PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Lake Texana

Prepared by:

John Findeisen and Todd Neahr
Inland Fisheries Division
District I-E, Mathis, Texas

Robert L.Cook
Executive Director

Phil Durocher
Director, Inland Fisheries

July 31, 2007

TABLE OF CONTENTS

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Texana were surveyed in 2006 using trap nets and electrofishing and in 2007 using gill nets. This report summarizes the results and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Lake Texana is a 9,727-acres (previously listed at 10,628 acres), controlled by the Lavaca-Navidad River Authority (LNRA), and located on the Navidad River in the Lavaca River Basin, approximately 20 miles east of Victoria. It receives water from the Navidad River, Sandy Creek, and Mustang Creek and is used for water supply and recreation. Water level typically fluctuates 2-4 ft annually but can fluctuate as high as six feet.

- **Management History:** Important sport fish species include blue, channel, and flathead catfish, white bass, largemouth bass, and white and black crappie. Palmetto bass had been previously stocked in the reservoir. The 2003 management plan focused on issues with largemouth bass reproduction, palmetto bass stockings, exotic aquatic vegetation, and the potential for increased water level fluctuations. Spring largemouth-bass-only electrofishing surveys were conducted in 2004, 2005, and 2007, with largemouth bass only being collected in 2007 survey. Palmetto bass stockings were discontinued due to low gill net catch rates. Treatment proposals were submitted and control efforts were implemented for giant salvinia (biological control agents and herbicides), water hyacinth (herbicides), and hydrilla (biological control agents). Water level fluctuations were monitored via the internet.

- **Fish Community:**
  - **Prey species:** Gizzard and threadfin shad were the primary forage species present in Lake Texana. Gizzard and threadfin shad abundance has increased from previous years, with nearly all of the gizzard shad available to predators. Relative abundance of bluegill was low in the fall 2006 electrofishing survey but numerous bluegill were observed in the spring 2007 largemouth bass only electrofishing survey.

  - **Catfishes:** Blue, channel, and flathead catfish were present in the reservoir with blue catfish being the most abundant. Blue catfish provided a good fishery as evidenced by good size structure and abundance of legal-sized fish. Blue catfish appear to be out-competing channel catfish in this reservoir. Flathead catfish are rarely collected in gill net surveys.

  - **Temperate basses:** White bass were present in the reservoir, although gill net catch rate was low. Palmetto bass are assumed no longer present in the reservoir, as evidenced by gill net surveys.

  - **Largemouth bass:** Largemouth bass abundance was low according to the fall 2006 electrofishing survey. However, the spring 2007 largemouth-bass-only electrofishing surveys indicated that largemouth bass were more abundant, as five times as many adult largemouth bass were collected in the spring with only 1/3 as much effort. Very few bass anglers have been encountered by district staff on this reservoir.

  - **Crappie:** Black and white crappie were present in the reservoir with white crappie being the most abundant. White crappie reached legal size (10 inches) between ages 1 and 2.

- **Management Strategies:** Continue to work with the LNRA on exotic aquatic vegetation control and native aquatic vegetation introductions. Conduct spring and fall electrofishing surveys to monitor the largemouth bass population after the 2006 and 2007 Florida largemouth bass stockings. Reduce the number of electrofishing, trap netting, and gill netting sampling stations from 24, 15, and 15, respectively, to 18, 10, and 10 in order to align with Inland Fisheries standard sampling protocols based on actual acreage.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Texana in 2006-2007. The purpose of the document is to provide fisheries information and provide management recommendations to protect and improve the sport fishery. This report deals primarily with major sport fishes and important prey species. Management recommendations address existing problems or opportunities. Historical data is presented with the 2006-2007 data for comparison.

Reservoir Description

Lake Texana is a 9,727-acres (previously listed at 10,628 acres), controlled by the LNRA, and located on the Navidad River in the Lavaca River Basin, approximately 20 miles east of Victoria. It receives water from the Navidad River, Sandy Creek, and Mustang Creek and is used for water supply and recreation. Water level typically fluctuates 2-4 ft annually but can fluctuate as high as six feet. Water level at the time of sampling was near conservation pool. Shoreline, boat, and handicap access were adequate. Substrate was composed primarily of clays, deep loams, and saline soils. Littoral habitat consisted of several native aquatic vegetation species (American pondweed, coontail, American lotus, cattail, and bulrush), flooded terrestrial vegetation, and standing timber. Exotic aquatic vegetation species present included hydrilla, water hyacinth, giant salvinia, alligator weed, and parrot feather. LNRA implemented annual herbicide treatments for water hyacinth and giant salvinia. The Texas Parks and Wildlife Department (TPWD) has assisted with the control of giant salvinia through use of the giant salvinia weevil *Cyrtobagus salviniae.* The lake is windswept and generally turbid throughout the year, however, clear water can be found in coves with dense stands of submersed vegetation.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Findeisen 2003) included:

1. Work with LNRA on enhancing habitat and decreasing turbidity through use of native aquatic vegetation plantings, work with LNRA on enhancing spawning substrate by constructing gravel spawning beds, conduct largemouth-bass-only electrofishing and seining surveys every other year to assess spawning success and recruitment, and stock Florida largemouth bass at a rate of 25 per acre.

   Action: District staff met with LNRA staff to discuss proposed management plan. LNRA budgeted funds specifically for native plant introductions and construction of gravel beds and constructed seven gravel beds in the spring 2006 (Appendix E). In 2006, plans were made for creating native aquatic vegetation planting sites but water hyacinth and giant salvinia stands became too dense at selected sites. Submersed vegetation, both native and exotic, appear to have no problem colonizing once water hyacinth and giant salvinia are removed. Spring, largemouth-bass-only electrofishing surveys were conducted in 2004, 2005 and 2007, with no bass being collected in 2004 and 2005 and 20 being collected in 2007. A spring seining survey was conducted in 2004 only. Aquatic vegetation and submersed timber prohibited effective seine surveys. Florida largemouth bass were stocked in 2006 and 2007 at 50/acre, following LNRA's aquatic vegetation control efforts (lead to an increase in submersed aquatic vegetation) and LNRA's cooperation with enhancing habitat and spawning areas.

2. Discontinued palmetto bass stockings since numerous stockings between 1996 and 1999 failed to produce a fishery. Change gill net survey sampling schedule from every other year to once every four years.

   Action: Palmetto bass were not requested and gill net surveys were conducted once every four years.

3. Continue to work with United State Department of Agriculture (USDA) on the use of giant salvinia weevils to control giant salvinia, as well as 'new' biological control agents for water hyacinth. Continue to assist and advise LNRA with
   locating and controlling giant salvinia and water hyacinth with herbicide treatments.
   Action: District staff assisted USDA with giant salvinia weevil releases and monitoring. Giant salvinia weevils showed some success at release sites prior to the conclusion of the research project. After completion of the research project in 2004, district staff released nearly 1,000,000 giant salvinia weevils into Lake Texana and in the Sandy Creek drainage. Success from this application appeared to be limited. Currently, USDA has acquired several new water hyacinth biological control agents and is waiting for quarantine test results. District staff assisted LNRA with the creation of an annual herbicide control program that LNRA has assumed full responsibility, of, independent of the district office.

4. Monitor fluctuations in lake level after the opening of the Mary Rhodes pipeline from Lake Texana to the City of Corpus Christi.
   Action: District staff have monitored the water level at Lake Texana weekly via the internet. The pipeline did not appear to affect the water level.

Harvest regulation history: Sport fish in Lake Texana are currently managed with statewide regulations (Table 2).

Stocking history: Florida largemouth bass were stocked in 2006 (N=488,326) and 2007 (N=486,494). Palmetto bass stockings have been discontinued. A complete stocking history is in Table 3.

Vegetation/habitat history: Lake Texana supports native emergent, native floating, and native submergent vegetation, several exotic species, and has large stands of standing timber (Table 4). Water hyacinth and giant salvinia are problematic species and can be found throughout the entire reservoir with the exception of no giant salvinia in the Mustang Creek arm of the reservoir. Both water hyacinth and giant salvinia are annually treated with herbicides by LNRA. TPWD released approximately 1,000,000 giant salvinia weevils between 2002 and 2005. Hydrilla and several native aquatic vegetation species have begun to expand in the reservoir as a result of vegetation control efforts on water hyacinth and giant salvinia. Historically, hydrilla has always been present in the reservoir but was only problematic shortly after the reservoir filled. At that time grass carp were released in the reservoir for hydrilla control. TPWD released approximately 700,000 hydrilla flies in 2005 to control hydrilla around the Navidad River boat ramp.

