

**DRIPPING SPRINGS LAKE**  
**5 YEAR**  
**LAKE MANAGEMENT PLAN**



**FISHERIES DIVISION**  
**CENTRAL REGION**

**OKLAHOMA DEPTMENT OF**  
**WILDLIFE CONSERVATION**

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## Background

Dripping Springs Lake impounds Salt Creek approximately 9 miles southwest of the town of Okmulgee in Okmulgee County, Oklahoma (Figure 1). It covers 1,150 surface acres and impoundment began in 1976, but the lake did not completely fill until 1979. The lake is owned by the City of Okmulgee and its primary purposes are water supply, flood control, and recreation.

Dripping Springs Lake has a mean depth of 14 feet and a secchi disc visibility of around 39.7 inches in the main pool in August. Turbidity is from plankton. The lake has a shoreline length of 18 miles and a storage capacity of 16,200 acre-feet. It has stretches of shoreline covered by common reed (Phragmites australis) and fairly extensive areas of water willow (*Justicia* spp.). Five fish attractor sites utilizing sunken cedar trees have been installed by the Oklahoma Department of Wildlife Conservation (ODWC) recently. Normal pool elevation is 741 feet MSL (above Mean Sea Level). Fish habitat consists primarily of aquatic vegetation and standing timber. The dam is located at latitude N 35° 34' 26" and longitude W 96° 06' 20".

The trophic state of the reservoir as measured by the Oklahoma Water Resources Board (OWRB) using Carlson's Trophic State Index (TSI, chlorophyll-a) averaged 54 in 2008 and 2009 indicating high levels of primary productivity and nutrients. The OWRB also found the lake to be stratified thermally during the summer months and was considered as not supporting the Fish and Wildlife Propagation (FWP) use for dissolved oxygen (DO) levels due to low summertime DO levels below the thermocline. Salinity and specific conductivity levels (0.05-0.07 parts per thousand and 114.8-164.4 microsiemens per cubic centimeter, respectively) were both within the normal ranges found in Oklahoma lakes. With pH levels ranging from 6.68-7.82 the lake was found to be neutral to slightly alkaline. The OWRB also found the lake's water clarity to be excellent compared to other Oklahoma reservoirs.

According to the Oklahoma Climatological Survey (OCS), wind direction is primarily from the south to southeast with an average annual speed of 6.7 mph. Temperatures range from an average daytime high of 93 degrees in July and August to an average low of 25 degrees in January. The average rainfall in the county is 43.89 inches with May and October being the wettest months. Thunderstorms occur on about 52 days each year, predominantly in the spring and summer. Humidity ranges from 42% to 96% during the day and is highest in June and lowest in March.

The lake opened to fishing on January 1, 1980 with a 14 inch minimum length limit and five bass per day creel limit. Because of intense fishing pressure, the City of Okmulgee reduced the creel limit to three bass per day and imposed a limit of no more than 80 boats per day on the lake on April 1, 1980. The bass population became overcrowded and was managed with various length limit regulations until it came in to a more balanced condition and is currently managed as a trophy bass lake with a state regulation imposing a 16-22 inch slot length limit, and a daily creel limit of 6 bass per day of which only one may be 22 inches or longer.

## History of fishery

Major sport fish species present in Dripping Springs Lake include largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctulatus*), white crappie (*Pomoxis annularis*), white bass (*Morone chrysops*), and channel catfish (*Ictalurus punctatus*).

For many years, the largemouth bass fishery in the lake was characterized by high recruitment, creating a stunted bass population (Table 2). A series of length limit regulations and lake drawdowns have improved this situation (Table 3). Currently, Dripping Springs regularly ranks well in spring electrofishing catch rates among lakes over 1,000 acres surveyed by the ODWC. In the last 10 years, catch per hour (C/h) for all size classes of bass have been good (Table 2, Figure 2). Largemouth bass continued to grow until age 8 after which growth was variable (Table 4).

Several stockings of Florida strain largemouth bass have been made in the lake (Table 1). The most recent electrophoresis results (2009) indicated 2.6% of the bass sampled during spring electrofishing were pure Florida strain largemouth bass. Despite this low percentage of pure Florida bass, 89.5% of the largemouth bass population carried Florida bass genes.

Dripping Springs Lake has been managed as a trophy bass fishery since January 1, 2000 (Table 3). At that time, a 6 bass per day creel limit and a 16-22 inch slot length limit with only one bass 22 inches or longer per day was implemented. This regulation was imposed to improve the trophy bass fishing potential of the lake and encourage the harvest of smaller bass to prevent over-population.

