33.4, 47.0, 47.3

SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

ATOKA RESERVOIR

2001

Performance Report

State: Oklahoma **Project No. F-44-D-16**

Project Title: Oklahoma Fisheries Management Program

Study Title: Surveys and Recommendations - Atoka Reservoir

Period Covered: 1 January 2001 - 31 December 2001

ABSTRACT

Atoka Reservoir was sampled by spring electrofishing, summer seining and fall gillnetting in 2001 to determine fish population trends. Abundance of largemouth bass was low, and the size structure was low. Body condition values were good. High water turbidity will prevent development of a quality bass fishery. Abundance and size structure of crappie has increased. Blue catfish numbers increased and should have a positive impact on the fishery of the reservoir. Bluegill abundance increased from the last sample, while gizzard shad numbers remained low. Bluegill and gizzard shad are still providing adequate forage for all the predators in the lake.

Recommendations include monitoring of the fish population in 2005. Development of the blue catfish fishery and population trends in other species will be evaluated. Channel catfish should be stocked in 2002 to enhance poor catfish recruitment.

INTRODUCTION

Atoka Reservoir impounds the North Boggy River, 6.4 km North of Atoka in Atoka County, Oklahoma (Fig. 1). Atoka Reservoir covers 2,388.7 surface hectares and was constructed in 1959 by Oklahoma City. Atoka Reservoir has a mean depth of 6.4 m and a maximum of 9.12 m, a shoreline development ratio of 8.3, a low water exchange and a secchi disc visibility of around 15 cm in the main pool in August. Turbidity is primarily from suspended clay. Fish habitat consists primarily of rock and flooded timber.

The reservoir has a southwest to northeast axis and is subject to strong southerly winds. The wave action of the reservoir keeps reddish clay particles suspended during much of the year. Fish species stocked in 1993 were C. Northern bass (Table 1).

Atoka Reservoir was sampled in 2001 by spring electrofishing, shoreline seining and fall gillnetting to evaluate the status of the fish population and to follow the development of the blue catfish fishery after their introduction in 1984 and 1991.

RESULTS

Largemouth Bass

1. **Largemouth bass abundance from 2001 spring electrofishing (C/f= 4.7) was below the minimum acceptable value for a quality fishery (C/f = 40). The total bass C/f has decreased from the most recent sample (Table 2).**

2. **The C/f of Age 0+ largemouth bass from seining of 0.05 was below the minimum acceptable value (C/f= 1.0), indicating inadequate reproduction. In 2001 spring electrofishing, the abundance of bass in all size groups decreased in recent samples.**

3. **Body condition values (W_r) for all size groups were satisfactory. Condition values for all size groups declined in recent samples.**

4. **Abundance of bass and size structure decreased. Body condition values were acceptable at Atoka Reservoir. High turbidity will prevent development of a high quality bass fishery.**

Crappie

1. **Crappie abundance from 2001 fall gillnetting (C/f = 0.29) was above the minimum acceptable value for a quality fishery. The total crappie C/f has increased from the most recent sample (Table 3).**

2. **The abundance of crappie in the ≥200 mm size groups were satisfactory, while those <200 mm and ≥250 mm size groups were above acceptable values. The abundance of crappie in the ≥200 mm and ≥250 mm size groups increased in recent samples.**

3. **Body condition values (W_r) were satisfactory for all size groups. Body condition values for all size groups increased from the most recent sample.**

4. **The abundance of crappie has increased from the most recent sample and the overall size structure has increased. Numbers of crappie collected below <200 mm increased indicating a good survival of young of the year crappie is occurring. There should be good fishing success for crappie in 2002.**

Blue catfish

1. Blue catfish abundance from 2001 fall gillnetting (C/f = 0.20) was above the minimum acceptable for a quality fishery (C/f = .10) (Table 4).

2. The abundance of blue catfish in all length groups were above acceptable values. The abundance of blue catfish in all size groups increased from the last sample.

3. Body condition values (W_r) were unsatisfactory for all size groups. Condition values for all size groups declined from the last sample.

4. Abundance and the overall size structure of blue catfish in Atoka Reservoir has increased. Numbers of quality size catfish $\geq$400 mm has increased and should provide good opportunities for anglers in 2002.

Bluegill

1. Bluegill abundance from 2001 spring electrofishing (C/f = 55.0) was above the minimum acceptable value for a quality forage supply. The total bluegill C/f has increased in recent samples (Table 5).

2. The C/f of bluegill from seining of 1.18 was above the minimum

acceptable, indicating adequate forage production.

3. Body condition values (W_r) were satisfactory for $\geq$150 mm size groups, while those 75-149 mm size groups were in poor condition. Condition values for all size groups declined in recent samples.

