

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

Averhoff Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish Populations in Averhoff Reservoir were surveyed in 2008 using electrofishing and in 2009 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:** Averhoff is a 174 acre narrow, riverine-type reservoir located on the Nueces River, near Crystal City, TX, in Zavala County. It was constructed by the Zavala-Dimmit Water Improvement District Number 1 in 1948 to provide water for agriculture, recreation, and flood control. Water level is not recorded for this reservoir. Access was fair with only one public ramp, and there were no handicap specific facilities. The primary shoreline habitat was overhanging brush, and native-submersed vegetation occupied 36 acres (20.7%).
- **Management History:** Important sport fish included largemouth bass and channel catfish. Harvest of both species was managed according to standard state-wide regulations.
- **Fish Community:**
 - **Prey species:** Bluegill and gizzard shad abundance was greater in 2008 compared to previous years. Populations of these species were composed of a sufficient number of small individuals suitable as prey for predators.
 - **Catfishes:** Channel catfish abundance was greater in 2009 than in previous years. The population remained mostly comprised of fish >16 inches.
 - **Largemouth bass:** Largemouth bass abundance was greater in 2008 than in previous years. Although population size structure was improved in 2008, few fish >14 inches were present in the population.
- **Management Strategies:**

Based on survey results all species should continue to be managed under current harvest regulations. Monitor fish populations with standard sampling conducted every fourth year (2012-2013) and conduct additional electrofishing in fall 2010 for the purpose of providing a more in-depth assessment of the forage base, primarily shad populations.

INTRODUCTION

This document is a summary of fisheries data collected from Averhoff Reservoir in 2008-2009. 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. Historical data is presented with the current data for comparison.

Reservoir Description

Averhoff is a narrow, riverine-type 174 acre reservoir located on the Nueces River, near Crystal City, TX, in Zavala County. It was constructed by the Zavala-Dimmit Water Improvement District Number 1 in 1948 to provide water for agriculture, recreation, and flood control. Water level is not recorded for this reservoir and was observed to be 5-7 feet low of full pool in fall 2008. Access was fair with only one public ramp, and there were no handicap specific facilities. In 2008, the primary shoreline habitat was overhanging brush, and native-submersed vegetation occupied 36 acres (20.7%). Other descriptive characteristics for Averhoff Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Dennis and Myers 2004) included:

1. Threadfin shad absence.

Action: Threadfin shad were not stocked because of the difficulty in obtaining this species for stocking. During the study period, however, small gizzard shad (3-4 inches) were abundant.

2. Absence of water body records.

Action: The lack of water body fish catch records for District 1D reservoirs was described in a 2005 news release. To date, no records have been established.

Harvest regulation history: Harvest of sport fishes in Averhoff Reservoir is managed according to standard state-wide harvest regulations (Table 2).

Stocking history: Palmetto bass were stocked in the late 1970s and Florida largemouth bass (FLMB) in the mid 1990s. The detailed stocking history is in Table 3.

Vegetation/habitat history: Native submersed vegetation species typically occur and at times rooted emergent species also occur in Averhoff Reservoir. In 2005, the predominant species present were Illinois pondweed, water stargrass, and Egyptian paspalidium (Dennis and Myers 2004).

METHODS

Fishes were collected by electrofishing (1.0 hour at 12 5-min stations) and gill netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill nets, as the number of fish per net night (fish/nn). Electrofishing and gill netting survey sites were randomly selected (Appendix A). A vegetation survey was conducted in 2008. Trap net sampling for crappies was not conducted because of its ineffectiveness and crappies are sparse and a relatively unimportant species in the reservoir's sport fish community. All surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2008).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics.

RESULTS AND DISCUSSION

Habitat: Shoreline structural habitat remained relatively unchanged since the survey in 2005, thus a structural habitat survey was not conducted during this study period. In 2008, native submersed vegetation occupied 36 acres representing 20.7% of the reservoir surface area. Predominant species were Illinois pondweed, water stargrass, and coontail. Complete results of the 2008 vegetation survey are contained in Table 4.

