PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-1

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

Meredith Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish Populations in Meredith Reservoir were surveyed in 2010 using electrofishing and trap nets and in 2011 using gill nets. Anglers were surveyed with a creel survey from April 2010 to September 2010. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Meredith Reservoir is an impoundment on the Canadian River 35 miles northeast of Amarillo, Texas. It was built in 1965 to provide municipal and industrial water. It experiences substantial water level fluctuations and covered approximately 3,264 acres during 2010-2011. First documented golden alga kill occurred 20 December, 2010 into March, 2011. Angler and boat access was adequate but only one boat ramp was usable in 2010 due to low water. There were two handicap accessible fishing piers. Habitat was primarily silt and rock, with some non-native macrophytes.

- **Management History:** Important sport fish included walleye, white bass, smallmouth bass, largemouth bass, white crappie, and catfish. Walleye were managed with a two under 16 inches regulation to improve angler catch rates and size of fish caught. Smallmouth bass were placed under a 12-15 inch slot limit in 1992 in an effort to increase the number of larger fish. Largemouth bass, crappie, and catfish have been managed under statewide regulations.

- **Fish Community:**
  - **Prey species:** Gizzard shad continued to be present in the reservoir. Electrofishing catch rate for gizzard shad has declined, but about 80% of gizzard shad available as prey to most sport fish. The electrofishing catch rate of bluegills declined since 2008.

  - **Catfishes:** The channel catfish population has remained stable with good angler catch rates. No flathead catfish were collected in spring gill nets in 2011. No anglers were documented as targeting flathead catfish by rod and reel.

  - **White bass:** Gill net catch rates of white bass declined slightly in 2011. White bass are still a popular sport fish with anglers and provided the majority of harvest from the reservoir.

  - **Black basses:** Smallmouth bass relative abundance was similar to previous samples. Size structure was poor with no fish over 13 inches. There was little directed angling pressure toward this species. The electrofishing catch rate of largemouth bass has remained below 10 fish/h since 2008. Directed angling pressure toward largemouth bass was low.

  - **Crappies:** Both white and black crappies are present in the reservoir, though white crappie are more abundant. Trap net catch rates have increased since 2008. Crappie were a popular sport fish in the reservoir but <10% of anglers sought crappie.

  - **Walleye:** The walleye population has remained relatively stable and was reproducing during record low water levels. Walleye were the most popular sport fish in the reservoir and some reached 16 inches by age 2.

- **Management Strategies:** Continue monitoring of sport fish populations to determine impact of increased chlorides due to drought conditions, monitor golden alga blooms, and finalize the zebra mussel response plan. Conduct gill net, electrofishing, and creel surveys annually, and general monitoring with trap nets in 2012 and 2014. Conduct a habitat survey in 2011.

INTRODUCTION

This document is a summary of fisheries data collected from Meredith Reservoir in 2010-2011. 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 are presented with the current data for comparison.

Reservoir Description

Meredith Reservoir is a 16,505-acre impoundment constructed in 1965 on the Canadian River by the US Bureau of Reclamation. It is located in Hutchinson, Moore, and Potter Counties approximately 35 miles northeast of Amarillo and is operated and controlled by the Canadian River Municipal Water Authority. The land surrounding Meredith Reservoir is owned and operated by the US Department of the Interior, National Park Service as the Lake Meredith National Recreation Area and the Alibates Flint Quarries National Monument. Primary water uses included municipal water supply and recreation. Meredith Reservoir was mesotrophic with a mean TSI chl-*a* of 42.66 (Texas Commission on Environmental Quality 2008). The first documented golden alga fish kill began on 20 December, 2010 and continued through 23 March, 2011. Habitat at time of sampling consisted of silt, rocks, and non-native submerged vegetation. Water level has been declining since 2000 and set a new record low level of 38.22 feet (2,931 acres) in April 2011 (Figure 1). Boat access consisted of one open public boat ramp. Four ramps were closed due to low water levels. Other descriptive characteristics for Meredith Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Munger and Clayton 2009) included:

1. Evaluation of the smallmouth bass slot length limit.
   Action: Extended drought conditions have impacted both angler access to the reservoir and quality habitat for smallmouth bass. Electrofishing catch rates have remained too low to complete the evaluation of the length limit.
2. Evaluation of the two under 16 inches walleye length-limit.
   Action: Gill net sampling and creel surveys have continued for the study. Drought impacts on angler access and walleye reproduction have complicated data analysis.

Harvest regulation history: Sport fishes in Meredith Reservoir are currently managed with statewide regulations with the exception of smallmouth bass (Table 2). From 1988 to 1992, smallmouth bass were managed with a 14-inch minimum length limit. A 12- to 15-inch slot length limit was implemented in 1992 to improve the population size structure.

Stocking history: Meredith Reservoir has not been stocked since 2000 (largemouth bass and walleye). Largemouth bass have been stocked to supplement natural reproduction when the Young:Adult Ratio was <1 and water levels were sufficient to provide nursery habitat. Yellow perch were experimentally stocked between 1980 and 1995 to provide an alternate forage species for walleye and an additional sport fish for anglers. The complete stocking history is in Table 3.

Vegetation/habitat history: Meredith Reservoir habitat was surveyed in 1998 when it supported a limited amount of aquatic vegetation (Munger 1999), primarily Eurasian watermilfoil and areas of cattail.

Water Transfer: Meredith Reservoir is primarily used for municipal water supply and recreation. The reservoir supplies water to 11 member cities via a 358-mile aqueduct system. The recent drought has resulted in water levels receding to below the water intakes. Portable electric pumps have been installed to lift water into the intake structure which then pumps water through the aqueduct. In January 2011, the

water authority temporarily ceased pumping water from the reservoir due to extreme low levels. Current estimates from the Canadian River Municipal Water Authority indicate the reservoir had 40,000 acre-feet of water in March 2011. The management plan is to pump 5,000 acre-feet in summer 2011. The reservoir is expected to lose another 20,000 acre-feet to evaporation over the next year. February water analysis indicates chlorides were 927 ppm and specific conductance was 3,768 µmhos/cm. Calculated salinity was 2.9 ppt. Evaporation loss will result in increases in chlorides.

METHODS

Fishes were collected by electrofishing (1.0 hour at 12 5-min stations), gill netting (6 net nights at 6 stations), and trap netting (6 net nights at 6 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (n/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (n/nn). Electrofishing survey sites were randomly selected. Trap net survey sites were biologist-selected. Gill net surveys were fixed sites based on historical sampling. A roving creel survey was conducted on 6 weekend days and 6 week days from April-June, 2010 and 7 weekend and 5 week days from July-September, 2010). All surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2008). Sampling efforts were reduced due to extreme low water levels.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD)] as defined by Guy et al. (2007), and condition [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and for creel statistics. Ages were determined using otoliths from the entire sample of 90 walleye. Source for water level data was the United States Geological Survey (USGS) website http://waterdata.usgs.gov/tx/nwis/uv/?site_no=07227900&PARAmeter_cd=00062,72020,00054.

RESULTS AND DISCUSSION

Habitat: A habitat survey was last conducted in 1998 (Munger 1999). Littoral zone habitat consisted primarily of silt, rocks, submerged terrestrial vegetation, and non-native submerged vegetation (Eurasian watermilfoil).

Creel: Directed fishing effort by anglers seeking a particular species was highest for walleye at 22.1% followed by channel catfish at 18.6% (Table 4). Total fishing effort for all species at Meredith Reservoir was 31,159 h in 2010 and estimated direct expenditures were $110,286 (Table 5).

Prey species: Electrofishing catch rates of bluegill and gizzard shad in 2010 were 2.0/h and 45.0/h, respectively. Index of vulnerability (IOV) for gizzard shad was good with 80% of gizzard shad available to existing predators; this was higher than IOV estimates for 2009 but similar to 2008 (Figure 2). Total CPUE of gizzard shad has declined since 2008 (Figure 2) and is likely due to extremely low water levels inhibiting sampling and reproduction. Total CPUE of bluegill has declined since 2008 and is likely due to water level impacts. Sample size was too small to evaluate size structure (Figure 3).

Channel catfish: The gill net catch rate of channel catfish was 2.0/nn in 2011 and 3.5/nn in 2010. The channel catfish population continued to have a stable population with low relative abundance (Figure 4). The percent of anglers seeking channel catfish was the highest since 2000 (Munger 2001, 2003, 2005; Munger and Clayton 2009; Munger and Henegar 2007) at 18.6% (Table 4). Total estimated harvest in 2010 was 1,518 fish, and the angler catch rate was 0.37/h (Table 6). Percent of released legal channel

catfish was variable and ranged from 0 to 27%. Observed harvest from April through September 2010 showed some illegal harvest as harvested fish ranged in length from 10 to 20 inches (Figure 5).

Flathead catfish: No flathead catfish were collected in gill net samples in 2011. The gill net catch rate in 2010 was 2.5/nn and 2009 was 1.5/nn (Figure 6). The loss of flathead catfish from the gill net sample may be due to low water levels or impact of golden alga. Previous samples were collected in areas with ample habitat, but current gill net sites are now out of habitat areas. There was no documented rod and reel angler directed effort toward the species (Tables 4 and 7), and no fish were documented in the creel.

White bass: The gill net catch rate of white bass was 4.5/nn in 2011 (Figure 7). The catch rate was down from 9.5/nn in 2010 and 6.1/nn in 2009. The percent of anglers seeking white bass was 6.6% (Table 4). Directed fishing effort was 2,054 hours in 2010 following extreme fluctuations from 260 h in 2008 to 5,191 h in 2009 (Table 8). Total harvest for white bass was 1,843 fish in 2010. Anglers released 5% to 43% of legal-sized fish. Observed harvest in 2010 showed angler compliance with harvest regulations as no fish <10 inches was documented in the creel (Figure 8).

Smallmouth bass: The electrofishing catch rate of smallmouth bass was 8.0/h in 2010 (Figure 9); similar to the catch rates in 2008 (10.7/h) and 2009 (6.7/h). Prior to the beginning of the drought in 2000, electrofishing catch rates were typically 40-70/h. There was little directed effort toward smallmouth bass from 2008 to 2010 with less than 1% of anglers seeking this species each year (Table 4). Estimated angler harvest increased to 101 fish in 2010 (Table 9). Directed effort for smallmouth bass has typically been very low, and only two harvested smallmouth bass were observed during the 2010 creel period (Figure 10).