4. Abundance of bluegill in Atoka Reservoir has increased and the overall size structure has improved. The numbers of harvestable size bluegill are still low. Shoreline seining indicated that reproduction of bluegill is occurring.

<u>Gizzard shad</u>

1. Shad abundance from 2001 spring electrofishing (C/f = 4.3) was below minimum acceptable value for a quality forage supply (C/f = = 40). Shad abundance from 2001 fall gill netting (C/f = 0.01) was below the minimum acceptable value for a quality forage supply (C/f = 0.2). The total shad C/f has been low but fairly stable in recent years (Table 6).

2. The C/f of shad from shoreline seining of 2.8 was below the most recent sample, but still indicated adequate forage production.

3. Spring electrofishing body condition values (W_r) were unsatisfactory

for the <200 mm size groups.

4. Abundance of gizzard shad has remained below recommended levels however, reproduction success was adequate in 2001.

RECOMMENDATIONS

Fish Surveys

1. The reservoir should be monitored in 2006 by spring electrofishing, shoreline seining and fall gill netting to evaluate trends in the fish population and the developing blue catfish fishery.

Fish stocking

1. A total of 59,718 channel catfish should be stocked in the summer of 2002 to help enhance low catfish recruitment.

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FIGURE 1. ATOKA RESERVOIR

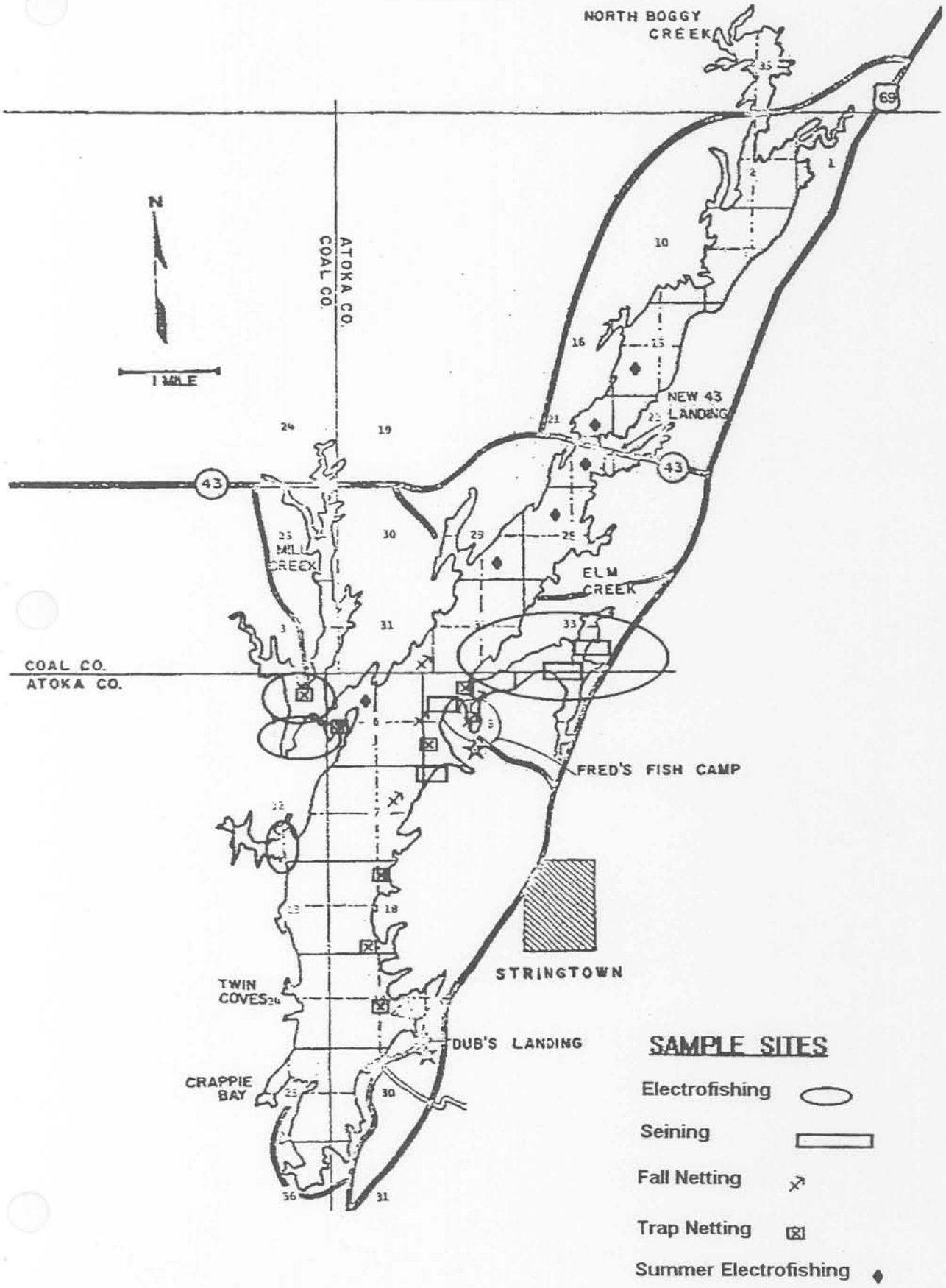

Table 1. Species, number and size of fish stocked in Lake Atoka, 1982 to 1993.

