**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 l). 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 350 34’ 26” and longitude W 960 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/f) 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 rostiformis 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 (Wr) 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 Wr values are 90.

 Total <8 in. 8-12 in. 12 in. 14 in. 21 in.

 (40) (15-45) (15-30) (15) (10) (2)

Year No. C/f C/f Wr C/f Wr C/f Wr C/f Wr C/f Wr

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

1. 14 inch minimum length limit
2. 13-15 inch slot length limit
3. Fall drawdown of the lake
4. Fall drawdown of the lake
5. 12-15 inch slot length limit
6. 14-21 inch slot length limit
7. 17-22 inch slot length limit
8. Severe drawdown of the lake to <20 acres for outlet tower repair
9. 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 Age9 Age 10 Age 12

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2010 6.8 9.5 12.7 15.4 17.7 18.8 19.3 21.3 20.4 22.4 21.12

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

 Total <8 in. 8-12 in. 12 in. 14 in.

Year No. C/f C/f Wr C/f Wr C/f Wr C/f Wr

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 (Wr) 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 Wr values are 90.

 Total <8 in. 8 in. 10 in.

 (4.8) (1.2-7.2) (1.92) (0.96)

Year No. C/f C/f Wr C/f Wr C/f Wr

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 (Wr) 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 Wr values are 90.

 Total <8 in. 8-12 in. 12 in.

 (4.8) (1.2) (1.2-7.2) (2.4)

Year No. C/f C/f Wr C/f Wr C/f Wr

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 (Wr) 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 Wr values are 90.

 Total <12 in. 12 in. 16 in.

 (4.8) (2.4) (2.4) (1.2)

Year No. C/f C/f Wr C/f Wr C/f Wr

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 (Wr) 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 Wr values are 90.

 Spring Electrofishing Fall Gillnetting Seining

 Total <200 mm Total <8 in. Age 0

 (40) (20) (4.8) (2.4) -

Year No. C/f C/f Wr No. C/f C/f Wr 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 --

![Dripping_Springs[1]]()

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.