

## The Fish Population of Two Cut-off Pools In Salt Creek, Osage County, Oklahoma<sup>1</sup>

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On July 28 and 29, 1954, two cut-off pools in Salt Creek, Osage County, Oklahoma, were rotenoned by members of the Oklahoma Fisheries Research Laboratory summer survey party. The objectives of this survey were to obtain data concerning species composition and age and growth rates of the fishes in a comparatively large tributary of the Arkansas River in the north-central region of the state. Individual specimens were preserved in 10% formalin, and scale samples, total lengths, and weights taken from fish of all major species.

### DESCRIPTION

Salt Creek is the only stream of importance in the western half of Osage County. It is approximately 40 miles long and flows nearly due south, paralleling the strike of the limestone beds. The stream bed is typically rock, with large, flat boulders and gravel bars occurring in the upper reaches. The gradient is rather steep, with a succession of alternating pools and riffles existing during periods of normal stream flow.

The drainage area contains a mixture of soil types, all of which were formed from limestone. The most common soil types are: Soil Unit 6 of the Bluestem Hill type, deep, medium textured, slowly permeable soil; Soil Unit 24-C of the Bluestem Hill type, shallow, stony, fine textured very slowly permeable soil; Soil Unit 2 of the Cherokee Prairie type, deep, fine textured, slowly permeable soil.

The sampling areas were located above and below the town of Fairfax, Oklahoma (Figure 1). Pool number 1, 4 miles northwest of Fairfax, was approximately 200 feet long, 30 feet wide, and contained approximately 0.344 acre feet of water. The maximum depth was 5 feet, and the average depth, 2.5 feet. Pool number 2, located 1.5 miles east of Fairfax, was about 6.5 miles downstream from pool number 1. This pool was approximately 100 feet long, 15 feet wide, totaling about 0.086 acre feet of water. The maximum depth was 4.5 feet and the average depth, 2.5 feet. The total surface area of the two pools equalled 0.172 acres. During the summer of 1954 there was no flow in the creek bed, and it was not joined with the Arkansas River. The pools were relatively clear, as the bottom was visible in three feet of water. Large, streamside elm, oak, hackberry, and sycamore trees shaded the stream throughout most of the day. Water temperatures ranged from 70-83° F, indicating that many of the pools were spring-fed.

### SPECIES PRESENT

A total of 215 individuals were recovered from the two cut-off pools following rotenoning, representing 36 species, and it was estimated that 75% of the fish present were picked up. A list of the species present, their total numbers, total weights, average lengths, and length ranges are presented in Table 1. Data were collected from 21 species for age and growth analysis (Table 2). The standard methods of age and growth determination were used, and calculated lengths at the end of each year of life were determined by direct proportion.

