PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-31

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

Lake McQueeney

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake McQueeney were surveyed in 2005 using trap nets and electrofishing, and in 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:** Lake McQueeney is located on the Guadalupe River in Guadalupe County. The reservoir, impounded in 1928, is used for hydroelectric generation and recreation. The reservoir is mainstream and maintains a fairly constant water level. Substrate in the upper portion is composed of rock and gravel, while the middle and lower portions are composed of clay, sand, and silt. Land around the reservoir has been heavily developed for residential use. Approximately 73% of the shoreline has been modified with bulkhead. Littoral habitat consisted of boat docks, piers, overhanging brush, both emergent and submergent vegetation, and floating-leaf native aquatic vegetation.

- **Management History:** Important sport fish include largemouth bass, white crappie, and channel catfish. The previous management focus has been on controlling nuisance aquatic vegetation and creating additional habitat. The first objective was to monitor for possible return of hydrilla and water hyacinth and conduct control measures as necessary. This was completed through vegetation surveys conducted every other year. In addition, there was a need to create a communication pathway among homeowner groups, the Guadalupe-Blanco River Authority (GBRA), and the Texas Parks and Wildlife (TPWD) Inland Fisheries district office. Creating additional fish habitat was discussed with GBRA but not implemented due to concerns between angling and recreational users.

- **Fish Community**
  - **Prey species:** Gizzard shad and bluegill continued to be the predominant prey in the reservoir. Availability of gizzard shad as prey for sportfish varied by year, and availability in 2005 was lower than in past years. Few bluegill were greater than 6 inches total length.

  - **Catfishes:** Blue and channel catfish were present in the reservoir, with channel catfish being more abundant. Gill net surveys conducted in 2006 indicated the majority of channel catfish were greater than legal size.

  - **Sunfish:** Redear and redbreast sunfish reached sizes greater than 8 inches total length in the reservoir. However, angling pressure was unknown at this time of publication.

  - **Largemouth bass:** Largemouth bass exhibited marginal body condition with few fish above legal size. Anecdotal reports from anglers in spring 2006 indicated moderate angling success.

  - **White crappie:** Trap net catch rates of white crappie increased noticeably in 2005. The majority of white crappie were collected in the lower, more shallow section of the reservoir.

- **Management Strategies:** Continue to work with anglers, recreational users and the GBRA to enhance fish habitat. Monitor for return of hydrilla and water hyacinth. Obtain funding for a future creel survey on this reservoir.

INTRODUCTION

This document is a summary of fisheries data collected from Lake McQueeney 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 are presented with the 2005-2006 data for comparison.

Reservoir Description

Lake McQueeney is a 396-acre impoundment located on the Guadalupe River in Guadalupe County (Table 1). The reservoir, impounded in 1928, is used for hydroelectric generation and recreation. The reservoir is mainstream and maintains a fairly constant water level. Substrate in the upper portion is composed of rock and gravel, while the middle and lower portions are composed of clay, sand, and silt. Land around the reservoir has been heavily developed for residential use. Approximately 73% of the shoreline has been modified with bulkhead. Littoral habitat consisted of boat docks, piers, overhanging brush, and both emergent and floating-leaf native aquatic vegetation. Littoral habitat covers less than 10% of the surface area of the reservoir. Floating, unrooted mats of *Hygrophila* sp., a nuisance exotic vegetation, were observed during a June 2004 vegetation survey. *Hygrophila* sp. has been present in the nearby Comal River for many years and has yet to become problematic in Lake McQueeney.

Management History

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

1. Monitor return of hydrilla and water hyacinth and implement control measures as necessary.
   Action: An aquatic vegetation survey was conducted every other year, with no exotic species being present. Since the hydrilla treatment in 1996, GBRA has maintained an open communication pathway with the homeowner groups on Lake McQueeney. 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 June 2004 when homeowner groups alerted GBRA and TPWD about the presence of *Hygrophila* sp.
2. Introduce new fish holding structures (brushpiles).
   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 angler versus recreational user conflicts on this reservoir. Currently this project has been brought back up for consideration.

Harvest regulation history: Sportfish in Lake McQueeney have historical been and are currently managed with statewide regulations (Table 2).

Stocking history: Approximately 80,000 blue catfish were stocked in 1995 and 1996, and 36,000 blue catfish were stocked in 2001. Channel catfish were most recently stocked (4,200 fish) in 1996. McQueeney Reservoir was stocked with 40,000 Florida largemouth bass in 2005. Prior to 2005, the last Florida largemouth bass stocking was in 1985 (19,500 fish). The complete stocking history can be found in Table 3.

In 1995 and 1996, the reservoir was stocked with radio-tagged triploid grass carp to control aquatic vegetation.

Vegetation/habitat history: Habitat in Lake McQueeney consists of boat docks, piers, bulkheads,

overhanging brush, submergent vegetation, emergent vegetation, and floating-leaf vegetation. Isolated submerged trees, stumps, and brush can be found throughout the reservoir, providing quality habitat for most gamefish species. The upper portion of the reservoir contains rock and gravel within the river channel, while the lower portion consists of steep banks with a mud and clay bottom. Results of the 2005 vegetation survey can be found in Table 4.

Hygrophila sp., an exotic and potentially nuisance species, was documented in floating mats during a 2004 vegetation survey at Lake McQueeney. The source of the introduction of *Hygrophila* sp. in Lake McQueeney is most likely attributed to the upstream Comal River, where *Hygrophila* sp. has been present for many years.

METHODS

Fishes were collected by electrofishing (1.0 hour at 12, 5-minute stations), trap nets (5 net nights at 8 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. Trap and gill nets CPUE was recorded as the number of fish caught in one net set overnight (fish/nn). Micro-satellite DNA analysis was used in 2005 to determine largemouth bass genetic composition; electrophoresis analysis was used in previous years. A littoral zone/physical habitat 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 2004).

Sampling statistics (CPUE for various length categories) and 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). 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 was determined using otoliths from 13 individuals between 13 and 14.9 inches total length.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of bulkheads and cut banks (Table 4). Native floating vegetation (spatterdock) covered more surface area than native emergent vegetation (water willow). Total coverage of vegetation for Lake McQueeney was 6.1%.

Prey species: Electrofishing catch rates of gizzard shad and bluegill in 2005 were 131.0/h and 67.0/h, respectively. Total CPUE of gizzard shad in 2005 was higher than the CPUE in 2003 (44.0/h) and similar to the CPUE in 2001 (140.0/h) (Figure 1). The IOV for gizzard shad was poor, indicating only 32% of gizzard shad were available to existing predators. The IOV estimate from 2005 was lower than IOV estimates from previous years. Total CPUE of bluegill from 2005 (67.0/h) was lower than both 2003 (113.0/h) and 2001 (80.0/h) (Figure 2). Smaller individuals continue to dominate the size structure and were available as forage.