Prey species: Gizzard shad CPUE (Figure 1) was greater in 2008 (83.0 fish/h) than in 2000 (30.0 fish/h) and 2004 (59.0 fish/h). Gizzard shad index of vulnerability (IOV) was likewise greater in 2008 (36.1) than in 2000 and 2004 (0.0 and 23.7, respectively) suggesting an increase in availability of gizzard shad as forage for predators. No threadfin shad were collected in 2008 as was the case in 2004 and 2000. Bluegill CPUE (Figure 2) was similar in 2008, 2004, and 2000, ranging from 97.0-118.0 fish/h. Bluegill PSD remained low in 2008 (17), indicating a high proportion of the population was of suitable size to be prey for predators. The CPUE for all sunfishes combined was 177.0 fish/h (Appendix B). Sunfish are the dominant forage in this reservoir.

Catfishes: Channel catfish CPUE (Figure 3) was greater in 2009 (4.8 fish/nn) than in 2005 (3.6 fish/nn) and 2002 (3.2 fish/nn). The 2009 population sample was composed of mostly quality-size individuals (>16 inches) which was similar to samples taken in previous years. Channel catfish Wr exceeded 90 for all size groups in 2009. Two flathead catfish and no blue catfish were collected in 2009.

Black basses: Largemouth bass CPUE (Figure 4) was greater in 2008 (74.0 fish/h) than in 2004 (50.0 fish/h) and 2000 (46.0 fish/h). Largemouth bass PSD was greater in 2008 (57) than in previous years suggesting an improved population size structure. However, relatively few largemouth bass >14 inches were collected suggesting that few larger fish exist in the population. Largemouth bass average Wr ranged from 82 to 92 in 2008. Electrophoretic analysis of age-0 and age-1 fish collected in 2004 indicated a 52.6% frequency of Florida largemouth bass alleles with 6.9% of the sample having the Florida largemouth bass genotype (Table 5). One guadalupe bass was collected during the 2008 electrofishing survey.

Fisheries management plan for Averhoff Reservoir, Texas

Prepared – July 2009.

ISSUE 1: No threadfin shad, a potentially important prey species, have been collected in routine fish community sampling since 1998, however abundance of small gizzard shad has recently increased.

MANAGEMENT STRATEGY

1. Monitor the shad population via electrofishing sampling in fall 2010 and 2012 to assess prey abundance and size.

ISSUE 2: Averhoff Reservoir has low fisheries potential because of its small size (173 acres) and rural location between Uvalde and Eagle Pass, TX. Thus, angler utilization is presumed to be very low. General rotation reservoirs according to Inland Fisheries Division guidelines are described as >500 acres in size and are to be sampled at least once every four years to formulate a reservoir-specific management plan. It was suggested that consideration be given to declassifying Averhoff as a general rotation reservoir which would permit additional allocation of fisheries monitoring and management efforts to more important highly utilized reservoirs in District 1D.

MANAGEMENT STRATEGIES

1. Conduct boat trailer counts in either spring 2012, 2013, or both years to assess angler utilization of the reservoir. If angler utilization is deemed insufficient to warrant inclusion as a general rotation reservoir, then propose to declassify it.

SAMPLING SCHEDULE JUSTIFICATION:

Conduct electrofishing and gill net surveys in 2012-2013 and additional electrofishing survey in 2010-2011 to monitor the populations of sport and forage fishes (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.
- Dennis, J., and R. Myers 2004. Statewide freshwater fisheries monitoring and management program survey report for:Averhoff Reservoir, 2004. Texas Parks and Wildlife Department, Federal Aid In Sport Fish Restoration, Grant F-30-R, Performance Report, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Table 1. Characteristics of Averhoff Reservoir, Texas.

Inland Fisheries water body code	0035
IF District	1D
Surface area	174 acres
Conservation pool elevation	595 feet above mean sea level
Shoreline length	32 miles
Controlling authority	Zavala-Dimmit Water Improvement District No. 1
Water uses	Irrigation and recreation
County	Zavala
Latitude	28.778870
Longitude	-99.828148
Nearest major metropolitan area and distance	Laredo – 100 miles San Antonio – 100 miles
Reservoir description	Main stream
River system	Nueces
Mean depth	24 feet
Maximum depth	28 feet
Shoreline development ratio	2.685
Watershed area	unknown
Secchi disc range	2-4 feet
Conductivity	530 umhos/cm
Constructed	1948
Boat access	fair–1 public ramp
Bank access	Poor and at boat ramp only
Handicap access	Inadequate-none

Table 2. Harvest regulations for Averhoff Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12" minimum
Catfish, flathead	5	18" minimum
Bass, largemouth and Guadalupe	5	14" minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10" minimum

Table 3. Fingerling stocking history of Averhoff Reservoir, Texas.

