Fort Gibson Lake Management Plan

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BACKGROUND

Fort Gibson Lake is a 19,900 acre reservoir located in Wagoner, Mayes, and Cherokee counties in northeast Oklahoma (Figure 1). This reservoir impounds the Grand (Neosho) River approximately 7.7 miles above its confluence with the Arkansas River, and about 5 miles northwest of the town of Fort Gibson, Oklahoma. The dam is located at: Longitude: 95°13'43", Latitude: 35° 52' 16". Fort Gibson Lake is owned and operated by the U.S. Army Corps of Engineers (USACE), and was authorized by the Flood Control Act approved August 18, 1941. Construction began in 1942. The project became fully operational in September 1953 for flood control and hydroelectric power. The watershed consists of approximately 12,492 square miles of runoff that originate in, and flow across multiple states including Arkansas, Kansas, Missouri, and Oklahoma. The eastern portion of the Fort Gibson Lake watershed is made up of the Ozark Plateau. The western portion of the watershed is indicative of the Prairie Plains. Table 1 contains a list of physical and chemical characteristics of Fort Gibson Lake.

HABITAT

Shoreline habitat in Fort Gibson Lake is primarily comprised of rock and gravel. Additional habitat includes man-made structures such as rip-rap, brush piles, and boat docks. Little aquatic vegetation or standing timber exists within the lake. Flooded brush can be found in some areas along the shoreline and most creek arms have some timber and stumps present. The ODWC has established and maintained 17 brush piles on Fort Gibson Lake. These brush piles were refurbished with cedar trees and spider blocks in 2011. Locations of brush piles are shown in Figure 2, and can be found on the Department's Interactive Digital Wildlife Atlas at http://www.wildlifedepartment.com/wmas2.htm.

WATER QUALITY

Fort Gibson Lake is classified as a hypereutrophic reservoir with excessive primary productivity and nutrient conditions. Water quality data collected through the OWRB as part of their Beneficial Use Monitoring Program (BUMP) classifies Fort Gibson Lake as supporting or partially supporting the outlined Fish and Wildlife Propagation (FWP) beneficial uses for turbidity, pH and metals. However, Fort Gibson Lake is classified as not supporting the FWP for dissolved oxygen levels. If D.O. values are less than 2.0 ppm for greater than 70% of the water column, the FWP beneficial use is deemed not supported. The complete BUMP report for Fort Gibson Lake can be viewed at http://www.owrb.ok.gov/quality/monitoring/bump/pdf_bump/2007/BUMPLakesReport.pdf. A brief overview of several water quality parameters from the 2006-2007 sampling period is included below.

Thermal and Chemical Stratification

During the 2006-2007 sampling period the upper portion of Fort Gibson Lake (Big Hollow area to Long Bay Landing) was well mixed during the fall and winter. During the spring the lake was

weakly stratified, however D.O. remained above 2.0 ppm. During the summer, up to 79% of the water column was anoxic, with D.O. values less than 2.0 ppm. In the lower lake (Long Bay Landing to the dam), thermal stratification was not present during the fall, winter and spring and the water column was well mixed. Stratification was present during the summer with anoxic conditions present for 50-82% of the water column.

Productivity

A trophic state index (TSI), using Carlson's TSI (chlorophyll-a), was calculated to measure the lake's productivity. The average TSI was 61, classifying the lake as hypereutrophic, indicative of variable oxygen concentrations, nutrient rich conditions, and limited benthic species diversity. Based on previous data collection efforts, the lake is currently listed in the Oklahoma Water Quality Standards as a Nutrient Limited Watershed. This listing means that the lake is considered threatened from nutrients pending a more intensive study. The TSI values were primarily hypereutrophic or eutrophic at all sites throughout the sample year.

Conductivity

Specific conductivity ranged from 164.9 µS/cm to 315.1 µS/cm, indicating low to moderate concentrations of ionized salts in Fort Gibson Lake.

pH

The pH values ranged from 6.04 to 8.91 representing a neutral to slightly alkaline system. With 16.5% of the values falling outside of the acceptable range of 6.5 to 9.0 in the upper lake and 12% of the values falling outside of the acceptable range in the lower lake, the values are partially supporting the beneficial use based on pH.

FISHERY

The major sportfish in Fort Gibson Lake include largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctulatus*), white bass (Morone chrysops), white crappie (Pomoxis annularis), black crappie (Pomoxis nigromaculatus), blue catfish (Ictalurus furcatus), channel catfish (Ictalurus punctatus), flathead catfish (Pylodictis olivaris), and paddlefish (Polyodon spathula). The primary forage species include threadfin shad (Dorosoma petenense) and gizzard shad (Dorosoma cepedianum). The fish stocking history for Fort Gibson Lake is included in Table 2. Special fishing regulations which apply to Fort Gibson Lake, including all tributaries and upstream to Markham Ferry dam include: 1) largemouth and smallmouth bass have a minimum size limit of 14 inches and a creel limit of six combined per day; 2) all crappie have a minimum size limit of 10 inches and a combined creel limit of 15 per day.

Black Bass

Fort Gibson Lake is one of the best black bass lakes in the state and is one of the more popular lakes in the state for holding bass tournaments. Tournament results show the lake now and historically to be among the best in size and number of bass caught. The Bassmaster Elite Series regular season finale was held on Fort Gibson in June of 2010, after dangerous flooding conditions left the Arkansas River Navigational Channel unfishable. With only one day to practice, the top five places in the tournament averaged over 70 pounds of bass in four days, and

the winning stringer, held by local professional angler Tommy Biffle, topped 73 pounds. Tournament results for Fort Gibson Lake are summarized in Table 3. Fort Gibson Lake contains two species of black bass; largemouth bass and spotted bass. A 14 inch minimum length limit for black bass was set on Fort Gibson Lake in 1990. The 14 inch minimum length limit still applies to largemouth bass, but size and creel limits on spotted bass were removed in 2010.

Largemouth Bass

The largemouth bass is the dominant black bass species in Fort Gibson Lake. Catch rates and size structure of largemouth bass are included in Table 4 and Figures 3 and 5. The region switched from using a variable voltage pulsator electrofisher to a generator powered pulsator electrofisher in 1992, resulting in larger catch rates after that point (Table 4). Fish kills occurred at Fort Gibson Lake and fishing success for largemouth bass declined from 2000 to 2003. Largemouth bass from Fort Gibson Lake were tested for Largemouth Bass Virus (LMBV). Although fish kills were never directly linked to LMBV, the population did test positive evry year from 200 to 2003. Test results from Fort Gibson Lake are listed in Table 6. Since 2004, the largemouth bass population has experienced consistently high recruitment and fishing success has recovered, remaining above the state average. Florida strain largemouth bass were stocked into Fort Gibson Lake on five occasions from 1974 to 1983 with no known success. Florida strain largemouth bass have a lower water temperature limit of 40 degrees F, and are no longer stocked north of 3400 heating degree days in Oklahoma.

Spotted Bass

Spotted bass make up a small portion of the black bass population at Fort Gibson Lake. However, there was a boom in spotted bass catch rates and recruitment from 2001 to 2006. This was due to the decreased competition between largemouth bass and spotted bass during the LMBV years. Catch rates and size structure of the spotted bass population are included in Table 5 and Figures 4 and 6.

Smallmouth Bass

Reservoir strain smallmouth bass were stocked into Fort Gibson Lake in 1991 (Table 2). Adult specimens are rarely seen. Northeast Oklahoma is home to the only population of Neosho strain smallmouth bass. Stocking of Reservoir strain smallmouth bass was discontinued to avoid compromising the native Neosho strain.

Temperate Bass

White Bass

White Bass are an important portion of the Fort Gibson Lake recreational fishery. They are abundant in number and create a popular spring fishery in the upper portions of Fort Gibson Lake and its tributaries during their spawning run. During the summer months a fishery develops down lakes off of shallow points and submerged islands. Trolling is a popular method around these sites and can produce good numbers of white bass. Catch rates and size structure of the Fort Gibson Lake white bass fishery are included in Table 7 and Figures 7 and 8.

Striped Bass Hybrids

Striped bass Hybrids were Stocked into Fort Gibson Lake twice in 1988 (Table 2). The reason for discontinuing stocking of these fish is unknown. Adult specimens are rarely seen.

Crappie
Fort Gibson Lake contains both white crappie and black crappie. Below average rainfall in 2005 and 2006 resulted in poor recruitment of Fort Gibson crappie. Young-of-the-year crappie feed on plankton until they reach approximately 5 inches long. Low inflows reduce the abundance of essential nutrients that drive plankton production. The high inflows experienced in 2007 resulted in a relatively large year class of young crappie. Crappie catch rates, growth rates, and size structure from fall trap netting are presented in Tables 8 and 9 and Figures 13 - 15.

Catfish
Blue Catfish
Blue catfish have become an increasingly sought after sport fish at Fort Gibson Lake over the last ten years. Catch rates and size structure of the Fort Gibson Lake blue catfish population are included in Table 10 and Figures 9 and 10.

Channel Catfish
Channel catfish are an important sport fish to both bank and boat anglers, ranking third in angler preference surveys. Since the mid 1990's channel catfish catch rates have steadily declined. This may be attributed to the growing blue catfish population. Catch rates and size structure of the Fort Gibson Lake channel catfish fishery are included in Table 12 and Figures 11 and 12.

Flathead Catfish
Adult Flathead Catfish are found near cover in larger pools and deep holes. They prefer old brushy tangles, submerged logs and undercut banks. Most are taken while trotlining, juglining, limblining or noodling. Flathead catfish gill net catch rates have historically been low on Fort Gibson Lake. Electrofishing may be a better method for determing flathead catfish abundance. Catch rates and size structure of the Fort Gibson Lake flathead catfish fishery are included in Table 12.

Paddlefish
Paddlefish have a large historical range in Oklahoma. The spawning migration into the upper end of Fort Gibson Lake (Grand River) congregates a large number of fish each year from March through June. Anglers frequently snag paddlefish over 50 lbs during this period. Paddlefish were sampled in Fort Gibson during the winter of 2004/2005 using gillnets. One thousand ninety one paddlefish were tagged and released in efforts to obtain a population estimate. A low number of tag returns made the population estimate inconclusive. A total of 90 paddlefish jaws were collected from netting mortalities for age and growth analysis. Size and age structures of the Fort Gibson Lake paddlefish fishery are included in Figures 16, 17 and 18.

Shad
Gizzard Shad
Gizzard Shad provide forage for most game species. The species is often used by anglers as bait for other fish species. Catch rates and size structure of the Fort Gibson Lake gizzard shad fishery are included in Table 13.