Blue catfish: The gill net catch rate of blue catfish was 0.4/nn in 2006, similar to 2002 (0.2/nn) and lower than 1999 (1.8/nn) (Figure 3). Despite previous stocking efforts, blue catfish have yet to produce a significant self-sustaining population through reproduction.

Channel catfish: The gill net catch rate of channel catfish was 5.4/nn in 2006, similar to 1999 (7.0/nn) but lower than 2002 (13.0/nn) (Figure 4). Size structure of channel catfish was good, as the majority of fish collected were of legal size. Relative weight was excellent as mean relative weight values were above 100 for most inch groups.

Redbreast sunfish: The electrofishing catch rate of redbreast sunfish was 27.0/h in 2005, less than 2001 (58.0/h) and 2003 (69.0/h) (Figure 5). Fish of preferred size (8") were collected during the 2005 sampling event; however, few fish were representative of each inch group.

Redear sunfish: The electrofishing catch rate for redear sunfish was 12.0/h and 10.0/h in 2001 and 2003 respectively, and in 2005 the catch rate decreased to 2.0/h (Figure 6). Redear sunfish collected during the 2005 sampling event were 8 inches and longer.

Largemouth bass: The electrofishing catch rate for largemouth bass in 2005 (45.0/h) was similar to catch rates in 2001 (49.0/h), while being lower than catch rates in 2003 (78/h). PSD (48) was good but very few fish above the 14-inch minimum length limit were collected during the 2005 electrofishing survey (Figure 7). Relative weight increased with length, possibly as a result of marginal forage for small fish. Growth to legal size (14 inches) was good as the average age was 2.6 years (N = 13; range 2-3 years). Genetics sampling indicated a 64.8% frequency of Florida largemouth bass alleles in Lake McQueeney, with 25.0% of the population being pure Florida largemouth bass (Table 5).

White crappie: The trap net catch rate of white crappie was 15.8/nn in 2005, higher than 2003 (2.4/nn) and 2001 (0.4/nn) (Figure 8). Relative weights were good, with mean relative weight values near 95. The majority of these fish were collected in the lower, shallower end of the reservoir.

Fisheries management plan for Lake McQueeney, Texas

Prepared – July 2006

ISSUE 1: Habitat in Lake McQueeney consists of aquatic vegetation (spatterdock and water willow), concrete bulkheads, and cut banks. 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, concerns about potential conflict between angler and other recreational users 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.

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 of 2006.

ISSUE 2: Nuisance aquatic vegetation, including hydrilla and water hyacinth, caused angler access problems in the reservoir prior to herbicide treatments and grass carp introductions. Hydrilla has not been observed in the reservoir since 1996. In June 2004, *Hygrophila* sp. was discovered in the reservoir, existing only as floating, unrooted mats. The potential for this species to become problematic is high, as the lower half of the reservoir has the necessary shallow water habitat for this species to flourish.

MANAGEMENT STRATEGIES

1. Continue to monitor the reservoir for the possible return of hydrilla and water hyacinth and implement control measures as necessary.
2. Monitor establishment of *Hygrophila* sp. through vegetation surveys with an emphasis in the shallow areas of the reservoir.
3. Continue to maintain open pathway of communication among TPWD, GBRA and homeowner groups concerning aquatic vegetation management.

ISSUE 3: There are currently no creel data for Lake McQueeney. This reservoir has redear and redbreast sunfish that reach large sizes but there are no data to quantify angling effort and angler catch and harvest rates of these two species. Guadalupe bass are also present in this reservoir, and angling effort and harvest data would be important for this endemic species.

MANAGEMENT STRATEGIES

1. Obtain funding for a university to conduct an annual creel survey on Lake McQueeney, 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 and electrofishing, trap netting, gill netting, and a report in 2009-2010 (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, second 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 McQueeney, Texas.

Characteristics	Description
Year constructed	1928
Controlling authority	Guadalupe Blanco River Authority
County	Guadalupe
Reservoir type	Main stream
Shoreline Development Index (SDI)	3.51
Conductivity	300-410 umhos/cm

Table 2. Harvest regulations for Lake McQueeney, 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, 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)	10 – No Limit

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

Species	Year	Number	Size
Blue catfish	1995	40,541	FGL
	1996	40,000	FGL
	2001	36,438	FGL
		116,979	
Channel catfish	1996	4,200	FGL
	1973	9,000	FGL
		13, 200	
Coppernose bluegill	1983	10,000	FGL
Florida Largemouth	1978	410	FGL
	1985	19,500	FGL
	2005	39,713	FGL
		59,623	
Triploid grass carp*	1995	25	ADL
	1996**	4	ADL
		29	

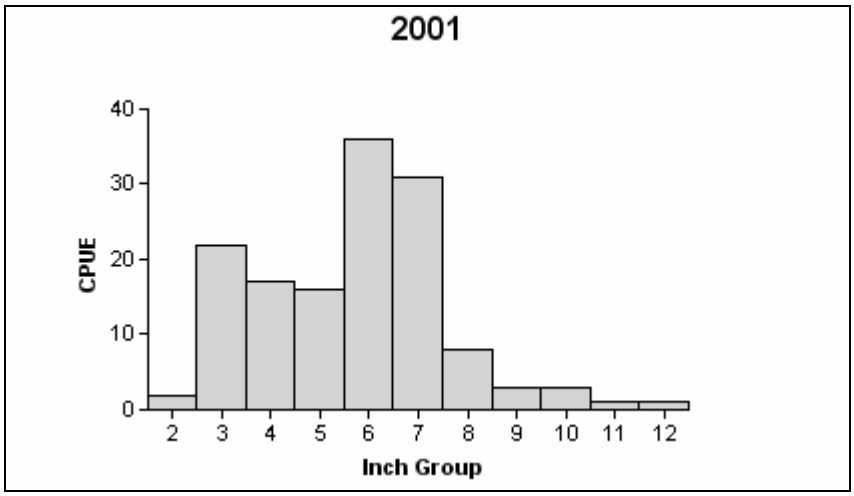
* Radio-tagged fish.
** Fish used to replace dead fish.