Species	Year	Number
Palmetto bass	1979	3,550
	1981	1,300
	1983	1,620
	Species total	6,470
Florida largemouth bass	1994	31,917
	1995	31,969
	1996	32,568
	Species total	96,454

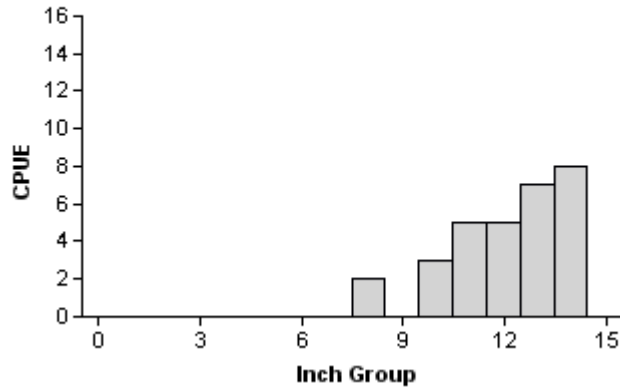
Table 4. Results of a vegetation survey conducted at Averhoff Reservoir, Texas, in September, 2008. Surface area coverage (acres) was estimated for each vegetation type and divided by total reservoir area (174 acres) to obtain percent of reservoir area occupied by species.

Vegetation type	Surface area	Percent
Mixed native vegetation*	36.0	20.7
Bull's tongue	<0.01	<0.01
Smartweed	<0.01	<0.01
Open water	137.0	79.3

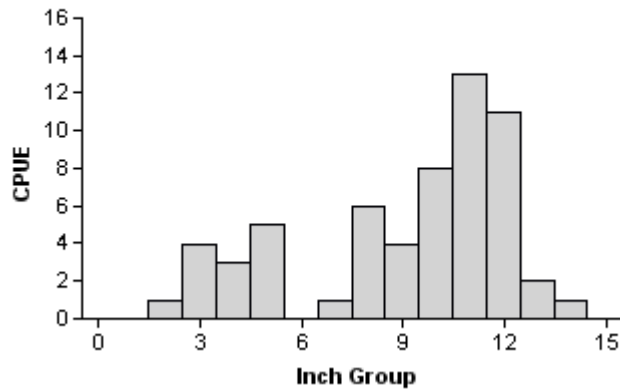
* Mixed native vegetation includes southern naiad, American pondweed, coontail, and water stargrass.

Gizzard Shad**2000**

Effort = 1.0
 Total CPUE = 30.0 (34; 30)
 IOV = 0

**2004**

Effort = 1.0
 Total CPUE = 59.0 (31; 59)
 IOV = 24 (12)

**2008**

Effort = 1.0
 Total CPUE = 83.0 (28; 83)
 IOV = 36 (18)