Threadfin Shad
Threadfin Shad are quite temperature sensitive, with die-offs reported at temperatures below 45°F. They have been introduced as forage fish in Fort Gibson Lake one time in 1976 (Table 2). Since introduction, populations have remained stable. Adults are considerably smaller than gizzard shad adults, rarely exceeding 6 inches in length. The species is often used by anglers as bait for other fish species. Catch rates and size structure of the Fort Gibson Lake threadfin shad fishery are included in Table 14.

Walleye
Walleye are not native to Oklahoma, but have been stocked into many Oklahoma reservoirs. Walleye were stocked into Fort Gibson Lake many times from the late 1960's to the mid 1980's (Table 2). Historic gill net data proves the stockings to be unsuccessful, and probably the reason for discontinuing walleye stockings.

Fish Consumption Advisories
Fish consumption advisories are issued by the Oklahoma Department of Environmental Quality (ODEQ). The most recent statewide fact sheet concerning fish consumption can be viewed at: http://www.deq.state.ok.us/factsheets/land/fishmerc.pdf.

Threats to the Fishery

Aquatic Nuisance Species (ANS)
Zebra Mussels
Adult zebra mussels (*Dreissena polymorpha*) were confirmed in Fort Gibson Lake in April of 2010. Proper cleaning methods of boats and equipment should be used to avoid the spread of zebra mussels to uninfested waters. Monitoring of zebra mussels in Fort Gibson Lake should be coordinated with efforts of USACE and other appropriate agencies and universities.

Bighead Carp
Adult bighead carp (*Hypophthalmichthys nobilis*) have been confirmed in Grand Lake. With the most recent confirmed fish snagged at Miami Park, on the Neosho River in April of 2009. No bighead carp have been found in Fort Gibson Lake, but their presence in the Grand River watershed is cause for concern. Documenting Asian carp sightings will be critical to monitoring their expansion.

The ODWC follows strict Hazard Analysis and Critical Control Point (HACCP) procedures to avoid transporting invasive species to uninfected water bodies. For more information, visit www.wildlifedepartment.com/nuisancespecies.htm.

Pollution
Potential pollution sources around Fort Gibson Lake include faulty septic tanks, subsurface disposal systems, private cabins, concessions, boats, improperly operated sanitary landfills, open dumps, water treatment plants, open burning, odors, noise, and wash and grease racks which drain into small retention ponds. These sources of pollution were identified by the Shoreline

Management Plan (SMP) written for Fort Gibson Lake by the USACE. On the publication date of the SMP none of the above listed potential pollution sources had adversely affected Fort Gibson Lake. However, these sources may be the cause of the lake's hypereutrophic status, and the reason dissolved oxygen standards are not being met during the summer. A routine surveillance and reporting program is carried out by USACE personnel for any potential problems that may arise. The entire SMP can be found at: http://www.swt.usace.army.mil/library/ShorelineManagementPlan/FortGibson/FortGibsonSMP.html.

Management Objectives

- Maintain total largemouth bass catch rates at or above 100/hour with catch rates of largemouth bass >14 inches at or above 40/hour and relative weights that exceed 90% for all size groups.
- Maintain sufficient levels of forage species.
- Protect and enhance aquatic habitat.

Goals

- Work with USACE and other appropriate entities to enhance boating and/or fishing access.
- Conduct public outreach and solicit feedback regarding fisheries management issues.
- Coordinate and assist with the documentation and monitoring of aquatic nuisance species.

Strategies

I. SSP trend data on the major sportfish and forage species will be collected and monitored.

1. Sampling for the major sportfish and forage species will be as follows:
    a. Largemouth Bass - Conduct Standardized Sampling Protocol (SSP) spring electrofishing for largemouth bass every other year to determine catch rates by size groups and relative weights. Age and growth data will be collected when necessary. Bass tournament results will be monitored annually to evaluate overall trends. Largemouth bass will be tested for LMBV if it is believed to be the cause of a fish kill.
    b. Spotted Bass – Conduct SSP spring electrofishing for spotted bass every other year to determine catch rates by size groups and relative weights. Age and growth data will be collected when necessary.
    c. White Bass – Conduct SSP fall gillnetting for white bass every other year to determine catch rates by size groups and relative weights.
    d. Crappie – Conduct SSP fall trapnetting for white crappie every other year to determine catch rates by size groups and relative weights. Age and growth data will be collected during sample years.
    e. Blue Catfish – Conduct electrofishing surveys as needed. Conduct SSP fall gillnetting for blue catfish every other year to determine catch rates by size groups and relative weights.

f. Channel Catfish – Conduct SSP fall gillnetting for channel catfish every other year to determine catch rates by size groups and relative weights.
g. Flathead Catfish – Conduct SSP fall gillnetting for flathead catfish every other year to determine catch rates by size groups and relative weights.
h. Gizzard Shad – Conduct SSP fall floating gillnetting for gizzard shad when necessary to determine catch rates by size groups.
i. Threadfin Shad – Conduct SSP fall floating gillnetting for threadfin shad when necessary to determine catch rates by size groups.

II. Utilize computer modeling software to determine if current length and creel limits are appropriate.

III. Aquatic habitat will be protected and enhanced in the following ways:
a. Oppose habitat degradation and shoreline development that is not conducive to the health of the ecosystem and does not require adequate mitigation. ODWC will propose adequate and reasonable mitigation measures when necessary, and encourage the USACE to follow existing SMP guidelines.
b. Maintain existing seventeen (17) fish attractors utilizing natural and artificial materials. These fish attractors will be maintained with cedar trees and spider blocks. Create five to ten (5-10) new fish attractors within this management plan time frame.

IV. Monitor and assess water quality in the forebay and the tailrace of Fort Gibson Dam during the summer period annually. Communicate with USACE to discuss results, and develop cooperative plans to deal with water quality problems.

V. Solicit ideas for additional boating access projects on Fort Gibson Lake, and attempt to secure cooperative agreements with appropriate partners to cost-share construction.

VI. Perform outreach to educate the public about the threats, prevention, and spread of ANS. Investigate and report all sightings of ANS to the ODWC ANS biologist, USACE, other resource agencies, and the media when appropriate.

TABLES

Table 1. Physical and chemical characteristics of Fort Gibson Lake.

Operating Agencies	U.S. Army Corps of Engineers
Impoundment Date	1953
Surface Area	19,900 acres
Shoreline	225 miles
Shoreline Development Ratio	11.6
Mean Depth	18.4 ft.
Watershed	12,492 square miles
Secchi Disk	29 inches
Conductivity	164.9 to 315.1 μS/cm
pH	6.04 to 9.00
Carlson's Trophic State Index (chlorophyll a)	61; Hypereutrophic

Table 2. Stocking Record for Fort Gibson Lake.

Species	N	Size (inches)
Largemouth Bass		
1952	5,000	Unknown
1974 (Florida)	10,000	Fry
1975 (Hybrid)	35,000	Fry
1981 (Florida)	55,125	2”
1982 (Florida)	20,600	1 ½” – 3”
1982 (Florida)	4,590	2 ½”
1983 (Florida)	99,700	2 ½” – 3”
Smallmouth Bass		
1991 (Res. Strain)	53,824	1 ¼”
Redear Sunfish		
1952	15,000	Unknown
Walleye		
1968	200,000	Fry
1969	596,000	Fry
1970	1,072,396	Fry
1971	1,038,009	Fry
1984	594,000	Fry
1984	75,300	1 ½”
1984	125,650	1 ½” – 1 ¾”
1985	72,168	1”
1985	116,000	1 ½”
1986	196,542	1 ¼”
Hybrid Striped Bass		
1988	292,500	Fry
1988	1,527,600	Fry
Threadfin Shad		
1976	5,000	Spawning Adults
Channel Catfish		
1952	20,000	Unknown

Table 3. Ft. Gibson Lake Tournament Results. Ranking of Lakes Statewide from which 10 or more Tournament Reports were Received. Ranked According to Quality Fishing Indicators. Ft. Gibson Lake Ranking listed in parentheses.

Year	*Number of Reports*	*Total Number of Anglers*	*Number of Bass Caught*	*Number of Bass Weighed In per 8-Hour Day*		*Bass/ Tourn*	*Bass Weighed In/Angler*	*Percent Successful Anglers*		*Average Weight per Bass (lbs.)*		*Number of Bass Weighing In Over 5 lbs.*	*Angler-Hours per Bass Weighing In Over 5 lbs.*	*Number of Bass Weighing In Over 8 lbs.*	*Avg. Big Bass*	*Avg. 1st Place Weight (lbs.)*		*Overall Rank*
1997	87	4483	4674	1.3	(# 7)	53.72	1.04	68	(# 7)	2.8	(# 4)*	265	(# 15)	4	5.42	14.8	(# 5)	# 3*
1998	98	4817	4310	1.2	(# 12)	43.98	0.89	64	(# 10)	2.8	(# 3)*	145	(# 22)	0	5.12	13.4	(# 5)	# 5
1999	42	2270	2776	1.4	(# 3)	66.1	1.22	68	(# 9)*	2.6	(# 8)	83	(# 15)	1	5.42	14.1	(# 8)	# 7
2000	62	3669	3599	1.1	(# 14)	58.05	0.98	61	(# 15)	2.6	(# 7)*	144	(# 13)	0	5.25	13.8	(# 8)	# 12
2001	56	3950	2351	0.7	(# 19)	41.98	0.59	50	(# 17)	2.2	(# 8)	51	(# 9)	0	4.0	9.67	(#13)	# 15
2002	22	894	611	0.7	(# 17)	27.77	0.68	59	(# 9)	2.2	(# 10)	13	(# 11)	0	4.07	8.90	(#13)	# 16
2003	23	1141	767	0.7	(# 22)	33.35	0.67	63	(# 11)	2.3	(# 11)	8	(# 24)	0	3.78	9.07	(#16)	# 20
2004	23	1810	1372	0.7	(# 21)	59.65	0.76	67	(# 11)	2.4	(# 7)*	21	(# 6)	0	4.76	11.4	(#10)	# 9
2005	25	1901	1919	1.7	(# 8)	76.76	1.01	73	(# 6)	2.4	(# 6)	22	(# 16)	0	4.99	13.8	(# 3)	# 1
2006	11	1150	1173	1.9	(#15)	106.6	1.02	68	(# 10)	2.2	(# 13)	15	(# 18)	0	4.84	13.7	(# 5)	# 13
2007	14	564	1220	2.2	(# 8)*	87.14	2.16	74	(# 7)	2.5	(# 3)	26	(# 4)	0	5.6	14.7	(# 5)	# 1
2008	4	NA	4270	NA	NA	122	.9	64	NA	2.5	NA	52.5	NA	0	5.84	15.4	NA	NA
2009	17	NA	4326	NA	NA	103	1.68	84	(#4)	2.8	(#4)	249.5	(#12)	0	5.9	18.1	(#5)	#3
2010	NA	NA	NA	NA	NA	NA	2.2	77	(#3)	2.6	(#3)	NA	NA	1	NA	17.5	(#3)	#2
Avg	**35**	**2423**	**2567**	**1.2**	**13.3**	**67.7**	**1.13**	**67**	**9.15**	**2.5**	**6.7**	**84.3**	**13.7**	**.43**	**5**	**13.5**	**7.6**	**8.2**

*Values were tied with other lake(s) for that indicator.

