = 33 (0.21)



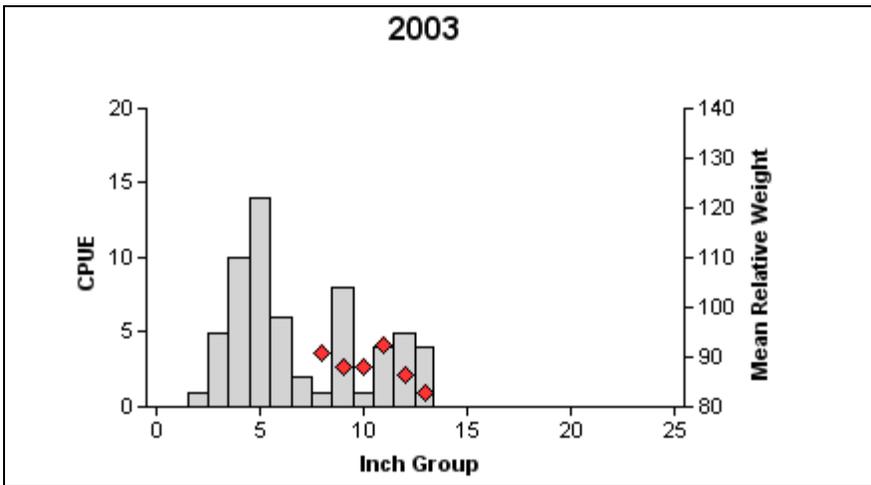
Effort = 1.0
 Total CPUE = 13.0 (54; 13)
 PSD = 33 (0.38)

Figure 6. Number of redear sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for fall electrofishing surveys, Lake Dunlap, Texas, 2001, 2003, and 2005.

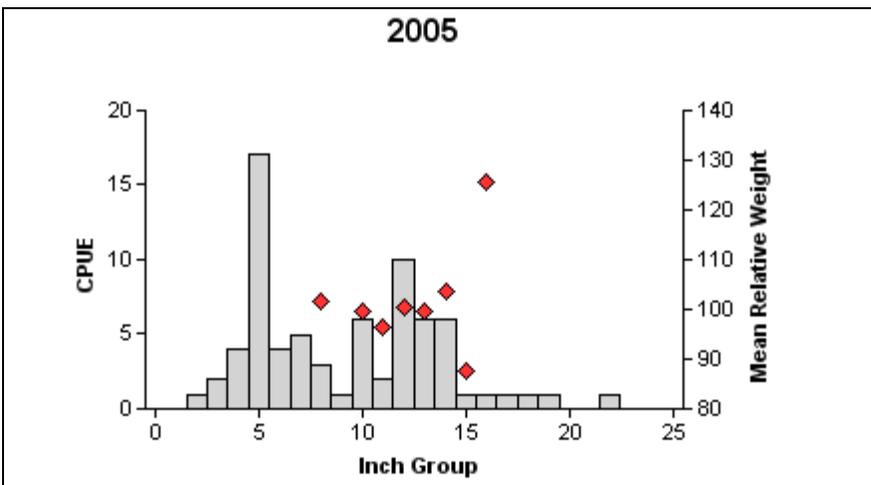
Largemouth Bass



Effort = 1.0
 Total CPUE = 93.0 (13; 93)
 Stock CPUE = 65.0 (14; 65)
 PSD = 38 (0.08)
 RSD-14 = 22 (0.06)



Effort = 1.0
 Total CPUE = 61.0 (16; 61)
 Stock CPUE = 23.0 (32; 23)
 PSD = 39 (0.09)
 RSD-14 = 0 (0)



Effort = 1.0
 Total CPUE = 73.0 (23; 73)
 Stock CPUE = 40.0 (24; 40)
 PSD = 70 (0.09)
 RSD-14 = 30 (0.09)