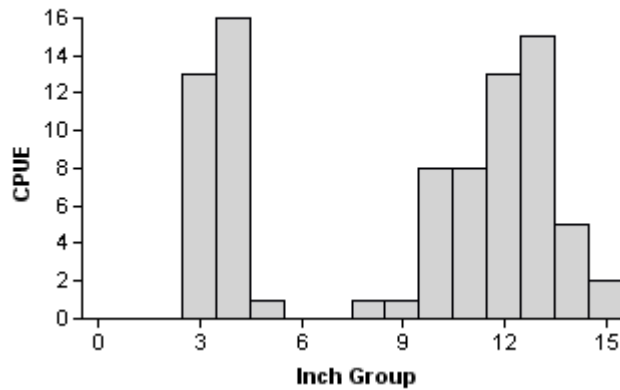
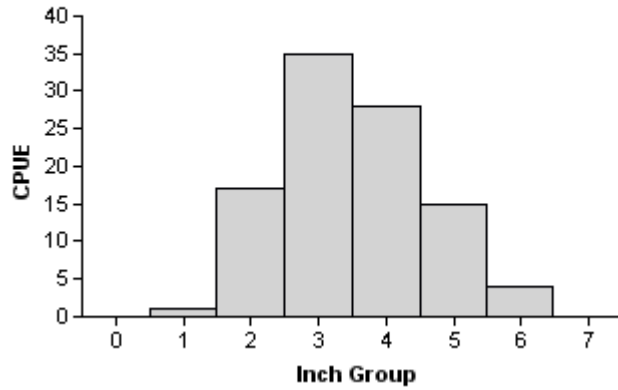
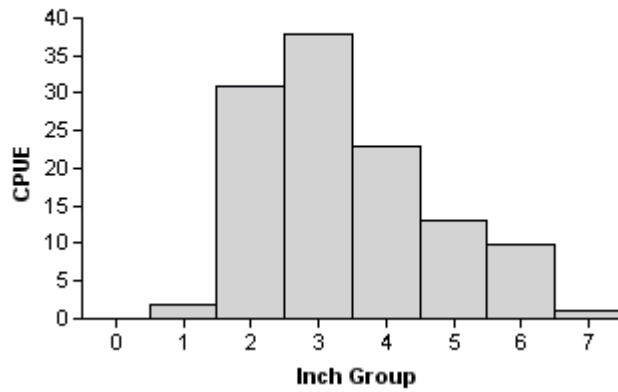


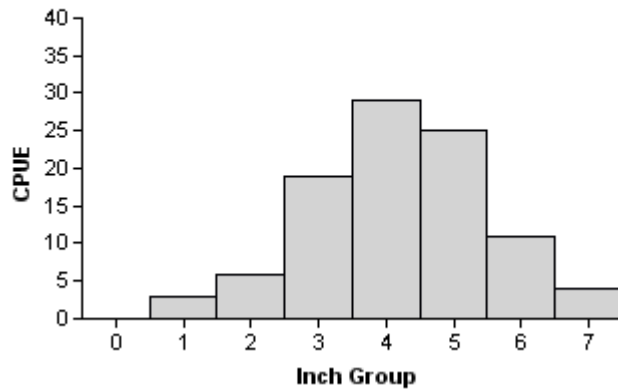
Figure 1. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Averhoff Reservoir, Texas, 2000, 2004, and 2008. RSE is used for CPUE values and SE is used for IOV values.

Bluegill**2000**

Effort = 1.0
 Total CPUE = 100.0 (26; 100)
 Stock CPUE = 82.0 (24; 82)
 PSD = 5 (2)

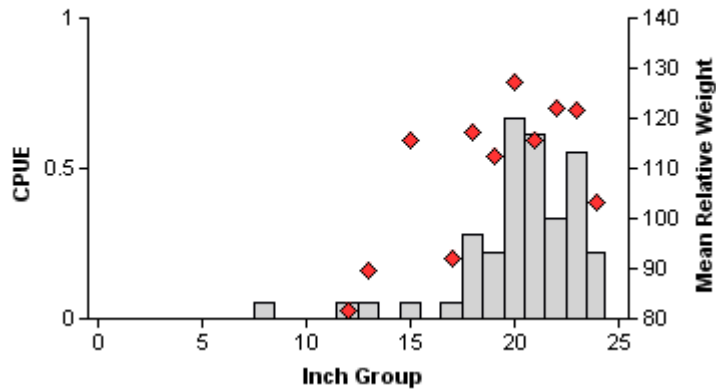
2004

Effort = 1.0
 Total CPUE = 118.0 (18; 118)
 Stock CPUE = 85.0 (16; 85)
 PSD = 13 (4)

