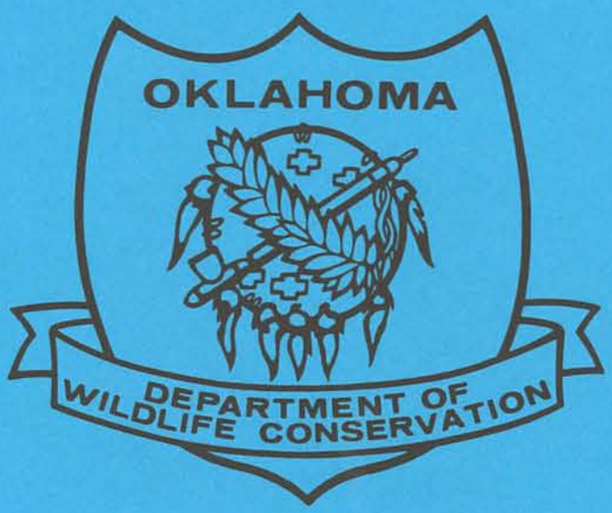
SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

LAKE LAWTONKA

1992

Job Performance Report

Oklahoma Fisheries Management Program

Federal Aid Project No. F 44-D-5

Fish Management Survey and Recommendations

for

Lake Lawtonka

Prepared by Larry Cofer

INTRODUCTION

Lake Lawtonka impounds Medicine Creek, a tributary of East Cache Creek, 20 km northwest of Lawton in Comanche County, Oklahoma (Fig. 1). Lake Lawtonka covers 960 surface hectares and was originally constructed in 1905 by the City of Lawton. At least two extensions were completed subsequently to bring the dam to its present height. Lawtonka has a mean depth of 8 m and a maximum of 30 m, a water exchange rate of 0.3, and a secchi disc visibility of around 100 cm in the main pool in August; turbidity is primarily from plankton. Fish habitat consists of flooded aquatic vegetation at the north end (at normal pool), native rock outcrops in the south end, and sparse flooded timber in coves. Major fisheries are for bass, crappie, channel catfish, white bass and walleye. The lake receives heavy angling pressure from Lawton/Ft. Sill and surrounding communities.

Annual water level drawdowns from domestic water supply use by Lawton/Ft. Sill are detrimental to cover-oriented species like bass and crappie. The reduced pool also causes sporadic shad spawning that limits production of pelagic species like walleye and white bass. Former fish population surveys indicated a below-average bass population and sporadic walleye and white bass recruitment. Channel catfish numbers have been consistently below average, despite annual stockings.

Intensive supplemental walleye fingerling and fry stockings have been attempted since 1984 at Lawtonka. Florida bass stocked in the 1970's produced a state record largemouth bass in 1983,

RESULTS

Largemouth Bass

1. Largemouth bass abundance from 1992 spring electrofishing (C/f=21.5) was below the minimum acceptable value for a quality fishery (C/f=40). The total bass C/f has been stable in recent sample years (Table 2).
2. The abundance of bass in all size groups was below acceptable values. The abundance of bass >356 mm was stable in recent samples.
3. Body condition values (W_r) were satisfactory for all size groups. Condition values for all size groups have been stable in recent samples.
4. Results of electrophoretic testing indicate that, of the 1991 year class, 2% were pure Florida strain, 9% were F_1 hybrids, 40% were F_x hybrids, and 49% were pure northern strain bass.
5. Poor bass recruitment remains a chronic problem at Lake Lawtonka, and the minimum length limit is still needed to limit harvest of fish below 356 mm.

Spotted Bass

1. The spotted bass C/f from 1992 spring electrofishing was 3.7. The total spotted bass C/f declined by half from the 1989 value (Table 3).
2. The abundance of spotted bass <200 mm and 200-299 mm declined since 1989.
3. Body condition values (W_r) were unsatisfactory for all size

4. The catch rate of small crappie was Lawtonka's best in the last five years. However, larger crappie were poor in abundance and condition.