Table 4. Total Number (No.), Catch Rates (C/f), and Relative Weights (W_r) by Size Groups of Largemouth Bass Collected by Spring Electrofishing from Fort Gibson Lake. Numbers in Parentheses Represent Acceptable C/f Values for a Quality Fishery. Acceptable W_r Values are ≥90.

Total (≥40)		<8 in. (15-45)		8–12 in. (15-30)		≥12 in. (≥15)		≥14 in. (≥10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1982	205	27.3	8.8	96	9.2	92	9.3	103	7.5	104
1984	363	31.6	8.8	91	11.5	91	11.3	100	8.2	102
1987	261	36.0	9.8	91	7.3	99	18.9	104	12.0	104
1989	233	20.7	2.4	98	6.8	97	11.5	103	8.8	104
1991	461	36.2	1.9	91	7.8	93	26.5	104	19.8	106
1996	303	121.2	21.2	104	27.6	102	72.4	109	61.2	109
1998	322	107.3	33.3	94	16.0	99	58.0	105	44.3	105
2001	271	154.9	20.8	88	49.7	92	84.6	103	64.6	104
2002	293	117.2	15.2	105	18.8	101	83.2	105	48.0	104
2004	433	83.0	14.0	101	30.2	102	40.0	102	23.0	102
2006	471	114	19.6	101	42.4	99	54.2	103	32.9	102
2011	431	136.4	12.3	93	30.3	94	NA	NA	58.1	100

Table 5. Total Number (No.), Catch Rates (C/f), and Relative Weights (W_r) by Size Groups of Spotted Bass Collected by Spring Electrofishing from Fort Gibson Lake. Numbers in Parentheses Represent Acceptable C/f Values for a Quality Fishery. Acceptable W_r Values are ≥90.

Total (≥40)			<8 in. (15-45)		8–12 in. (15-30)		≥12 in. (≥15)		≥14 in. (≥10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1982	23	3.1	0.7	92	1.7	84	0.7	98	0.4	104
1984	43	3.7	0.9	85	1.7	82	1.2	87	0.1	93
1987	56	7.7	1.0	70	3.3	88	3.4	93	--	--
1989	69	6.1	0.4	--	4.4	83	1.3	89	0.4	96
1991	76	6.0	0.5	73	2.4	82	3.1	94	1.3	99
1996	19	7.6	2.0	--	0.4	84	5.2	100	3.2	101
1998	7	2.3	1.0	--	1.0	82	0.3	97	--	--
2001	18	10.3	--	--	4.0	90	6.3	93	1.7	92
2002	45	18.0	1.6	129	5.6	102	10.8	104	5.6	105
2004	119	19.8	2.3	100	10.0	100	7.7	102	4.5	103
2006	54	12.0	2.2	102	2.4	103	7.3	104	4.2	105
2011	16	5.05	1.26	89	1.26	91	NA	NA	2.2	100

Table 6. Year, sample size, number of fish testing positive, and percent of the sample testing positive for Largemouth Bass Virus from Fort Gibson Lake.

Year	Sample size	No. Positive	% Positive
2000	36	18	50
2001	36	9	25
2002	36	10	28
2003	36	10	28

Table 7. Total Number (No.), Fish Per Net Night (C/f), and Relative Weights (Wr) by Size Groups of White Bass Collected by Gill Netting from Fort Gibson Lake.

	Total		< 8 in.		≥ 8 in.		8 – 12 in.		≥ 12 in.	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
1982	43	2.16	0.48	104	1.68	111	0.24	121	1.44	109
1984	74	4.8	3.12	106	2.4	96	1.68	96	0.72	93
1987	111	8.4	0.96	101	--	--	2.4	100	4.8	98
1989	160	12	1.2	103	4.56	95	6.24	96	--	--
1991	389	29.04	9.12	99	12.72	97	7.2	100	--	--
1996	105	12	0.48	83	11.52	100	6.72	100	4.8	100
1999	65	4.56	1.44	98	3.36	91	1.44	91	1.92	90
2005	370	28.08	3.84	100	24.48	107	15.12	108	9.12	106
2008	77	6	1.92	110	3.84	108	1.92	113	2.16	105
2009	62	4.6	1.2	101	3.4	94	.9	99	2.4	93

Table 8. Total Number (No.), Fish Per Net Night (C/f), and Relative Weights (Wr) by Size Groups of All Crappie Collected by Trap Netting from Fort Gibson Lake. Numbers in Parentheses Represent Acceptable C/f Values for a Quality Fishery.

	Total		<5 in.		≥5 in.		≥8 in.		≥10 in.	
	(≥25)		(≥5)		(10-40)		(≥10)		(≥4)	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
1987	9	9.84	1.2	107	8.64	94	8.64	94	4.32	91
1991	704	13.44	0.72	--	12.72	98	8.16	102	3.6	102
1992	232	9.36	0.48	107	8.88	96	6.48	95	0.96	94
1993	187	12.48	5.28	96	7.2	88	5.04	89	2.4	92
1995	1356	71.28	48.9	111	22.32	110	15.12	112	2.4	105
1996	1105	55.2	2.64	111	44.16	106	8.4	103	2.16	101
1997	525	26.16	0.96	110	25.44	101	11.76	101	3.6	97
1998	417	27.84	1.92	98	25.92	99	15.84	102	3.36	104
1999	457	22.8	9.12	97	13.68	94	9.84	95	5.04	97
2001	381	17.28	7.92	94	9.36	93	3.84	95	1.92	96
2002	385	18.24	2.88	69	11.52	85	6.48	90	1.2	93
2006	109	5.28	0.72	134	4.56	102	3.12	101	2.16	99
2007	307	15.36	4.32	105	10.8	106	6	108	3.12	104

Table 9. Mean length at Age of Crappie Collected by Trap Netting from Fort Gibson Lake. Numbers in Parentheses Represent Values for Acceptable Growth Rates.

	Age 1	Age 2	Age 3	Age 4
Year	(≥ 6.3 in.)	(≥ 7.9 in.)	(≥ 8.9 in.)	(≥ 9.8 in.)
1987	7.83	8.62	11.42	..
1991	7.99	10.16	11.18	13.78
1992	8.19	8.86	11.18	13.78
1993	5.63	7.24	9.41	11.42
1995	7.32	8.19	9.65	10.20
1996	7.32	9.13	8.66	9.53
1997	7.72	10.08	11.61	10.08
1998	7.17	8.35	11.54	12.20
1999	7.83	8.62	11.42	..
2001	7.99	10.16	11.18	13.78

Table 10. Total Number (No.), Fish Per Net Night (C/f), and Relative Weights (Wr) by Size Groups of Blue Catfish Collected by Gill Netting from Fort Gibson Lake.

Total		< 12 in.		8 – 16 in.		≥ 12 in.		≥ 16 in.	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
1982	0	--	--	--	--	--	--	--	--	--
1984	0	--	--	--	--	--	--	--	--	--
1987	13	0.96	0.24	122	--	--	0.72	96	0.72	97
1989	6	0.48	--	--	--	--	0.48	102	0.24	98
1991	43	3.12	0.24	147	--	--	3.12	114	2.88	114
1996	65	7.44	2.64	107	2.64	104	4.8	107	4.32	108
1999	61	4.32	2.16	96	3.12	89	2.16	79	0.96	74
2005	87	6.48	1.92	91	3.6	84	4.56	86	1.68	90
2008	46	3.36	1.2	120	1.2	108	2.16	89	1.68	90
2009	70	5.21	1.58	100	1.4	87	3.6	87	2.86	89

Table 11. Total Number (No.), Fish Per Net Night (C/f), and Relative Weights (Wr) by Size Groups of Channel Catfish Collected by Gill Netting from Fort Gibson Lake.

Total		< 12 in.		8 – 16 in.		≥ 12 in.		≥ 16 in.	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
1982	310	15.36	7.92	97	10.8	92	7.44	95	3.36	104
1984	175	12.96	8.4	95	7.92	89	4.32	89	1.44	98
1987	146	11.04	5.04	90	--	--	6	86	2.88	89
1989	202	15.36	6.72	92	--	--	8.64	87	3.84	92
1991	291	21.6	6.48	107	--	--	15.36	95	6.72	102
1996	70	7.92	5.28	95	4.8	87	2.64	92	1.44	101
1999	170	12	7.92	87	8.64	84	4.08	86	2.16	90
2005	144	10.8	6.96	87	8.16	85	3.84	86	1.44	94
2008	115	8.88	4.08	90	7.2	86	4.8	84	1.68	89
2009	50	3.65	1.1	103	2.26	85	2.6	88	1.03	96

Table 12. Total Number (No.), Fish Per Net Night (C/f), and Relative Weights (Wr) by Size Groups of Flathead Catfish Collected by Gill Netting from Fort Gibson Lake.

Total			≥ 12 in.		≥ 20 in.		≥ 24 in.		≥ 28 in.	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
1982	5	0.24	0.24	106	0.24	112	0.24	106	--	--
1984	4	0.24	0.24	118	0.24	118	0.24	118	0.24	120
1987	5	0.48	0.48	97	0.48	97	0.24	97	0.24	62
1989	9	0.72	0.72	109	0.48	112	0.24	113	0.24	115
1991	8	0.72	0.48	109	0.48	109	0.24	105	0.24	93
1996	5	0.48	0.48	112	0.48	111	0.24	111	0.24	114
1999	3	0.24	0.24	138	0.24	161	0.24	161	0.24	122
2005	4	0.24	0.24	96	0.24	94	0.24	85	--	--
2008	5	0.48	0.48	93	0.24	91	0.24	86	--	--
2009	5	0.36	0.36	94	0.14	85	0.14	85	--	--

Table 13. Total Number (No.), Fish Per Net Night (C/f) by Size Groups of Gizzard Shad Collected by Gill Netting from Fort Gibson Lake.

	Total		< 6 in.	≥ 6 in.
Year	No.	C/f	C/f	C/f
1982	247	12.24	10.32	1.68
1984	248	18.24	14.16	4.08
1987	87	6.48	5.52	0.96
1989	774	58.32	42.24	16.32
1991	209	15.6	14.4	1.2
1996	230	26.16	25.92	0.24
1999	276	19.44	11.28	8.16
2005	494	39.12	16.8	22.32
2008	368	27.84	2.88	24.96
2009	149	9.94	9.94	--

Table 14. Total Number (No.), Fish Per Net Night (C/f) by Size Groups of Threadfin Shad Collected by Gill Netting from Fort Gibson Lake.