Largemouth bass: The electrofishing catch rate of largemouth bass was 4.0/h in 2010 and has remained at less than 10/h since 2008 (Figure 11). Largemouth bass was not a highly sought species as only 4.8% of anglers sought this species in 2010 though this is the highest percentage since 2007 (Table 4). Directed fishing effort for largemouth bass increased in 2010 to 1,484 h which was the highest level since 2007 (Table 10). No largemouth bass were documented as harvested or released during creel surveys so estimated catch and harvest are all zero.

White crappie: The trap net catch rate of white crappie was 9.5/nn in 2010 and has increased each year since 2008 (Figure 12). A large percentage of the sampled population was legal size (10 inches) in 2010 as indicated by a PSD-P of 44. The relative weight of white crappie less than 9 inches was below 90 while those 9 inches and larger were above 90 (Figure 12). The percent of anglers seeking crappie has been less than 10 since 2007 except in 2008 when it increased to 23.2% (Table 4). Directed effort for white crappie declined from 5,164 h in 2008 to 2,268 h in 2010 (Table 11). Estimated total harvest declined from 3,731 fish in 2007 to 857 fish in 2010 (Table 11). Most white crappie harvested in 2010 were 11 inches (Figure 13).

Walleye: The gill net catch rate of walleye was 15.0/nn in 2011 and had improved from 4.5/nn in 2010 (Figure 14). The PSD-16 was good at 66. Mean relative weight was under 90 for all size classes in 2011 and was lower than values observed in 2009 and 2010 (Figure 14). Electrofishing surveys indicated continued reproduction (Figure 15) even though most known spawning structure is now out of the water due to drought. Walleye were still the most sought species by anglers at 22.1%, but this is the lowest percentage in the last four years (Table 4) and is now only 3.5 percentage points ahead of channel catfish. Directed effort for walleye in 2010 was the lowest since 2007 at 6,886 h (Table 12). Angler catch rate was 0.36/h in 2010 and no legal fish were documented as being released (Table 12). Most of the documented harvest was fish from 15-17 inches (Figure 16). Some walleye reached 16 inches in total length by age 2, and all were 16 inches by age 4 (Figure 17). Young-of-the-year walleye were collected in fall electrofishing samples, but no one-year-old fish were collected in gill nets indicating the smaller fish may have been impacted by the golden alga bloom from December, 2010 to March, 2011.

Fisheries management plan for Meredith Reservoir, Texas

Prepared – July 2011.

ISSUE 1: Drought conditions have dramatically changed available habitat in the reservoir and have increased chlorides. Current estimates from the Canadian River Municipal Water Authority indicate the reservoir had 40,000 acre-feet of water in March, 2011. Their management plan is to pump 5,000 acre-feet in summer 2011 and the reservoir is expected to lose another 20,000 acre-feet to evaporation over the next year. February water analysis indicates chlorides were 927 ppm and specific conductance was 3,768 µmhos/cm. Calculated salinity was 2.9 ppt. Evaporation loss will result in increased chlorides.

MANAGEMENT STRATEGY

1. Conduct detailed habitat mapping of the reservoir basin while water levels are low and substrate is visible.
2. Investigate impact of increased chlorides on sport fish populations through standard sampling.

ISSUE 2: Meredith Reservoir experienced its first bloom of golden alga on 12/20/2010. The bloom continued through 3/23/2011. The majority of fish killed were gizzard shad and catfish species. High chlorides and low water levels may increase the incidence of golden alga blooms.

MANAGEMENT STRATEGIES

1. Monitor reservoir for repeat golden alga blooms.
2. Monitor impact of golden alga on sport fish populations through standard sampling.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (Dreissena polymorpha) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state. Analysis of zebra mussel risk to Meredith Reservoir indicated it is at high risk due to location between infested reservoirs, environmental conditions and angler traffic between infested reservoirs in adjacent states and Texas. Current low water conditions and high chlorides have reduced the risk of infestation, but inflows could return the reservoir to high risk.

MANAGEMENT STRATEGIES

1. Monitor reservoir water quality for conditions favorable to zebra mussels.
2. Finalize the Meredith Zebra Mussel Response Plan with the National Park Service and the Canadian River Municipal Water Authority.
3. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
4. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
5. Educate the public about invasive species through the use of media and the internet.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes trap net sampling in 2012 and 2014. Electrofishing, gill netting, and creel surveys are conducted every year. Creel surveys will be reduced to spring quarter only until water levels increase. Sampling with all gears is conducted in 2012/2013 and 2014/2015 (Table 13).

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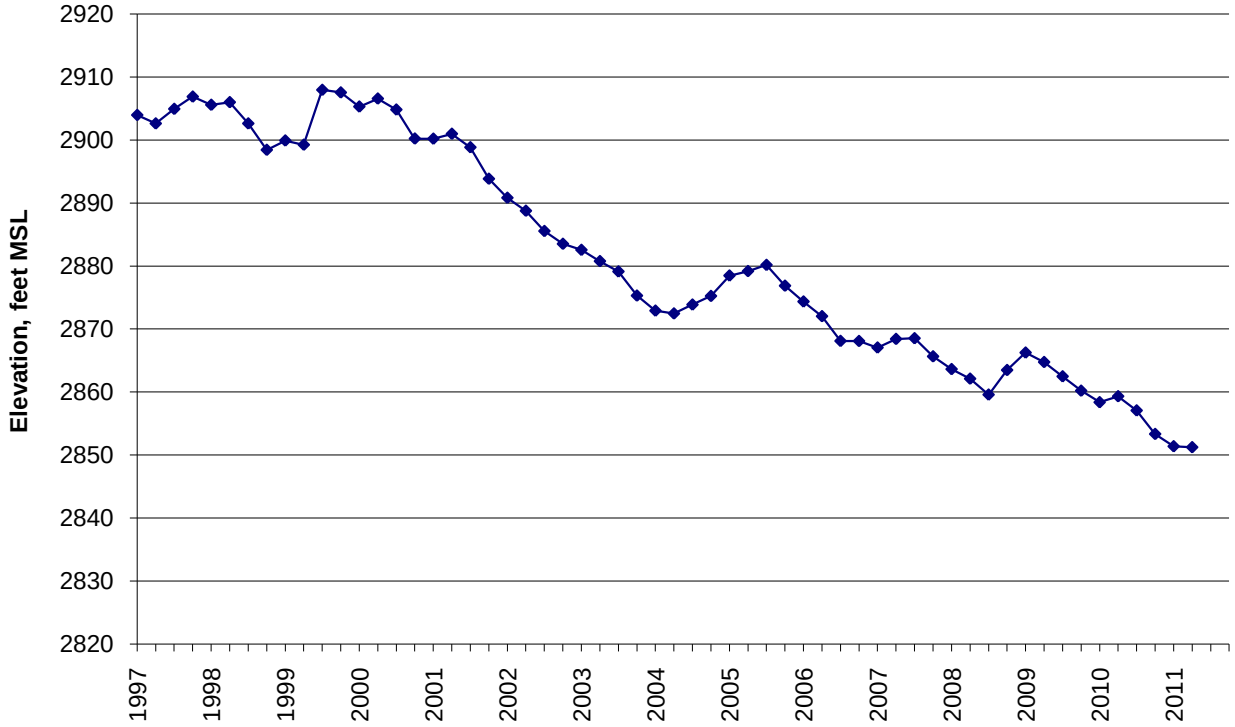


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Meredith Reservoir, Texas. Conservation pool is 2,941 ft MSL.

Table 1. Characteristics of Meredith Reservoir, Texas.

Characteristic	Description
Year constructed	1965
Controlling authority	Canadian River Municipal Water Authority
Counties	Hutchinson, Moore, Potter
Reservoir type	Mainstream
Shoreline Development Index (SDI)	5.05
Conductivity	3,768 µmhos/cm

Table 2. Harvest regulations for Meredith Reservoir.

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, smallmouth	5	12 – 15 Slot Limit
Bass, largemouth	5	14 – No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 – No Limit
Walleye	5	No more than 2 under 16

Table 3. Stocking history of Meredith Reservoir, Texas. Size Categories are: FRY =<1 inch, FGL = 1-3 inches, and ADL = adults.

Species	Year	Number	Size	Species	Year	Number	Size
Rainbow trout	1973	50,000	ADL	Florida largemouth bass	1986	631	ADL
					1990	401,749	FGL
Brown trout	1973	30,000	ADL		1993	100,000	FGL
					Total	502,380	
Blue catfish	1965	2,500	FGL				
	1966	9,000	FGL	Florida largemouth bass hybrid	2001	32,000	FGL
	1971	12,000	FGL				
	1972	30,000	FGL	Kemp's largemouth bass	1988	412,727	FGL
	1988	160,500	FRY		1990	189	ADL
	Total	214,000			Total	412,916	
Channel catfish	1965	421,500	FGL	Mixed largemouth bass	1989	197	ADL
	1966	360,000	FGL		1990	40	ADL
	1970	9,680	FGL		Total	237	
	1971	12,000	FGL				
	1973	107,690	FGL	Crappie	1994	308	ADL
	Total	910,870					
				White crappie	1965	125,000	FRY
Flathead catfish	1966	15,000	FGL		1965	258	ADL
	1966	18	ADL		1966	50,000	FGL
	Total	15,018			Total	175,258	
White bass	1965	15	ADL	Black crappie	1966	150,000	FGL
Smallmouth bass	1974	11,100	FGL	Yellow perch	1980	2,500	ADL
	1975	28,000	FGL		1981	2,500	ADL
	1976	66,000	FGL		1983	2,212	ADL
	1977	322,700	FGL		1984	400	ADL
	Total	427,800			1992	165,116	FGL
					1995	30,381	FGL
Largemouth bass	1965	480,000	FGL		Total	203,109	
	1966	432,000	FGL				
	1973	61,000	FGL	Walleye	1965	500,000	FRY
	1973	27,000	ADL		1966	2,000,000	FRY
	1983	553	ADL		1969	750,000	FRY
	1994	286,400	FGL		1998	5,096,000	FRY
	1995	586,663	FGL		2000	290,196	FGL
	1997	177,000	FGL		Total	8,636,196	
	2000	20,370	FGL				
	Total	2,070,986					

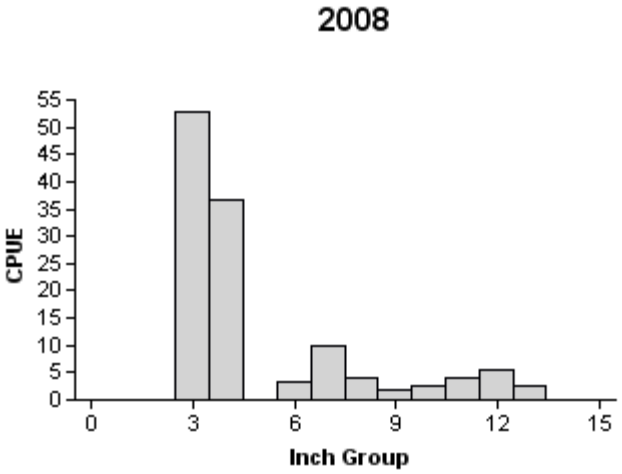
Table 4. Percent of anglers seeking each species as determined by angler surveys on Meredith Reservoir, Texas, April through September, 2007 – 2010.