Spotted bass have been present in the lake since its impoundment and exist at varying abundance levels (Table 5 Figure 3).

White crappie are present in the lake at low to moderate abundance levels but have decreased in the most recent gillnetting survey in 2010 (Table 6, Figure 4).

White bass catch rates in gill netting at Dripping Springs Lake have varied over the years (Table 7). Catch per net night has ranged from a low of 0.48 (1987) to a high of 10.32 (1993). The catch per net night for quality-size white bass (>12 inches) has been good in the last two surveys (Table 7, Figure 5).

Channel catfish catch rates in gill netting at Dripping Springs Lake have been low since 1989 (Table 8, Figure 6). The catch per net night for quality-size individuals (>16 inches) in 2010 gill netting (2.54/ net set) however, was above the minimum acceptable rate for a quality fishery (>1.2/net set; Table 8).

The abundance of gizzard shad has improved and exceeded minimum acceptable levels for both overall abundance and abundance of <8 inch shad (Table 9).

## Threats to fishery

- Zebra mussels (*Dreissena polymorpha*) and quagga mussels (*Dreissena rostriformis bugensis*) can be transported on boats and trailers moving from infested waters. Dripping Springs is a popular bass fishery. Anglers from around the state traveling to the lake pose a significant risk of transporting these organisms unless precautions are taken. Zebra mussels are present in Eufaula Lake approximately 49 miles downstream via the Deep Fork River.
- Grass carp (*Ctenopharyngodon idella*) also represent a potential problem from ponds in the area where they are stocked for vegetation control.
- Common reed (*Phragmites australis*) exists in the lake in scattered beds and appears to be on the increase. It grows in such dense, tall beds that it blocks shoreline access to the lake.
- Stratification of the lake may become a problem. The Oklahoma Water Resources Board (OWRB) has listed the lake as not supporting the Fish and Wildlife Propagation Beneficial Use due to up to 60% of the water column having a dissolved oxygen (DO) reading of <2.0 mg/l in July at one of their sampling sites at the lake dam during the 2009 survey. This problem may become worse as it does in most lakes as they age.
- Dripping Springs and Okmulgee Lake downstream are both water supplies for the City of Okmulgee. Water is drawn from Okmulgee Lake to the City's water treatment plant. Dripping Springs is used to keep Okmulgee lake levels up during dry spells and the drought years we have recently experienced. Depending on the timing of these releases into Okmulgee Lake, the effects may be beneficial or harmful to the fish populations. If Dripping Springs is lowered in the spring just after spawning, the newly hatched fish will be exposed to higher predation but if it is done in late fall the drawdown may have little or no effect and may even be beneficial to the predator populations by pulling prey species out of the shoreline vegetation. The timing of the releases is very important.

## Management Objectives

### Sampling goals by species

- Largemouth bass – Maintain the catch rate for largemouth bass at or above 80/hr with a catch rate of bass >21 inches exceeding 3/hr.
- Encourage anglers to harvest <16 inch largemouth bass and all spotted bass to reduce competition and promote good largemouth bass growth rates. It is hoped that the removal of the statewide creel limit on spotted bass will encourage spotted bass harvest and reduce competition with largemouth bass for forage in the lake.
- Conduct spring electrofishing surveys at least bi-annually to monitor progress. Collect age and growth data and evaluate Florida largemouth bass stocking success by collecting fish periodically for genetic analysis.
- White crappie - Continue periodic monitoring of the white bass population with gillnetting surveys and collect age and growth data.

- White bass - Continue periodic monitoring of the white bass population with gillnetting surveys and collect age and growth data.
- Channel catfish - Maintain a catch rate of 4.8/net set of gill netting and conduct gillnetting surveys every 3-5 years to monitor population status.

### Strategies to achieve sampling goals

#### 1. Stockings

- Continue stockings of Florida-strain largemouth bass to maintain a high percentage of pure Florida largemouth bass in the bass population.
- Stock 7-inch channel catfish at a rate of 20/acre as necessary to maintain their population at a satisfactory abundance level.

#### 2. Surveys

- Monitor the largemouth bass population with periodic electrofishing surveys. Collect samples for genetic evaluation and age and growth data as necessary.
- Monitor the channel catfish populations with periodic gill netting (~ 3 to 5 year intervals) and collect age and growth information.
- Conduct shad netting concurrent with other gill netting to evaluate the forage base in the lake and its effects on the predator fish populations.

#### 3. Habitat improvement

- Continue constructing fish attractor sites and maintaining and refurbishing existing sites on the lake.