METHODS

Fishes were collected using electrofishing (2.0 hours at 24 5-minute stations), trap nets (15 net nights at 15 stations) and gill nets (15 net nights at 15 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing (fish/h) and for trap and gill nets as the number of fish caught in one net set overnight (fish/nn). Access, aquatic vegetation, and habitat surveys were conducted in 2006. All stations were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Sampling statistics (CPUE for various length categories) and structural indices [Proportional Stock Density (PSD) and Relative Stock Density Preferred (RSD-P)], and condition indices [relative weight indices ($\underline{W_r}$)] were calculated for target fishes according to Anderson and Neumann (1996). 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. White crappie were aged using otoliths. Source for the water level data was the United States Geological Survey.

RESULTS AND DISCUSSION

Habitat: Littoral zone shoreline habitat consisted of natural shoreline, concrete, cut bank, and gravel shoreline. Littoral zone, near shore habitat consisted of flooded terrestrial vegetation, hydrilla, giant salvinia, water hyacinth, alligator weed, American lotus, coontail, American pondweed, and standing timber. Results of the complete littoral zone habitat/vegetation survey is in Table 4.

Prey species: The 2006 electrofishing CPUE for gizzard shad and threadfin shad were 145.0/h and 400.5/h, respectively. Electrofishing CPUE for gizzard shad in 2006 was higher than 1999 (94.5/h) and 2002 (87.0/h) (Figure 2). The Index of Vulnerability (IOV) for gizzard shad was 98, indicating that 98% of the gizzard shad were less than 8 inches in length and available to predation and similar to previous years. The electrofishing CPUE for threadfin shad in 2006 was substantially higher than in 1999 (98.5/h) and 2002 (173.5/h).

The 2006 electrofishing CPUE for bluegill was 12.5/h, less than in 1999 (77.0/h) and 2002 (30.5/h) (Figure 3). Bluegill and other sunfish do not provide a fishery as few fish $\geq$ 6 inches were present in the reservoir.

Blue catfish: The 2007 gill net CPUE for blue catfish was 18.0/nn, substantially higher than 2001 (6.5/nn) and 2003 (7.7/nn) (Figure 4). PSD in 2007 (17) was similar to 2001 (16), and higher than in 2003 (4). Mean relative weights of blue catfish, stock size and greater, were good, averaging in the mid 90s. Blue catfish are the dominant catfish species in this reservoir, and the population appears to be increasing. Several blue catfish greater than quality size (20 inches total length) were collected in the 2007 survey.

Channel catfish: The 2007 gill net CPUE for channel catfish was 0.3/nn, similar to 2001 (0.3/nn) and 2003 (0.2/nn) (Figure 5). The low channel catfish catch rates may be due to competition with the increasing blue catfish population.

White bass: The 2007 gill net CPUE for white bass remains low and was 0.1/nn in 2007 (Figure 6). Since 2001, the majority of white bass collected in gill net surveys have been of legal size or greater.

Largemouth bass: The 2006 electrofishing CPUE for largemouth bass was 2.0/h, lower than both 1999 (28.5/h) and 2002 (6.5/h) (Figure 7). All four largemouth bass collected in the fall 2006 electrofishing survey came from one station. A higher largemouth bass CPUE was expected since the reservoir was stocked with 488,326 Florida largemouth bass in spring 2006. Submersed aquatic vegetation was absent at many fall electrofishing sites, including the site where all four largemouth bass were collected. Habitat at that site was composed of root wads and overhanging brush. No largemouth bass were collected in the spring largemouth-bass-only electrofishing surveys conducted in 2004 and 2005. However, the 2007 spring largemouth-bass-only electrofishing survey indicated that largemouth bass were more abundant than the fall 2006 electrofishing survey suggested; as CPUE-S was 30/h. All largemouth bass collected in spring 2007 were captured in or around submersed aquatic vegetation.

White crappie: The 2006 trap net CPUE for white crappie was 7.4/nn, lower than both 1999 (9.9/nn) and 2002 (11.1/nn) (Figure 8). The PSD was similar to previous years while RSD-10 increased slightly each year. Mean relative weights of white crappie, stock size and greater, averaged in the mid 90s. White crappie reached legal size between ages 1 and 2.

Black crappie: The 2006 trap net CPUE of black crappie was 0.4/nn, lower than in 1999 (2.0/nn) and similar to 2002 (0.8/nn) (Figure 9). Black crappie are present in the reservoir with poor size structure.

Fisheries management plan for Lake Texana, Texas

Prepared - July 2007.

ISSUE 1 Water hyacinth and giant salvinia continue to create access problems on Lake Texana and prohibit the colonization and growth of submersed aquatic vegetation utilized by centrarchid species. LNRA has been conducting herbicide treatments on the reservoir resulting in the colonization and growth of submersed aquatic vegetation in a few areas.

MANAGEMENT STRATEGIES

1. Continue to provide support for LNRA on control of water hyacinth and giant salvinia.

2. When available, obtain and release new biological control agents from USDA for water hyacinth and giant salvinia control.

ISSUE 2 Florida largemouth bass were stocked in 2006 and 2007 as a result of increased fish habitat, primarily submergent aquatic vegetation.

MANAGEMENT STRATEGY

1. Monitor success of Florida largemouth bass stockings through additional electrofishing surveys. One additional night fall survey will be conducted in 2008 and additional spring surveys conducted during the day in 2008 and 2010.

ISSUE 3 Lake Texana was previously listed at 10,628 surface acres in size. According to the Texas Water Development Board (TWDB), Lake Texana is 9,727 surface acres in size at conservation pool. Current sampling effort for Lake Texana was based on the previous surface area listing.

MANAGEMENT STRATEGY

1. Change the survey sampling effort for Lake Texana from 24 electrofishing stations, 15 trap net stations, and 15 gill net stations to 18 electrofishing stations, 10 trap net stations, and 10 gill net stations to align with TWDB surface area listing and current TPWD sampling and stocking protocols.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes routine electrofishing, trap netting, and gill netting once every four years and additional fall electrofishing in 2008 and spring electrofishing in 2008 and 2010 (Table 5). The additional electrofishing will be conducted to monitor the largemouth bass population following stocking in 2006 and 2007. Routine trap netting surveys are adequate to monitor crappie populations and routine gill netting surveys are adequate to monitor catfish and white bass populations

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.

Findeisen, J. A. 2003. Statewide freshwater fisheries monitoring and management program survey report for Lake Texana, 2002. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

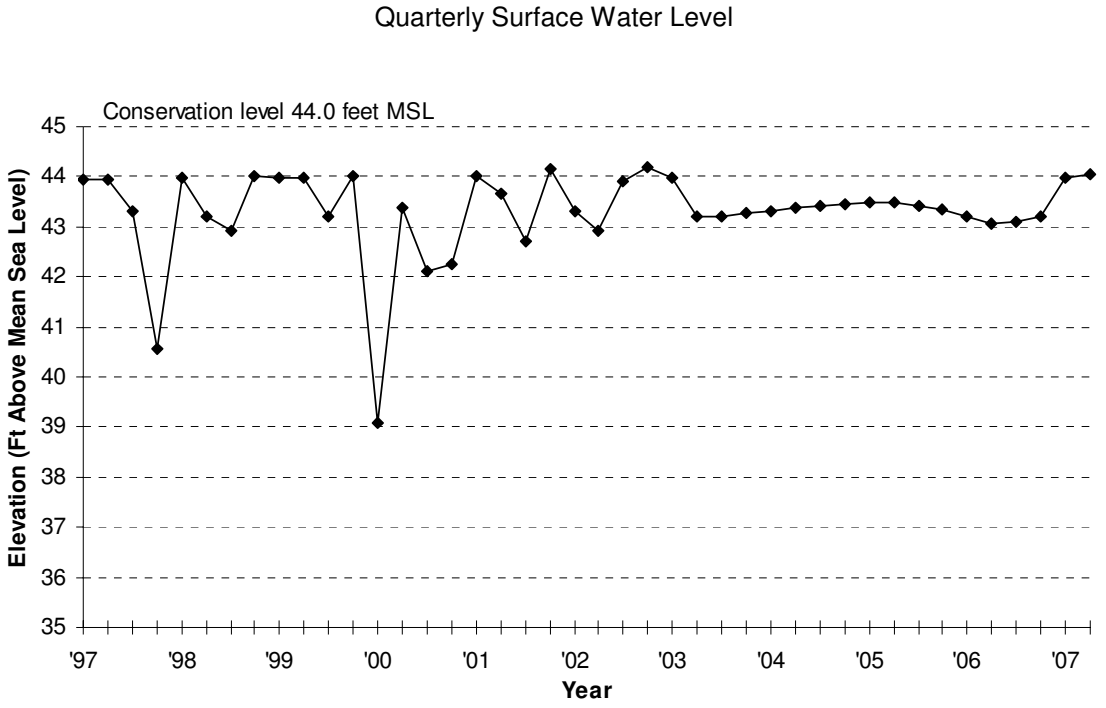


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Texana Reservoir, Texas.