	Total		< 5 in.	≥ 5 in.
Year	No.	C/f	C/f	C/f
1982	--	--	--	--
1984	--	--	--	--
1987	--	--	--	--
1989	--	--	--	--
1991	--	--	--	--
1996	--	--	--	--
1999	44	3.12	1.44	2.88
2005	530	44.4	32.16	12.24
2008	309	37.68	32.64	5.04
2009	1	.072	.072	--

FIGURES

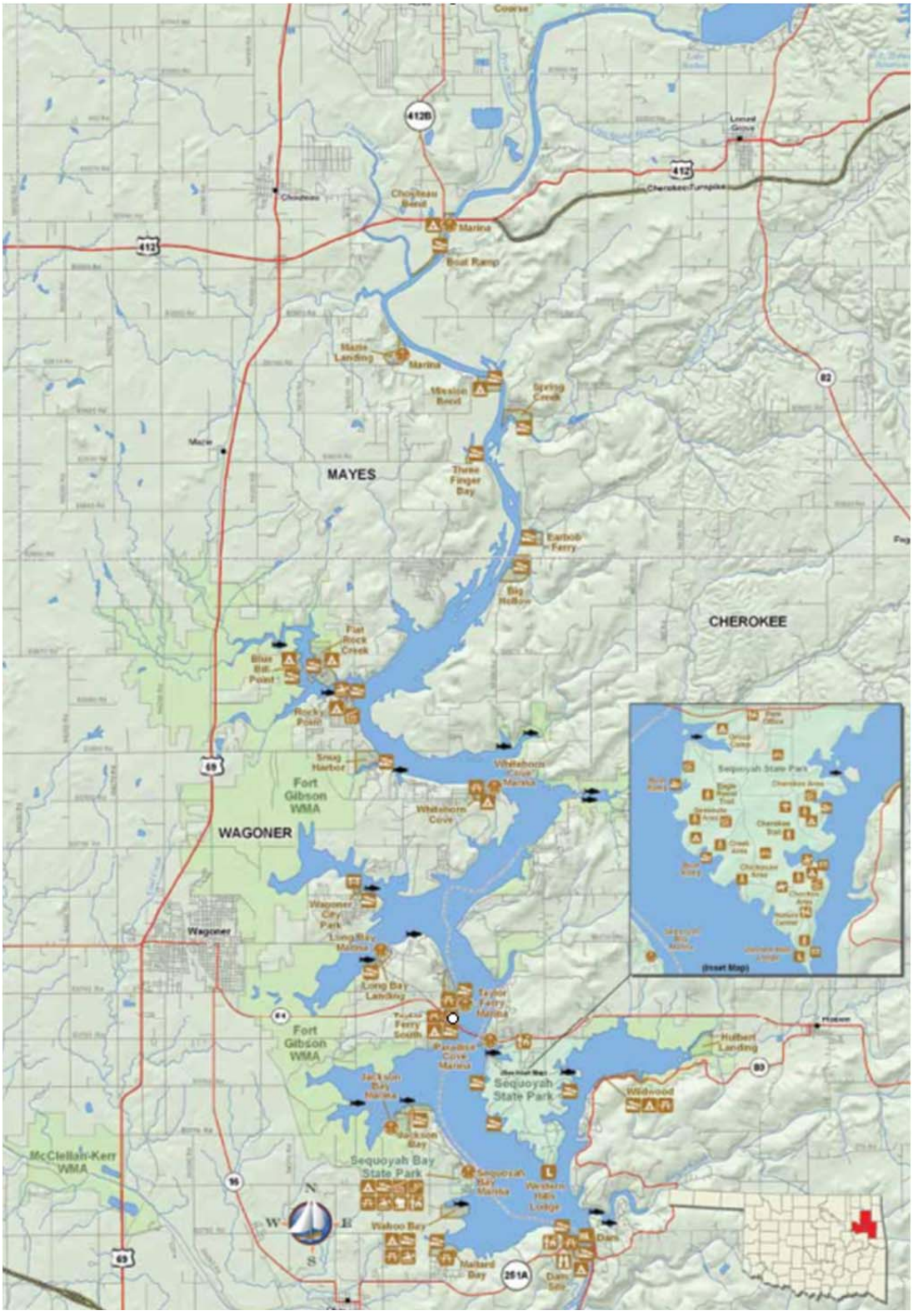

Figure 1. Map of Fort Gibson Lake and vicinity.

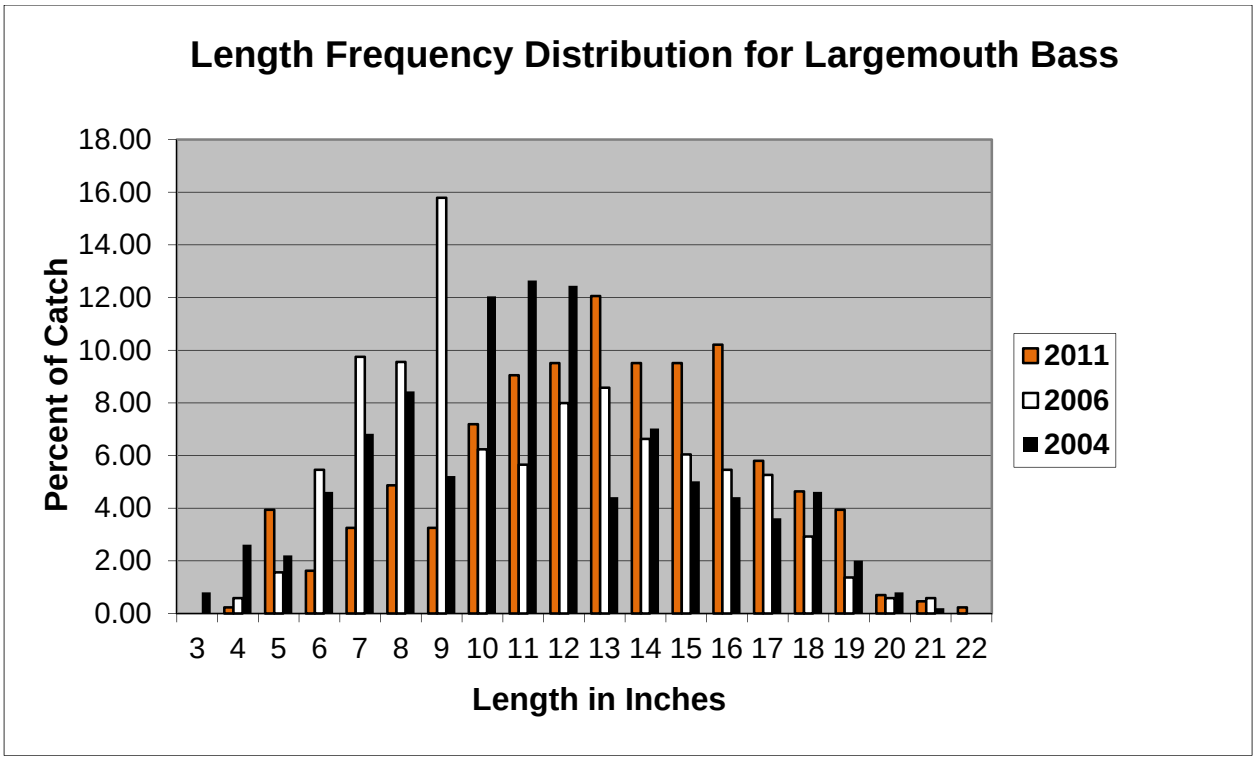

Figure 3. 2004-2011 Spring Electrofishing at Fort Gibson Lake. Length Frequency Distribution for Largemouth Bass.

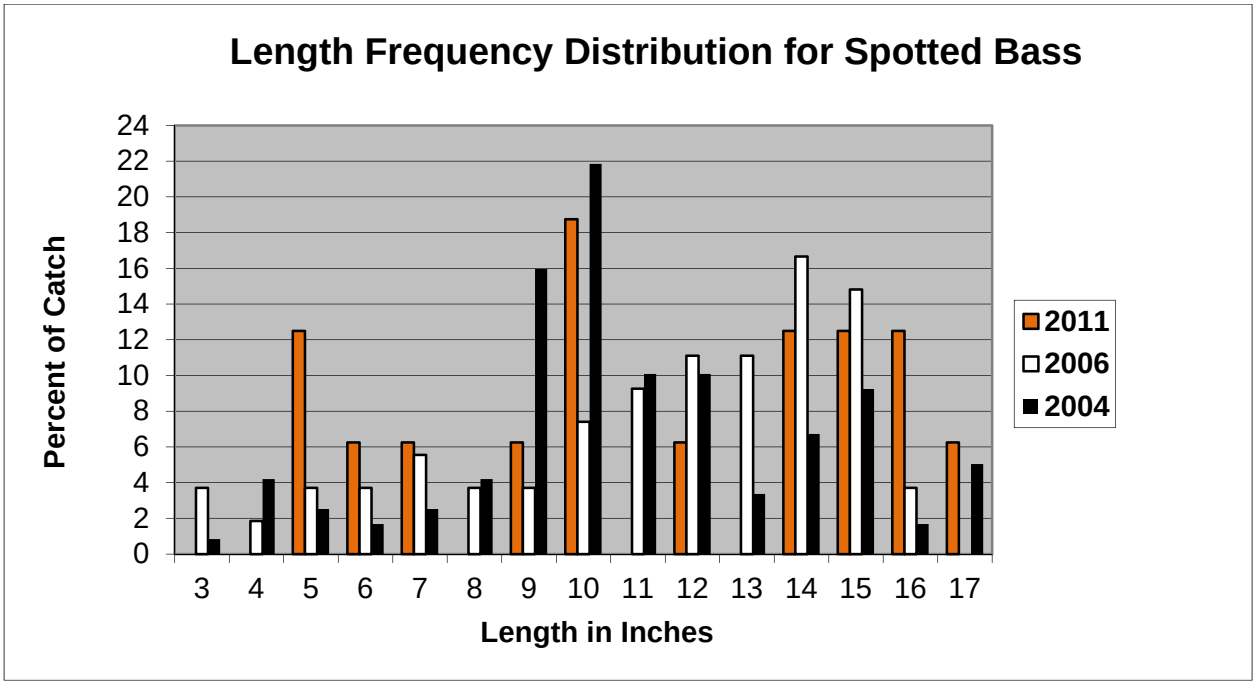

Figure 4. 2004-2011 Spring Electrofishing at Fort Gibson Lake. Length Frequency Distribution for Spotted Bass.