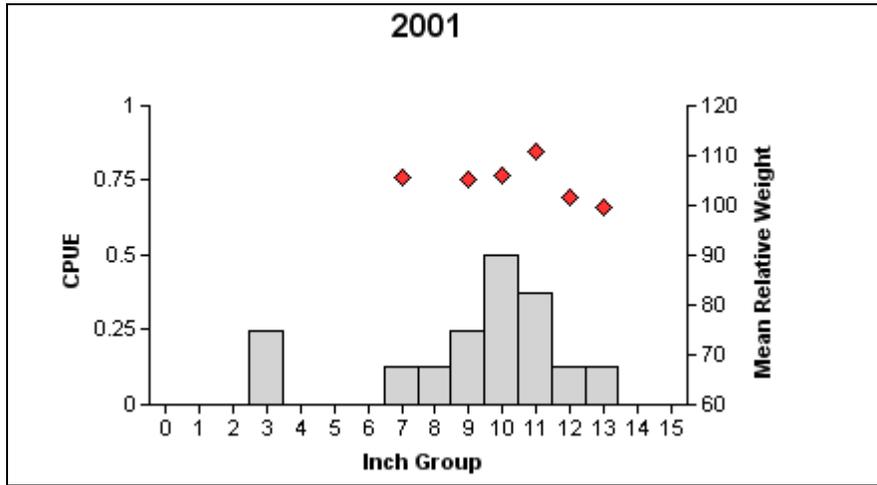
Figure 7. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for population indices are in parentheses) for fall electrofishing surveys, Lake Dunlap, Texas, 2001, 2003, and 2005.

Largemouth Bass

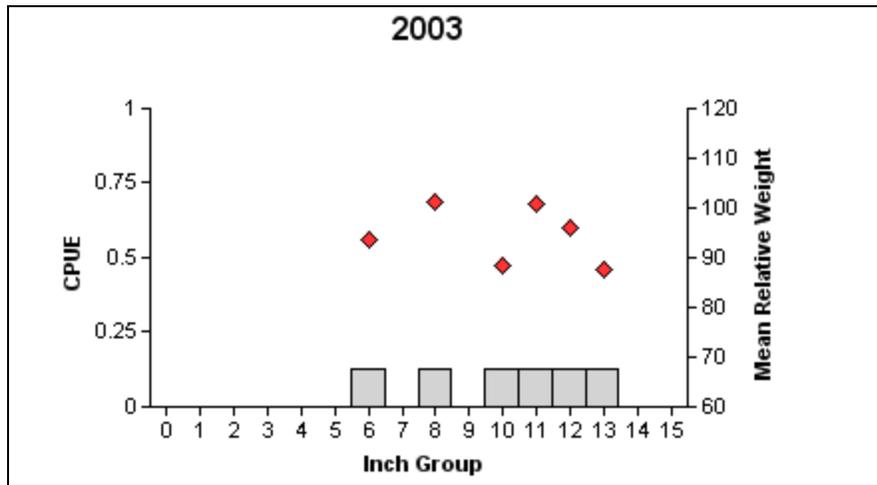
Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake Dunlap, Texas 2005. Electrophoresis analysis was used to determine genetic composition in 2001 and 2003 and micro-satellite DNA analysis was used in 2005. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation intergrade between a FLMB and a NLMB, Fx = second or higher generation intergrade between a FLMB and a NLMB.

Year	Sample size	Genotype				% FLMB alleles	% Pure FLMB
		FLMB	F1	Fx	NLMB		
2001	30	9	6	11	4	60.0	Unknown
2003	30	8	5	15	2	70.8	Unknown
2005	30	5	1	24	0	66.4	17

White Crappie



Effort = 8.0
 Total CPUE = 1.9 (23; 15)
 PSD = 92 (0.07)
 RSD-10 = 69 (0.12)



Effort = 8.0
 Total CPUE = 0.8 (65; 6)
 PSD = 83 (0.17)
 RSD-10 = 67 (0)

No white crappie were collected using randomly set trap nets in 2005.

Effort = 5.0
 CPUE = 0.0

Figure 8. 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 population indices are in parentheses) for fall trap net surveys, Lake Dunlap, Texas, 2001, 2003, and 2005.