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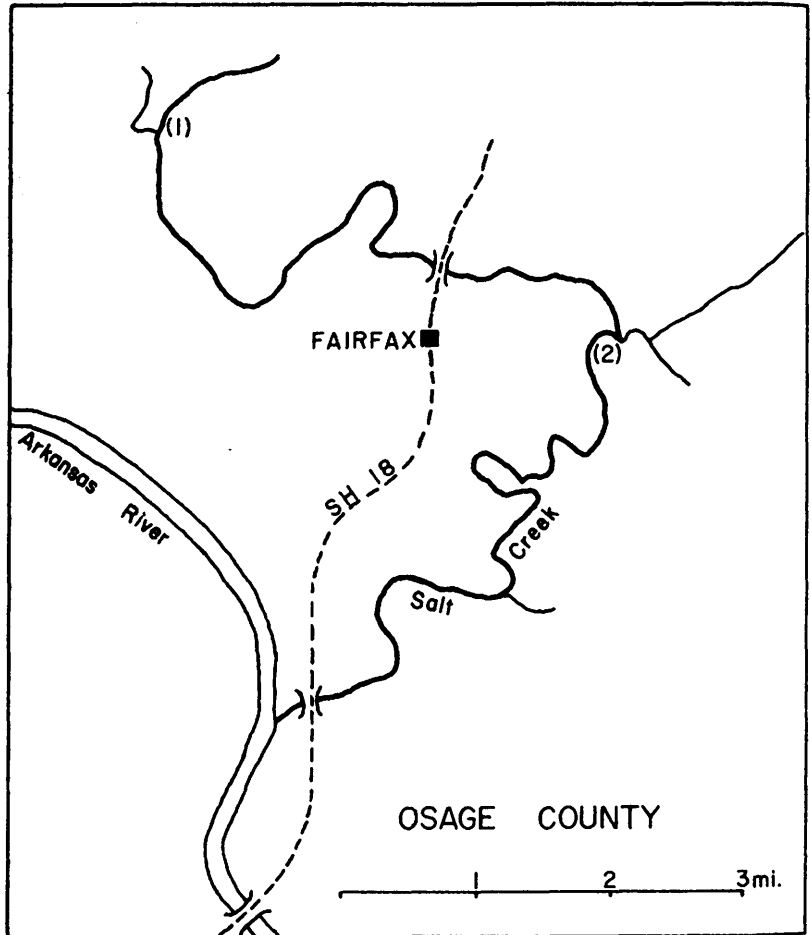


FIGURE 1. Map of the lower portion of Salt Creek, Osage County, showing the location of sampling stations (1) and (2).

#### DISCUSSION

The two pools produced a combined yield of 41.7 pounds of fish, which is equivalent to 242 pounds per surface acre. This yield is much higher than the 162 pounds per acre reported for the North Fork of Licking River, Kentucky (1), and may be attributable to the concentrating effect of unconnected pools resulting from no stream flow, but is quite probably typical of actual fish production in streams in the Osage hills area.

The game and sport fishes comprised 45 percent of the number and 54 percent of the weight of the total population sample (Table 1), which represents an abnormally high ratio of sport to forage and rough fishes. The latter were probably more abundant in the larger, 2 to 5 acre pools, and are undoubtedly much more numerous when the creek is connected to the Arkansas River. There were six largemouth bass, three spotted bass, and

two channel catfish of legal size in the 0.172 acre area. In addition, 11 green sunfish, 2 bullheads, 6 flatheads, and 3 drum were taken which were of a desirable size.

In comparison with growths of the same species in the Illinois River (2), a clear tributary of the Arkansas River in eastern Oklahoma, Salt-Creek largemouth bass, green sunfish, longear sunfish, warmouth, yellow and black bullhead, river carpsucker, carp, and drum are increasing in length at a faster rate. Spotted bass, white and black crappie, bluegill, flathead catfish, and black buffalo exhibited very similar growth rates in both streams, and only channel catfish, golden and river redhorse, and gizzard shad were growing more slowly in Salt Creek. The Illinois is regarded as a highly productive river, but the growth-rate comparison above suggests that Salt Creek is even more productive. Salt Creek spotted bass growth was surpassed by only one stream out of eight in the state from which data are available (Table 3).

Salt Creek has been held in high regard by bass and sunfish anglers in the past, and there has also been some limited commercial fishing activity on the lower two miles of the stream in recent years. However, it is periodically subjected to pollution from oil field brine wastes on the upper part of the watershed, and the effluents are often so toxic that the desirable fish population is eradicated. The elimination of this harmful practice, and also that of introducing untreated sewage from the city of Fairfax, would greatly enhance the opportunities of sport fishermen in the future. Further management techniques, such as rough fish eradication and habitat improvement, might then be instituted.

#### LITERATURE CITED

1. CHARLES, JAMES R. 1953. A preliminary report on the total population manipulation of a warm water stream. Contribution from Dingell-Johnson Project No. F-4-R, Kentucky.
2. JENKINS, ROBERT M., EDGAR M. LEONARD, and GORDON E. HALL. 1952. An investigation of the fisheries resources of the Illinois River and pre-impoundment study of Tenkiller Reservoir, Oklahoma. Okla. Fish. Research Lab. Rept. No. 26, 136 pp; mimeo.