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

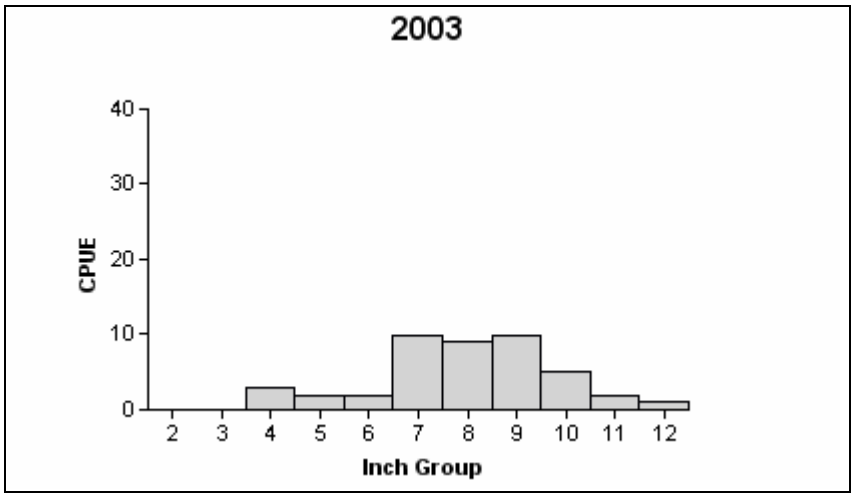
	Shoreline Distance		Surface Area	
Shoreline habitat type	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead	11.9	72.9		
Concrete	0.1	0.6		
Cut bank	4.1	25.2		
Nondescript	<0.1	0.2		
Rocky/gravel	0.2	1.1		
Total	16.3	100		
Native emerged vegetation [a]	2.46	15.1	1.9	0.5
Native floating vegetation [b]	0.29	1.8	22.3	5.6

[a] water willow
[b] spatterdock

Gizzard Shad



Effort = 1.0
Total CPUE = 140.0 (25; 140)
IOV = 89 (0.04)



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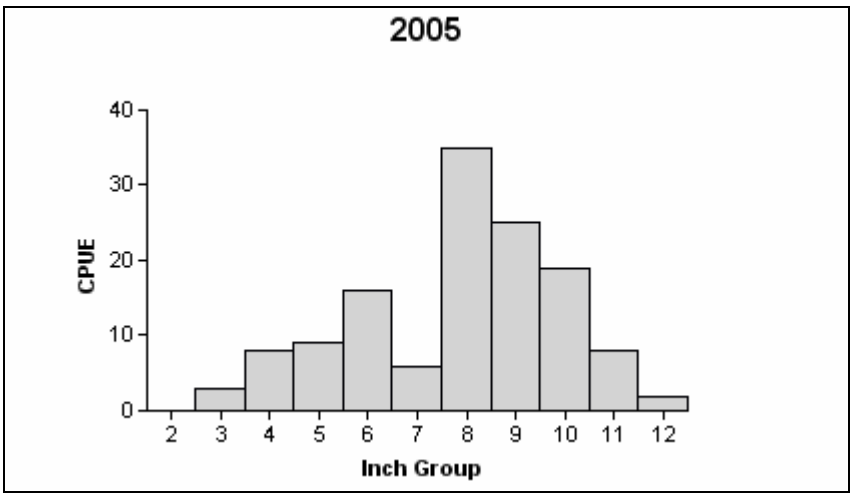
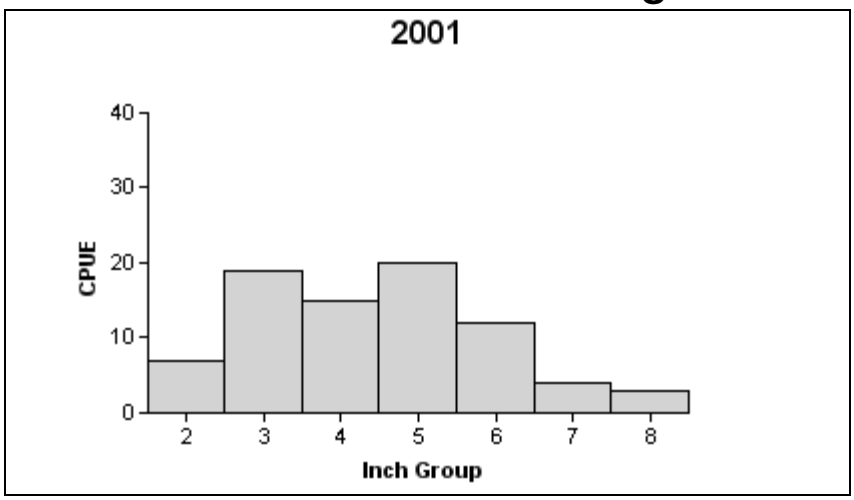
IOV = 39 (0.08)



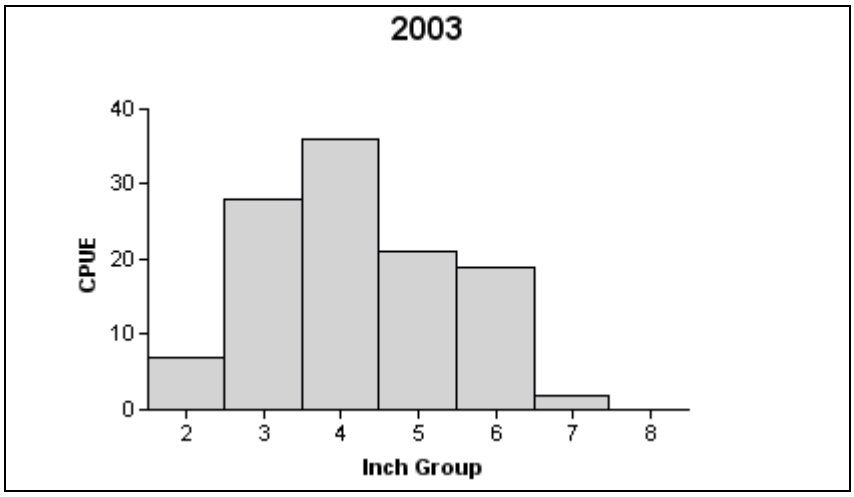
Effort = 1.0
Total CPUE = 131.0 (50; 131)
IOV = 32 (0.12)

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 McQueeney, Texas 2001, 2003, and 2005.