#### 4. Regulations

- Maintain the current creel limit of 6 bass/day with only one over 22 inches in length. If necessary, make adjustments to these regulations to improve the size structure of the population to achieve desired catch rates for different size classes of bass.
- Conduct additional outreach to encourage harvest of spotted bass and small largemouth bass.
- Work with City of Okmulgee to allow bass tournaments (maybe paper-only or other restrictions, maybe they encourage spotted bass tournaments, etc.)

Table 1. Species, number and size of fish stocked in Dripping Springs Lake 1981 - 2011.

DATE	SPECIES	NUMBER	SIZE
1981	Channel catfish	25,000	fingerlings
	Channel catfish	13,435	growouts
	Threadfin shad	900	adults
	Inland silversides	13,500	adults
1982	Threadfin shad	5,000	adults
	Channel catfish	35,900	fingerlings
1983	Channel catfish	54,985	fingerlings
1984	Channel catfish	52,776	fingerlings
1986	Florida LMB	12,000	fingerlings
	Channel catfish	14,000	fingerlings
1987	Florida LMB	15,039	fingerlings
1988	Florida LMB	21,079	fingerlings
1989	Florida LMB	21,000	fingerlings
1990	Channel catfish	45,800	fingerlings
	Florida LMB	21,000	fingerlings
1991	Florida LMB	7,000	fingerlings
	Threadfin shad	68,000	adults
	Channel catfish	36,150	fingerlings
1997	Florida LMB	115,000	fingerlings
	Channel catfish	53,362	fingerlings
	Bluegill	437,885	fingerlings
	Redear	154,000	fingerlings
1998	Florida LMB	114,330	fingerlings
	Channel catfish	11,868	fingerlings
1999	Florida LMB	46,680	fingerlings
	Channel catfish	11,500	fingerlings
2000	Florida LMB	23,000	fingerlings
2002	Florida LMB	24,750	fingerlings
2004	Florida LMB	24,290	fingerlings
2008	Florida LMB	23,100	fingerlings
2012	Florida LMB	114,970	fingerlings

Table 2. Total number (No.), catch rates (C/f), and relative weights ( $W_r$ ) by size groups of **largemouth bass** collected by spring electrofishing from Dripping Springs Lake (VVP 1980-1988; GPP 1989-2011). Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable  $W_r$  values are  $\geq 90$ .

Year	Total ( $\geq 40$ )		<8 in. (15-45)		8-12 in. (15-30)		$\geq 12$ in. ( $\geq 15$ )		$\geq 14$ in. ( $\geq 10$ )		$\geq 21$ in. ( $\geq 2$ )	
	No.	C/f	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$
1980	261	40.2	14.8	92	16.8	83	8.6	86	1.5	--		
1981	353	102.0	32.0	88	63.2	86	6.8	93	1.1	--		
1982	231	92.4	42.8	98	44.4	85	5.2	89	1.2	106		
1983	99	66.0	20.7	85	35.3	80	10.0	88	3.3	100		
1985	128	39.4	20.9	80	4.3	82	14.2	89	2.2	85	0.9	126
1987	121	53.8	15.1	96	25.3	89	13.3	93	8.0	98	0.0	--
1988	262	65.5	22.5	92	20.0	85	23.0	86	13.7	87	1.2	94
1989	156	78.0	23.0	98	27.0	84	28.0	90	19.0	93	1.0	110
1990	347	99.1	32.9	97	30.3	83	36.0	88	23.1	89	2.6	96
1991	321	107.0	32.3	93	34.3	91	40.3	87	17.7	90	1.3	98
1992	210	76.4	27.6	85	19.3	82	29.5	87	23.3	88	1.5	93
1993	176	70.4	15.6	92	32.4	89	22.4	86	13.2	87	2.0	94
1994	183	73.2	18.0	92	17.6	88	37.6	87	22.0	89	4.8	99
1995	168	67.2	16.4	83	14.4	84	36.4	88	23.2	89	5.2	97
1999	172	114.7	48.0	83	37.3	81	29.3	100	24.0	101	5.3	99
2000	431	172.4	94.4	87	53.2	84	24.8	92	16.0	94	2.8	94
2001	228	130.3	46.9	86	55.4	81	28.0	89	17.1	94	2.3	110
2003	587	130.4	48.7	88	49.1	84	32.7	90	15.3	95	1.6	91
2005	513	114.0	40.0	84	40.4	85	33.6	89	15.3	92	0.9	108
2009	497	110.4	29.6	94	17.1	97	63.7	91	33.6	91	3.3	95
2010	589	130.9	57.8	102	95.5	96	35.3	95	24.2	96	3.3	103
2011	439	97.5	23.8	107	32.4	95	41.6	91	22.9	94	2.67	99

Table 3. History of bass population management changes implemented on Dripping Springs Lake.

