SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

FISH MANAGEMENT SURVEYS AND RECOMMENDATIONS

FOR

LAKE PAWHUSKA

1998

Performance Report

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LAKE PAWHUSKA

ABSTRACT

Lake Pawhuska was sampled by fall night electrofishing in 1990 and 1991 and by spring night electrofishing in 1998 to determine the survival of stocked smallmouth bass and to collect trend data on largemouth and spotted bass populations. Smallmouth bass abundance was very low but natural recruitment was documented for the fist time. Largemouth and spotted bass abundance and size structure was satisfactory for quality fisheries but excessive recruitment and competition appeared to be occurring for sub-adult fish.

Recommendations were made to impose a slot length limit of 330 -406mm on largemouth and spotted bass and a minimum length limit of 406mm on smallmouth bass. Other recommendations included the need for additional angler access facilities and the refurbishing of existing fish attractors.

INTRODUCTION

Lake Pawhuska impounds an unnamed tributary of Clear Creek, 4.8 km west and 3.2 km south of Pawhuska in Osage County, Oklahoma (Figure 1). Pawhuska Lake covers 38 hectares and was constructed in 1936 by the WPA for a municipal water supply. Lake Pawhuska has a mean depth of 8.8m and a maximum depth of approximately 11m, a shoreline development ratio of 2.2, a water exchange rate of 0.3, and a secchi disk visibility of 183cm in the main pool in August; turbidity is primarily from plankton blooms. Fish habitat consists primarily of a rocky bottom substrate and a narrow strip of emergent aquatic vegetation (Dianthea sp.) along most of the shoreline. Pawhuska Lake is a major put and take winter trout fishery from November 1 through March 31, annually.

Recent fish stockings include smallmouth bass and rainbow trout (Table 1). A boating/fishing access development project was completed in 1997. Facilities constructed include an access road, parking area, restrooms, boat ramps and a boat/fishing dock.

Pawhuska Lake was sampled in 1998 by night spring electrofishing to evaluate the "black bass" populations and to determine the extent of trout carry over into late spring. Fall night electrofishing was conducted in 1990 and 1991 to evaluate the survival of stocked fingerling smallmouth bass.

RESULTS

Largemouth Bass

1. Largemouth bass abundance from 1998 spring electrofishing (C/f=112) was well above the minimum acceptable value for a quality fishery (C/f=40). Bass abundance from 1990 and 1991 fall night electrofishing (C/f=83 and 104, respectively) was also above the minimum value for a quality fishery. The total bass C/f has increased in recent sample years (Table 2).
2. In 1998 spring electrofishing, the abundance of all bass size groups was satisfactory. In 1990 fall night electrofishing, the abundance of bass < 200mm was satisfactory, while those 200 - 299 and > 300mm were above and below, respectively, acceptable values. Bass abundance in 1991 fall night electrofishing, was satisfactory for < 200mm fish, while those 200 - 299 and > 356mm were above and below, respectively, the acceptable values. The abundance of all bass size groups has fluctuated in recent samples.
3. Body condition values (W_r) were satisfactory for all size groups of bass. Condition values for all size groups have been stable in recent samples.
4. Abundance, size structure and body condition values were generally acceptable at Pawhuska Lake, indicating a quality largemouth bass fishery.

Spotted bass

1. Spotted bass abundance from 1998 spring electrofishing (C/f=87.8) was acceptable for a quality fishery (C/f=40). The

abundance of bass from 1990 and 1991 fall night electrofishing was also acceptable for a quality fishery. The total bass C/f has generally increased in recent sample years (Table 3).

2. In 1998 spring and fall night electrofishing, the abundance of all spotted bass size groups was generally satisfactory, except for fish > 300mm in 1990. The abundance of bass size groups has been cyclic but generally increased in recent samples.
3. Body condition values (W_r) were unsatisfactory for all size groups in 1998 and have declined in recent samples.
4. Abundance, size structure and body condition values were marginally acceptable at Lake Pawhuska for a quality fishery. Low body condition values for fish < 300mm indicated intense competition for prey was probably occurring at this trophic level.

Smallmouth bass

1. In 1990 and 1991 fall night electrofishing, smallmouth bass abundance (C/f=3.0 and < 1.0, respectively) was well below the minimum acceptable value for a quality fishery (C/f=15). Smallmouth bass abundance from 1998 spring electrofishing (C/f=5.6) was also below the minimum acceptable value. The total bass C/f has increased only slightly in recent samples (Table 4 and 5).
2. The abundance of all smallmouth bass size groups from both spring and fall night electrofishing were below acceptable values. Smallmouth bass collected in 1990 and 1991 represented fish stocked in 1989 and 1990. Fish collected in

1998 represented natural recruitment which had not been previously documented.

3. Abundance and size structure of the smallmouth bass population in 1998 indicated the initial stockings in 1998, 89 and 90 probably had very limited survival. Larger smallmouth bass (122 - 216mm) stocked in 1993 should have experienced a higher survival rate and reached sexual maturity in 1997 (Table 1).