Table 1. Characteristics of Lake Texana, Texas.

Characteristic	Description
Year constructed	1980
Controlling authority	Lavaca-Navidad River Authority
County	Jackson
Reservoir type	Mainstem
Shoreline Development Index	8.0
Conductivity	500-700 umhos/cm
Access: Boat	Good, 9 boat ramps
Bank	Adequate, 9 boat ramps, 1 fishing jetty, state park piers
Handicapped	Adequate, state park and LNRA park

Table 2. Harvest regulations for Lake Texana, 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, palmetto	5	18 – No Limit
Bass, largemouth	5	14 – No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 – No Limit

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

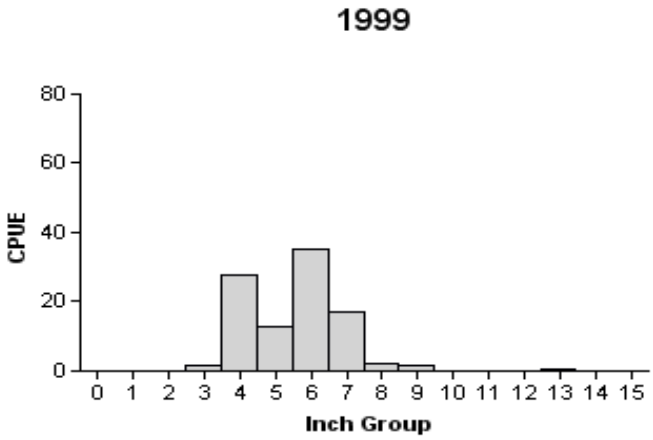
Year	Number	Size
	Threadfin shad	
1980	7,900	ADL
	Rainbow trout	
1993	2,009	ADL
	Blue catfish	
1994	300	ADL
	Channel catfish	
1980	285,646	FGL
1994	500	ADL
Species total	286,146	
	Striped bass	
1981	1,981,000	FGL
1982	1,365,507	FGL
1983	375,000	FGL
1984	1,189,600	FGL
1987	60,500	FGL
1988	700,000	FGL
1989	618,237	FGL
Species total	6,289,394	
	Palmetto bass	
1996	82,500	FGL
1997	165,081	FGL
1998	165,500	FGL
1999	82,789	FGL
Species total	495,870	
	Florida largemouth bass	
1979	5,000	FGL
1980	102,629	FGL
1981	553,678	FGL
1994	245,783	FGL
2006	488,326	FGL
2007	486,494	FGL
Species total	1,881,910	
	Triploid grass carp	
1989	15,294	ADL
1990	96	ADL
1991	26	ADL
Species total	15,416	

Table 4. Survey of littoral zone and physical habitat types, Lake Texana, Texas, 2006. 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, only the upper and lower sections of the reservoir were surveyed. Surface area estimates for vegetation are based on the acreage of water containing a specific vegetation type not the total acreage of vegetation.

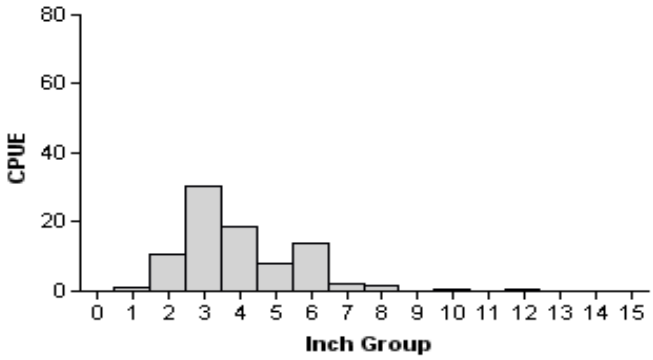
Habitat type	Shoreline Distance		Surface Area of Water with Vegetation	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Shoreline habitat				
Boulder	<0.1	<0.1		
Bulkhead	0.6	0.4		
Concrete	2.8	1.8		
Nondescript	145.6	93.4		
Overhanging brush	2.5	1.6		
Rip rap	2.5	1.6		
Rocky/gravel shoreline	1.9	1.2		
Total	155.9	100		
Vegetation				
Native floating vegetation[a]			76.6	0.8
Native submerged vegetation[b]			57.8	0.6
Flooded terrestrial vegetation			219.3	2.3
Hydrilla			609.6	6.3
Giant salvinia			768.9	7.9
Water hyacinth			928.9	9.6
Adjacent to shoreline				
Boat dock	0.3	0.2		
Standing timber			795	8.2

[a] American lotus and duck weed
[b] Coontail and American pondweed

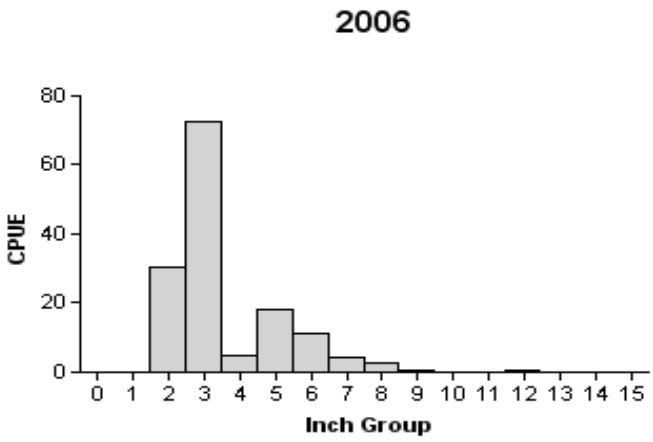
Gizzard Shad



Effort = 2.0
Total CPUE = 94.5 (82; 189)
IOV = 95 (2)



Effort = 2.0
Total CPUE = 87.0 (26; 174)
IOV = 97 (3)



Effort = 2.0
Total CPUE = 145.0 (36; 290)
IOV = 98 (1)

Figure 2. Number of gizzard shad caught per hour (CPUE, bars) and population population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Texana, Texas, 1999, 2002, and 2006.