Table 6. Proposed sampling schedule for Lake Dunlap, Texas. Electrofishing and trap net surveys are conducted in the fall and the gill net survey in the spring. Standard survey denoted by S.

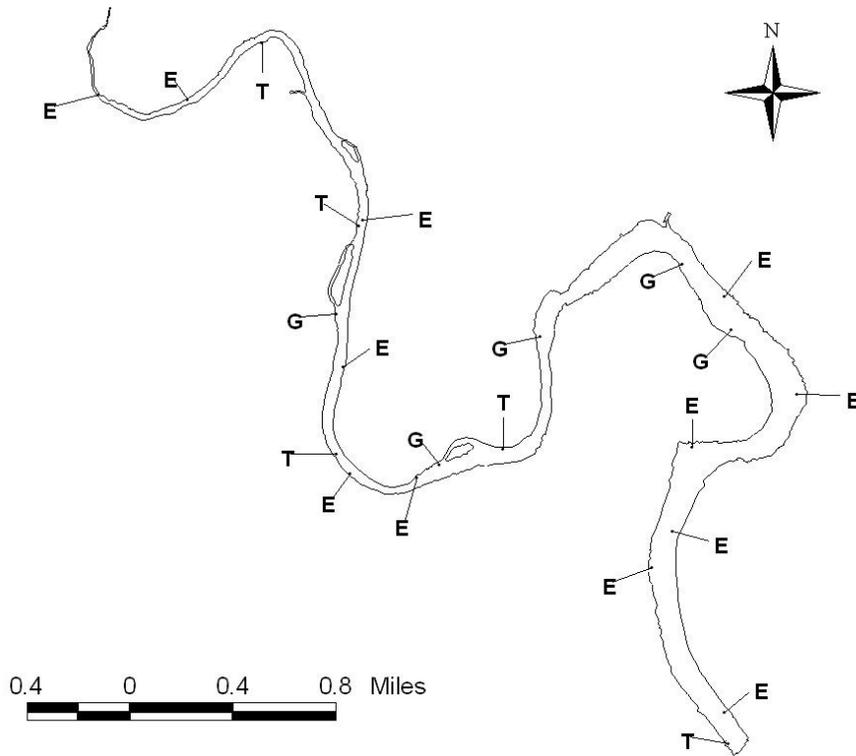
Survey Year	Electrofishing	Trap Netting	Gill Netting	Report
Fall 2006-Spring 2007				
Fall 2007-Spring 2008	S	S		
Fall 2008-Spring 2009				
Fall 2009-Spring 2010	S	S	S	S