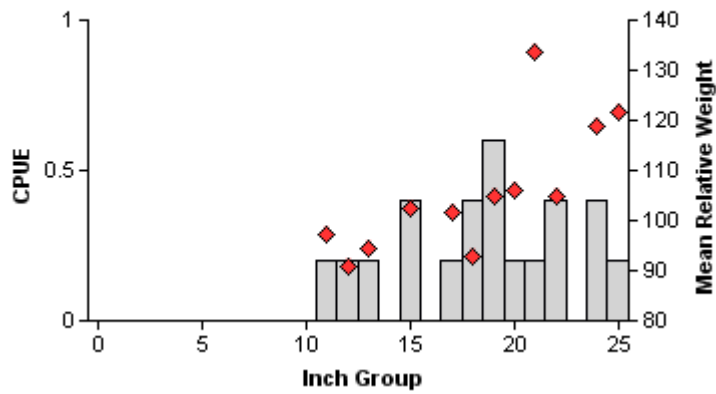
2008

Effort = 1.0
 Total CPUE = 97.0 (16; 97)
 Stock CPUE = 88 (16; 88)
 PSD = 17 (4)

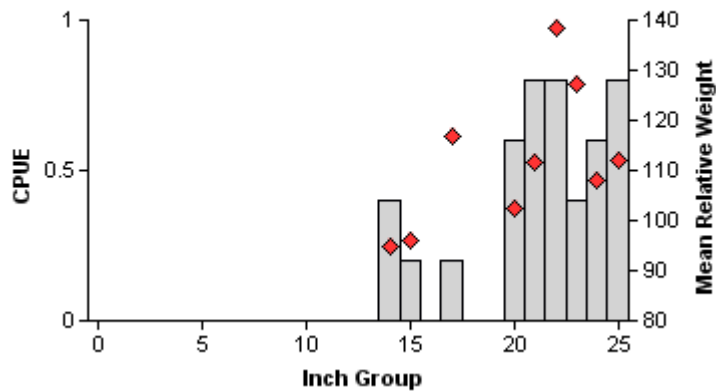
Figure 2. Number of bluegill caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Averhoff Reservoir, Texas, 2000, 2004, and 2008. RSE is used for CPUE values and SE is used for PSD values.

Channel Catfish**2002**

Effort = 18.0
 Total CPUE = 3.2 (15; 57)
 Stock CPUE = 3.1 (15; 56)
 PSD = 95 (3)
 RSD-P = 7 (4)

2005

Effort = 5.0
 Total CPUE = 3.6 (34; 18)
 Stock CPUE = 3.6 (34; 18)
 PSD = 72 (10)
 RSD-P = 17 (9)

2009

Effort = 5.0
 Total CPUE = 4.8 (40; 24)
 Stock CPUE = 4.8 (40; 24)
 PSD = 88 (5)
 RSD-P = 29 (4)

Figure 3. Number of channel catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Averhoff Reservoir, Texas, 2002, 2005, and 2009. RSE is used for CPUE values and SE is used for RSD and PSD values.

