SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

FISH MANAGEMENT SURVEYS AND RECOMMENDATIONS

FOR

LAKE HEFNER

1999

Performance Report

State: Oklahoma Project No. F 44 - 5

Project Title: Oklahoma Fisheries Management Program

Study Title: Surveys and Recommendations - Hefner Reservoir

Period Covered: 1 January 1999 - 31 December 1999

Lake Hefner

ABSTRACT

Lake Hefner was sampled by gill netting in 1999 to determine fish population trends. Crappie gill net abundance (C/f=0.03) declined. White bass abundance (C/f=0.32) increased, and was above acceptable value (C/f≥0.20). The walleye gill net catch (C/f=0.08) increased. Channel catfish abundance (C/f=0.35) declined, but was above acceptable value (C/f≥0.20). Gizzard shad gill net abundance (C/f=0.45) declined, but was above acceptable value for a quality forage base.

INTRODUCTION

Lake Hefner impounds Bluff Creek of Northwestern Oklahoma City in Oklahoma County. Lake Hefner covers 1032 hectares and was constructed in 1947 by the city of Oklahoma City. Lake Hefner has a maximum depth of 28.7 m, a shoreline development ratio of 3.2 and a secchi disc visibility of 61 cm in the main pool in August; Turbidity is primarily from plankton. Fish habitat consists

primarily of demand shoreline rip rap, and concrete boat docks.

Past surveys indicate a young expanding walleye population established by water releases from Canton Lake.

In 1999, 105,405 walleye and 13,656 channel catfish fingerlings were stocked (Table 1.). Fingerling production has come from the Oklahoma City Fish Hatchery. Introductory smallmouth bass stocking was begun in 1995 with a stocking in 1996 and 1997. Several fish attractors; fish condos, tire and pallet reefs, have been placed along with catfish spawning structures. A new heated enclosed fishing dock was built in 1997 to improve angler access. A walleye spawning shoal was constructed of limestone rock. Smallmouth bass spawning habitat, consisting of spawning benches and shoals, have also been placed. A 14-inch minimum length limit on largemouth bass, smallmouth bass, and an 18-inch minimum length limit on walleye exists at the lake.

Lake Hefner was sampled in 1999 by gill netting to provide fish population trend information.

RESULTS

Crappie (Combined)

1. Crappie abundance from 1999 fall gill netting (C/f= 0.03) was below the minimum acceptable value for a quality fishery (C/f≥0.20).
2. The abundance of crappie <200 mm was below acceptable value (Table 2).
3. Body condition values (W_r) were unsatisfactory for crappie of all size groups.
4. Past creel survey data indicates a larger population than by gill net sampling.

White bass

1. White bass abundance from 1999 fall gill netting (C/f= 0.32) increased and was above acceptable values for a quality fishery (C/f≥ 0.20). The total white bass C/f has increased in recent years (Table 3).
2. The abundance of white bass 200-299 mm and ≥300 mm was satisfactory.
3. Body condition values (W_r) was satisfactory for 200-299 mm and ≥300 mm.

Walleye

1. Walleye abundance from 1999 fall gill netting (C/f= 0.08) increased, but was below the minimum acceptable value for a quality fishery (C/f> 0.10). The total walleye C/f has increased in recent years (Table 4).
2. The abundance of walleye 300-399 mm and ≥400 mm was satisfactory.
3. Body condition values (W_r) were satisfactory for 300-399 mm.

Channel catfish

1. Channel catfish abundance from 1999 fall gill netting (C/f= 0.35) was above the minimum acceptable value for a quality fishery (C/f≥ 0.20).
2. The abundance of channel catfish <300 mm and ≥300 mm satisfactory and above the minimum acceptable values. The abundance of channel catfish <300 mm has increased in recent sample years (Table 5).
3. Body condition values (W_r) were satisfactory for ≥300 mm and ≥400 mm.

Gizzard shad

1. Shad abundance from 1999 fall gill netting (C/f= 0.45) was above the minimum acceptable value for a quality forage base (C/f=0.20), (Table 6). The total shad C/f has declined in

recent sampling years.

2. Body condition values (W_r) were unsatisfactory for ≥200 mm. Condition values for this size group have decreased in recent years.

RECOMMENDATIONS

Fish Stocking

1. Walleye fingerling stocking (250/hectare) should continue.
2. Smallmouth bass fingerling (20/hectare) should be made. No natural reproduction of stocked smallmouth bass has occurred due to past years of low lake levels during spawning season.

Fish Surveys

1. Fall electrofishing should be conducted to evaluate the smallmouth bass population.
2. Fall gill netting should continue.