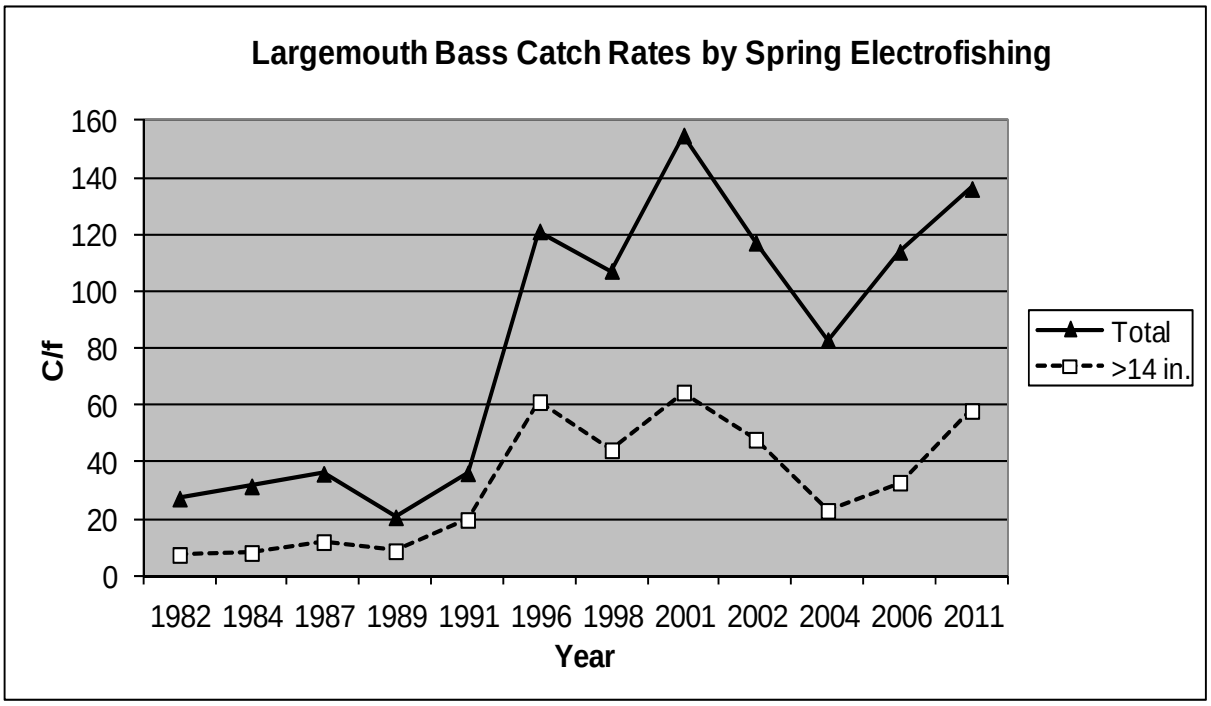

Figure 5. 1982-2011 Largemouth Bass Catch Rates by Spring Electrofishing at Fort Gibson Lake. (*Note: 14" minimum black bass length limit went into effect in 1990.)

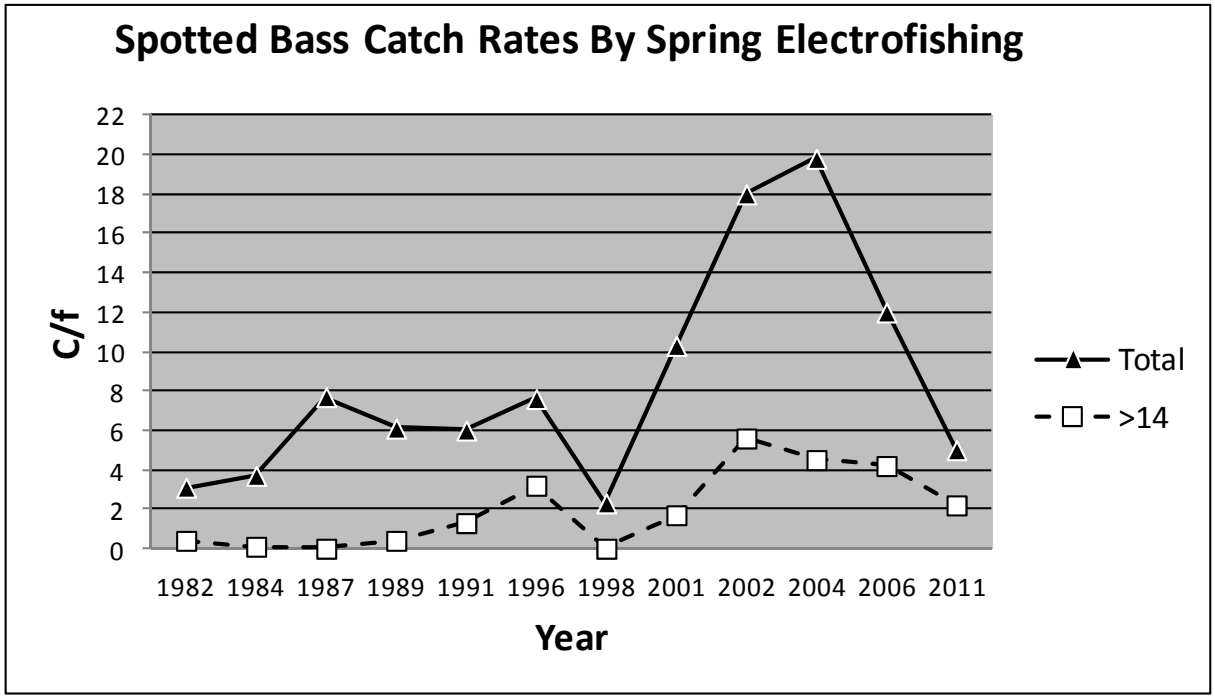

Figure 6. 1982-2011 Spotted Bass Catch Rates by Spring Electrofishing at Fort Gibson Lake. (*Note: 14" minimum black bass length limit went into effect in 1990.)

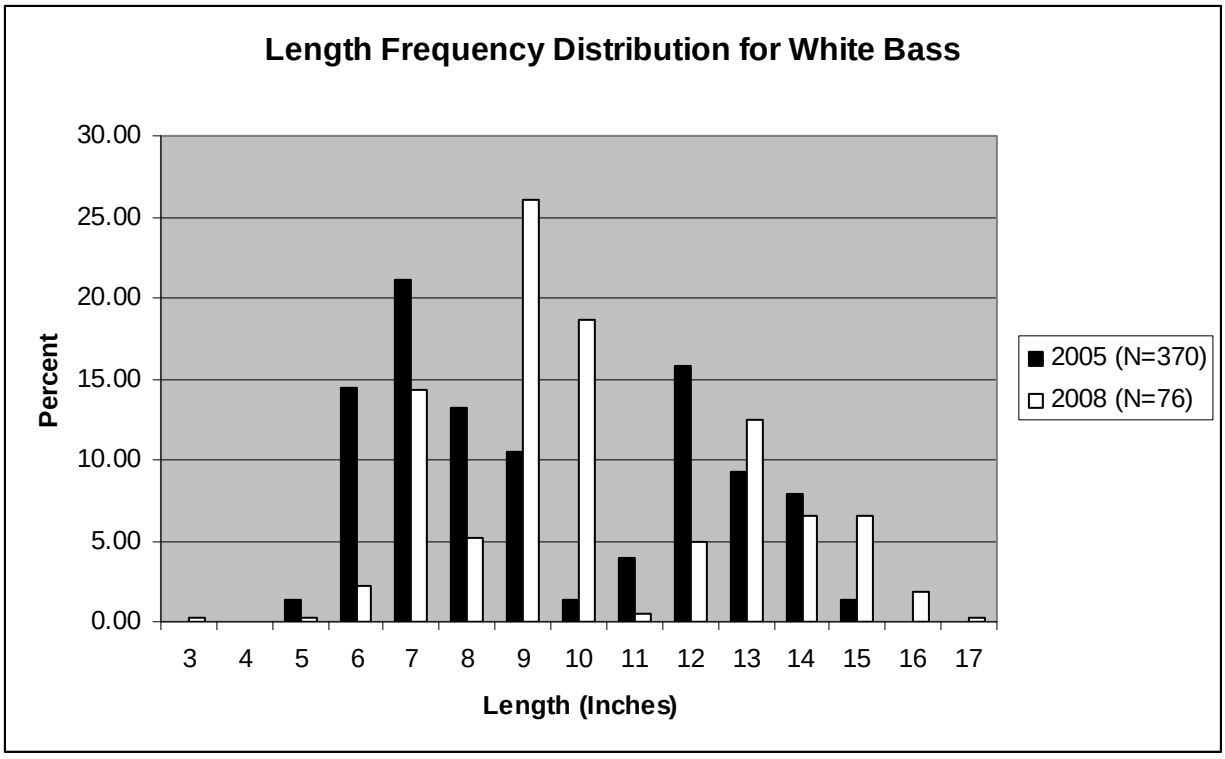

Figure 7. 2005-2008 Fall Gill Netting at Fort Gibson Lake. Length Frequency Distribution for White Bass.

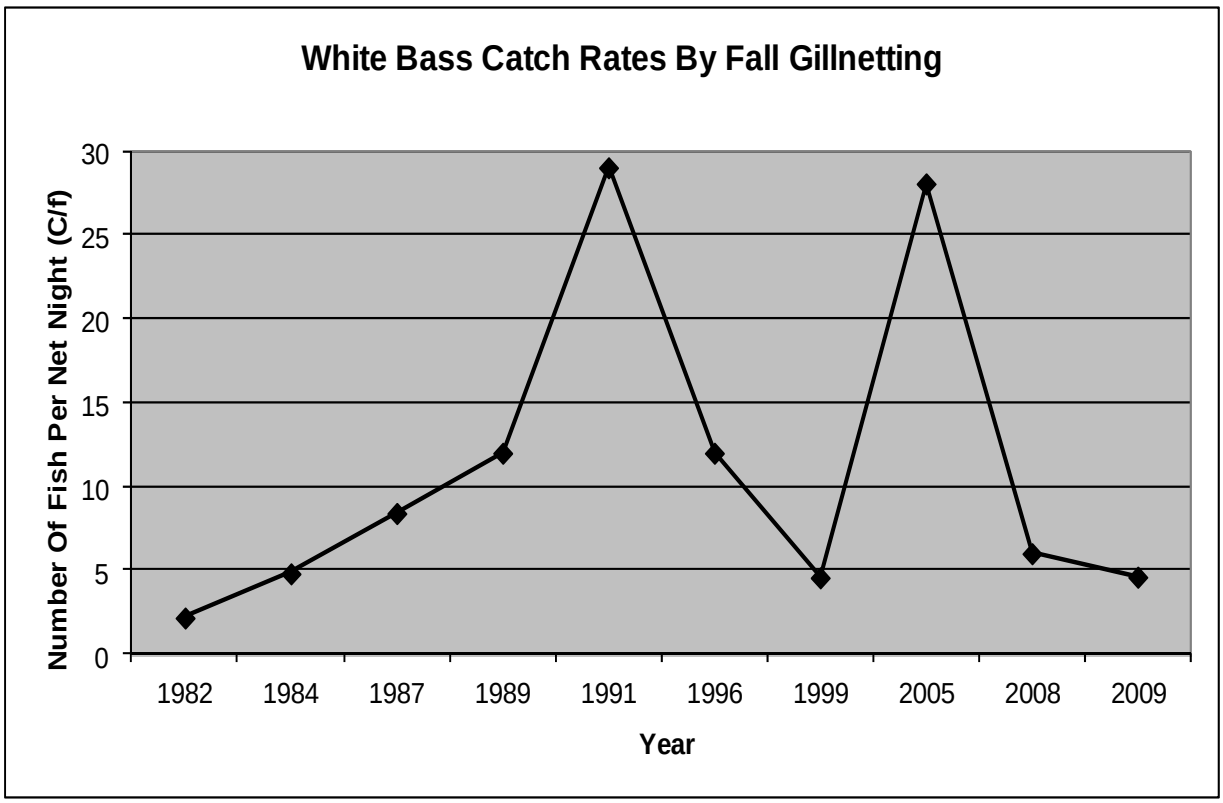

Figure 8. 1982-2009 Fall Gill Netting at Fort Gibson Lake. Fish per net night for White Bass.