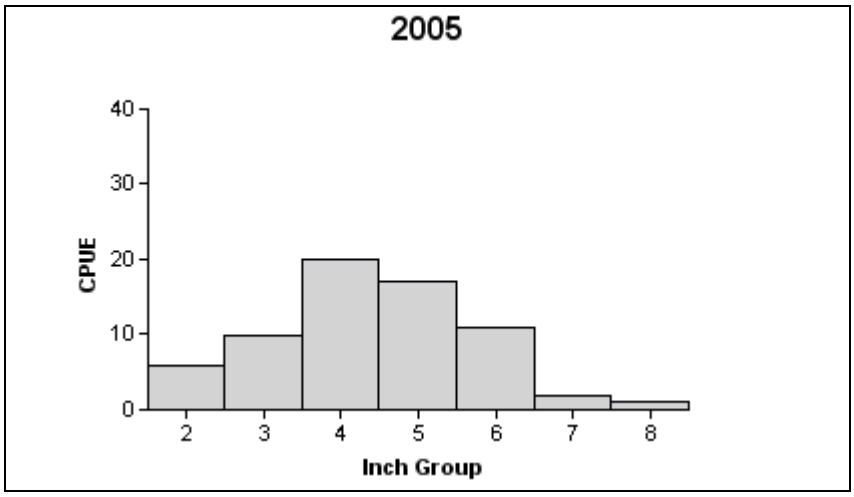
Bluegill



Effort = 1.0
Total CPUE = 80.0 (29; 80)
PSD = 26 (0.04)



Effort = 1.0
Total CPUE = 113.0 (22; 113)
PSD = 20 (0.06)

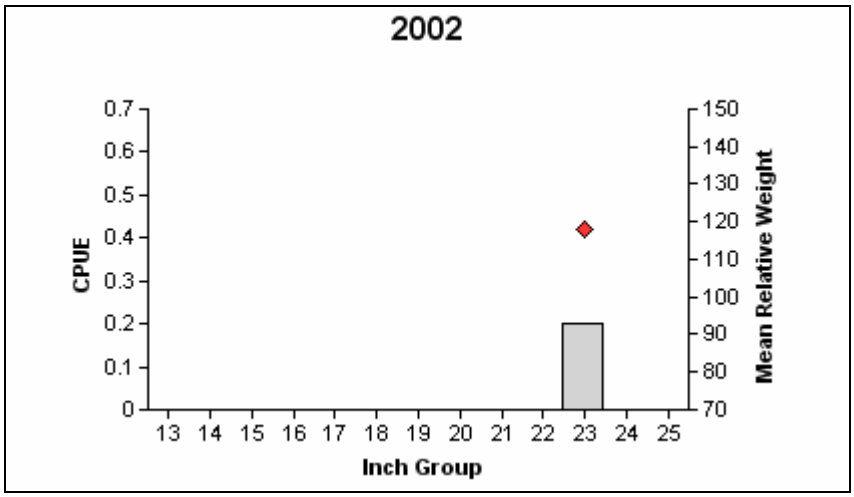


Effort = 1.0
Total CPUE = 67.0 (27; 67)
PSD = 23 (0.08)

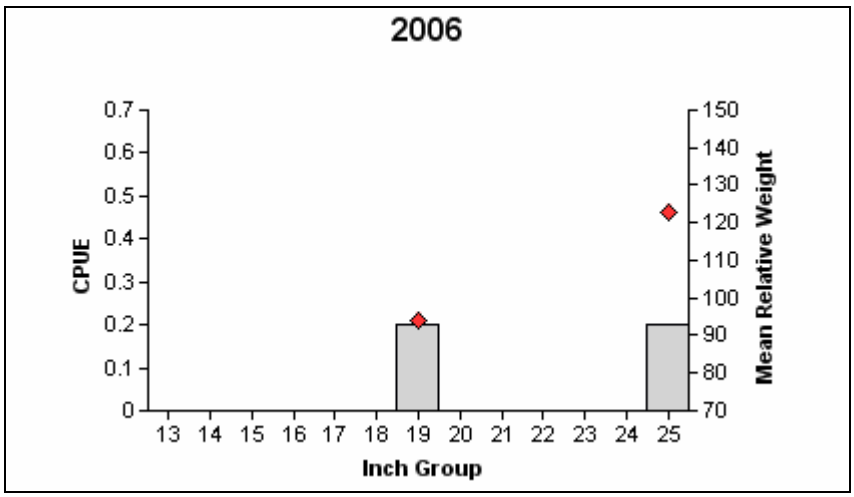
Figure 2. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake McQueeney, Texas 2001, 2003, and 2005.

Blue Catfish

Effort = 5.0
Total CPUE = 1.8 (38; 9)
PSD = 0 (0.81)



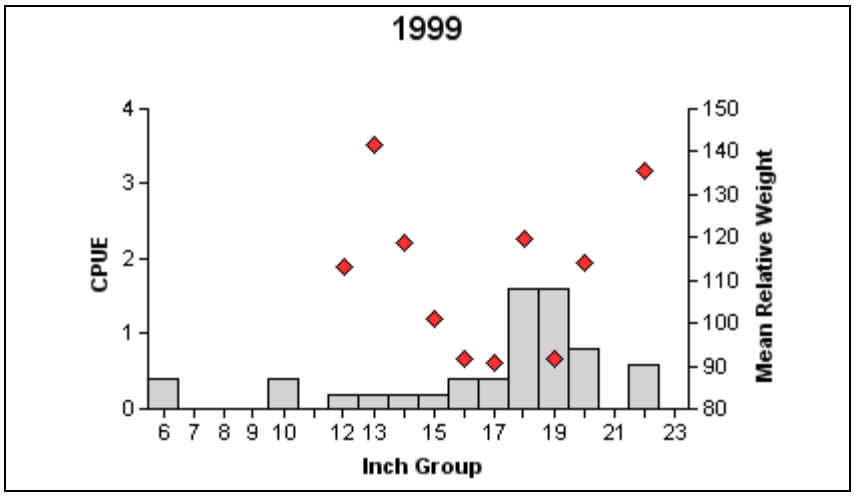
Effort = 5.0
Total CPUE = 0.2 (100; 1)
PSD = 100 (0.00)



Effort = 5.0
Total CPUE = 0.4 (0; 2)
PSD = 50 (0.5)

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 size structure are in parentheses) for spring gill net surveys, Lake McQueeney, Texas 1999, 2002, and 2006.