White bass

1. White bass abundance from 1992 fall gillnetting (C/f=0.08) was below the minimum acceptable value for a quality fishery (C/f= 0.2). The total white bass C/f has declined in recent sample years (Table 6).
2. The abundance of all white bass size groups was below acceptable values. The abundance of white bass >300 mm declined in recent samples.
3. Body condition values (W_r) were satisfactory for white bass <200 mm, but larger white bass were in poor condition. Condition values for white bass >200 mm have declined in recent samples.
4. The catch rate and condition values for adult white bass declined dramatically in recent years, possibly reflecting a scarcity of forage-size shad.

Walleye

1. Walleye abundance from 1992 fall gillnetting (C/f=0.08) was below the minimum acceptable value for a quality fishery (C/f= 0.1). The total walleye C/f from gillnetting has been stable in recent sample years (Table 7). Walleye abundance from 1992 fall-night electrofishing (C/f=0.9) was below the minimum acceptable value for a quality fishery (C/f= 15). The total walleye C/f from electrofishing has declined in recent sample years (Table 8).

Flathead Catfish

1. Three flatheads were collected in 1992 by gillnetting. This low catch rate has been stable in recent years.

Bluegill

1. Bluegill abundance from 1992 spring electrofishing (C/f=45) was comparable to the minimum acceptable value for a quality forage supply. The total bluegill C/f has been stable in recent sample years (Table 10).
2. The abundances of bluegill <75 mm and 75-149 mm were satisfactory, while those >150 mm were below acceptable values. The abundances of all bluegill size groups were stable in recent samples.
3. Body condition values (W_r) were satisfactory for all size groups. Condition values for all size groups have been stable in recent samples.

Gizzard Shad

1. Shad abundance from 1992 spring electrofishing (C/f=48) was comparable to the minimum acceptable value (C/f= 40). Shad abundance from 1992 fall gillnetting (C/f=0.05) was below the minimum acceptable value (C/f= 0.2). The total shad C/f increased in electrofishing from 1989, but was stable in recent sample years for gillnetting (Table 11).
2. In spring electrofishing, the abundance of shad <200 mm was below the acceptable value, indicating an unsatisfactory forage supply. In fall gillnetting, the abundance of shad <200 mm was again below the acceptable value, indicating an unsatisfactory forage supply. The abundance of shad <200 mm

RECOMMENDATIONS

Habitat Enhancement

1. The City of Lawton should implement a water conservation plan to maintain summer water levels in Lawtonka to the extent possible. This would improve bass and crappie abundances and shad spawning conditions.

Fish Attractor Structures

1. All existing fish attractors should be refurbished by 1994.

Fish Stockings

1. Saugeye fingerlings should be stocked in alternate years (50 mm, @ 50/hectare- 48,000) in lieu of walleye, beginning in 1993 . Alternate-year stockings may reduce chronic problems with low predator weights caused by poor shad production.
2. Florida bass (75 mm, @ 25/hectare- 24,000) should be stocked periodically to maintain Lawtonka's proven trophy bass potential.
3. Larger channel catfish fingerling (>175 mm) stockings should be attempted to improve catch rates.

Fish Surveys

1. Spring electrofishing should be conducted again by 1996 to assess the 356 mm (14-inch) minimum length limit for bass, established by the City in 1991.
2. A fall gillnet survey should be conducted again to assess larger stocked channel catfish.
3. Fall-night electrofishing should be conducted in 1993 to assess natural smallmouth bass reproduction and saugeye survival.

Table 1. Species, number and size of fish stocked in Lake Lawtonka, 1980-1992.

DATE	SPECIES	NUMBER	SIZE
1980	Channel catfish	23,080	Fingerling
1981	Largemouth bass	242,895	Fingerling
1981	Channel catfish	40,000	Fingerling
1982	Channel catfish	35,000	Fingerling
1983	Channel catfish	62,522	Fingerling
1984	Walleye	294,000	Fingerling
1984	Channel catfish	36,842	Fingerling
1985	Walleye	231,830	Fry
1985	Channel catfish	55,900	Fingerling
1986	Walleye	24,000	Fingerling
1986	Channel catfish	48,000	Fingerling
1987	Walleye	34,000	Fingerling
1987	Florida LMB	25,121	Fingerling
1987	Channel catfish	47,239	Fingerling
1988	Channel catfish	14,436	Fingerling
1988	Walleye	24,000	Fingerling
1988	Largemouth bass	1,000	Fingerling
1989	Intergrade LMB	24,000	Fingerling
1989	Channel catfish	24,000	Fingerling
1990	CFLMB	6,0000	Fingerling
1990	Channel catfish	24,000	Fingerling
1990	IFLMB	36,300	Fingerling
1990	Smallmouth bass	20,048	Fingerling
1990	Walleye	624,000	Fry
1991	Channel catfish	49,112	Fingerling
1991	Walleye	720,000	Fry
1991	Smallmouth bass	24,000	Fingerling
1992	Channel catfish	51,684	Fingerling
1992	Smallmouth bass	24,000	Fingerling
1992	CFLMB	8,664	Fingerling
1992	Threadfin shad	5,000	Adults
1992	Walleye	1,200,000	Fry