Species	Year			
	2007	2008	2009	2010
Common carp	0.2		0.5	
Channel catfish	5.5	10.9	8.1	18.6
White bass	5.3	1.2	10.7	6.6
Bluegill	0.7			
Smallmouth bass		0.7	0.9	0.6
Largemouth bass	1.9	2.5	2.1	4.8
White crappie	8.9	23.2	6.5	7.3
Walleye	26.0	35.0	29.0	22.1
Anything	40.2	19.2	40.0	38.7
Black bass	6.2	3.4	0.6	0.8
Catfishes	5.1	3.9	1.7	0.6

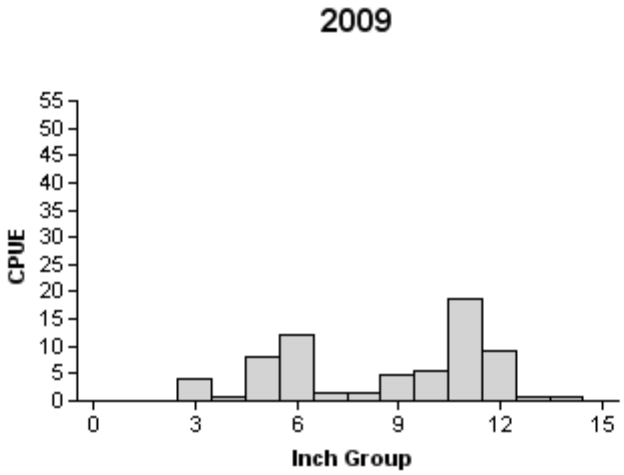
Table 5. Total fishing effort (h) for all species and total directed expenditures in US dollars at Meredith Reservoir, Texas, April through September, 2007-2010. RSE is in parentheses.

	Year			
Creel Statistic	2007	2008	2009	2010
Total fishing effort	46,303.8 (16)	22,264.1 (17)	48,561.3 (15)	31,158.9 (17)
Total directed expenditures ($)	199,446 (82)	115,757 (43)	206,281 (48)	110,286 (41)

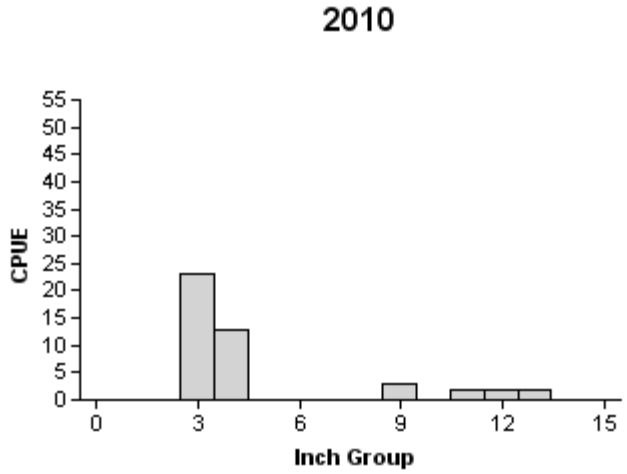
Gizzard Shad



Effort = 1.5
Total CPUE = 123.3 (52; 185)
Stock CPUE = 30.7 (36; 46)
PSD = 39 (12)
IOV = 83 (7)



Effort = 1.5
Total CPUE = 66.7 (15; 100)
Stock CPUE = 42.0 (24; 63)
PSD = 70 (6)
IOV = 39 (11)



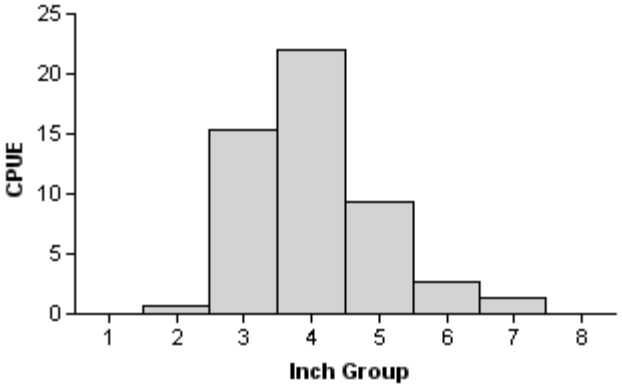
Effort = 1.0
Total CPUE = 45.0 (33; 45)
Stock CPUE = 9.0 (47; 9)
PSD = 67 (22)
IOV = 80 (10)

Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2008, 2009, and 2010. RSE is used for CPUE values and SE is used for PSD and IOV values.

Bluegill

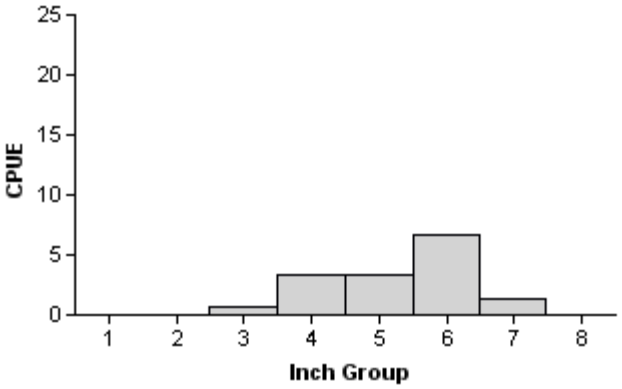
2008

Effort = 1.5
Total CPUE = 51.3 (29; 77)
Stock CPUE = 50.7 (69; 76)
PSD = 8 (2)



2009

Effort = 1.5
Total CPUE = 15.3 (27; 23)
Stock CPUE = 15.3 (69; 23)
PSD = 52 (10)



2010

Effort = 1.0
Total CPUE = 2.0 (67; 2)
Stock CPUE = 2.0 (100; 2)
PSD = 0 (0)

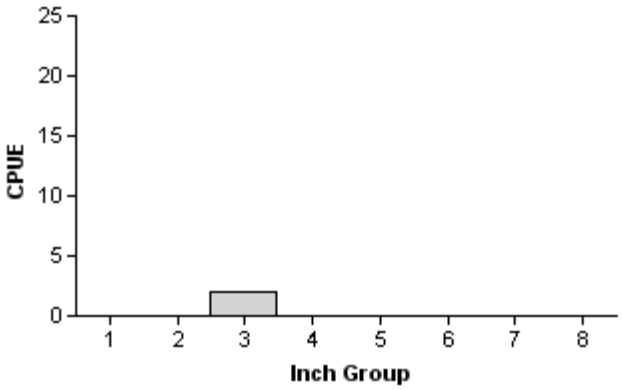


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2008, 2009, and 2010. RSE is used for CPUE values.