Channel Catfish



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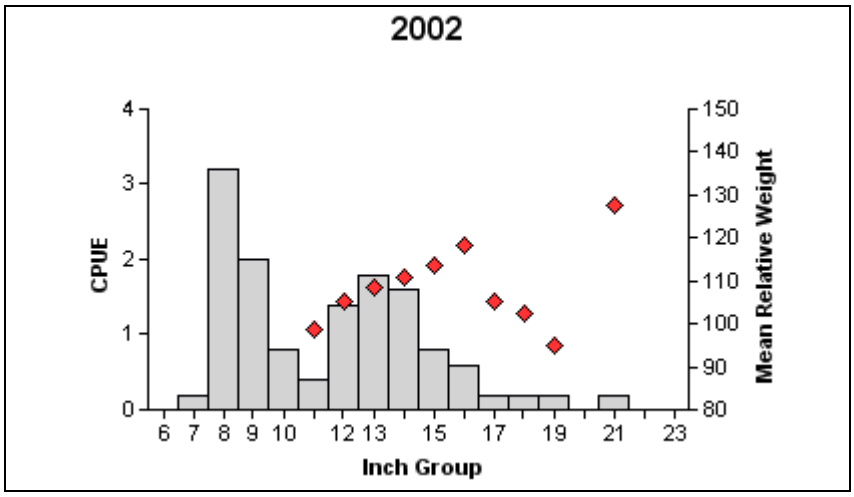
PSD = 87 (0.08)

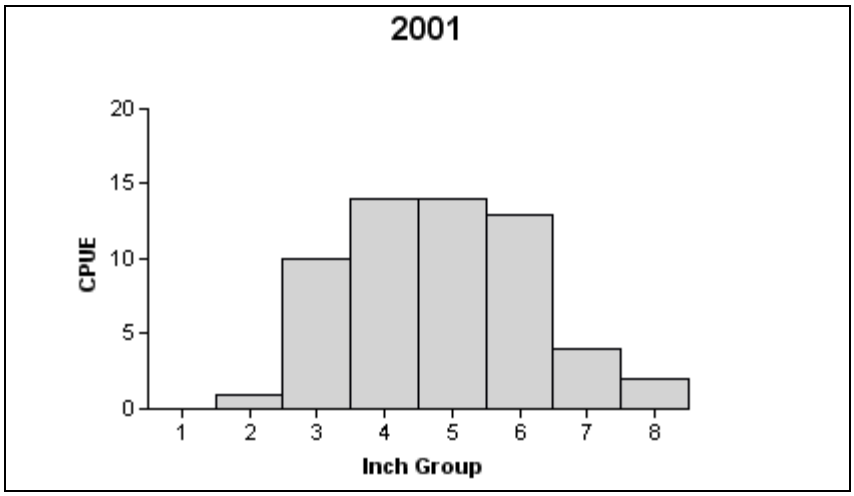


Effort = 5.0
Total CPUE = 13.6 (47; 68)
PSD = 19 (0.11)

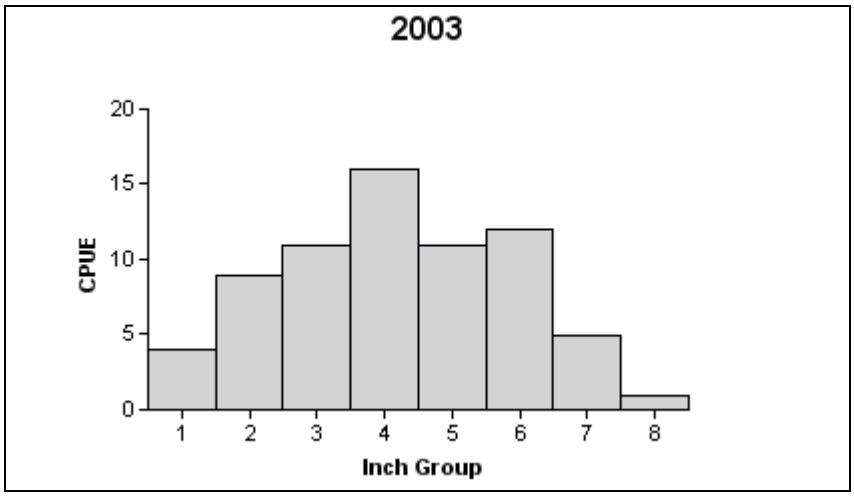
Effort = 5.0
Total CPUE = 5.4 (27; 27)
PSD = 39 (0.14)

Figure 4. 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 in parentheses) for spring gill net surveys, Lake McQueeney, Texas 1999, 2002, and 2006.

Redbreast Sunfish



Effort = 1.0
Total CPUE = 58.0 (33; 58)
PSD = 33 (0.05)

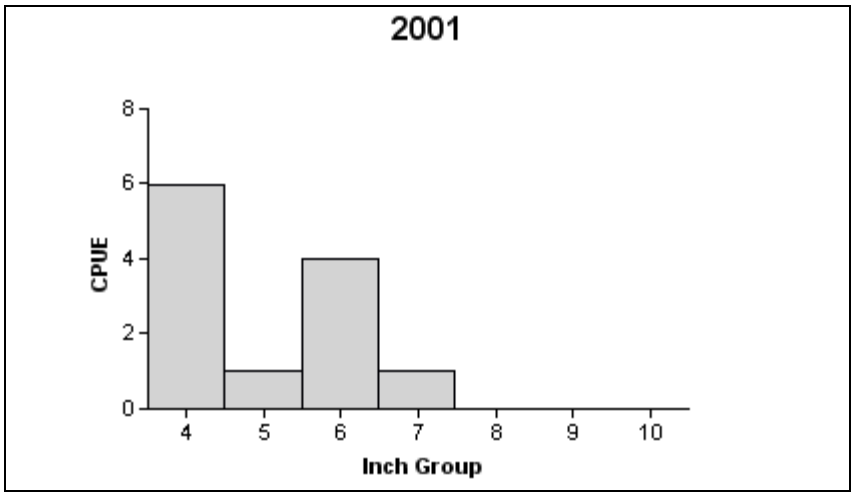


Effort = 1.0
Total CPUE = 69.0 (20; 69)
PSD = 32 (0.07)

Effort = 1.0
Total CPUE = 27.0 (16; 27)
PSD = 48 (0.12)