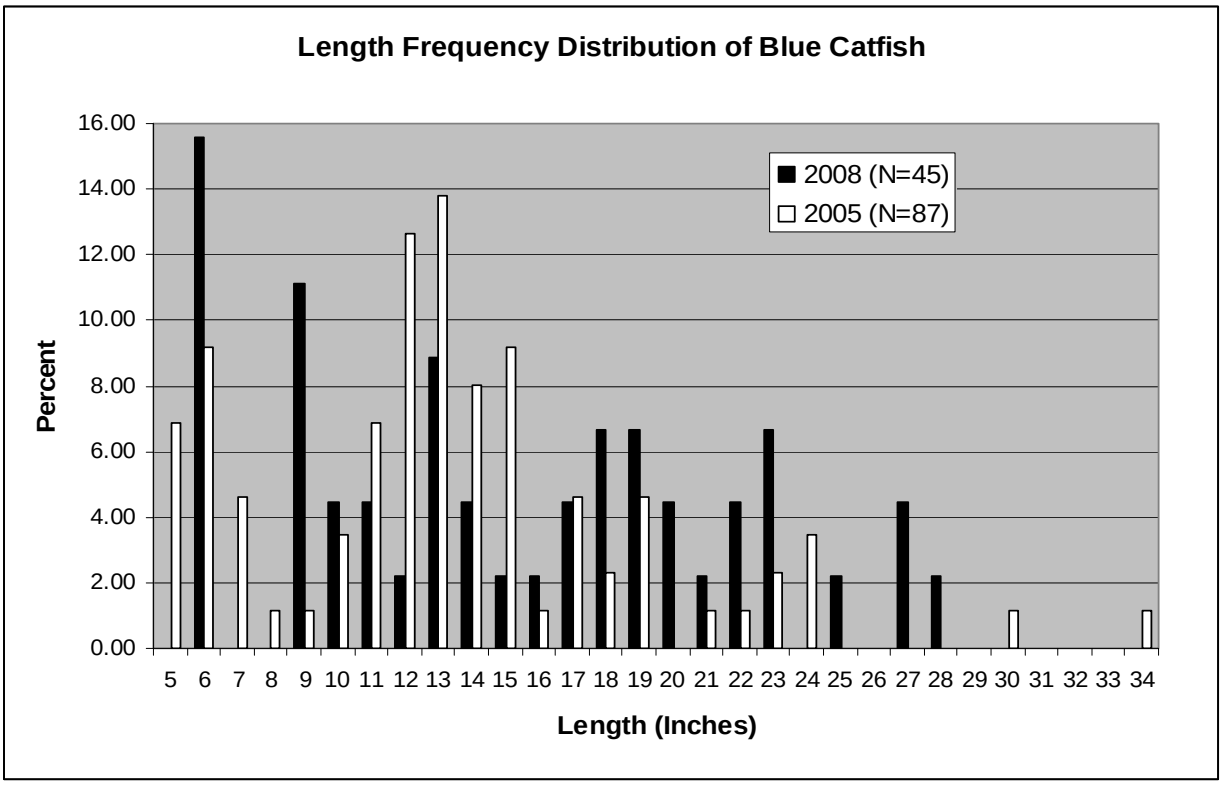

Figure 9. 2005-2008 Fall Gill Netting at Fort Gibson Lake. Length Frequency Distribution for Blue Catfish.

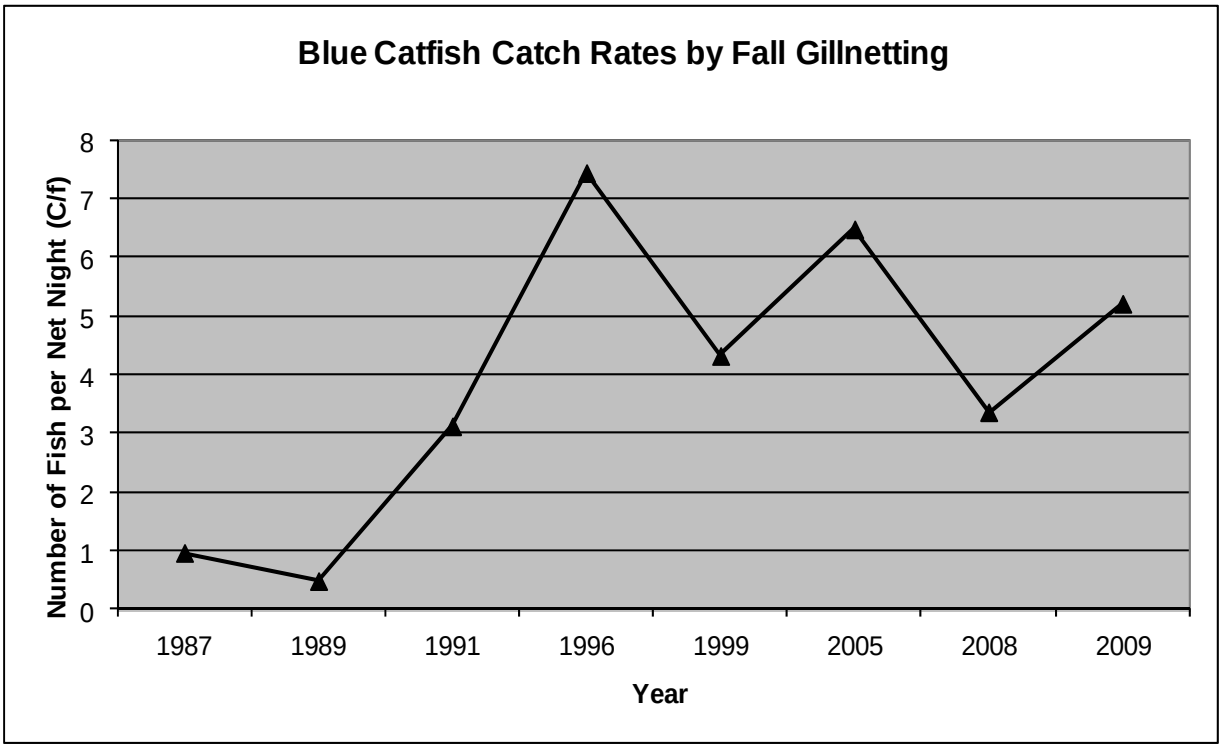

Figure 10. 1987-2009 Fall Gill Netting at Fort Gibson Lake. Fish per net night for Blue Catfish.

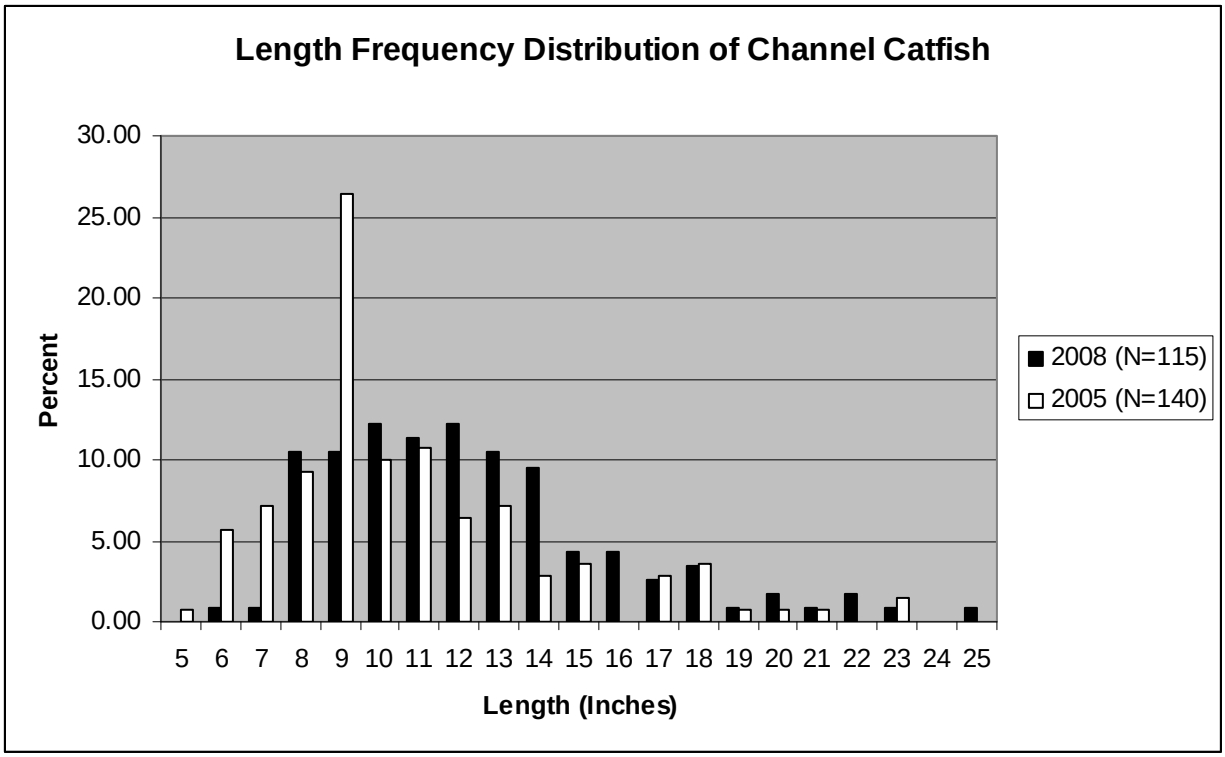

Figure 11. 2005-2008 Fall Gill Netting at Fort Gibson Lake. Length Frequency Distribution for Channel Catfish.