Table 4. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **smallmouth bass** collected by fall-night electrofishing from Lake Lawtonka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥15)		<200 mm -		200-299 mm -		≥300 mm -		≥356 mm -	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1990	19	9.5	9.0	-	0.5	-	0	-	0	-
1991	55	36.7	18.7	-	16	-	2	-	0	-
1992	25	11.1	2.2	-	8.5	-	0.4	-	0.4	-

Table 5. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **crappie** collected by gill netting from Lake Lawtonka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥.20)		<200 mm (.05-.30)		≥200 mm (≥.08)		≥250 mm (≥.04)	
Year	No.	C/f	C/f	W	C/f	W_r	C/f	W_r
1977	5	0.10						
1979	15	0.13						
1981	7	0.07						
1982	3	0.03						
1984	10	0.08						
1985	59	0.30						
1987	50	0.22	0.03	>90	0.19	>100	0.04	>100
1988	43	0.20	0.06	92	0.15	>100	0.04	>100
1989	37	0.12	0.09	93	0.03	117	0.01	117
1990	10	0.04	0.02	110	0.02	112	0.004	92
1992	56	0.23	0.18	92	0.05	89	0.02	87

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

	Total (>.10)		<300 mm (≥.06)		300-399 mm (≥.02)		≥400 mm (≥.02)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1977	11	0.23						
1979	17	0.14						
1981	35	0.36						
1982	29	0.29						
1984	19	0.16						
1985	12	0.06						
1987	21	0.09	0.04	>90	0.02	>90	0.03	>90
1988	12	0.06	0.04	>90	0	-	0.02	>90
1989	30	0.10	0.06	105	0.03	100	0.01	101
1990	10	0.04	0.004	95	0.03	92	0.01	101
1992	18	0.08	0.01	96	0	-	0.06	88

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

	Total (≥15)		<300 mm (≥10)		300-399 mm (≥3)		≥400 mm (≥2)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1990	25	6.7	1.6	-	2.4	-	2.7	-
1991	4	2.7	0.7	100	2.0	92	0	-
1992	2	0.9	0.4	-	0	-	0.4	-

Table 11. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **bluegill** collected by spring electrofishing from Lake Lawtonka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥45)		<75 mm (≥10)		75-149 mm (20-100)		≥150 mm (≥15)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1989	121	34.6	9.7	-	18.6	107	6.3	97
1992	179	44.8	11	-	28.5	104	5.25	103

Table 12. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **gizzard shad** collected by spring electrofishing, gill netting, and seining from Lake Lawtonka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Spring Electrofishing Total (≥40)		<200 mm (≥20)		Fall Gillnetting Total (≥.20)		<200 mm (≥.10)	
Year	No.	C/f	C/f	W	No.	C/f	C/f	W
1977						0.04		
1979						0.18		
1981						0.05		
1982						0.34		
1984						0.09		
1985						0.10		
1987						0.14	0	-
1988						0.04	0	-
1989	22	5.2	0.2	-	?	0.03	0	-
1990					?	0.06	0.004	98
1992	143	48	7.3	103	13	0.05	0	-

* Seven adult threadfin shad (121-140 mm) were collected by gillnetting from Lawtonka in 1992. Around 20 adults were also captured during a fall-night electrofishing run at the north end; these comprised around 10% of the total shad seen that night.

Figure 2. Length limit determination graph for Lake Lawtonka, 1989 and 1992.