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

Redear Sunfish



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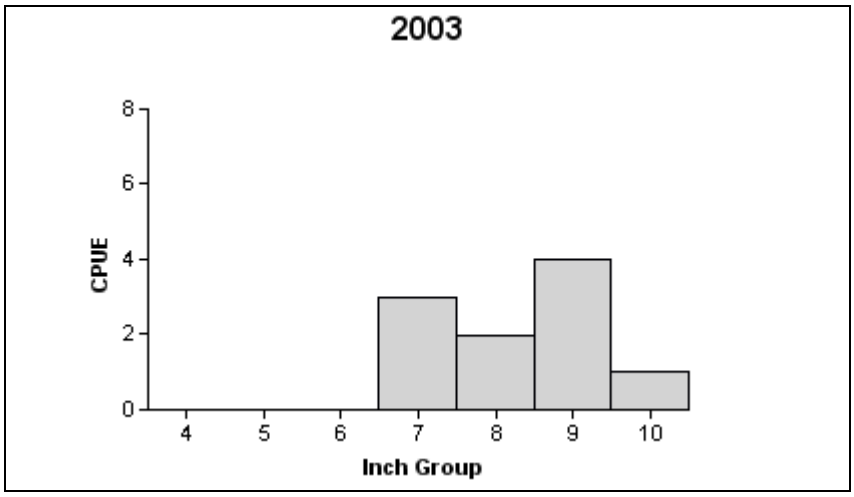
Total CPUE = 12.0 (100; 12)
PSD = 8 (0.0)



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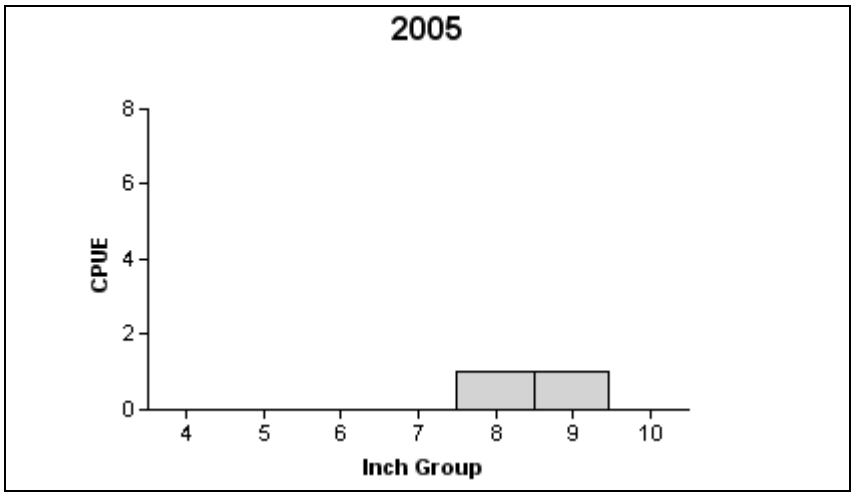
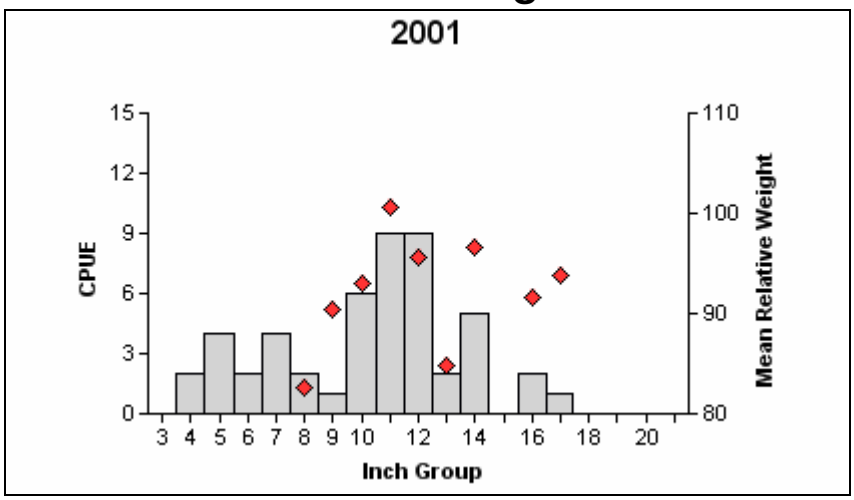
PSD = 100 (0.0)



Effort = 1.0
Total CPUE = 2.0 (100; 2)
PSD = 100 (0.0)

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

Largemouth Bass



Effort = 1.0
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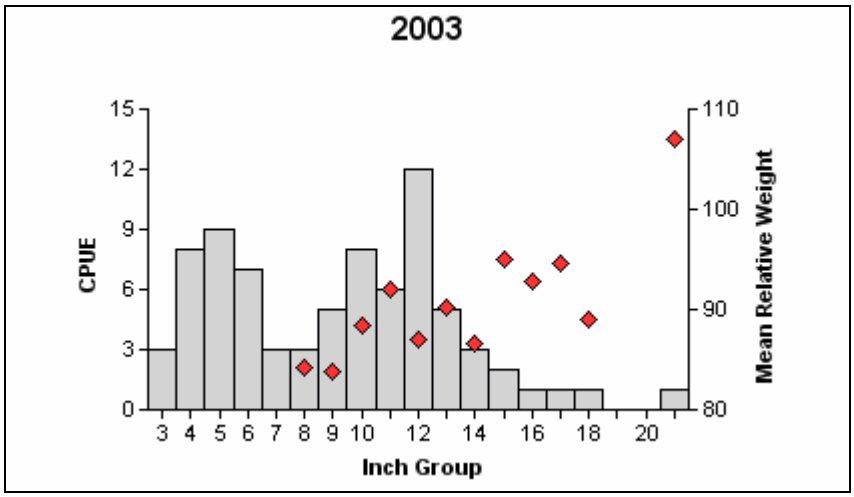
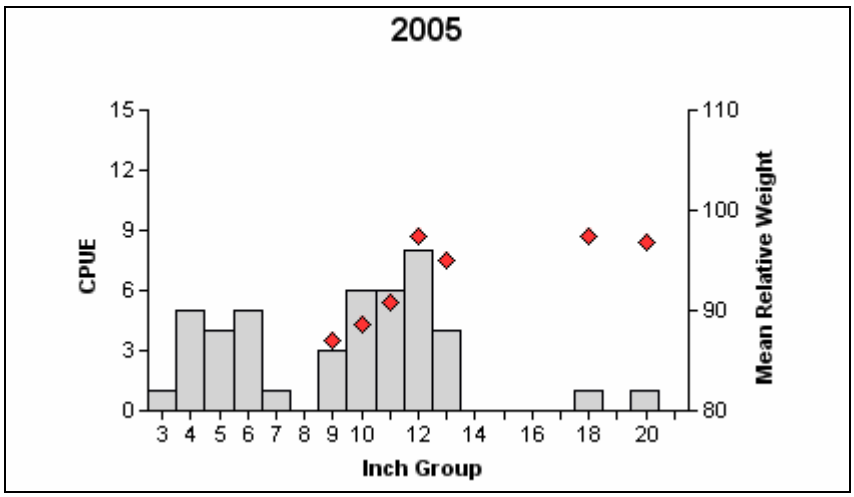
PSD = 51 (0.06)
RSD-14 = 22 (0.1)