Year	Change
1980	14 inch minimum length limit
1981	13-15 inch slot length limit
1982	Fall drawdown of the lake
1983	Fall drawdown of the lake
1986	12-15 inch slot length limit
1987	14-21 inch slot length limit
1991	17-22 inch slot length limit
1996	Severe drawdown of the lake to <20 acres for outlet tower repair
2000	16-21 inch slot length limit implemented

Table 4. Mean length (inches) at age of largemouth bass collected by electrofishing from Dripping Springs Lake.

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Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 12
2010	6.8	9.5	12.7	15.4	17.7	18.8	19.3	21.3	20.4	22.4	21.12

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Table 5. Total number (No.), catch rates (C/f), and relative weights ( $W_r$ ) by size groups of **spotted bass** collected by spring electrofishing (VVP 1980-1988; GPP 1989-2011) from Dripping Springs Lake. Acceptable  $W_r$  values are  $\geq 90$ .

Year	Total		<8 in.		8-12 in.		$\geq 12$ in.		$\geq 14$ in.	
	No.	C/f	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$
1980	0	0.0	0.0	--	0.0	--	0.0	--	0.0	--
1981	1	0.3	0.0	--	0.3	--	0.0	--	0.0	--
1982	0	0.0	0.0	--	0.0	--	0.0	--	0.0	--
1983	1	0.7	0.0	--	0.7	--	0.0	--	0.0	--
1985	0	0.0	0.0	--	0.0	--	0.0	--	0.0	--
1987	0	0.0	0.0	--	0.0	--	0.0	--	0.0	--
1988	7	1.7	0.5	--	0.5	71	0.7	77	0.0	--
1989	5	2.5	0.5	--	2.0	78	0.0	--	0.0	--
1990	26	7.4	3.1	--	2.9	72	1.4	70	0.0	--
1991	18	6.0	0.7	66	5.0	79	0.3	85	0.0	--
1992	22	8.0	1.8	72	5.5	76	0.7	79	0.0	--
1993	25	10.0	2.0	74	8.0	82	0.0	--	0.0	--
1994	23	9.2	2.4	63	6.0	75	0.8	77	0.0	--
1995	27	10.8	5.6	66	4.4	82	0.8	73	0.0	--
1999	2	1.3	0.7	76	0.0	--	0.7	97	0.0	--
2000	7	2.8	0.4	85	2.4	83	0.0	--	0.0	--
2001	5	2.9	1.1	94	1.7	80	0.0	--	0.0	--
2003	11	2.4	0.0	--	2.4	83	0.0	--	0.0	--
2005	22	4.9	0.7	80	3.8	79	0.7	78	0.0	--
2010	42	9.3	4.9	103	2.7	96	1.8	78	0.7	78
2011	23	5.1	0.7	105	4.4	96	0.2	82	0.2	82

Table 6. Total number (No.), catch rates (C/f), and relative weights ( $W_r$ ) by size groups of **crappie** collected by gill netting from Dripping Springs Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable  $W_r$  values are  $\geq 90$ .

Year	Total ( $\geq 4.8$ )		<8 in. (1.2-7.2)		$\geq 8$ in. ( $\geq 1.92$ )		$\geq 10$ in. ( $\geq 0.96$ )	
	No.	C/f	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$
1987	10	2.16	1.2	94	1.2	85	0.24	86
1989	12	2.64	1.68	97	1.2	87	0.96	86
1991	13	2.40	2.40	90	0.00	--	0.00	--
1993	23	4.32	3.12	80	1.44	83	0.96	84
2010	11	1.08	0.22	91	0.86	85	0.29	79

Table 7. Total number (No.), catch rates (C/f), and relative weights ( $W_r$ ) by size groups of **white bass** collected by gill netting from Dripping Springs Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable  $W_r$  values are  $\geq 90$ .