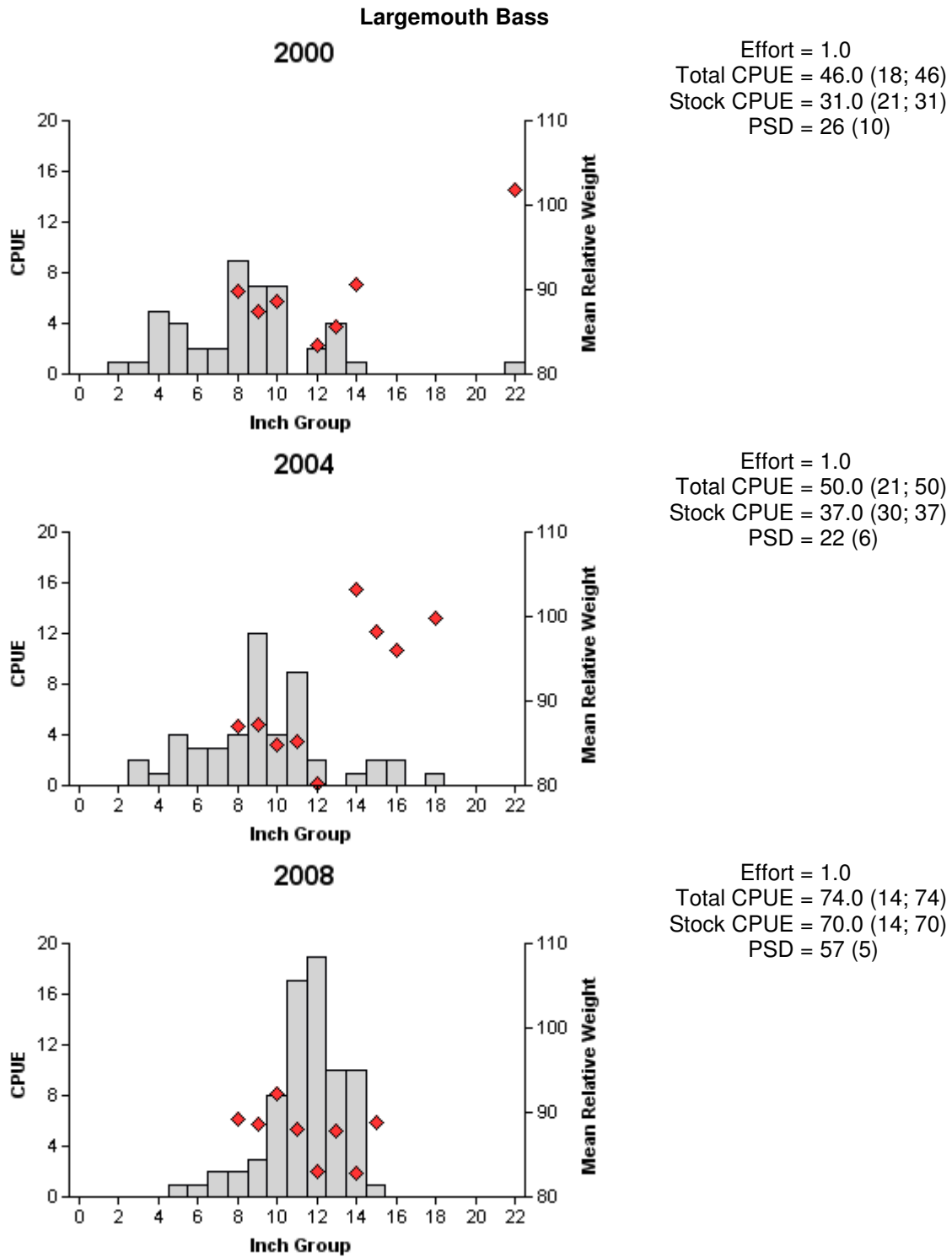


Figure 4. Number of largemouth bass caught per hour (CPUE), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Averhoff Reservoir, Texas, 2000, 2004, and 2008. RSE is used for CPUE values and SE is used for PSD values.

Table 5. Results of electrophoretic analysis of age-0 largemouth bass collected by electrofishing during fall from Averhoff Reservoir, Texas, in selected years from 1998 to 2004. F1 fish are those resulting from a cross between pure Florida largemouth bass (FLMB) and pure northern largemouth bass (NLMB), and FX fish are those resulting from all other crosses.

Number of fish by genotype							
Year	Sample size	FLMB	F1	FX	NLMB	% FLMB alleles	% FLMB genotype
1998	18	6	1	11	0	34.7	33.3
2000	17	3	2	10	2	53.1	17.6
2004	29*	2	4	21	2	52.6	6.9