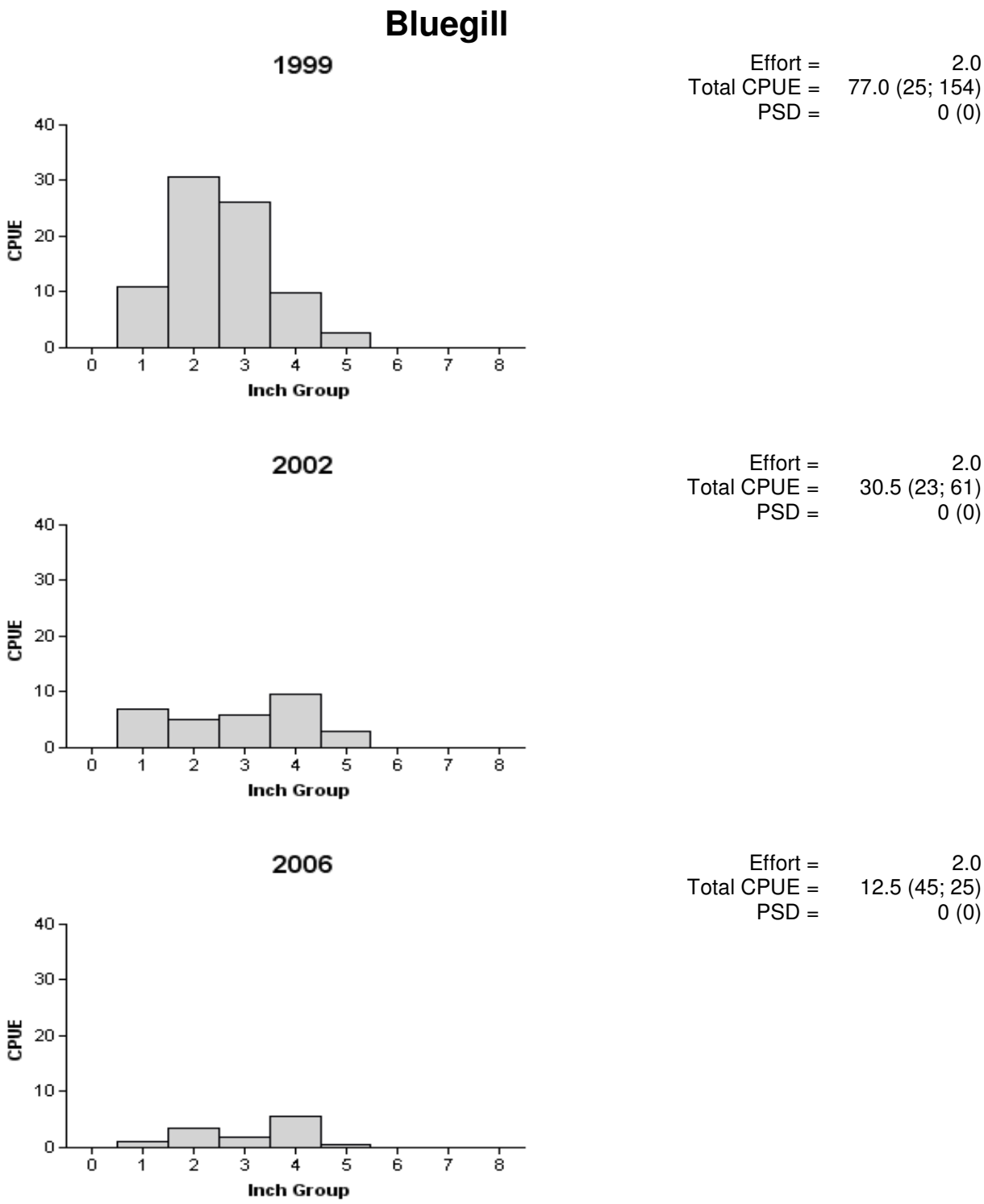
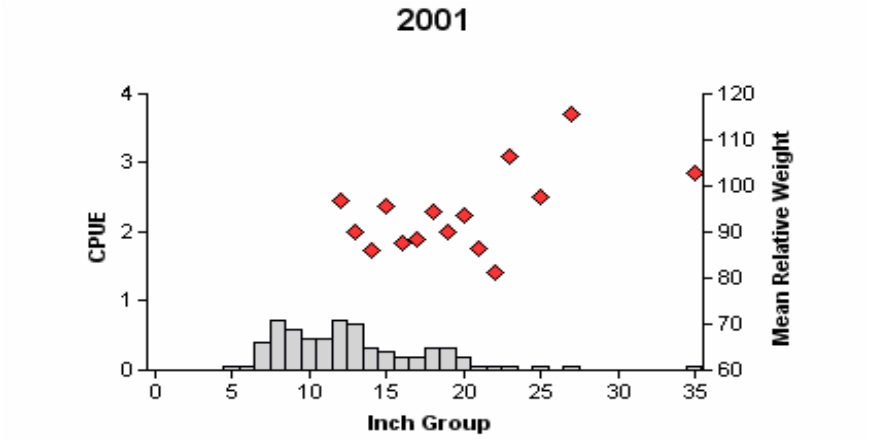
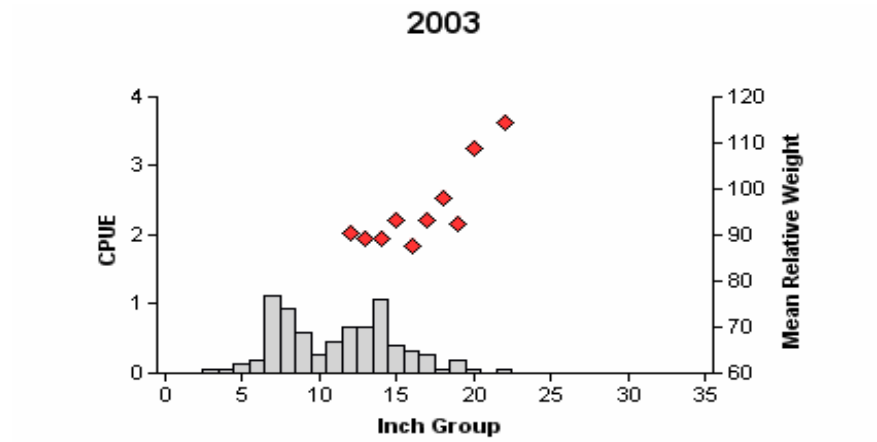


Figure 3. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Texana, Texas, 1999, 2002, and 2006.

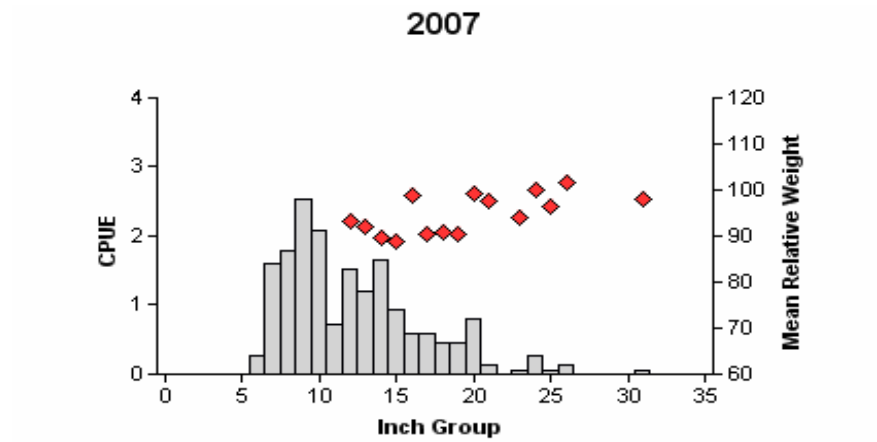
Blue Catfish



Effort = 15
Total CPUE = 6.5 (28; 97)
PSD = 16 (5)



Effort = 15
Total CPUE = 7.7 (37; 115)
PSD = 4 (3)

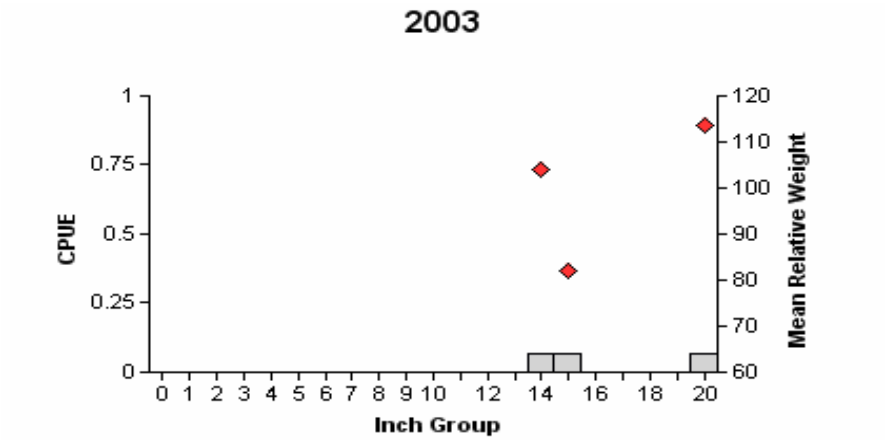


Effort = 15
Total CPUE = 18.0 (30; 270)
PSD = 17 (2)

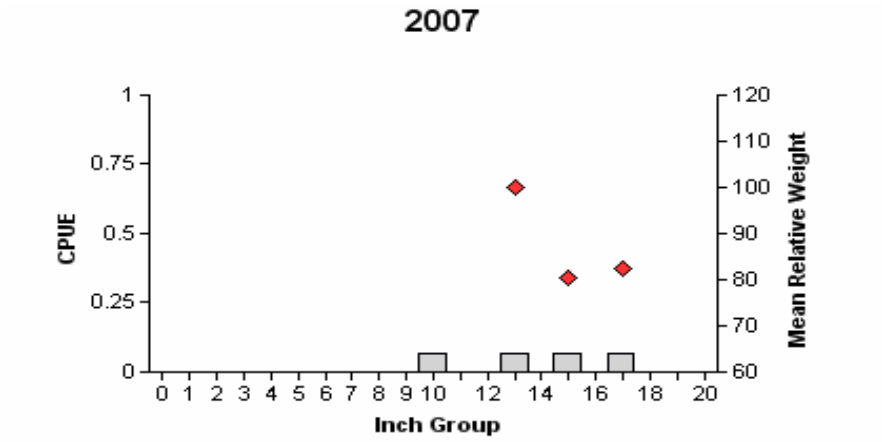
Figure 4. Number of blue catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Lake Texana, Texas, 2001, 2003, and 2007.