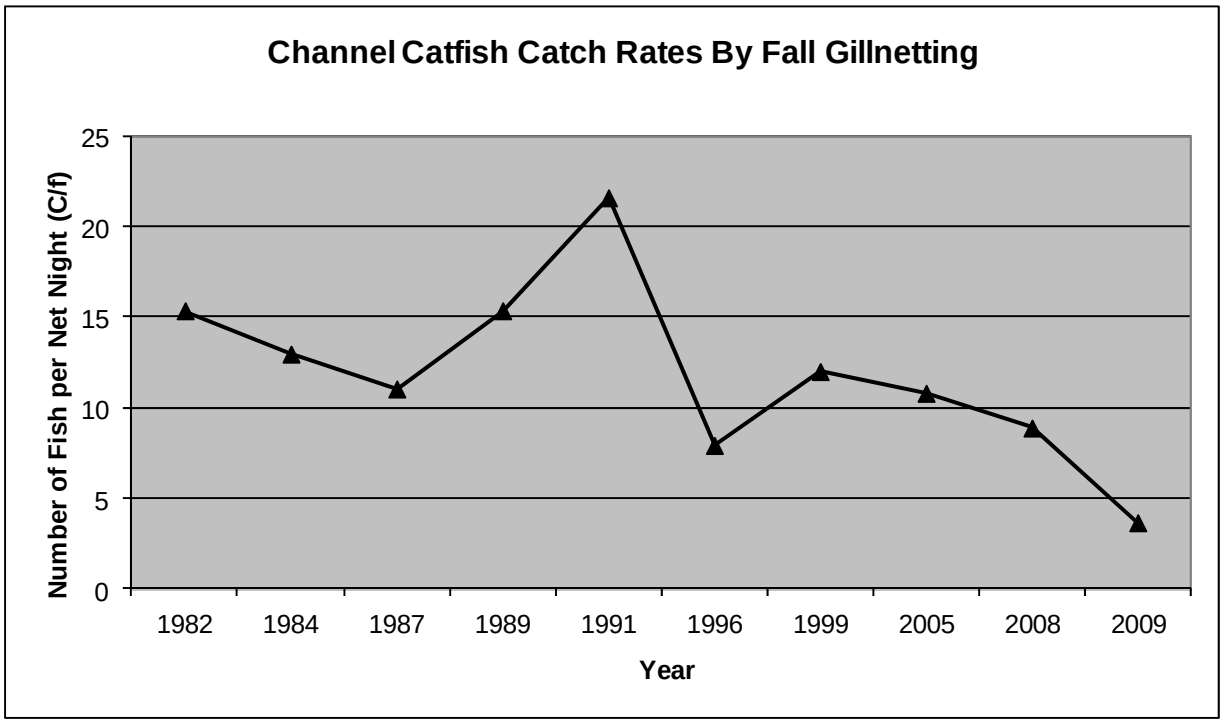

Figure 12. 1982-2009 Fall Gill Netting at Fort Gibson Lake. Fish per net night for Channel Catfish.

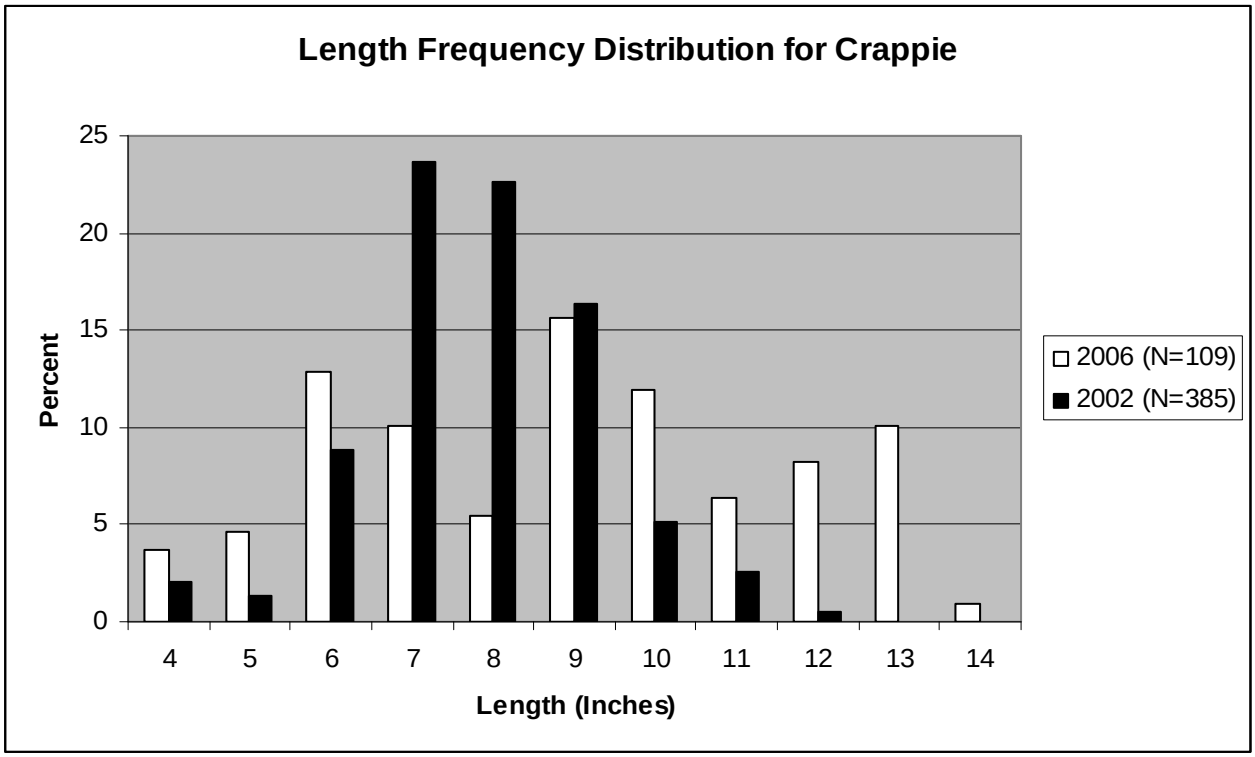

Figure 13. 2002-2006 Fall Trap Netting at Fort Gibson Lake. Length Frequency Distribution for All Crappie Combined.

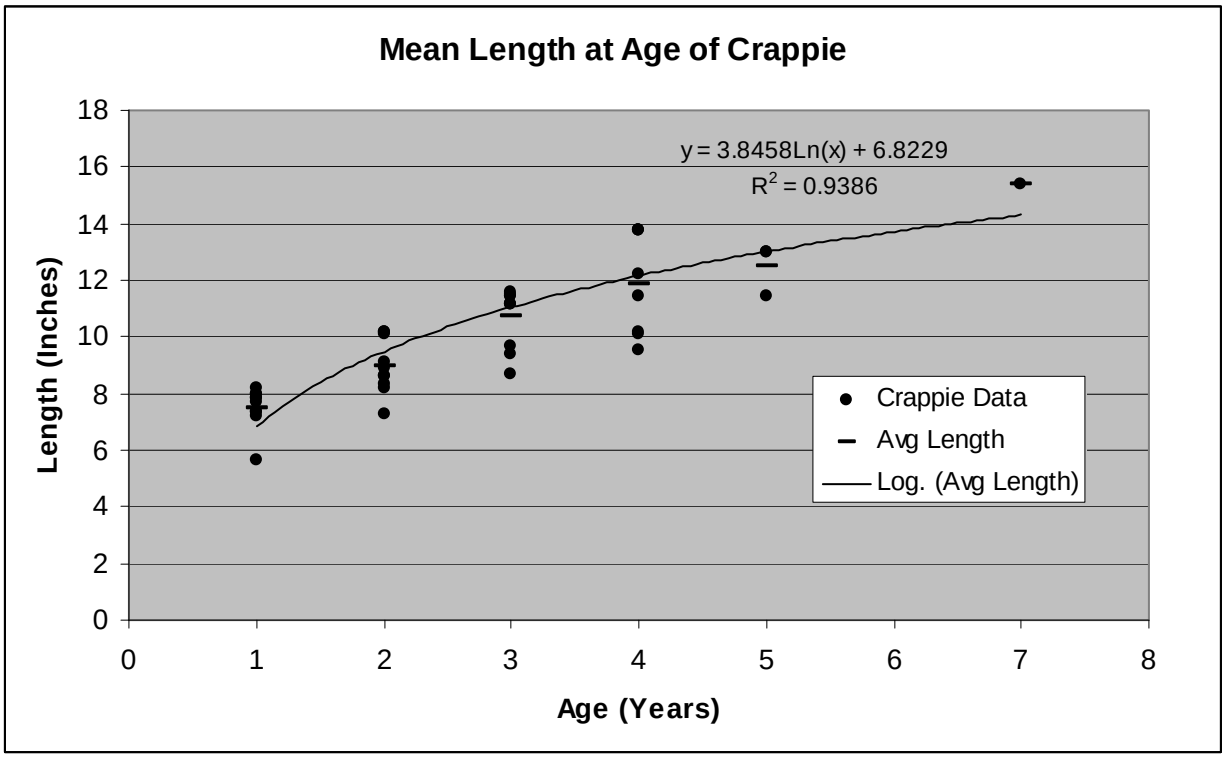

Figure 14. 1987-2001 Trap Netting at Fort Gibson Lake. Mean Length at Age, All Crappie Combined.