Year	Total ( $\geq 4.8$ )		<8 in. ( $\geq 1.2$ )		8-12 in. (1.2-7.2)		$\geq 12$ in. ( $\geq 2.4$ )	
	No.	C/f	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$
1987	2	0.48	0.00	--	0.00	--	0.48	103
1989	6	1.44	0.72	96	0.00	--	0.72	95
1991	28	5.28	0.00	--	3.12	84	1.92	92
1993	54	10.32	1.92	84	0.48	90	8.16	87
2010	59	5.9	0.5	88	1.2	85	4.22	84

Table 8. Total number (No.), catch rates (C/f), and relative weights ( $W_r$ ) by size groups of **channel catfish** collected by gill netting from Dripping Springs Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable  $W_r$  values are  $\geq 90$ .

Year	Total ( $\geq 4.8$ )		<12 in. ( $\geq 2.4$ )		$\geq 12$ in. ( $\geq 2.4$ )		$\geq 16$ in. ( $\geq 1.2$ )	
	No.	C/f	C/f	$W_r$	C/f	$W_r$	C/f	$W_r$
1987	53	12.0	1.2	82	10.8	80	1.68	90
1989	13	2.88	0.00	--	2.88	83	2.4	83
1991	6	1.2	0.24	113	0.96	83	0.48	84
1993	16	3.12	1.2	77	1.92	79	0.96	81
2010	34	3.43	0.0	--	3.43	84	2.54	85

Table 9. Total number (No.), catch rates (C/f), and relative weights ( $W_r$ ) by size groups of **gizzard shad** collected by spring electrofishing (VVP 1980-1988; GPP 1989-2010), gill netting, and seining from Dripping Springs Lake. Numbers in parentheses represent acceptable C/f values for a quality forage supply. Acceptable  $W_r$  values are  $\geq 90$ .

Year	Spring Electrofishing				Fall Gillnetting				Seining	
	Total ( $\geq 40$ )	<200 mm ( $\geq 20$ )			Total ( $\geq 4.8$ )	<8 in. ( $\geq 2.4$ )			Age 0 -	
	No.	C/f	C/f	$W_r$	No.	C/f	C/f	$W_r$	No.	C/f
1980	181	27.8							0	0.00
1981	50	14.3	0.0						15	0.74
1982	26	10.4	0.0	--					0	0.00
1983	165	110.0	0.0	--					0	0.00
1985	33	10.2	1.5	70	8	1.44	0.48	84	0	0.00
1987	78	34.7	11.6	91	40	9.12	5.66	91	0	0.00
1988	150	37.5	16.0	85						
1989	85	42.5	4.0	91	19	4.32	2.16	75	0	0.00
1990	81	23.1	2.6	88					0	0.00
1991	70	31.1	15.6	76	10	0.08	0.02	--	0	0.00
1992	39	17.3	0.4	70						
1993	117	46.8	0.8	--	17	3.36	3.36	80		
1994	110	44.0	0.0	--						
1995	66	37.7	2.3	81						
1999	61	40.7	14.0	--						
2000	59	47.2	0.0	--						
2001	35	20.0	0.0	--						
2010					79	7.8	3.8	--		