Channel Catfish

Effort = 15
Total CPUE = 0.3 (57; 4)
PSD = 50 (37)



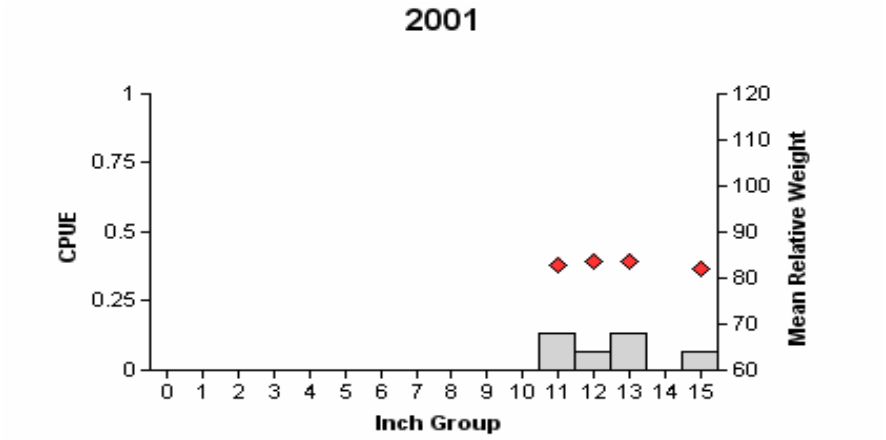
Effort = 15
Total CPUE = 0.2 (72; 3)
PSD = 33 (16)



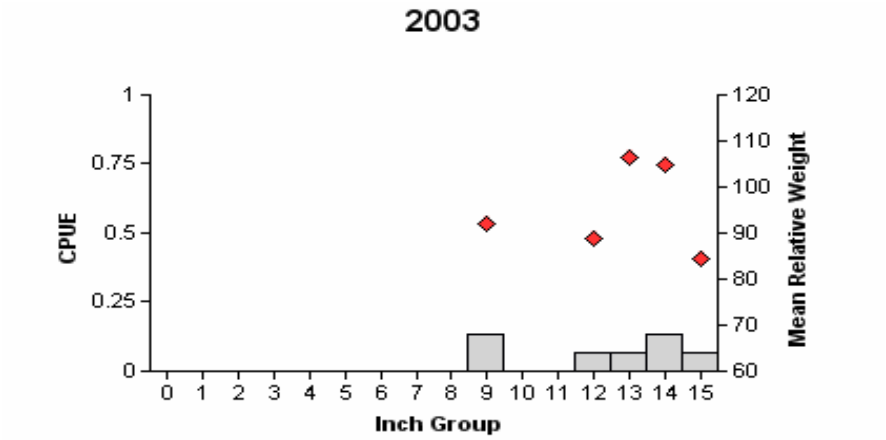
Effort = 15
Total CPUE = 0.3 (57; 4)
PSD = 33 (33)

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 netting surveys, Lake Texana, Texas, 2001, 2003, and 2007.

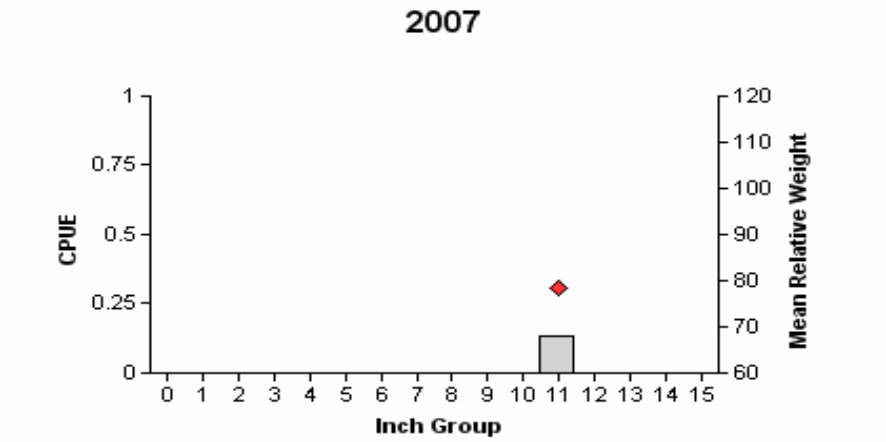
White Bass



Effort = 15
Total CPUE = 0.4 (84; 6)



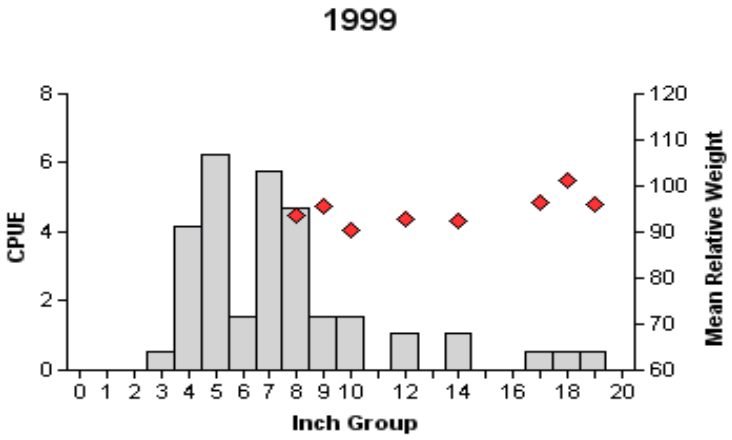
Effort = 15
Total CPUE = 0.5 (62; 7)



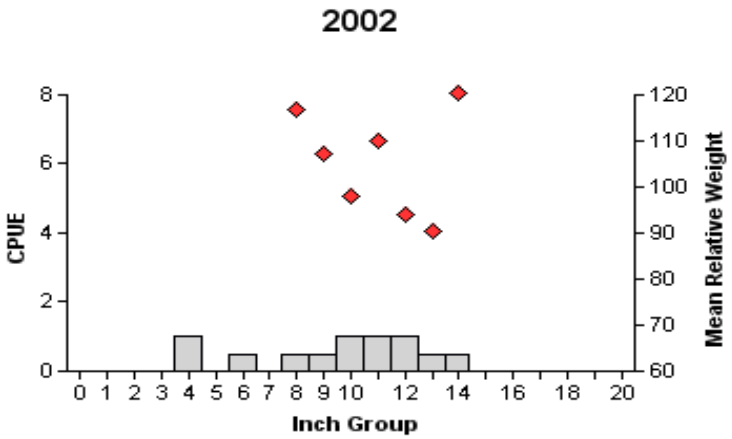
Effort = 15
Total CPUE = 0.1 (68; 2)

Figure 6. Number of white bass 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 netting surveys, Lake Texana, Texas, 2001, 2003, and 2007.

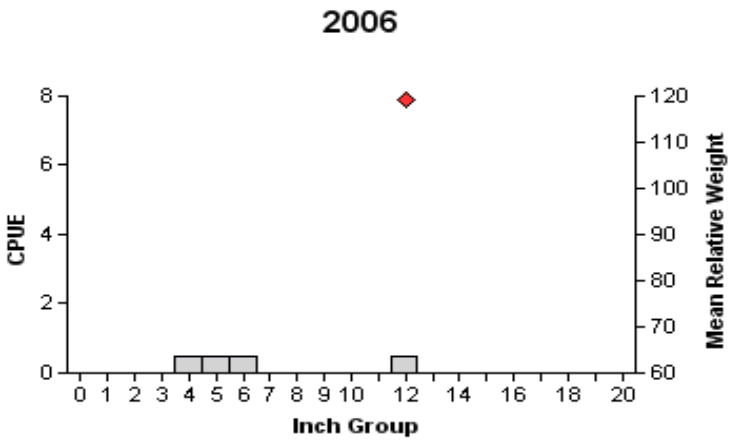
Largemouth Bass



Effort =	2.0
Total CPUE =	28.5 (25; 57)
Stock CPUE =	11.0 (32; 22)
PSD =	32 (14)
RSD-14 =	23 (13)



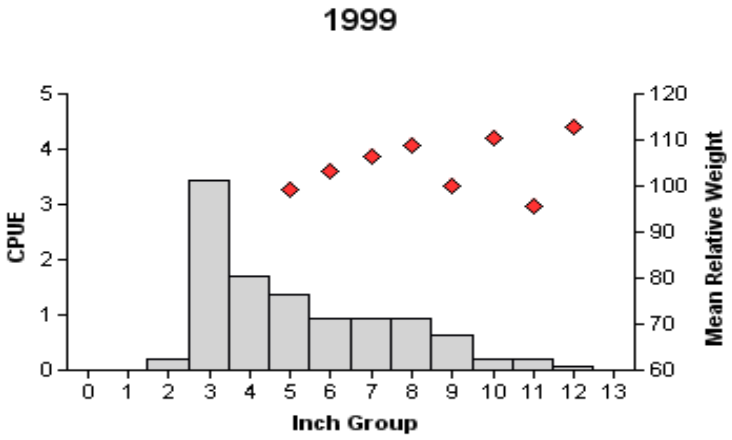
Effort =	2.0
Total CPUE =	6.5 (40; 13)
Stock CPUE =	5.0 (41; 10)
PSD =	40 (15)
RSD-14 =	10 (10)



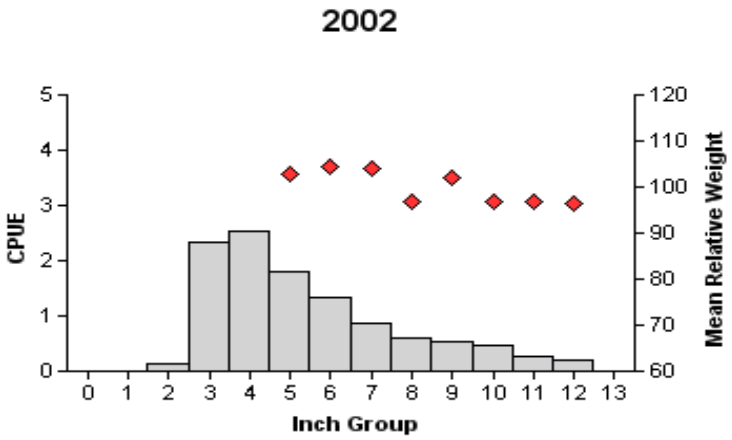
Effort =	2.0
Total CPUE =	2.0 (100; 4)
Stock CPUE =	0.5 (100; 1)
PSD =	100 (0)
RSD-14 =	0 (0)

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 parentheses) for fall electrofishing surveys, Lake Texana, Texas, 1999, 2002, and 2006.