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Table 1.

Species, number and size of fish stocked in Lake Hefner 1989 - 1999.

Date	Species	Number	Size
1989	Rainbow trout	600	Adult
	Walleye	100,000	Fry
	Walleye	334,500	Fingerling
	Channel catfish	26,700	Fingerling
1990	Rainbow trout	590	Adult
	Walleye	120,000	Fry
	Walleye	116,655	Fingerling
	Channel catfish	108,500	Fingerling
1991	Rainbow trout	150	Adult
	Walleye	400,000	Fry
	Walleye	160,000	Fingerling
	Channel catfish	7,000	Fingerling
1992	Rainbow trout	625	Adult
	Walleye	525,000	Fingerling
	Channel catfish	40,000	Fingerling
1993	Rainbow trout	84	Adult
	Walleye	222,311	Fingerling
1994	Rainbow trout	233	Adult
	Walleye	182,750	Fingerling
	Channel catfish	75,260	Fingerling
1995	Rainbow trout	669	Adult
	Walleye	313,302	Fingerling
	Channel catfish	30,000	Fingerling
	Smallmouth bass	22,000	Fingerling
1996	Rainbow trout	493	Adult
	Walleye	316,725	Fingerling
	Channel catfish	29,200	Fingerling
	Smallmouth bass	16,860	Fingerling

Table 1. continued...

Date	Species	Number	Size
1997	Rainbow trout	151	Adult
	Walleye	349,800	Fingerling
	Channel catfish	29,935	Fingerling
	Smallmouth bass	18,865	Fingerling
1998	Rainbow trout	245	Adult
	Walleye	175,505	Fingerling
1999	Rainbow trout	221	Adult
	Walleye	105,400	Fingerling
	Channel catfish	13,656	Fingerling

Table 2.
Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of crappie collected by gill netting from Lake Hefner. 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
1991	3	0.03	0.03	94	--	--	--	--
1992	35	0.37	0.37	97	--	--	--	--
1993	11	0.15	0.15	108	--	--	--	--
1994	15	0.16	0.13	101	0.02	92	--	--
1995	23	0.24	0.19	100	0.04	77	--	--
1996	3	0.03	0.03	91	--	--	--	--
1997	7	0.07	0.03	95	0.04	98	0.02	104
1998	26	0.18	0.14	102	0.03	97	--	--
1999	3	0.03	0.02	99	0.01	66	--	--

Table 3.
Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of white bass collected by gill netting from Lake Hefner. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥.20)		<200 mm (≥.05)		200-299 mm (.05-.30)		≥300 mm (≥.10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1991	20	0.22	--	--	0.05	97	0.16	103
1992	70	0.75	0.37	86	0.03	94	0.34	96
1993	20	0.28	--	--	--	--	0.28	128
1994	31	0.32	0.05	102	0.11	85	0.16	88
1995	91	0.93	0.03	77	0.14	83	0.76	88
1996	77	0.76	0.01	100	0.43	85	0.33	100
1997	10	0.10	0.01	93	0.01	84	0.08	94
1998	43	0.30	0.03	106	0.10	83	0.17	88
1999	39	0.32	0.01	96	0.19	101	0.12	101

Table 4.

Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of walleye collected by gill netting from Lake Hefner. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥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
1991	19	0.20	0.03	101	0.11	111	0.06	106
1992	16	0.17	0.06	90	0.07	120	0.10	94
1993	5	0.07	0.03	85	0.01	34	0.03	84
1994	8	0.08	0.02	90	0.02	86	0.04	109
1995	5	0.05	0.05	97	0.01	99	0.04	97
1996	12	0.12	0.01	81	--	--	0.11	102
1997	7	0.07	0.03	89	0.02	91	0.02	97
1998	4	0.03	0.01	88	0.01	116	0.01	97
1999	10	0.08	0.01	96	0.03	100	0.15	94

Table 5.