Figure 1. Dripping Springs Lake

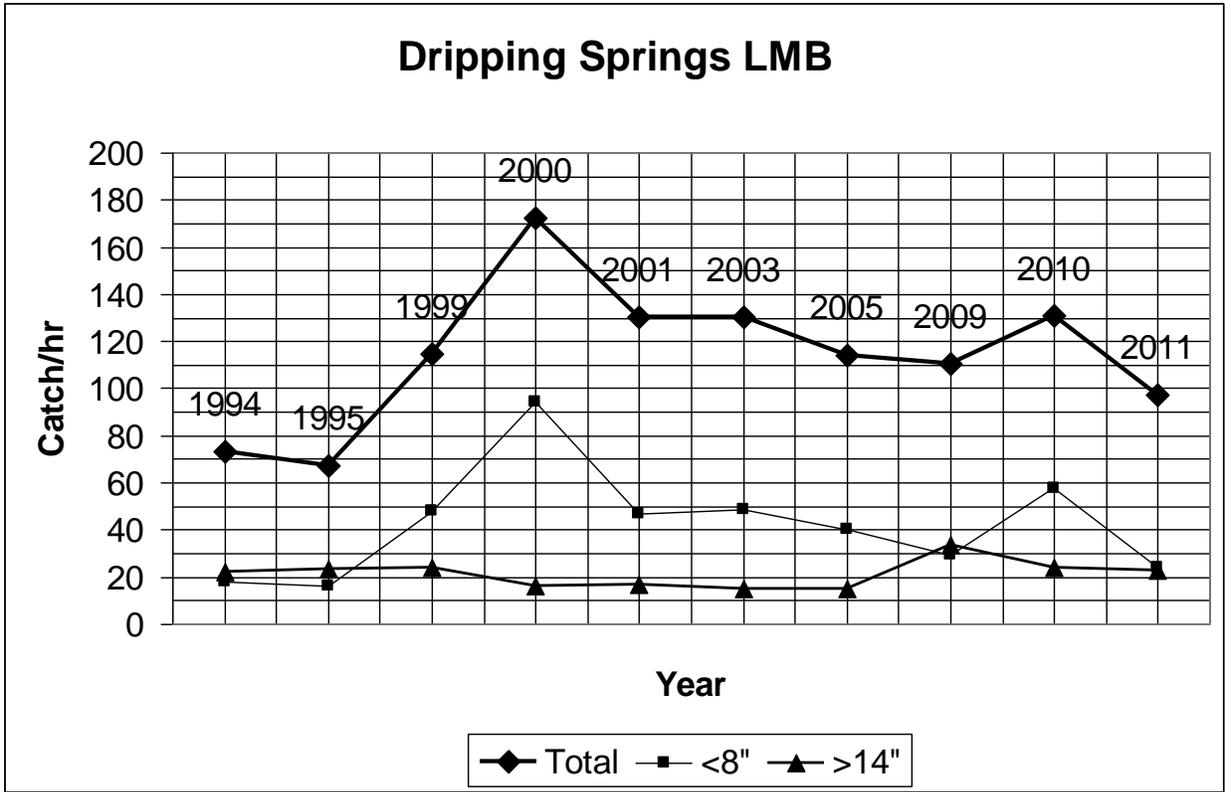


Figure 2. Largemouth bass catch per hour (C/f) by electrofishing in Dripping Springs Lake 1994 - 2011.

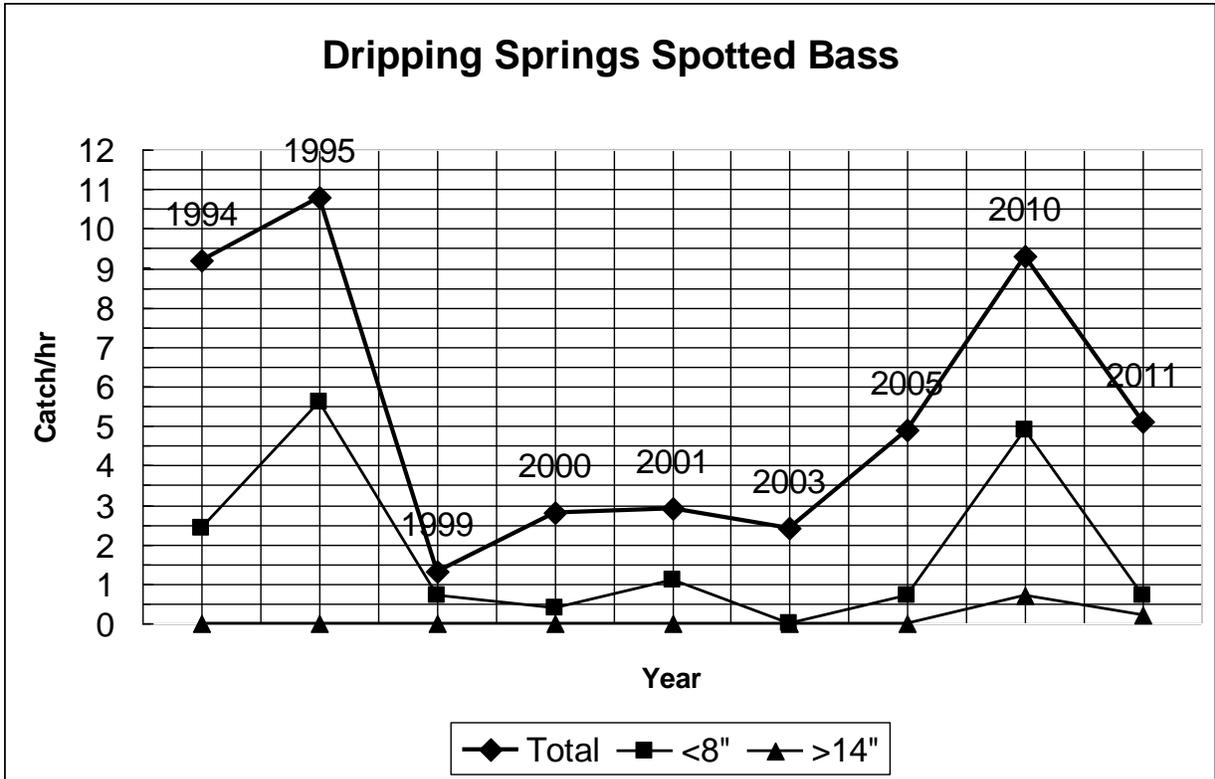


Figure 3. Spotted bass catch per hour (C/f) by electrofishing in Dripping Springs Lake 1994 - 2011.