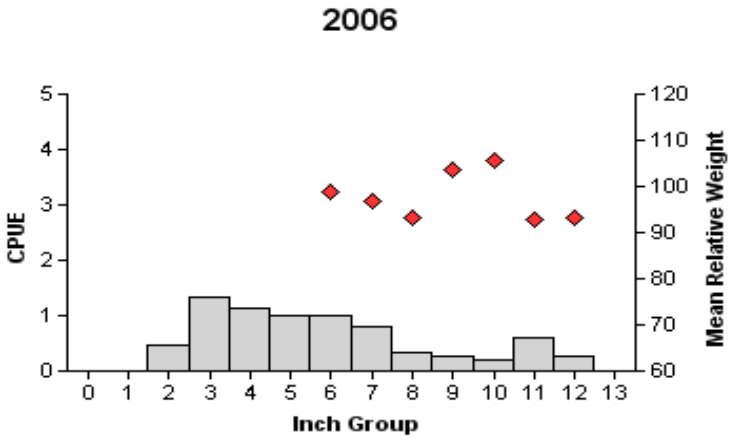
White Crappie



Effort =	15
Total CPUE =	9.9 (16; 149)
PSD =	39 (4)
RSD-10 =	9 (2)



Effort =	15
Total CPUE =	11.1 (31; 166)
PSD =	34 (7)
RSD-10 =	15 (3)



Effort =	15
Total CPUE =	7.4 (32; 111)
PSD =	37 (8)
RSD-10 =	24 (5)

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 netting surveys, Lake Texana, Texas, 1999, 2002, and 2006.

White Crappie

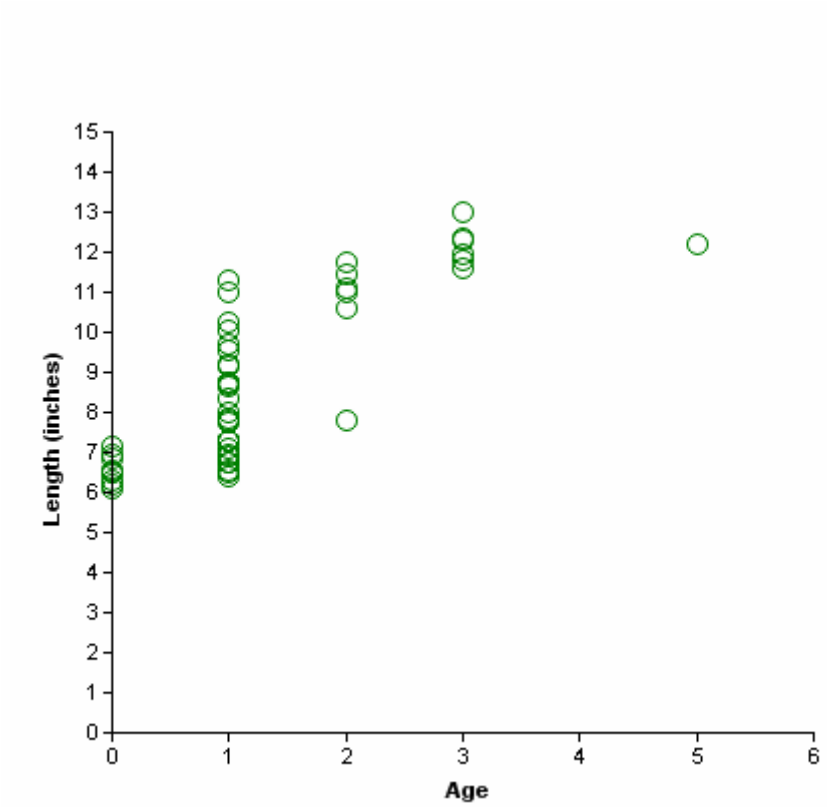
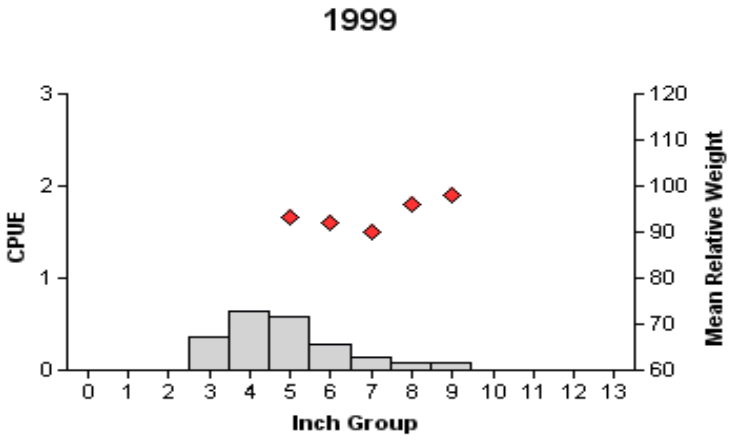
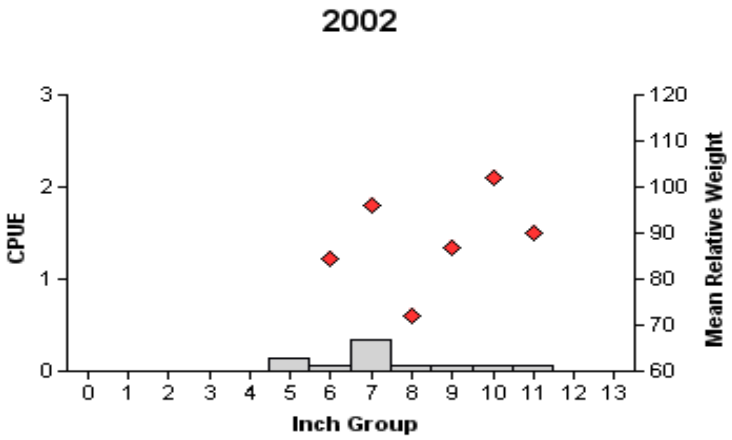


Figure 9. Length at age for white crappie collected from trap nets at Lake Texana, Texas, November 2006 (N=52).

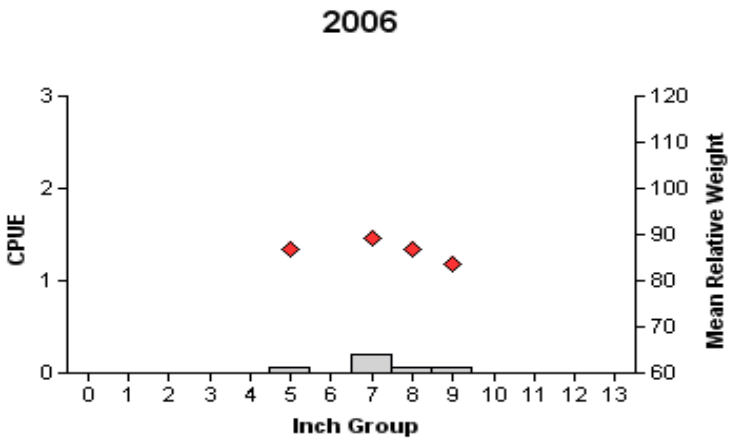
Black Crappie



Effort =	15
Total CPUE =	2.0 (25; 30)
PSD =	12 (7.8)
RSD-10 =	0 (0)



Effort =	15
Total CPUE =	0.8 (53; 12)
PSD =	33 (14.1)
RSD-10 =	17 (10)



Effort =	15
Total CPUE =	0.4 (53; 6)
PSD =	33 (14.1)
RSD-10 =	0 (0)

Figure 10. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Lake Texana, Texas, 1999, 2002, and 2006.