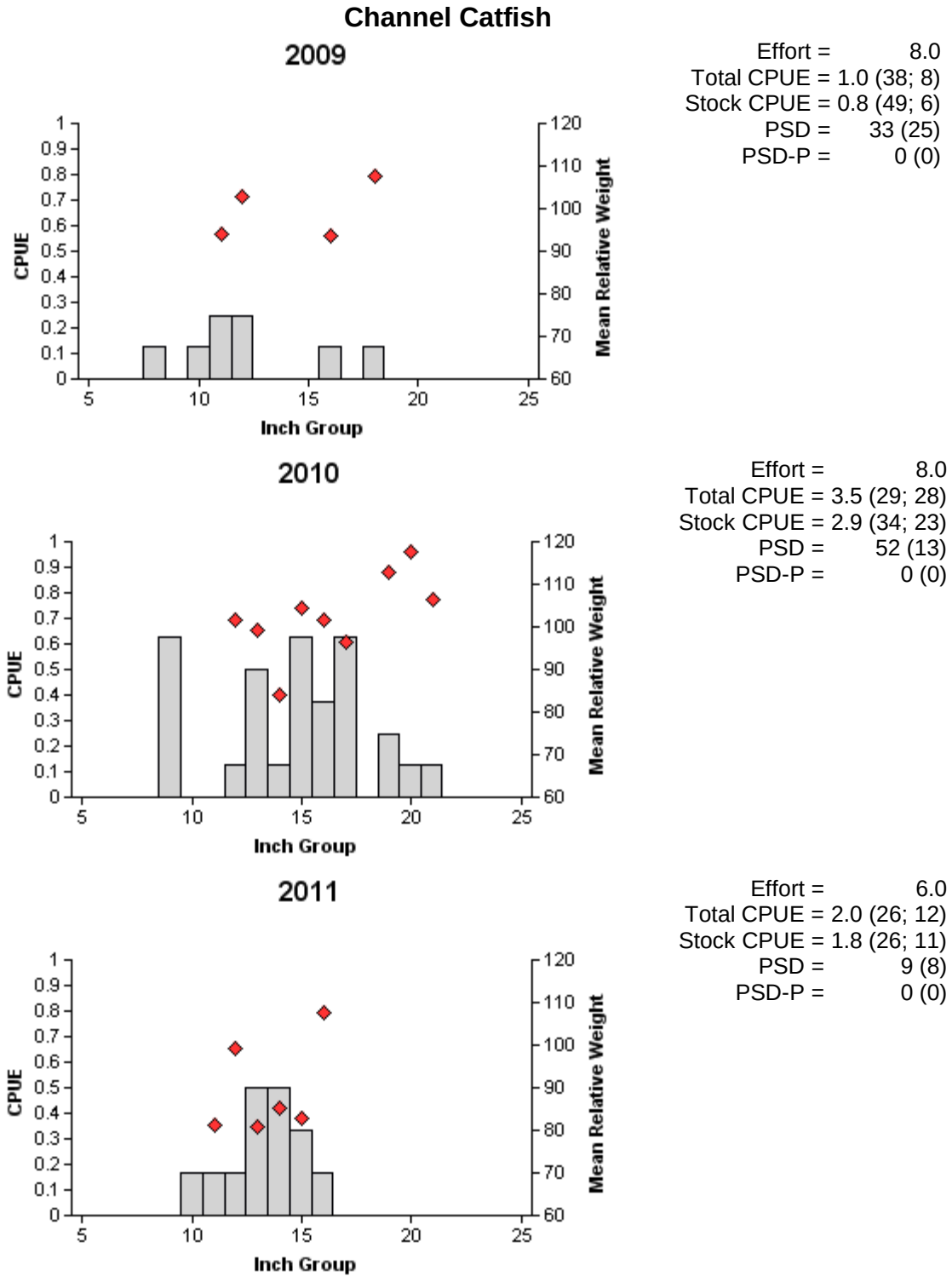


Figure 4. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Meredith Reservoir, Texas, 2009, 2010, and 2011. RSE is used for CPUE values and SE is used for PSD values.

Channel Catfish

Table 6. Creel survey statistics for channel catfish at Meredith Reservoir from April through September for 2007 to 2010, where total catch per hour is for anglers targeting channel catfish and total harvest is the estimated number of channel catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses. Meredith Reservoir was 5,650 acres in 2007, 4,144 acres in 2008, 5,000 acres in 2009, and 4,200 acres in 2010.

	Year			
Creel Survey Statistic	2007	2008	2009	2010
Directed effort (h)	2,558.03 (36)	2,437.29 (41)	3,931.12 (31)	5,785.47 (24)
Directed effort/acre	0.45 (36)	0.59 (41)	0.79 (31)	1.38 (24)
Total catch per hour	0.32 (61)	0.36 (35)	0.19 (96)	0.37 (52)
Total harvest	898 (75)	1,335 (48)	1,505 (49)	1,518 (45)
Harvest/acre	0.16 (75)	0.32 (48)	0.30 (49)	0.36 (45)
Percent legal released	27	0	12	21

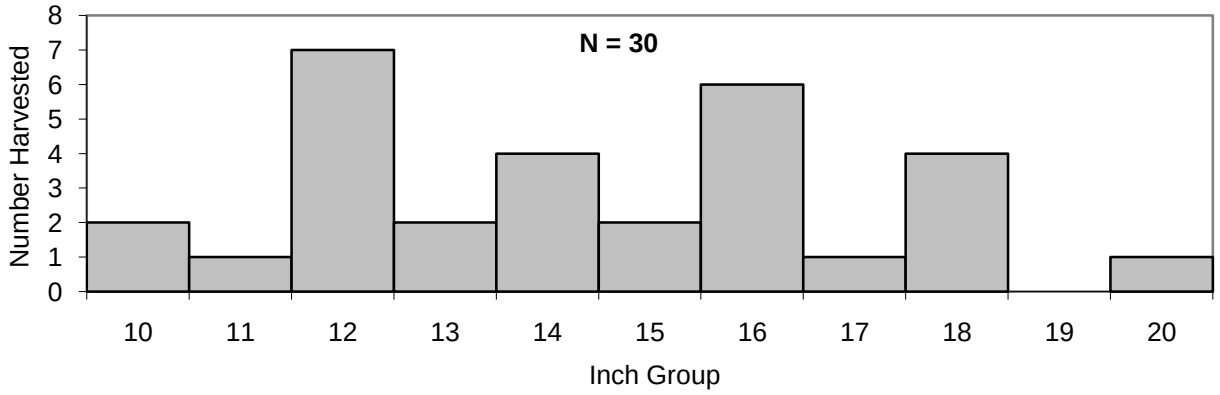
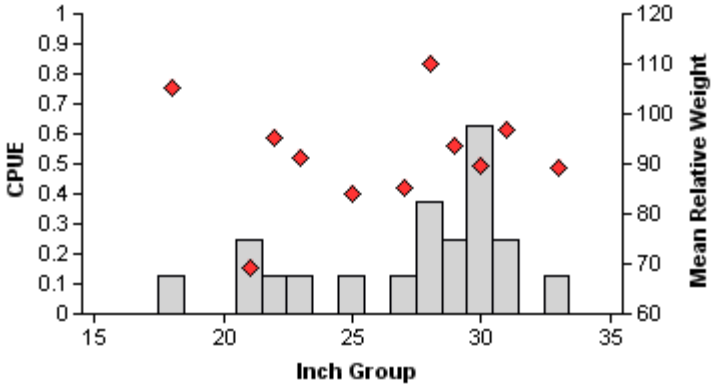


Figure 5. Length frequency of harvested channel catfish observed during creel surveys at Meredith Reservoir, Texas, April through September 2010, all anglers combined. N is the number of harvested channel catfish observed during creel surveys.

Flathead Catfish

Effort = 8.0
Total CPUE = 1.5 (22; 12)
Stock CPUE = 1.5 (22; 12)
PSD = 83 (9)
PSD-P = 42 (12.6)



Effort = 8.0
Total CPUE = 2.5 (20; 20)
Stock CPUE = 2.5 (20; 20)
PSD = 95 (5)
PSD-P = 65 (7.8)

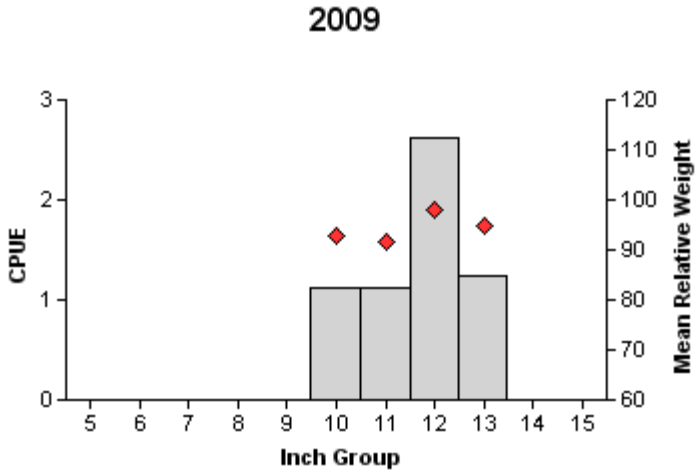
Figure 6. Number of flathead catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Meredith Reservoir, Texas, 2009 and 2010. No flathead catfish were collected in 2011 gill net surveys. RSE is used for CPUE values and SE is used for PSD values.

Flathead Catfish

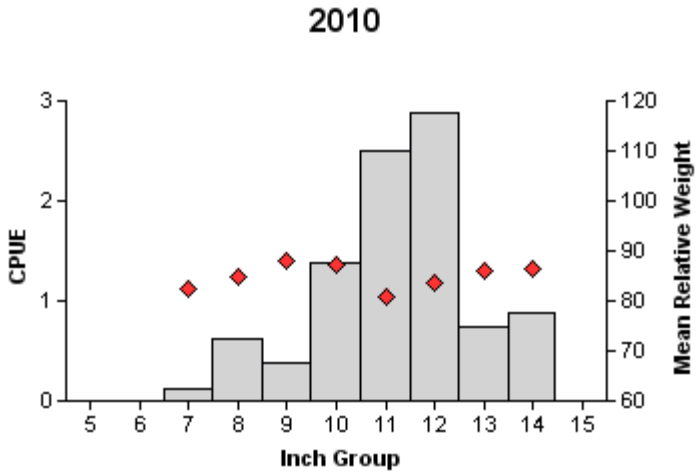
Table 7. Creel survey statistics for flathead catfish at Meredith Reservoir from April through September for 2007 to 2010, where total catch per hour is for anglers targeting flathead catfish and total harvest is the estimated number of flathead catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses. Meredith Reservoir was 5,650 acres in 2007, 4,144 acres in 2008, 5,000 acres in 2009, and 4,200 acres in 2010.

	Year			
Creel Survey Statistic	2007	2008	2009	2010
Directed effort (h)	0.0 (.)	0.0 (.)	0.0 (.)	0.0 (.)
Directed effort/acre	0.0 (.)	0.0 (.)	0.0 (.)	0.0 (.)
Total catch per hour	0.0 (.)	0.0 (.)	0.0 (.)	0.0 (.)
Total harvest	43 (636)	0 (.)	60 (788)	0 (.)
Harvest/acre	<0.01 (636)	0.00 (.)	0.00 (.)	0.00 (.)
Percent legal released	0	0	0	0

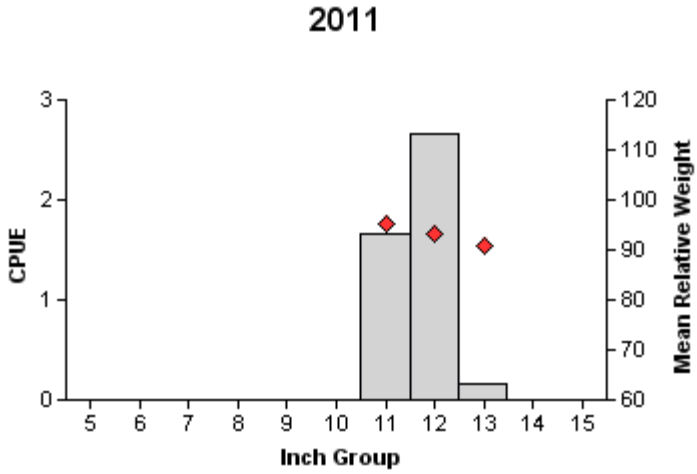
White Bass



Effort = 8.0
Total CPUE = 6.1 (33; 49)
Stock CPUE = 6.1 (33; 49)
CPUE-10 = 6.1 (33; 49)
PSD = 100 (0)
PSD-P = 63 (12)
PSD-10 = 100 (0)



Effort = 8.0
Total CPUE = 9.5 (39; 76)
Stock CPUE = 9.5 (39; 76)
CPUE-10 = 8.4 (46; 67)
PSD = 92 (7)
PSD-P = 47 (5)
PSD-10 = 88 (8)



Effort = 6.0
Total CPUE = 4.5 (78; 27)
Stock CPUE = 4.5 (78; 27)
CPUE-10 = 4.5 (78; 27)
PSD = 100 (0)
PSD-P = 63 (10)
PSD-10 = 100 (0)

Figure 7. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Meredith Reservoir, Texas, 2009, 2010, and 2011. RSE is used for CPUE values and SE is used for PSD values.