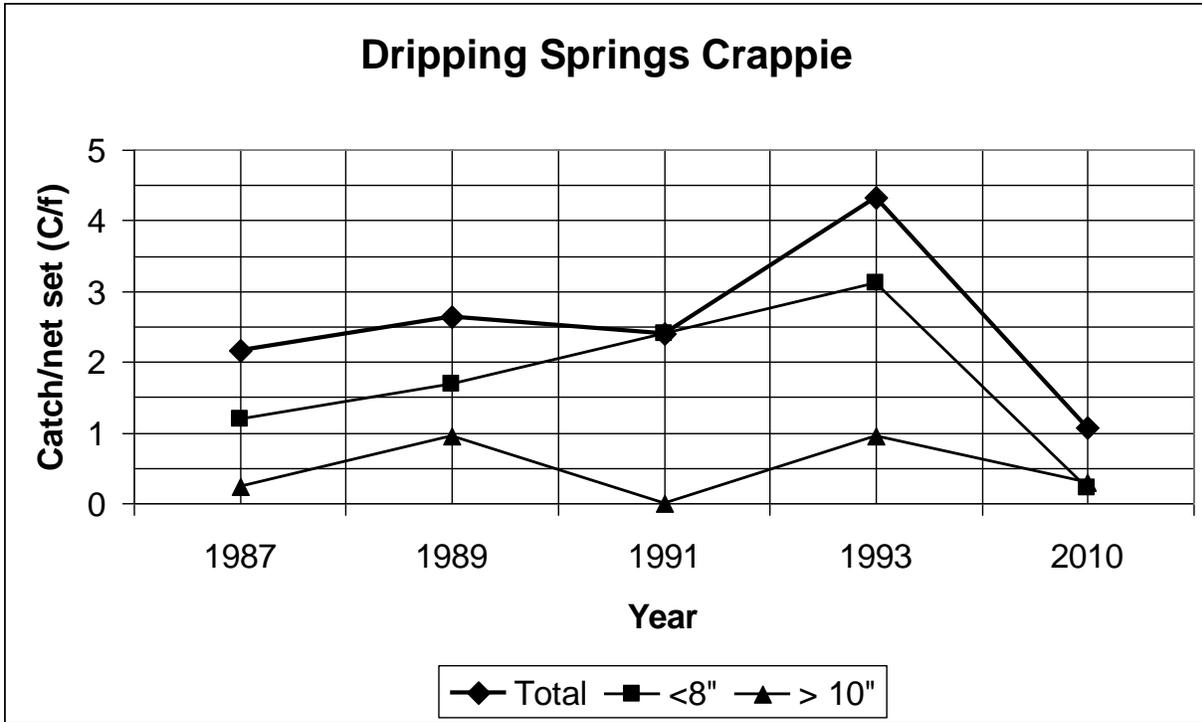


Figure 4. Crappie catch per net set (C/f) in Dripping Springs Lake 1987 - 2010.