Effort = 1.0
Total CPUE = 78.0 (16; 78)
PSD = 54 (0.09)
RSD-14 = 19 (0.05)



Effort = 1.0
Total CPUE = 45.0 (20; 45)
PSD = 48 (0.08)
RSD-14 = 7 (0.03)

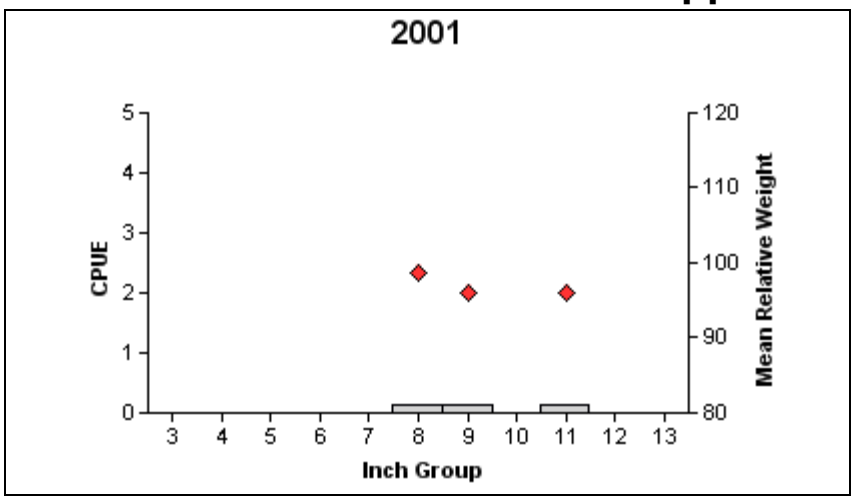
Figure 7. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parenthesis) for fall electrofishing surveys, Lake McQueeney, Texas, 2001, 2003, and 2005.

Largemouth Bass

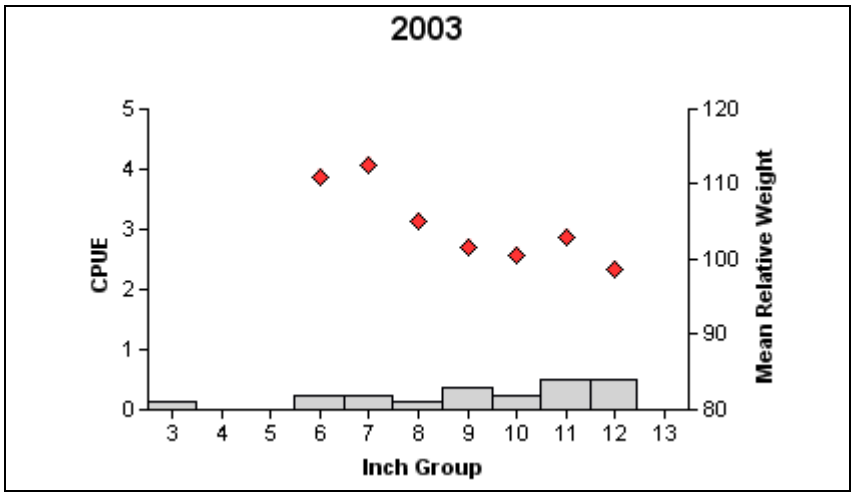
Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake McQueeney, Texas 2005. Electrophoresis analysis was used to determine genetic composition in 2001 and 2003 and micro-satellite DNA analysis was used in 2005. FLMB = Florida largemouth bass, NLMB = Northern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

		Genotype					
Year	Sample size	FLMB	F1	Fx	NLMB	% FLMB alleles	% Pure FLMB
2001	30	10	5	15	0	75.8	Unknown
2003	30	2	12	15	1	58.3	Unknown
2005	24	6	0	18	0	64.8	25.0

White Crappie



Effort = 7.0
Total CPUE = 0.4 (0; 3)
PSD = 100 (0)
RSD-10 = 33 (0.33)



Effort = 8.0
Total CPUE = 2.4 (38; 19)
PSD = 78 (0.04)
RSD-10 = 56 (0.08)

Effort = 5.0
Total CPUE = 15.8 (35; 79)
PSD = 95 (0.04)
RSD-10 = 71 (0.06)

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 size structure are in parentheses) for fall trap net surveys, Lake McQueeney, Texas 2001, 2003, and 2005.

Table 6. Proposed survey schedule for Lake McQueeney, Texas. Trap net and electrofishing surveys are conducted in the fall and the gill net survey is conducted in the spring. “S” denotes the years standard sampling is conducted and Federal Aid Report is submitted.