White Bass

Table 8. Creel survey statistics for white bass at Meredith Reservoir from April through September for 2007 to 2010, where total catch per hour is for anglers targeting white bass and total harvest is the estimated number of white bass harvested by all anglers. Relative standard errors (RSE) are in parentheses. Meredith Reservoir was 5,650 acres in 2007, 4,144 acres in 2008, 5,000 acres in 2009, and 4,200 acres in 2010.

	Year			
Creel Survey Statistic	2007	2008	2009	2010
Directed effort (h)	2,465.02 (35)	259.91 (95)	5,190.78 (31)	2,054.50 (35)
Directed effort/acre	0.44 (35)	0.06 (95)	1.04 (31)	0.49 (35)
Total catch per hour	0.78 (86)	0.00 (.)	1.81 (111)	0.31 (115)
Total harvest	3,516 (36)	1,717 (42)	6,631 (42)	1,843 (45)
Harvest/acre	0.62 (36)	0.41 (42)	1.33 (42)	0.44 (45)
Percent legal released	43	24	5	11

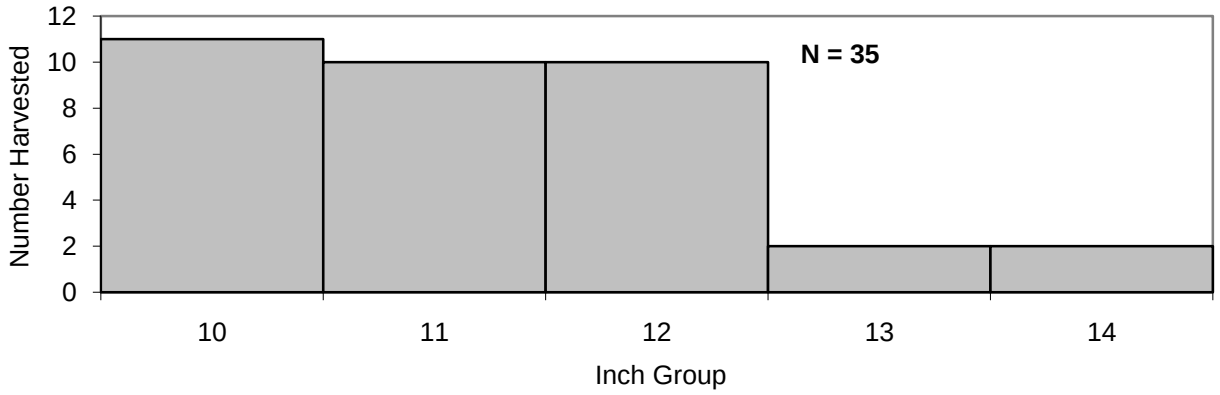


Figure 8. Length frequency of harvested white bass observed during creel surveys at Meredith Reservoir, Texas, April through September 2010, all anglers combined. N is the number of harvested white bass observed during creel surveys.

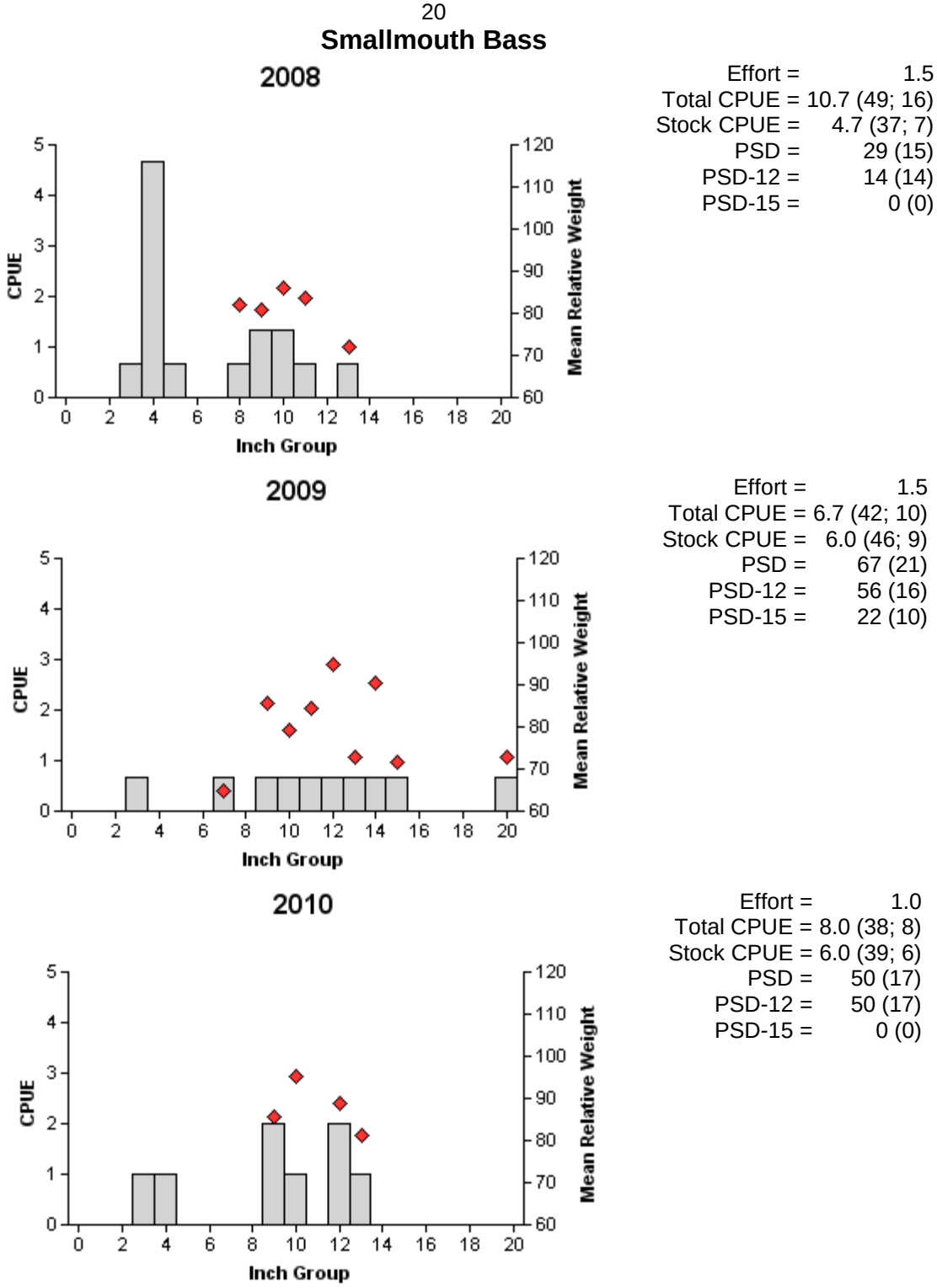


Figure 9. Number of smallmouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2008, 2009, and 2010. RSE is used for CPUE values and SE is used for PSD values.

Smallmouth Bass

Table 9. Creel survey statistics for smallmouth bass at Meredith Reservoir from April through September for 2007 to 2010, where total catch per hour is for anglers targeting smallmouth bass and total harvest is the estimated number of smallmouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses. Meredith Reservoir was 5,650 acres in 2007, 4,144 acres in 2008, 5,000 acres in 2009, and 4,200 acres in 2010.

	Year			
Creel Survey Statistic	2007	2008	2009	2010
Directed effort (h)	0.0 (.)	146.93 (145)	431.08 (101)	186.16 (116)
Directed effort/acre	0.00 (.)	0.04 (145)	0.09 (101)	0.04 (116)
Total catch per hour	0.00 (.)	0.00 (.)	0.09 (.)	0.86 (.)
Total harvest	43 (333)	34 (400)	10 (342)	101 (297)
Harvest/acre	<0.01 (333)	<0.01 (400)	<0.01 (342)	0.02 (297)
Percent legal released	85	27*	100	55

*All fish released were below the slot length limit.

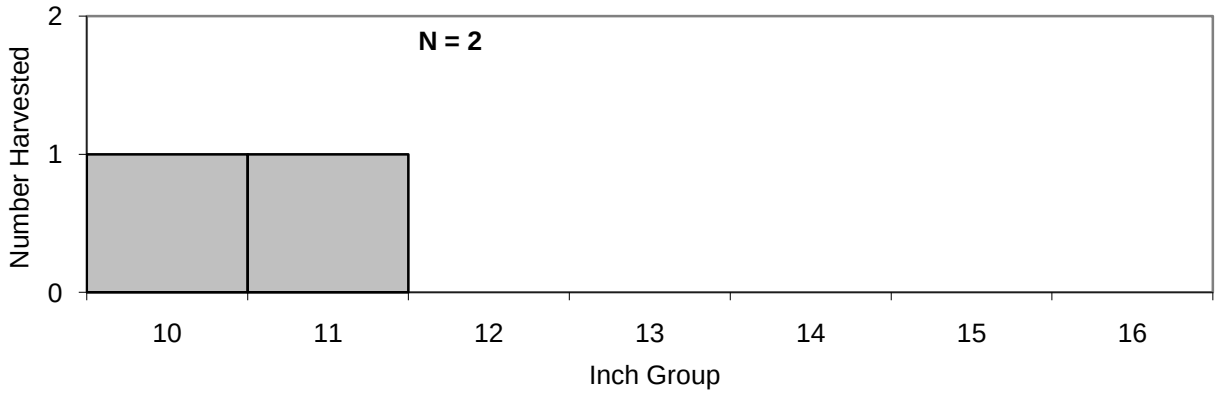


Figure 10. Length frequency of harvested smallmouth bass observed during creel surveys at Meredith Reservoir, Texas, April through September 2010, all anglers combined. N is the number of harvested smallmouth bass observed during creel surveys.