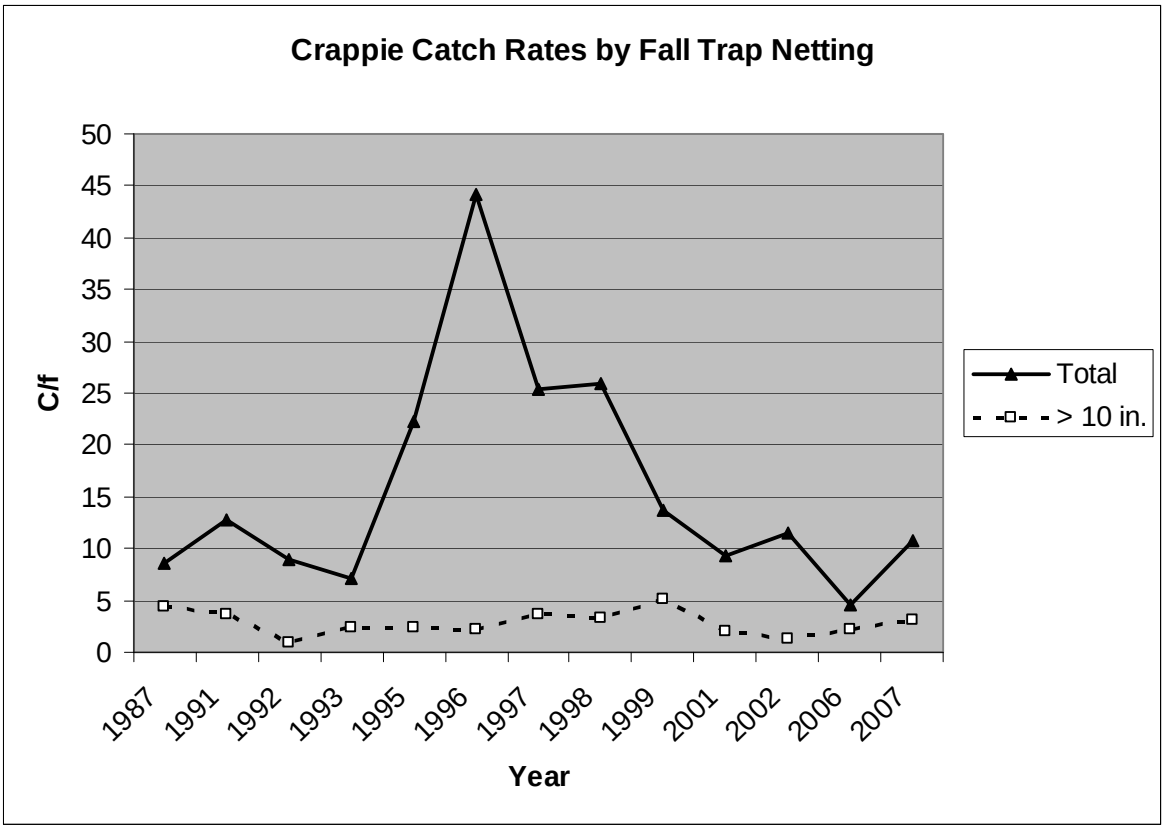

Figure 15. 1987-2007 Crappie Catch Rates by Fall Trap Netting at Fort Gibson Lake. (*Note: 10" Crappie length limit went into effect in 1996.)

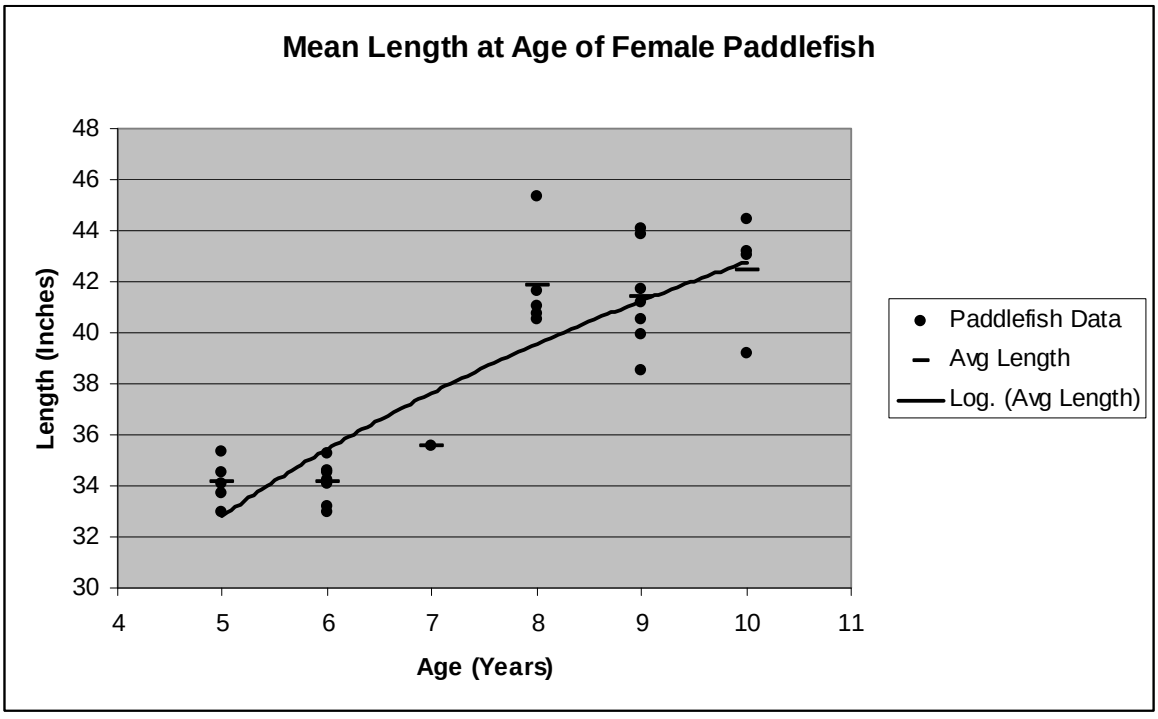

Figure 16. 2004-2005 Gillnetting at Fort Gibson Lake. Mean Lenth at Age, Female Paddlefish.

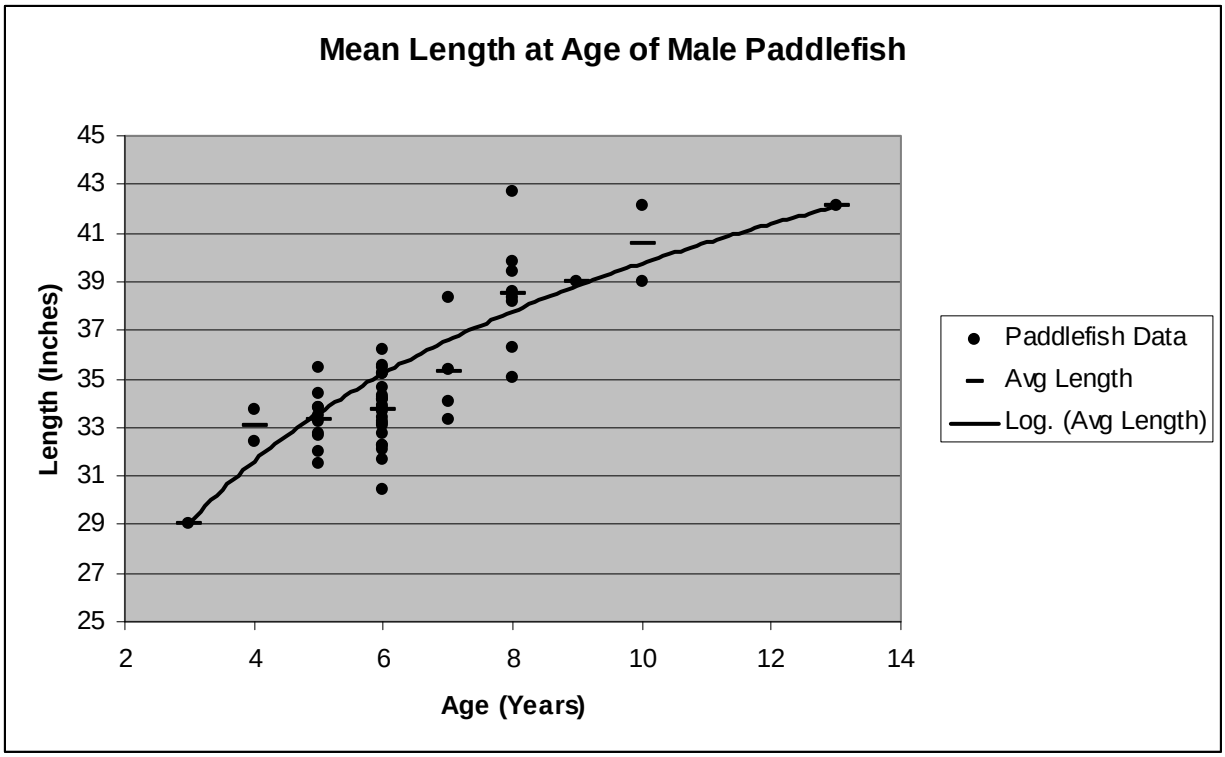

Figure 17. 2004-2005 Gillnetting at Fort Gibson Lake. Mean Length at Age, Male Paddlefish.

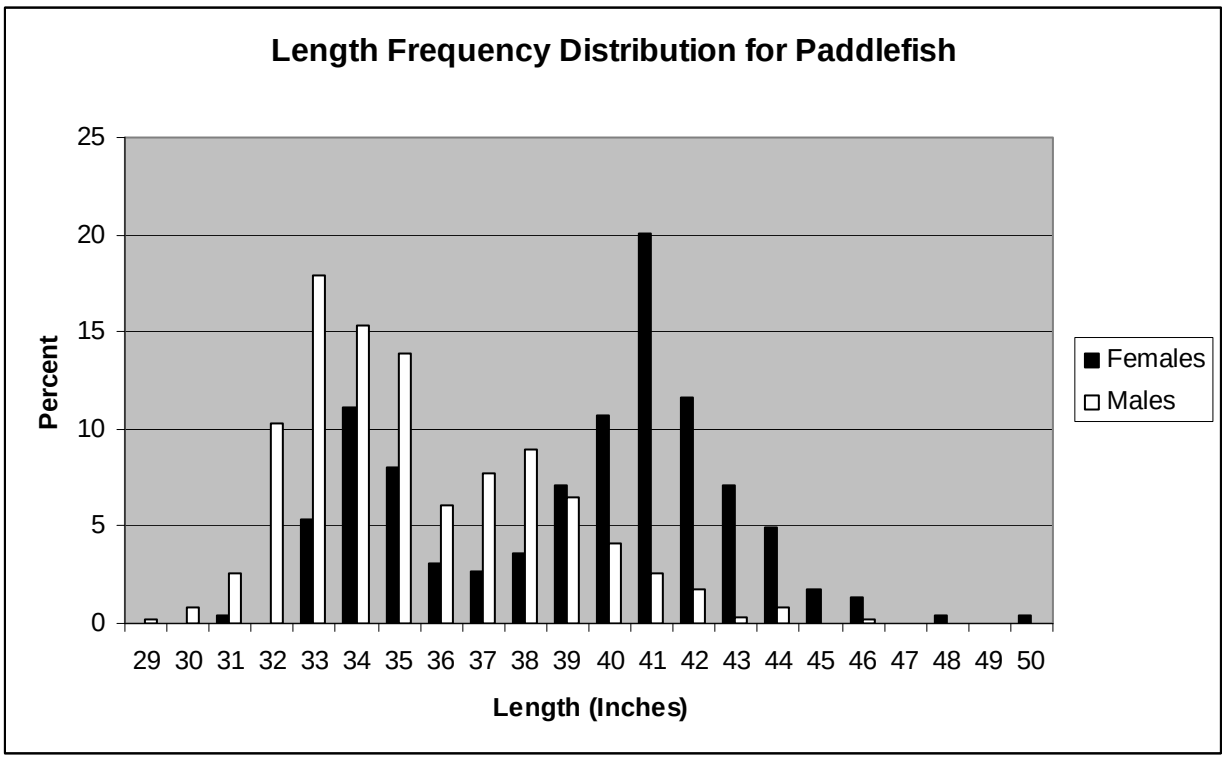

Figure 18. 2004-2005 Gillnetting at Fort Gibson Lake. Length Frequency Distribution for Male and Female Paddlefish.