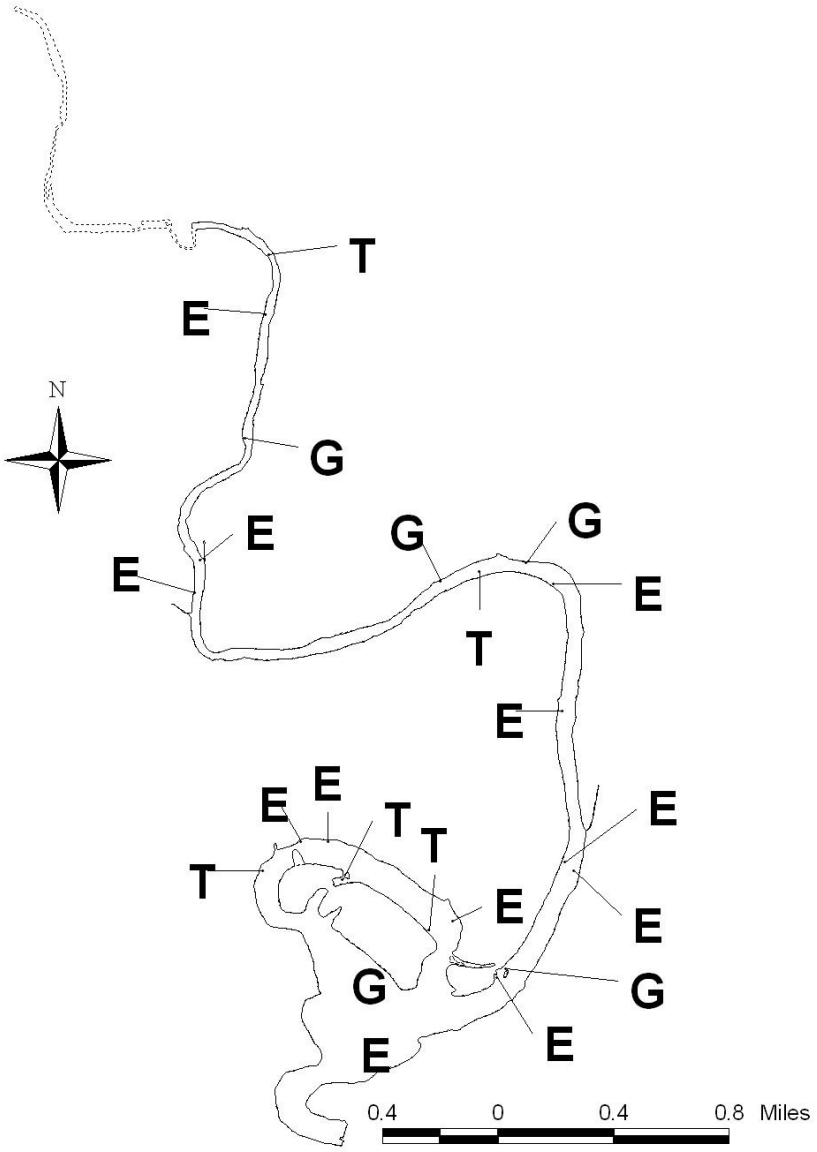
Survey year	Electrofishing	Trap Netting	Gill Netting	Report
Fall 2006 – Spring 2007				
Fall 2007 – Spring 2008	S	S		
Fall 2008 – Spring 2009				
Fall 2009 – Spring 2010	S	S	S	S

APPENDIX A

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

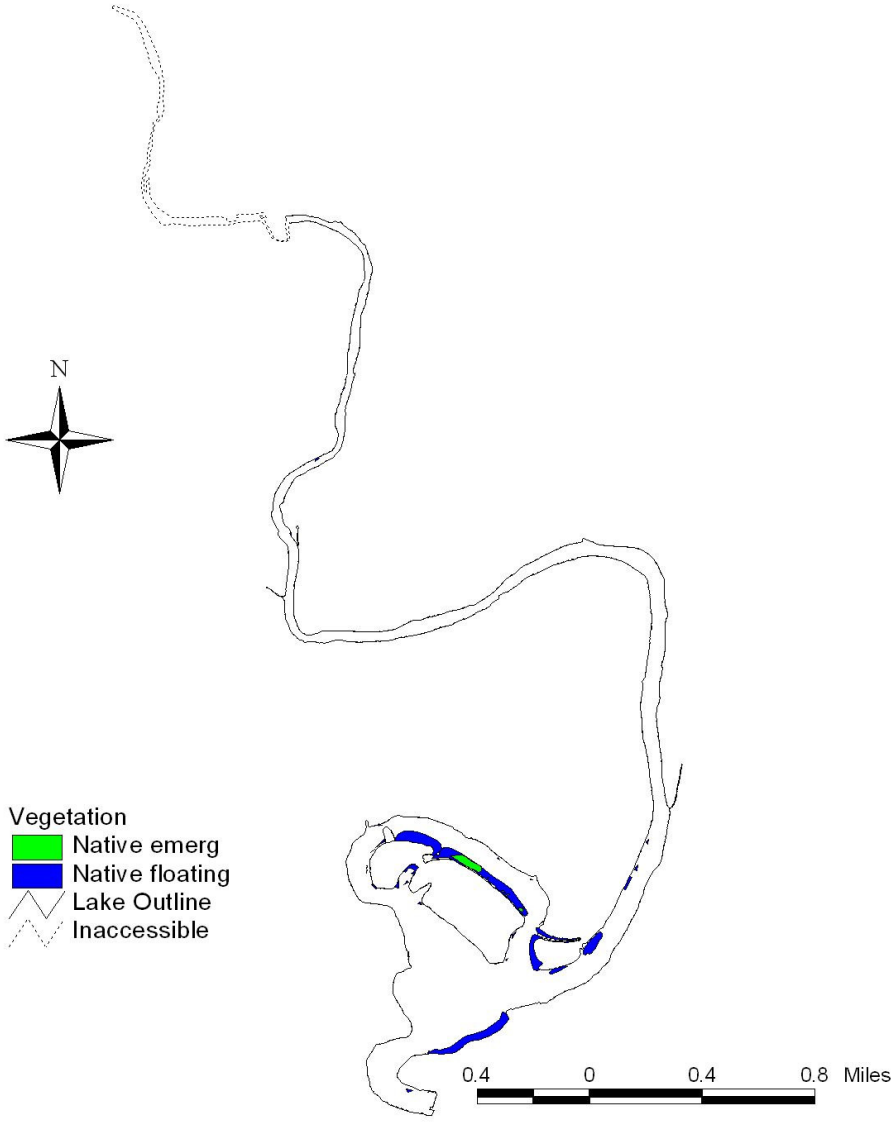
	Electrofishing		Trap Netting		Gill Netting	
Species	N	CPUE	N	CPUE	N	CPUE
Spotted gar					1	0.2
Longnose gar					5	1.0
Gizzard shad	131	131.0			66	13.2
Threadfin shad	67	67.0				
Common carp	1	1.0				
Bullhead minnow	62	62.0				
Gray redhorse	10	10.0			114	22.8
Blue catfish					2	0.4
Channel catfish	9	9.0			27	5.4
Flathead catfish	2	2.0			4	0.8
White bass	1	1.0			2	0.4
Redbreast sunfish	27	27.0				
Warmouth	1	1.0	4	0.8		
Bluegill	67	67.0	170	34.0	1	0.2
Longear sunfish	47	47.0	12	2.4	4	0.8
Redear sunfish	2	2.0	1	0.2		
Smallmouth bass			3	0.6		
Spotted bass	1	1.0	2	0.4	2	0.4
Largemouth bass	45	45.0	2	0.4	4	0.8
Guadalupe bass	27	27.0				
White crappie	5	5.0	78	15.6	2	0.4
Black crappie					1	0.2
Logperch	8	8.0				
Rio Grande cichlid	9	9.0	6	1.2	1	0.2
Blue tilapia	2	2.0			1	0.2

APPENDIX B



Location of sampling sites, Lake McQueeney, Texas, 2005-2006. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and E, respectively. Dotted lake outline denotes area not accessible to boat anglers.

APPENDIX C



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