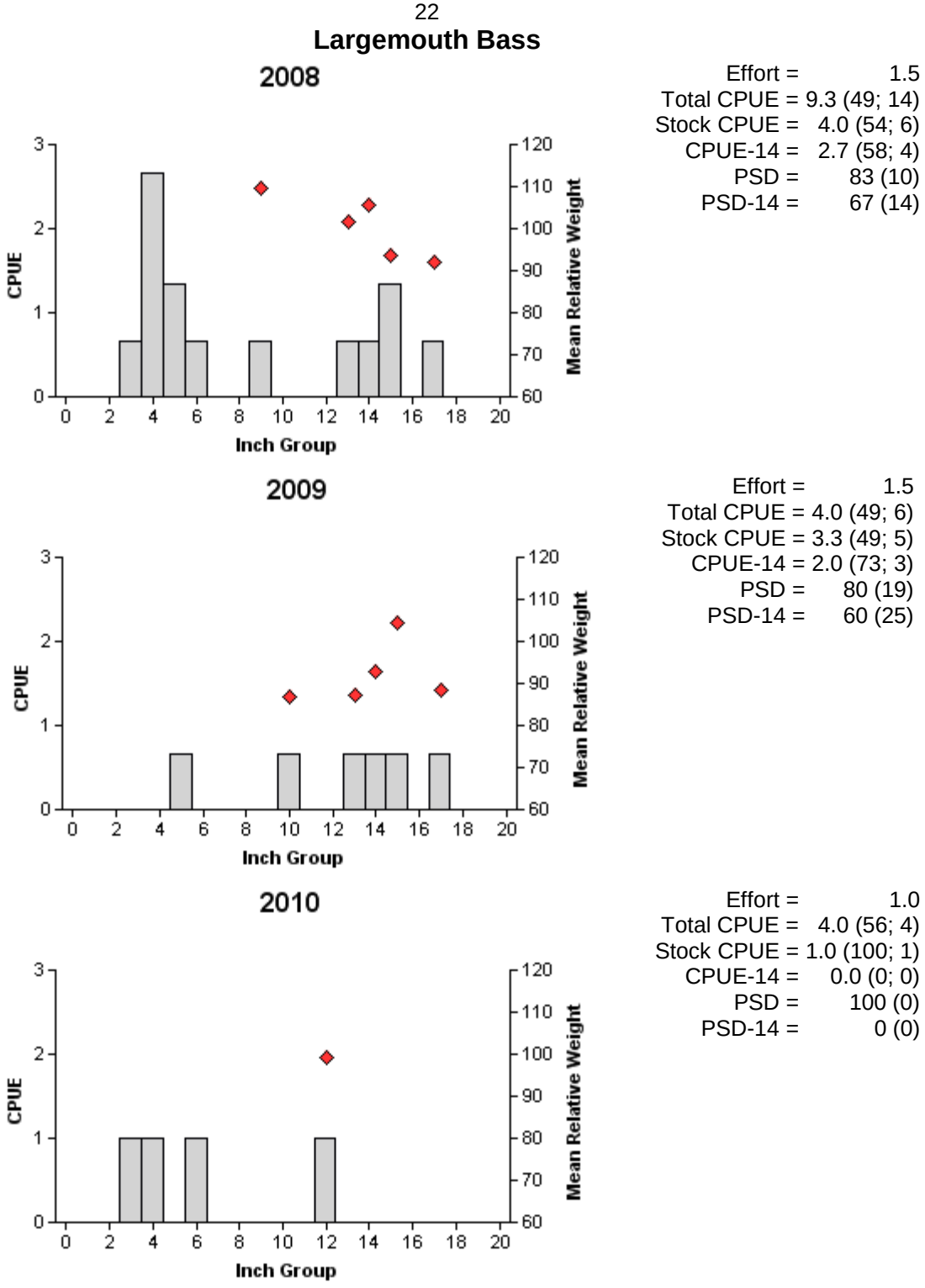


Figure 11. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2008, 2009, and 2010. RSE is used for CPUE values and SE is used for PSD values.

Largemouth Bass

Table 10. Creel survey statistics for largemouth bass at Meredith Reservoir from April through September for 2007 to 2010, where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses. Meredith Reservoir was 5,650 acres in 2007, 4,144 acres in 2008, 5,000 acres in 2009, and 4,200 acres in 2010.

	Year			
Creel Survey Statistic	2007	2008	2009	2010
Directed effort (h)	865.47 (58)	559.85 (63)	1,011.14 (62)	1,484.28 (40)
Directed effort/acre	0.15 (58)	0.14 (63)	0.20 (62)	0.35 (40)
Total catch per hour	0.03 (135)	0.29 (131)	0.00 (.)	0.00 (.)
Total harvest	0 (387)	41 (400)	0 (.)	0 (.)
Harvest/acre	0.00 (387)	<0.01 (400)	0.00 (.)	0.00 (.)
Percent legal released	43	30	0	0

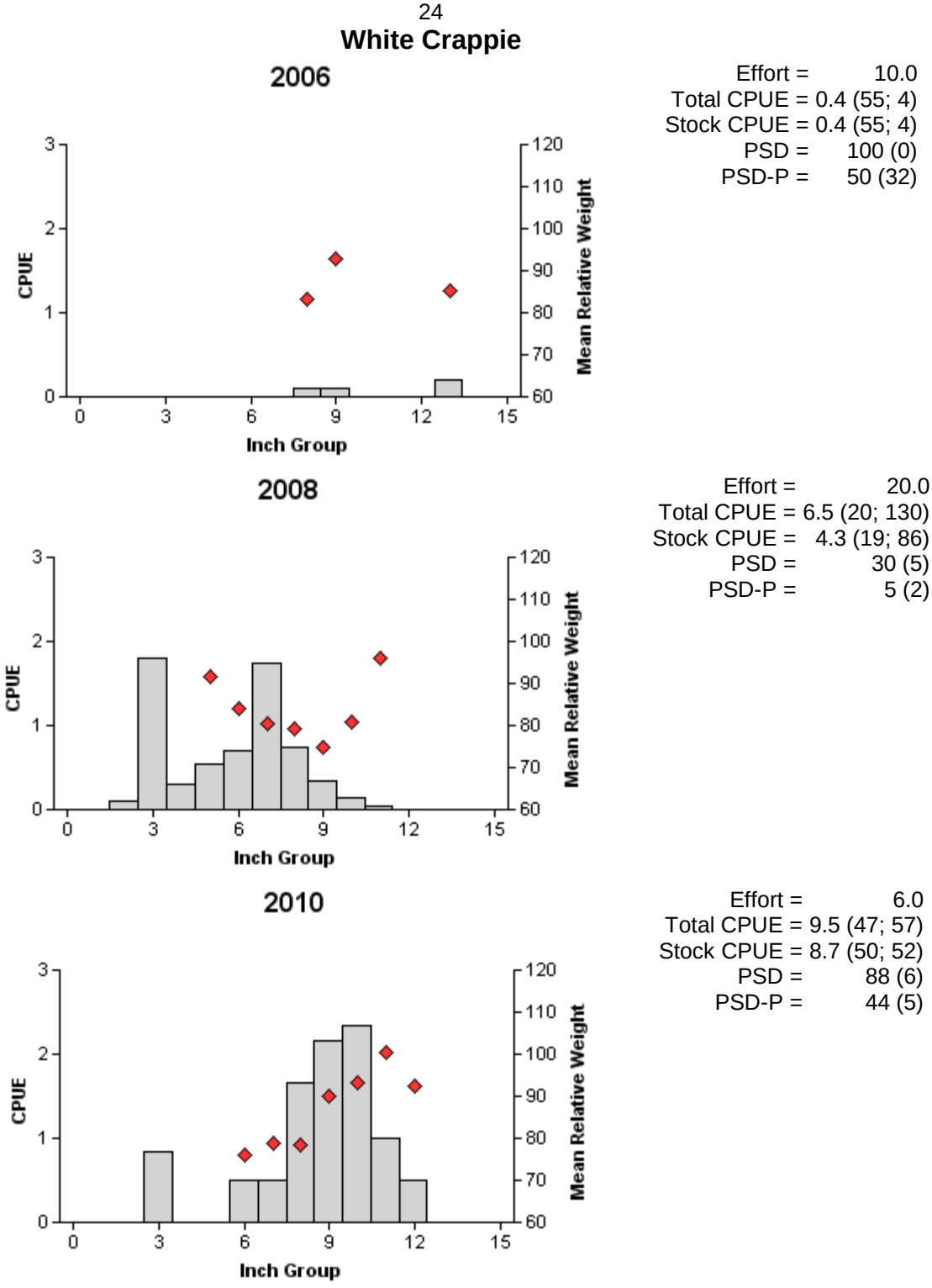


Figure 12. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall trap net surveys, Meredith Reservoir, Texas, 2006, 2008, and 2010. RSE is used for CPUE values and SE is used for PSD values.

White Crappie

Table 11. Creel survey statistics for white crappie at Meredith Reservoir from April through September for 2007 to 2010, where total catch per hour is for anglers targeting white crappie and total harvest is the estimated number of white crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses. Meredith Reservoir was 5,650 acres in 2007, 4,144 acres in 2008, 5,000 acres in 2009, and 4,200 acres in 2010.