Table 5. Proposed sampling schedule for Lake Texana, Texas. Electrofishing and trap net surveys are conducted in the fall and the gill net survey in the spring. Standard surveys are denoted by S and additional surveys are denoted by A.

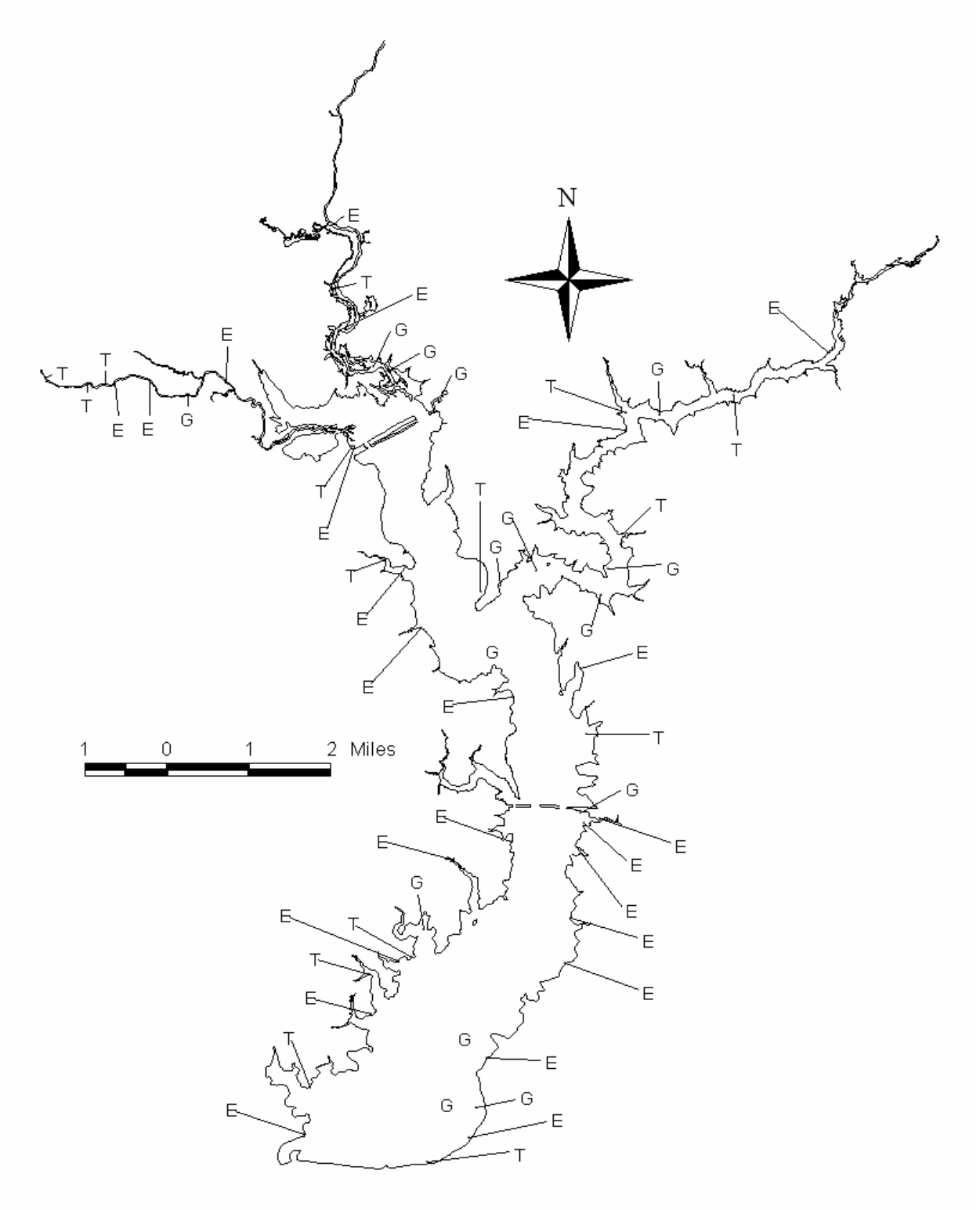
Survey Year	Electrofishing	Spring Electrofishing	Trap Netting	Gill Netting	Report
Fall 2007-Spring 2008		A			
Fall 2008-Spring 2009	A				
Fall 2009-Spring 2010		A			
Fall 2010-Spring 2011	S		S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Lake Texana, Texas, 2006-2007.

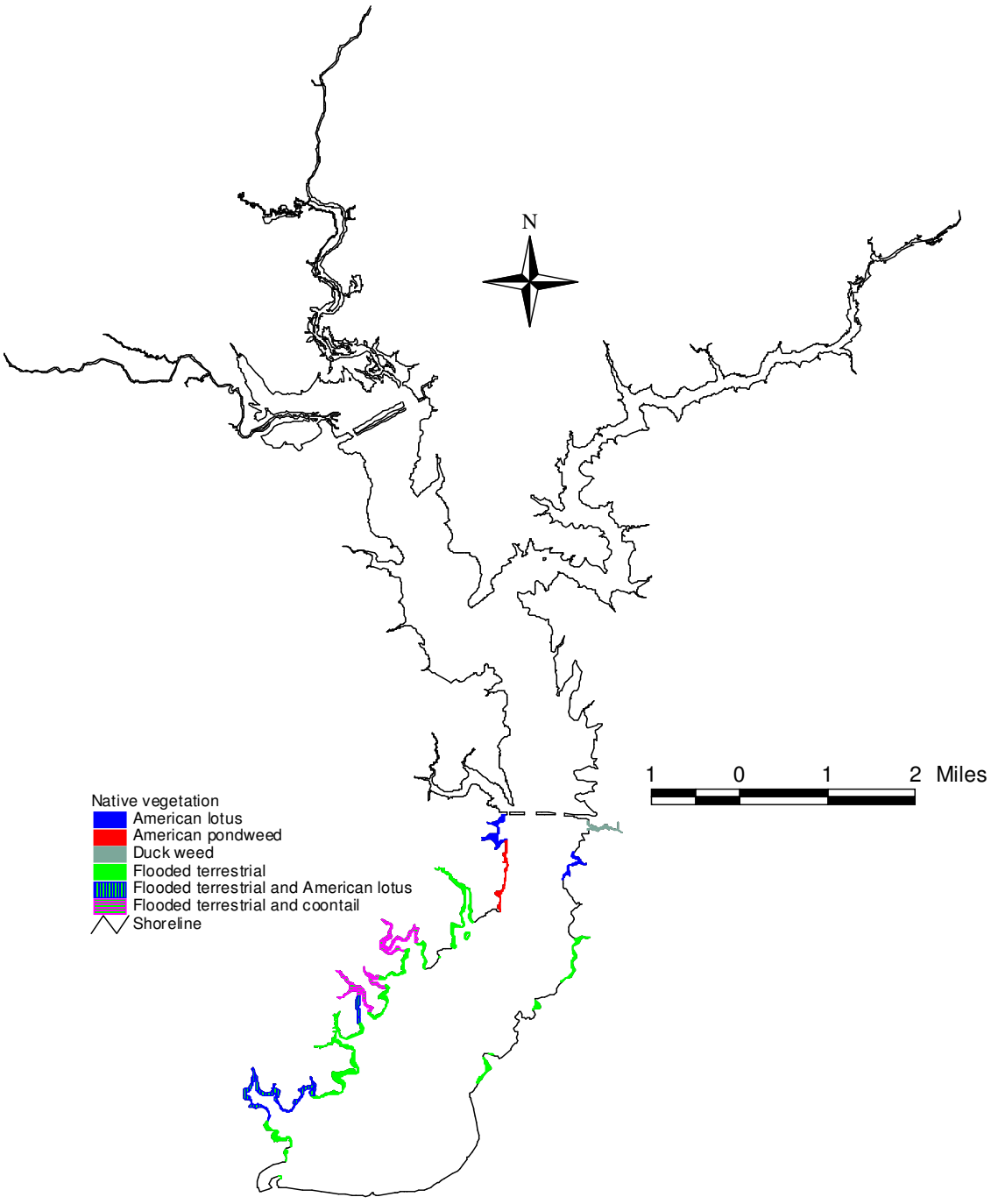
Species	Electrofishing		Trap Netting		Gill netting	
	N	CPUE	N	CPUE	N	CPUE
Spotted gar			4	0.3	13	0.9
Longnose gar					65	4.3
Gizzard shad	290	145.0	2	0.1	56	3.7
Bowfin			1	0.1		
Threadfin shad	801	400.5	24	1.6		
Common carp					1	0.1
Bullhead minnow	2	1.0				
Inland silverside	6	3.0				
Smallmouth buffalo					48	3.2
Black bullhead			2	0.1		
Yellow bullhead					1	0.1
Blue catfish					270	18.0
Channel catfish					4	0.3
Tadpole madtom			4	0.3		
Flathead catfish					3	0.2
White bass					2	0.1
Warmouth	1	0.5				
Bluegill	25	12.5	5	0.3	1	0.1
Longear sunfish	4	2.0				
Largemouth bass	4	2.0				
White crappie	5	2.5	111	7.4	58	3.9
Black crappie			6	0.4		
Freshwater drum	3	1.5	2	0.1	158	10.5