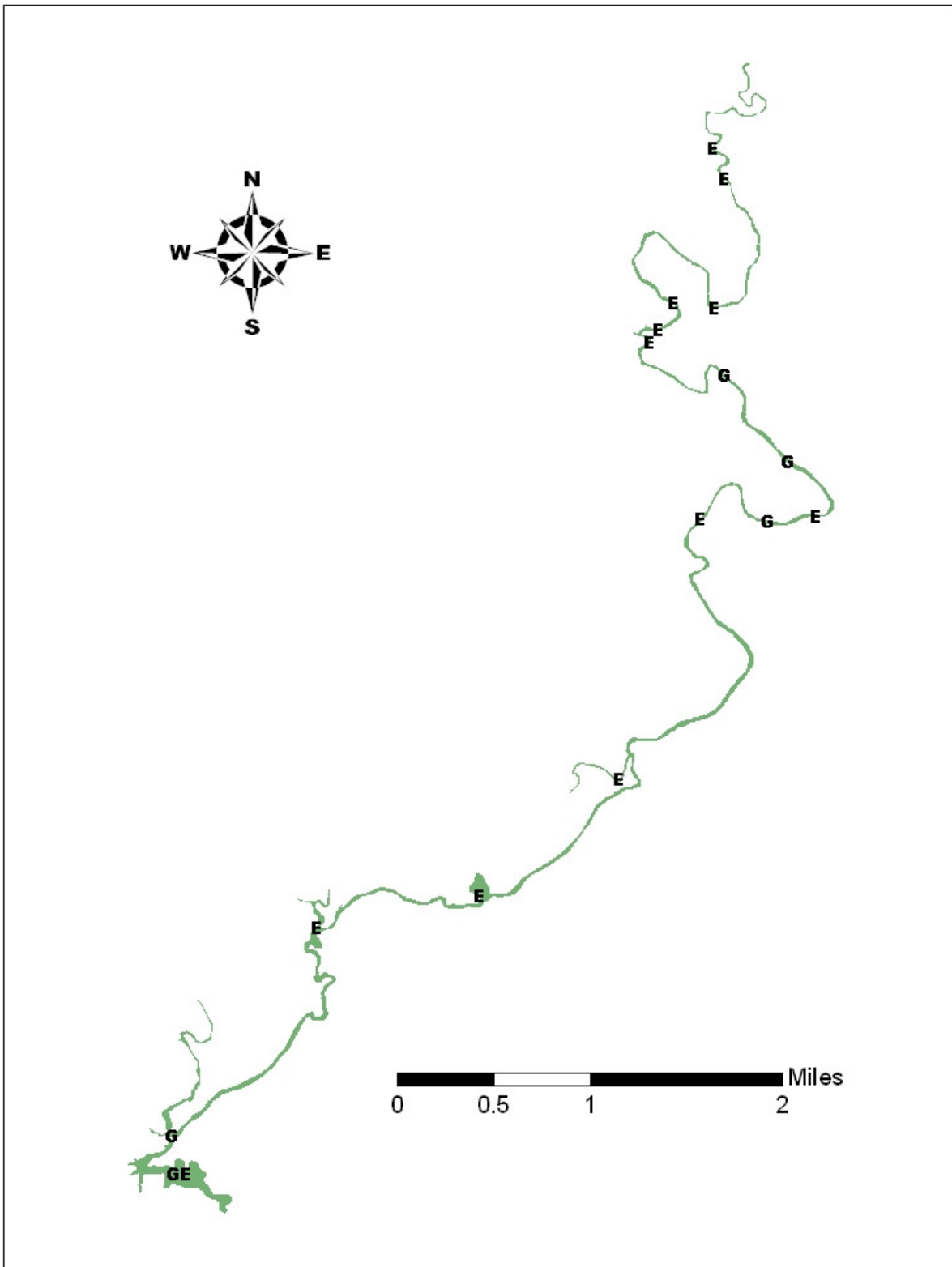
* Age-0 and age-1 fish in the sample.

Table 6. Proposed sampling schedule for Averhoff Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey Year	Electrofishing	Trap Net	Gill Net	Creel Survey	Report
Fall 2009-Spring 2010					
Fall 2010-Spring 2011	A				
Fall 2011-Spring 2012				A*	
Fall 2012-Spring 2013	S		S	A*	S

*Boat trailer counts will be made in either spring 2012, 2013, or both years to assess angler utilization of the reservoir.

Appendix A



Location of sampling sites, Averhoff Reservoir, Texas, 2008-2009. Gill net and electrofishing stations are indicated by G and E, respectively.

Appendix B

Catch rate (CPUE) of all target species collected from all gear types from Averhoff Reservoir, Texas, 2008-2009. Effort was 1.0 hours for electrofishing and 5.0 net-nights for gill netting.

Species	Electrofishing	Gill netting
Spotted gar		2.0
Longnose gar		4.6
Gizzard shad	83.0	14.2
Grey redhorse	1.0	
Channel catfish		4.8
Flathead catfish		0.4
Mexican tetra	1.0	
Redbreast sunfish	25.0	
Warmouth	9.0	0.2
Bluegill	97.0	
Longear sunfish	6.0	
Redear sunfish	40.0	0.6
Largemouth bass	74.0	6.4
Guadalupe bass	1.0	
White crappie		1.0
Black crappie	1.0	0.2
Rio Grande cichlid	2.0	
Tilapia	2.0	