Bluegill

1. Bluegill abundance from 1998 spring electrofshing (C/f=177.8) was several fold above the minimum acceptable value for a quality prey supply (C/f= > 45). The total bluegill C/f has increased substantially in recent years (Table 6). Much of the increase in abundance can be credited to a change in electrofishing equipment after 1987 which was several times more efficient.
2. In 1998 spring electrofishing, only the abundance of bluegill > 150mm was below the minimum acceptable value. The abundance of all bluegill size groups increased since 1987.
3. Body condition values (W_r) were satisfactory for all size groups of bluegill. Condition values for all sizes of bluegill increased in 1998.
4. Abundance, size structure and body condition values for bluegill in Lake Pawhuska, indicated they were providing an abundant source of prey.

Redear

1. Redear abundance from 1987 spring electrofishing (C/f=11.7) was below the minimum acceptable values for a quality fishery

or prey supply (Table 7). Redear were not targeted for collection in subsequent surveys.

Rainbow trout

1. Only five (5) trout having a maximum length of 276mm were collected, indicating a low carry over from the last stockings in mid-March.

RECOMMENDATIONS

Fish Attractor Structure

1. All existing fish attractors should be refurbished by 2000.

Fish Stockings

1. Smallmouth bass fingerlings should be stocked at a rate of 25 fish per hectare in 1999 and 2000 to supplement low natural recruitment. These stockings, combined with limited natural recruitment, should provide an adequate brood source capable of sustaining the fishery in subsequent years.
2. The annual stockings of 41,000 catchable size rainbow trout should be continued to provide a winter time put and take fishery. Trout should be released twice monthly from November 1, through March 31.

Fishing Regulations

1. A slot length limit of 330 - 406mm is recommended for largemouth bass and spotted bass to encourage the harvest of smaller size fish which should reduce the competition for prey

at this trophic level and sustain the abundance of quality size fish.

2. A minimum 406mm length limit is recommended for smallmouth bass to protect the slowly developing population from excessive harvest.

Angler Access Improvements

1. Additional access are needed on the west side of Pawhuska Lake to accommodate heavy angler use during the annual winter trout season. Handicapped accessible restrooms, parking space and a fishing dock should be located near the existing natural boat ramp area near the west end of the dam.

2. A foot access only fishing trail should be constructed around the perimeter of the lake to facilitate bank angler access.

3. Safety barriers should be installed on the dam access roadway to prevent vehicles form accidentally leaving the road on both the upstream and downstream side.

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Table 1. Species, number and size of fish stocked in Lake Pawhuska, 1988-1998.

DATE	SPECIES	NUMBER	SIZE
1988	Smallmouth Bass (Reservoir Strain)	2,485	Fingerlings
	Smallmouth Bass (Northern Strain)	2,232	Fingerlings
1989	Smallmouth Bass (Reservoir Strain)	2,890	Fingerlings
	Smallmouth Bass (Northern Strain)	2,570	Fingerlings
1990	Smallmouth Bass (Reservoir Strain)	4,163	Fingerlings
	Smallmouth Bass (Northern Strain)	5,120	Fingerlings
1993	Smallmouth Bass (Reservoir Strain)	500	Sub-adults
1998	Rainbow Trout	41,250	8.5"- 25.0"
	Smallmouth Bass (Reservoir Strain)	1,000	3.5 inches
	Bluegill	200	3.0 inches

Table 2. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **largemouth bass** collected by electrofishing from Lake Pawhuska. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥ 90.

	Total (≥40)		<200 mm (15-45)		200-299 mm (15-30)		≥300 mm (≥15)		≥356 mm (≥10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1987[3]	11	5.6	4.1	117	1.5	89				
1990[2]	83	83.0	37.0	99	45.0	92	1.0	98		
1991[2]	121	104.3	27.6	95	60.3	92	16.4	93	7.8	96
1998[1]	101	112.2	45.6	93	26.7	91	40.0	90	10.0	94

[1] Spring night electrofishing (GPP)
[2] Fall night electrofishing
[3] Spring day electrofishing (VVP)

Table 3. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **spotted bass** collected by electrofishing from Lake Pawhuska. Acceptable W_r values are ≥90.

	Total		<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
1987[3]	49	24.9	18.8	72	5.6	79	0.5	93		
1990[2]	61	61.0	40.0	80	18.0	81	3.0	91		
1991[2]	64	55.2	14.7	83	20.7	83	19.8	90	7.8	91
1998[1]	79	87.8	48.9	79	31.1	80	7.8	86	3.3	88

[1] Spring electrofishing
[2] Fall night electrofishing
[3] Spring day electrofishing

Table 4. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **smallmouth bass** collected by spring electrofishing from Lake Pawhuska. 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 (≥2)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1998	5	5.6	5.6							

Table 5. 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 Pawhuska. 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 (≥2)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1990	4	4.0	3.0		1.0	78				
1991	1	0.9			0.9	103				

Table 6. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **bluegill** collected by spring electrofishing from Lake Pawhuska. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total[1] (≥45)		<75 mm[1] (≥10)		75-149 mm[1] (20-100)		≥150 mm[1] (≥15)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1987	41	20.8	2.5		14.2	95	4.1	91
1998	106	177.8	14.4		92.2	107	11.1	107

[1] Spring electrofishing

Table 7. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **redear** collected by spring electrofishing from Lake Pawhuska. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total[1] (≥35)		<150 mm[1] (≥20)		≥150 mm[1] (≥15)	
Year	No.	C/f	C/f	W_r	C/f	W_r
1987	23	11.7	1.0	100	10.7	101

[1] Spring electrofishing

Figure 1.

LAKE PAWHUSKA

1 North

★ Spring Electrofishing Stations