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

	Total (≥.20)		<300 mm (≥.10)		≥300 mm (≥.10)		≥400 mm (≥.05)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1991	46	0.50	0.09	91	0.26	112	0.06	117
1992	53	0.56	0.29	76	0.28	96	0.25	103
1993	73	1.01	0.69	93	0.32	108	0.18	108
1994	68	0.70	0.43	89	0.27	96	0.12	105
1995	42	0.43	0.25	89	0.18	94	0.09	107
1996	44	0.44	0.26	97	0.18	96	0.06	116
1997	39	0.40	0.18	92	0.21	92	0.13	95
1998	67	0.50	0.19	106	0.28	105	0.10	111
1999	42	0.35	0.22	88	0.12	101	0.04	108

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

	Total[1] (≥40)		<200 mm[1] (≥20)		Total[2] (≥.20)		≥200 mm[2] (≥.10)		Age 0[3]	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	No.	C/f
1991	--	--	--	--	0.44	90	0.44	90	14	6.90
1992	--	--	--	--	1.35	78	0.36	72	--	--
1993	--	--	--	--	1.40	96	0.79	81	278	68.47
1994	--	--	--	--	0.56	87	0.49	87	--	--
1995	--	--	--	--	1.18	76	0.58	84	--	--
1996	--	--	--	--	1.75	83	0.70	77	--	--
1997	--	--	--	--	1.30	94	1.04	94	--	--
1998	--	--	--	--	0.58	84	0.43	88	--	--
1999	--	--	--	--	0.45	86	0.40	80	--	--

[1] Spring electrofishing
[2] Gill netting
[3] Seining

Table 7.

Total number (No.), catch rates (C/f), of non-game fish collected by gill netting from lake Hefner.

	DRM[1]		RCS[1]		SBF[1]		SHG[1]		CRP[1]		Total	
Year	No.	C/f	No.	C/f	No.	C/f	No.	C/f	No.	C/f	No.	C/f
1991	2	0.02	5	0.05	1	0.01	--	--	1	0.01	9	0.10
1992	4	0.04	15	0.16	--	--	--	--	--	--	19	0.20
1993	3	0.04	24	0.33	1	0.01	--	--	--	--	27	0.38
1994	3	0.03	08	0.08	1	0.01	--	--	1	0.01	14	0.14
1995	1	0.01	10	0.10	1	0.01	--	--	3	0.03	15	0.15
1996	6	0.06	27	0.27	3	0.03	--	--	1	0.01	37	0.37
1997	2	0.02	16	0.16	1	0.01	--	--	2	0.02	21	0.21
1998	12	0.08	34	0.23	2	0.01	--	--	2	0.01	50	0.34
1999	3	0.03	32	0.26	--	--	--	--	2	0.02	37	0.31

[1] BBH= black bullhead; YBH= yellow bullhead; DRM= freshwater drum; CRP= common carp; SBF= smallmouth buffalo; BBF= bigmouth buffalo; BUF= buffalo spp.; RCS= river carpsucker; RRH= river redhorse; LNG= longnose gar; SPG= spotted gar; SHG= shortnose gar; GAR= gar spp.

Table 6

Total number (No.), central rates (C%), and relative weights (W%) by frequency of elevated cord coefficient by epochs (electrocardiography, with medical selected from Lead derivations). Numbers in parenthesis represent acceptable CI% values for a quality factor. Acceptable W values are 120.

Total (2%)	<200 (m)		1.20-1.40		>200 bmr		Age 9/
Type	No.	C%	W	C%	W	C%	W
1991	--	--	0.17	30	0.43	20	14
1992	--	--	1.35	78	0.36	73	--
1993	--	--	1.40	96	0.70	82	243
1994	--	--	0.35	07	0.43	87	--
1995	--	--	1.18	76	0.35	84	--
1996	--	--	1.75	93	0.70	77	--
1997	--	--	1.20	94	1.04	94	--
1998	--	--	0.58	84	0.43	88	--
1999	--	--	0.45	86	0.15	80	--

Showing electrocardiogram
0.11 medians
Beats/sec

Table 7

Total number (No.), central rates (C%), of true-name fish caught-eye by gill nodding from lake Mother.

	DOM		SUB		DHO		Total	
Year	No.	C%	No.	C%	No.	C%	No.	C%
1991	2	0.00	1	0.01	--	--	1	0.01
1992	14	0.16	--	--	--	--	14	0.20
1993	26	0.28	1	0.01	--	--	27	0.32
1994	17	0.08	1	0.01	--	--	18	0.14
1995	15	0.20	1	0.02	--	--	16	0.17
1996	23	0.37	3	0.03	--	--	27	0.37
1997	12	0.16	1	0.01	--	--	13	0.23
1998	24	0.28	2	0.01	--	--	26	0.19
1999	14	0.27	--	--	--	--	27	0.21

SUB= black mullhead; DHO= yellow-bellied; DOM= strawberries (dry); CUR= common carp; SUC= smallmouth bass; PER= bluegill sunfish; BLU= white sucker; CRE= blue catfish; BUB= redhorse; BUS= river redhorse; DOM= longnose dace; SUD= spotted gar; SUN= shortnose dace; CAT= dace; CRA=