DATE	SPECIES	NUMBER	SIZE
1982	Walleye	1,000,000	Fry
1983	Largemouth bass	59,200	Fingerlings
1984	Channel Catfish	58,271	Fingerlings
1984	Blue catfish	1,820	Fingerlings
1986	Channel catfish	46,342	Fingerlings
1987	Channel catfish	34,950	Fingerlings
1988	Channel catfish	41,290	Fingerlings
1989	Channel catfish	18,000	Fingerlings
1990	Largemouth bass	20,072	Fingerlings
1990	Intergrade LMB	20,264	Fingerlings
1991	Blue catfish	59,558	Fingerlings
1992	Blue catfish	57	Adults
1992	Channel catfish	71,200	Fingerlings
1993	C.Northern bass	21,000	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 and seining from Lake Atoka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

			Spring Electrofishing						Seining		
	Total		<200 mm		200-299 mm		≥300 mm		≥356 mm		Age 0
	(≥40)		(15-45)		(15-30)		(≥15)		(≥10)		(≥1.0)
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r	C/f
1979	9	1.6	0.2	-	0.9	-	0.5	-	-	-	.06
1983	213	16.7	6.7	-	5.5	-	4.5	-	0.8	-	2.1
1985	111	15.9	-	-	2.0	-	7.6	-	3.1	-	.05
1992	148	28.2	13.0	96	5.1	100	10.1	103	3.6	96	.34
1996	162	49.8	20.6	98	19.4	98	9.8	91	4.3	93	.34
2001	14	4.7	2.3	96	1.3	94	1.0	84	0.67	85	.05

Table 3. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of crappie collected by gill netting from Lake Atoka. 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_r	C/f	W_r	C/f	W_r
1979	3	.009	.002	-	.006	-	.006	-
1983	83	0.19	0.11	-	0.08	-	0.05	-
1985	3	.009	.009	-	-	-	-	-
1992	115	0.51	0.47	102	0.04	92	0.04	95
1996	32	0.14	0.09	80	0.04	79	0.02	77
2001	58	0.29	0.21	91	0.08	87	0.06	88

Table 4. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of blue catfish collected by gill netting from Lake Atoka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥.10)		<300 mm (≥.05)		≥300 mm (≥.05)		≥400 mm (≥.03)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1990	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-
1992	52	0.23	0.15	97	0.08	87	0.05	86
1996	18	0.08	0.04	93	0.03	85	0.02	89
2001	40	0.20	0.08	82	0.11	79	0.06	80

Table 5. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of bluegill collected by spring electrofishing and seining from Lake Atoka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

			Spring Electrofishing						Seining	
	Total (≥45)		<75 mm (≥10)		75-149 mm (20-100)		≥150 mm (≥15)		<100 mm -	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	No.	C/f
1979	16	2.9	-	-	2.2	-	0.7	-	-	-
1983	114	8.9	2.0	-	6.2	-	0.6	-	1	0.04
1985	170	24.3	5.7	-	16.6	-	1.9	-	-	-
1992	253	48.2	19.0	-	29.1	76	-	-	-	-
1996	111	34.2	4.0	-	28.3	82	1.8	106	22	1.08
2001	165	55.0	32.3	-	22.3	69	0.3	99	25	1.18

Table 6. 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 Atoka. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Spring Electrofishing				Fall Gillnetting				Seining	
	Total (≥40)		<200 mm (≥20)		Total (≥.20)		<200 mm (≥.10)		Age 0 -	
Year	No.	C/f	C/f	W_r	No.	C/f	C/f	W_r	No.	C/f
1979	-	-	-	-	-	-	-	-	174	10.9
1983	387	30.4	29.5	-	13	0.03	0.02	-	-	-
1985	42	6.0	5.9	-	-	-	-	-	169	8.3
1992	24	4.6	3.6	97	24	0.11	0.06	56	775	38.2
1996	27	8.3	8.0	87	1	.004	.004	49	186	9.2
2001	14	4.7	4.3	87	3	0.01	0.01	-	56	2.8