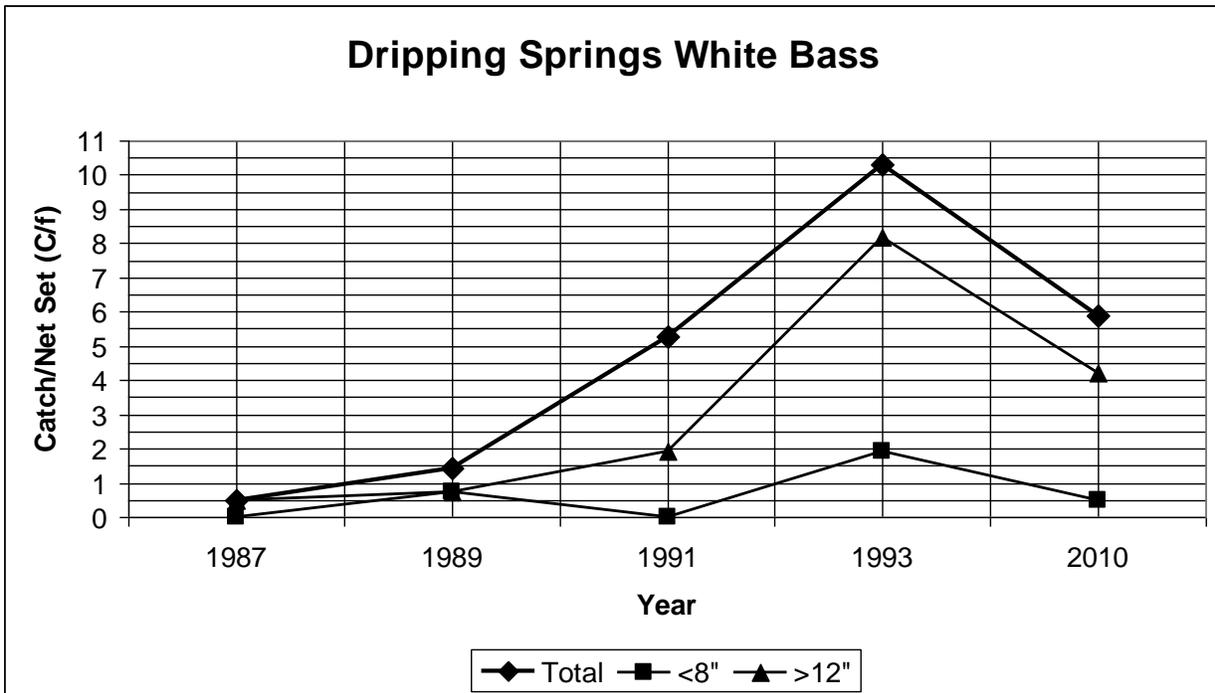


Figure 5. White bass catch per net set (C/f) in Dripping Springs Lake 1987 - 2010.

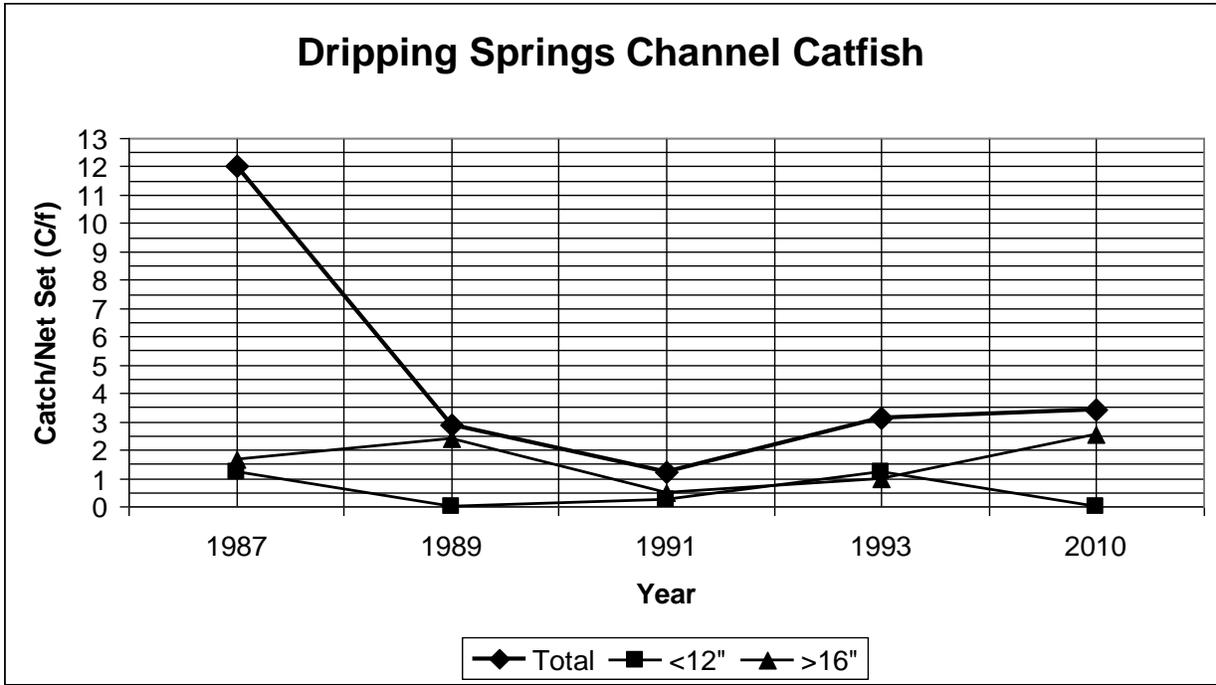


Figure 6. Channel catfish catch per net set (C/f) in Dripping Springs Lake 1987 - 2010.