	Year			
Creel Survey Statistic	2007	2008	2009	2010
Directed effort (h)	4,123.76 (31)	5,164.29 (28)	3,174.17 (36)	2,267.76 (38)
Directed effort/acre	0.73 (31)	1.25 (28)	0.64 (36)	0.54 (38)
Total catch per hour	1.28 (69)	0.60 (74)	1.70 (50)	2.08 (26)
Total harvest	3,731 (32)	1,727 (47)	519 (59)	857 (55)
Harvest/acre	0.66 (32)	0.42 (47)	0.10 (59)	0.204 (55)
Percent legal released	<1	0	1	3

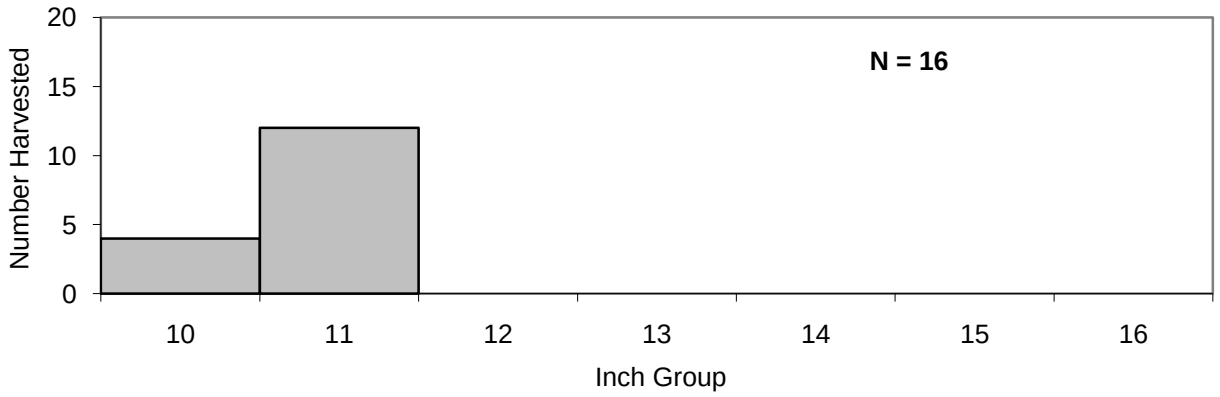


Figure 13. Length frequency of harvested white crappie observed during creel surveys at Meredith Reservoir, Texas, April through September 2010, all anglers combined. N is the number of harvested white crappie observed during creel surveys.

Walleye

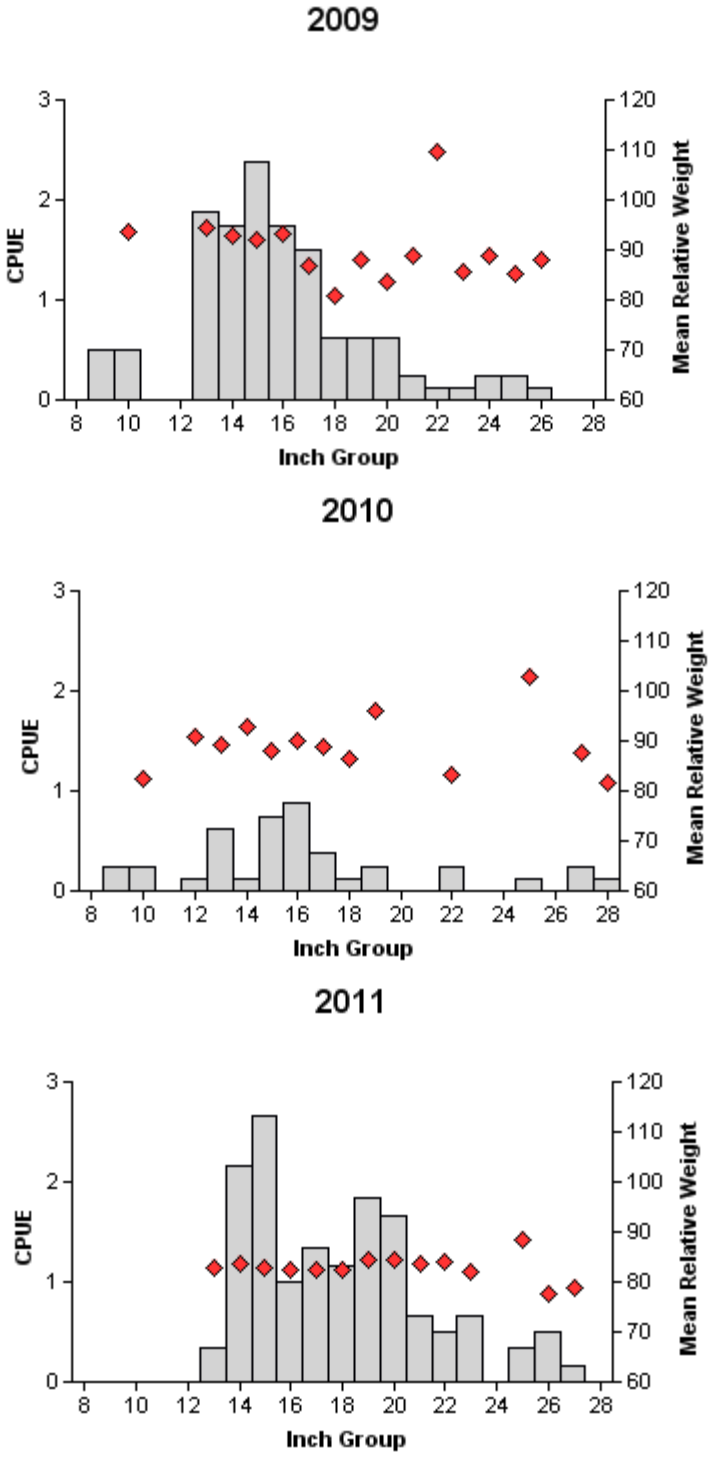


Figure 14. Number of walleye caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Meredith Reservoir, Texas, 2009, 2010, and 2011. RSE is used for CPUE values and SE is used for PSD values.

Walleye

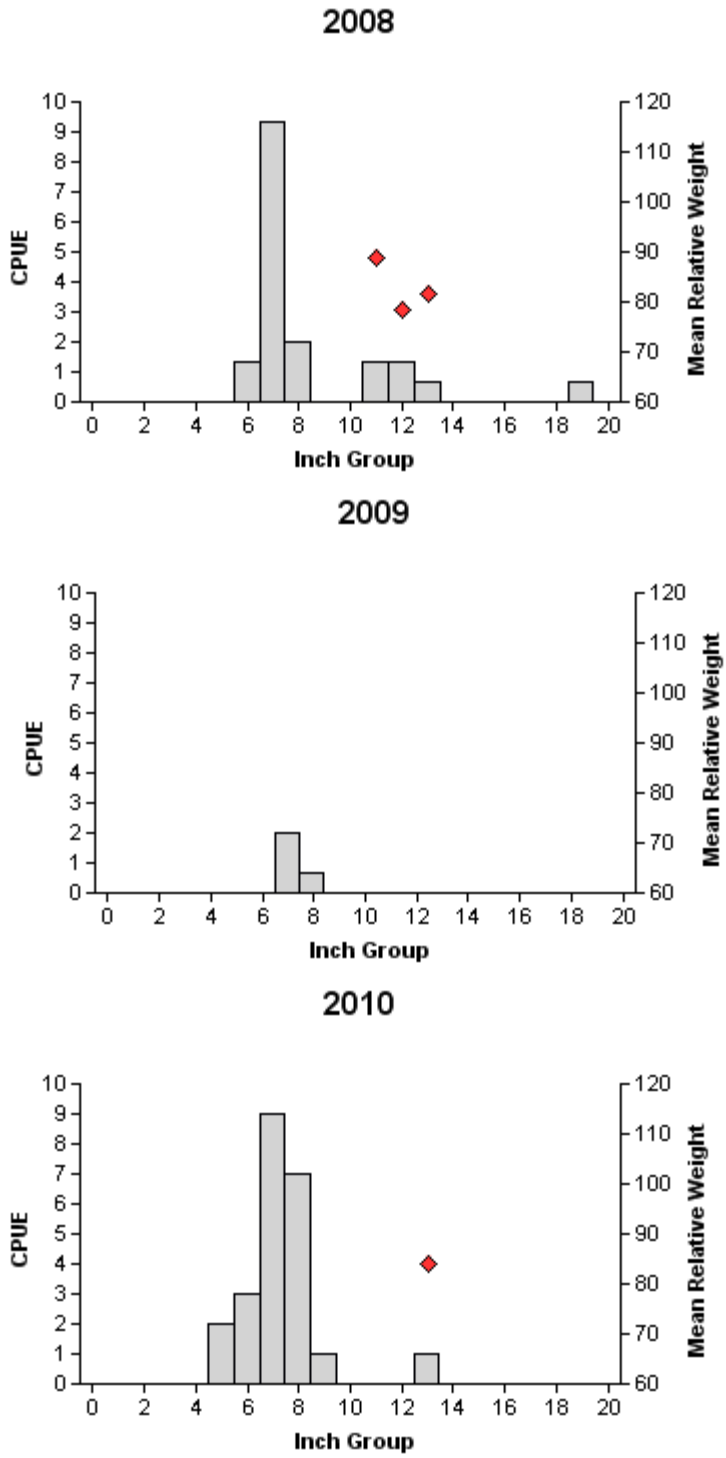


Figure 15. Number of walleye caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Meredith Reservoir, Texas, 2008, 2009, and 2010. RSE is used for CPUE values and SE is used for PSD values.

Walleye

Table 12. Creel survey statistics for walleye at Meredith Reservoir from April through September for 2007 to 2010, where total catch per hour is for anglers targeting walleye and total harvest is the estimated number of walleye harvested by all anglers. Relative standard errors (RSE) are in parentheses. Meredith Reservoir was 5,650 acres in 2007, 4,144 acres in 2008, 5,000 acres in 2009, and 4,200 acres in 2010.

	Year			
Creel Survey Statistic	2007	2008	2009	2010
Directed effort (h)	12,025.19 (23)	7,783.55 (24)	14,071.60 (22)	6,886.39 (23)
Directed effort/acre	2.13 (23)	1.88 (24)	2.81 (22)	1.64 (23)
Total catch per hour	0.37 (41)	0.16 (59)	0.09 (49)	0.36 (83)
Total harvest	2,409 (42)	1,240 (47)	512 (113)	1,109 (46)
Harvest/acre	0.43 (42)	0.30 (47)	0.10 (113)	0.26 (46)
Percent legal released*	4	0	7	0

*Only includes fish over 16 inches.