APPENDIX B



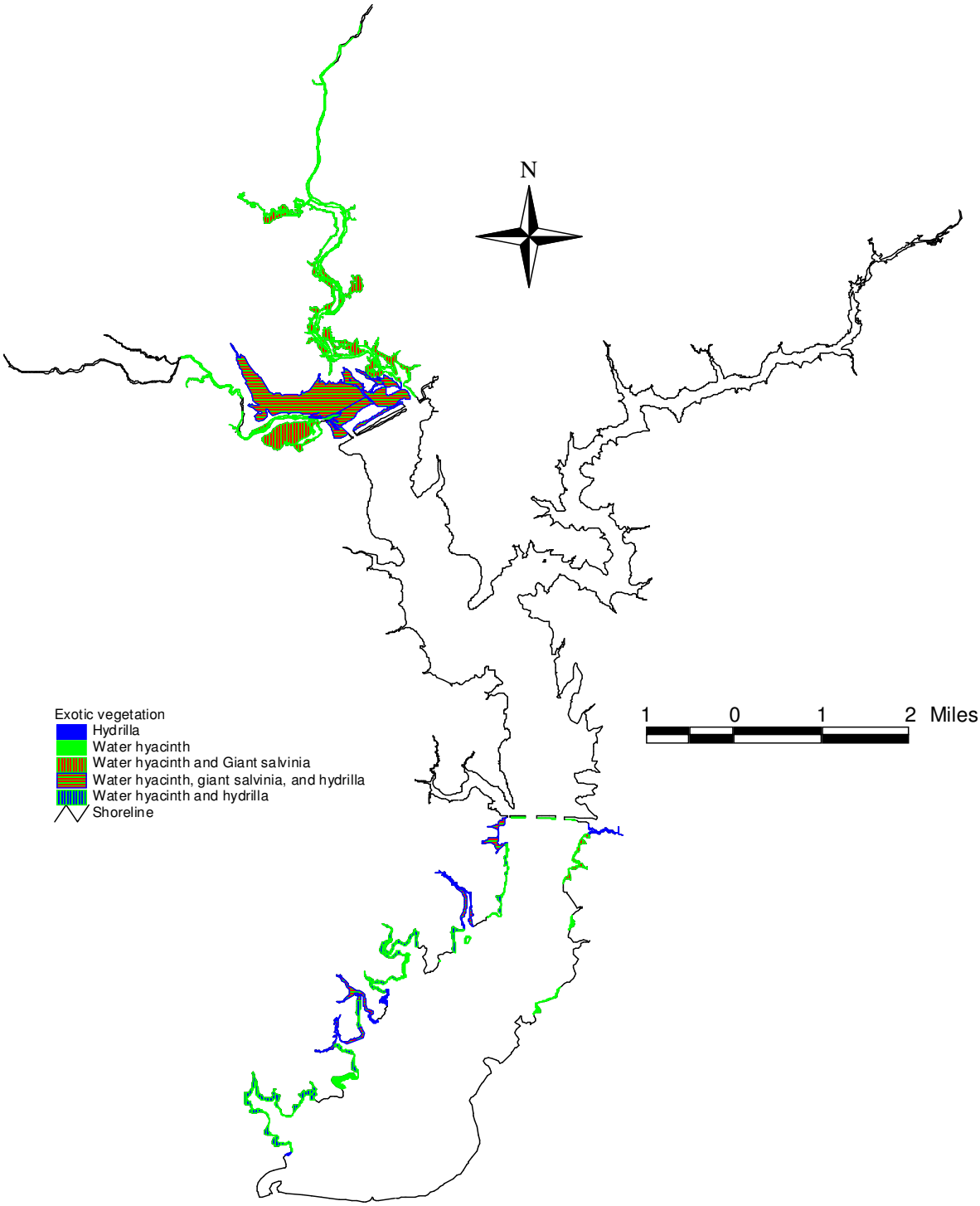
Location of sampling sites, Lake Texana, Texas, 2006-2007. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively.

APPENDIX C



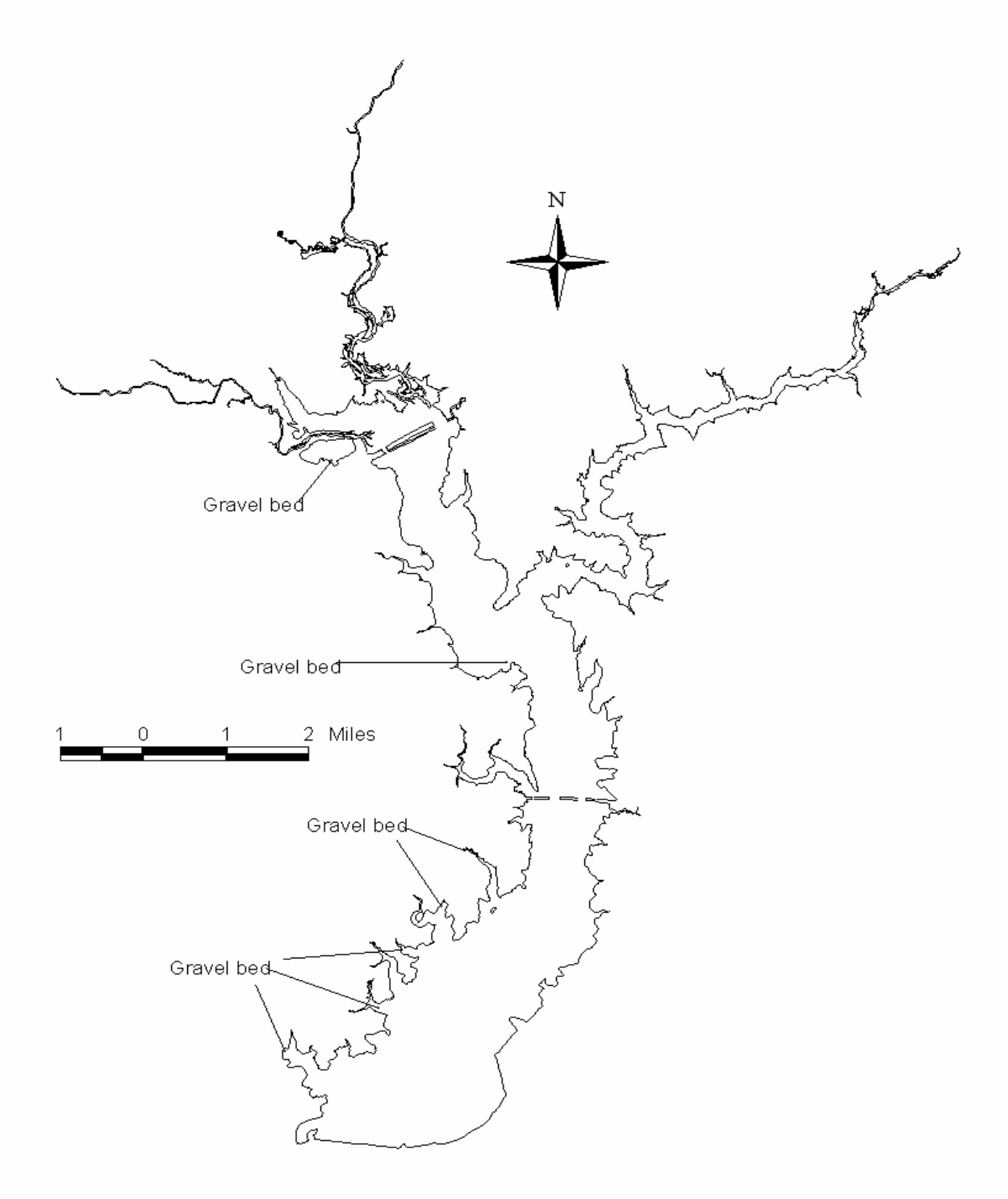
Native aquatic vegetation map for the upper and lower sections of Lake Texana, Texas, 2006.

APPENDIX D



Exotic aquatic vegetation map for the upper and lower sections of Lake Texana, Texas, 2006.

APPENDIX E



Location of gravel beds, constructed by LNRA, in Lake Texana, Texas.