APPENDIX A

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

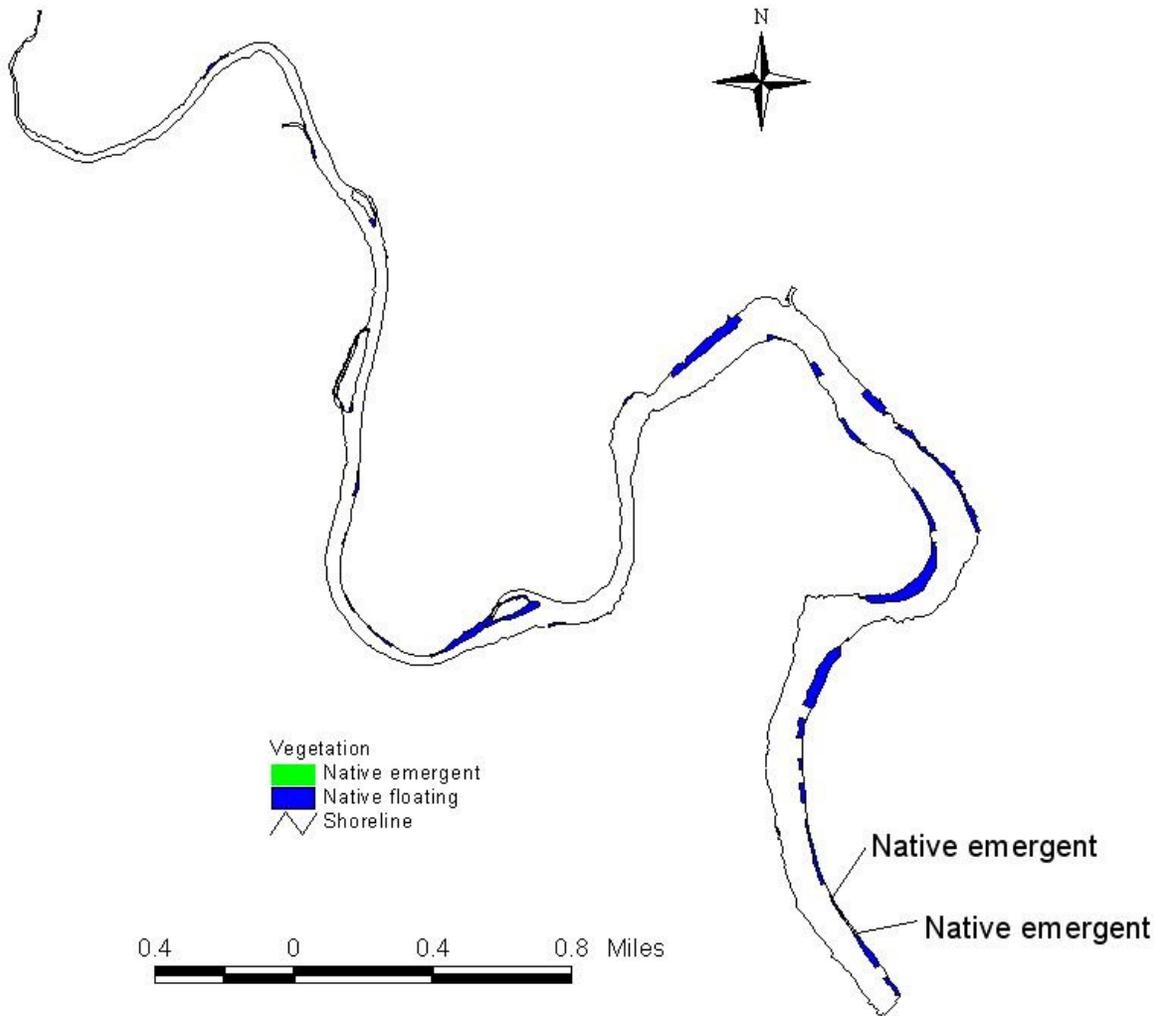
Species	Electrofishing		Trap Netting		Gill netting	
	N	CPUE	N	CPUE	N	CPUE
Longnose gar					1	0.2
Gizzard shad	100	100.0			26	5.2
Threadfin shad	3	3.0				
Common carp	1	1.0				
Bullhead minnow	76	76.0				
Inland silverside	9	9.0				
Other minnows	8	8.0				
Blacktail shiner	4	4.0				
Grey redhorse	20	20.0			20	4.0
Blue catfish	1	1.0			2	0.4
Channel catfish	4	4.0			35	7.0
Flathead catfish					5	1.0
White bass					2	0.4
Redbreast sunfish	137	137.0				
Green sunfish	2	2.0				
Warmouth	9	9.0	1	0.2		
Bluegill	66	66.0	26	5.2		
Longear sunfish	72	72.0	4	0.8		
Redear sunfish	13	13.0	1	0.2		
Smallmouth bass	1	1.0	2	0.4	1	0.2
Spotted bass			2	0.4		
Largemouth bass	73	73.0				
White crappie	1	1.0				
Rio Grande Cichlid	12	12.0				
Blue tilapia	3	3.0				

APPENDIX B



Location of sampling sites, Lake Dunlap, Texas, 2005-2006. Electrofishing, trap net, and gill net stations are indicated by E, T, and G, respectively. Water level was at conservation pool at time of sampling.

APPENDIX C



Locations of aquatic vegetation, Lake Dunlap, Texas, 2005. Water willow was the only native emergent species and spatterdock was the only native floating species.