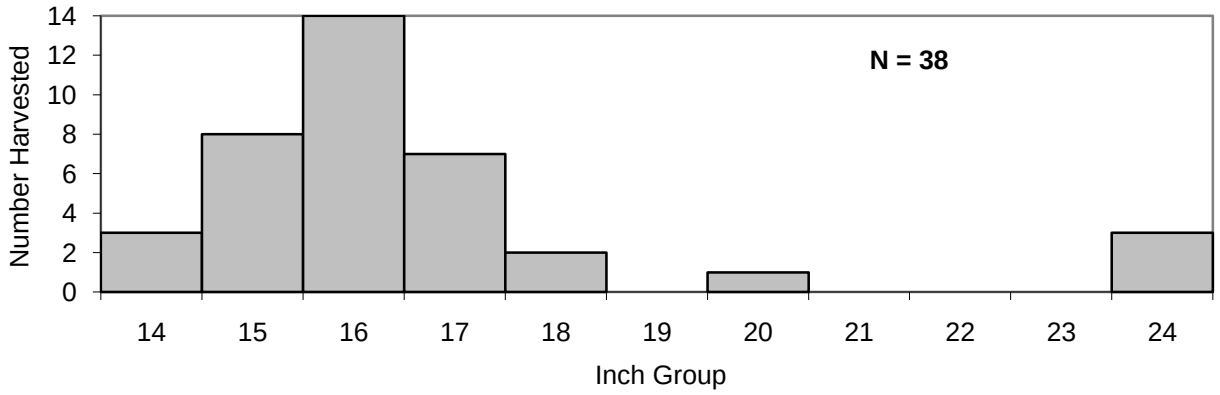


Figure 16. Length frequency of harvested walleye observed during creel surveys at Meredith Reservoir, Texas, April through September 2010, all anglers combined. N is the number of harvested walleye observed during creel surveys.

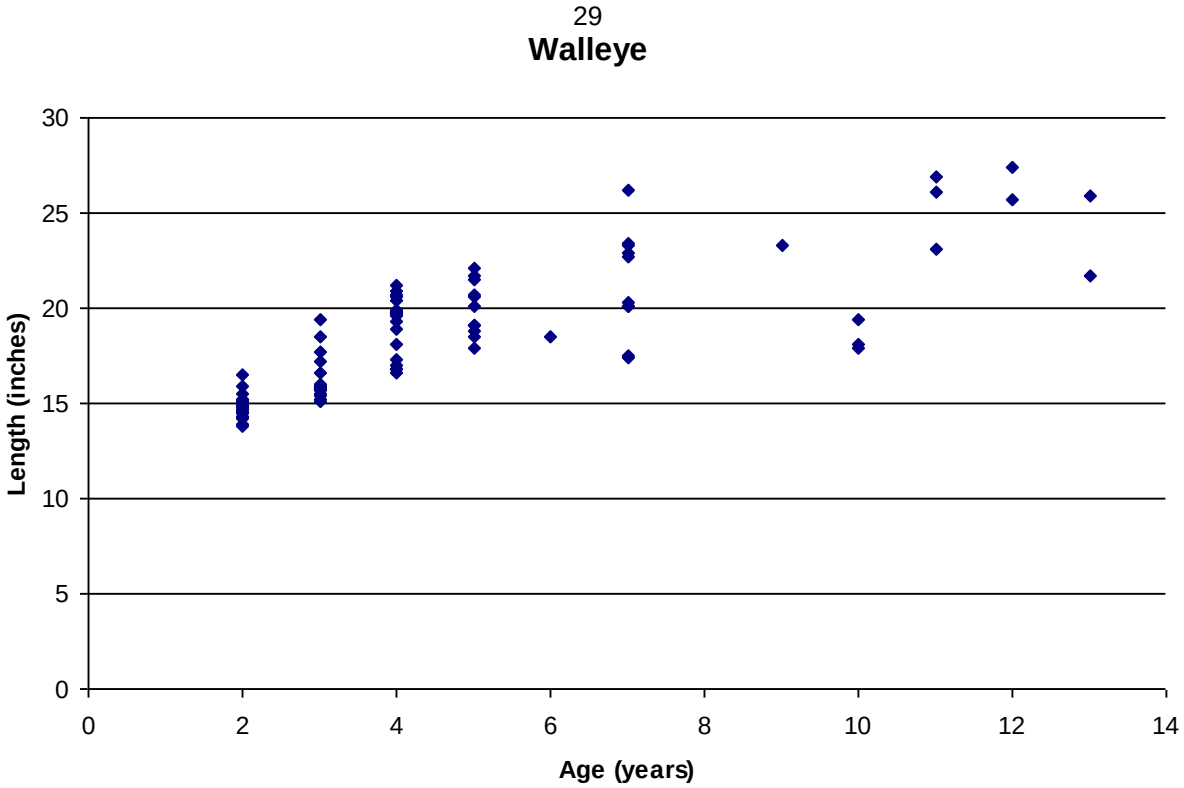


Figure 17. Length at age for walleye collected from gill nets at Meredith Reservoir, Texas, April 2011. Sample size was 90 fish.

Table 13. Proposed sampling schedule for Meredith Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. S denotes standard survey and A denotes additional survey. The creel survey will be 3 months from April through June.

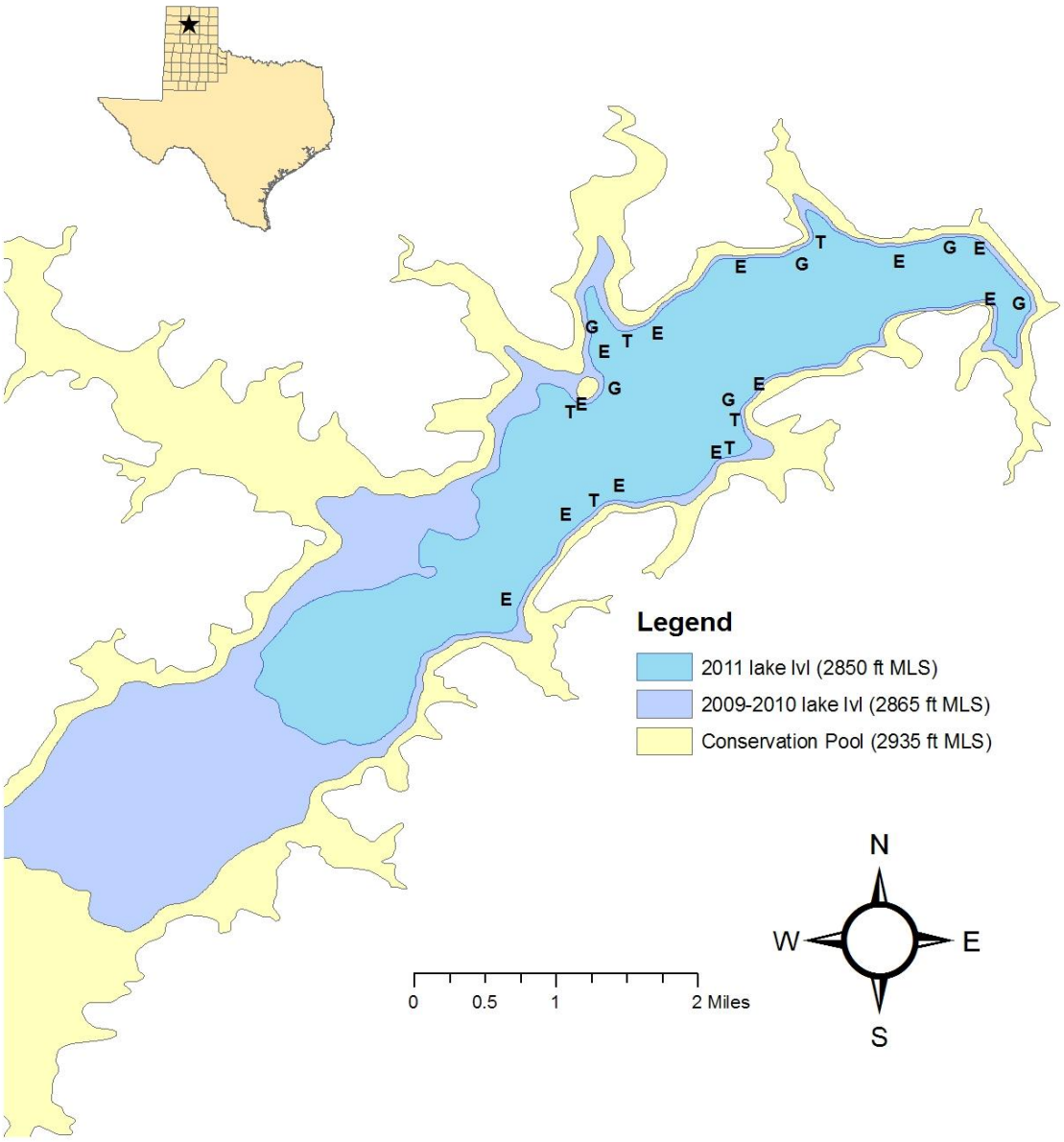
Survey Year	Electrofishing	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2011-Spring 2012	A		A	A	A		
Fall 2012-Spring 2013	A	A	A	A			A
Fall 2013-Spring 2014	A		A	A			
Fall 2014-Spring 2015	S	A	S	S	S	S	S

APPENDIX A

Catch rate of all species collected from all gear types from Meredith Reservoir, Texas, 2010-2011. Effort was 1.0 h for electrofishing, 6 net nights for gill nets, and 6 net nights for trap nets.

	Electrofishing		Gill Netting		Trap Netting	
Species	CPUE	N	CPUE	N	CPUE	N
Gizzard shad	45.0	45				
Common carp	5.0	5	2.8	17		
River carpsucker	11.0	11	7.8	47		
Channel catfish	16.0	16	2.0	12	0.2	1
White bass	72.0	72	4.5	27	0.3	2
Green sunfish	1.0	1				
Bluegill	2.0	2			3.5	21
Longear sunfish	12.0	12			3.5	21
Smallmouth bass	8.0	8				
Largemouth bass	4.0	4				
White crappie	1.0	1			9.5	57
Walleye	23.0	23	15.0	90	0.2	1

APPENDIX B



Location of sampling sites, Meredith Reservoir, Texas, 2010-2011. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. The 2011 lake level indicates approximate elevation at time of sampling.