TABLE I

List of fishes recovered from two cut-off pools (0.172 surface acres) in Salt Creek, including numbers, total weight, average length, and length range of each species.

Species	No. of fish	Total weight (grams)	Average length (inches)	Length range (inches)
Spotted gar ( <i>Lepisosteus productus</i> )	1	227	24.0	24.0
Longnose gar ( <i>Lepisosteus osseus</i> )	1	225	23.5	23.5
Gizzard shad ( <i>Dorosoma cepedianum</i> )	8	563	8.6	7.6-11.2
Black buffalo ( <i>Ictiobus niger</i> )	4	502	9.2	7.6-9.8
River carpsucker ( <i>Carpiodes carpio</i> )	7	278	7.6	6.2-8.5
Golden redbhorse ( <i>Moxostoma erythrurum</i> )	8	1,178	10.4	9.1-12.0
River redbhorse ( <i>Moxostoma carinatum</i> )	4	1,508	12.9	9.6-15.4
Spotted sucker ( <i>Minytrema melanops</i> )	5	388	9.0	8.4-9.3
Carp ( <i>Cyprinus carpio</i> )	7	1,696	10.0	8.7-12.5
Redfin shiner ( <i>Notropis umbratilis</i> )	5	.....	.....	.....
Mimic shiner ( <i>Notropis volucellus</i> )	4	.....	.....	.....
Ghost shiner ( <i>Notropis buchmanii</i> )	3	.....	.....	.....
Suckermouth minnow ( <i>Phenacobius mirabilis</i> )	4	.....	.....	.....
Bluntnose minnow ( <i>Pimephales notatus</i> )	31	.....	.....	.....
Slim minnow ( <i>Pimephales icnellus</i> )	2	.....	.....	.....
Channel catfish ( <i>Ictalurus punctatus</i> )	2	543	12.8	11.0-14.6
Black bullhead ( <i>Ameiurus melas</i> )	1	225	10.3	10.3
Yellow bullhead ( <i>Ameiurus natalis</i> )	3	402	8.1	6.2-9.3
Flathead catfish ( <i>Pilodictus olivaris</i> )	9	2,839	13.6	8.8-21.5
Gambusia ( <i>Gambusia affinis</i> )	2	.....	.....	.....
Brook silversides ( <i>Labidesthes sicculus</i> )	1	.....	.....	.....
Spotted bass ( <i>Micropterus punctulatus</i> )	11	1,426	9.2	8.0-12.9
Largemouth bass ( <i>Micropterus salmoides</i> )	18	2,683	7.8	1.3-12.5
Warmouth ( <i>Chaenobryttus coronarius</i> )	2	107	5.2	5.2-5.3
Green sunfish ( <i>Lepomis cyanellus</i> )	21	1,400	5.7	3.8-7.3
Redear sunfish ( <i>Lepomis microlophus</i> )	1	60	5.5	5.5
Longear sunfish ( <i>Lepomis megalotis</i> )	4	138	4.4	4.1-4.8
Orangespotted sunfish ( <i>Lepomis humilis</i> )	3	127	4.0	3.9-4.1
Bluegill ( <i>Lepomis macrochirus</i> )	19	291	4.3	3.8-5.0
White crappie ( <i>Pomoxis annularis</i> )	4	138	5.7	5.0-6.7
Black crappie ( <i>Pomoxis nigromaculatus</i> )	1	76	7.0	7.0
Slenderhead darter ( <i>Hadropterus phoxocephalus</i> )	3	.....	.....	.....
Channel darter ( <i>Hadropterus copelandi</i> )	2	.....	.....	.....
Log perch ( <i>Percina caprodes</i> )	1	.....	.....	.....
Orangethroat darter ( <i>Etheostoma spectabile</i> )	4	.....	.....	.....
Freshwater drum ( <i>Aplodinotus grunniens</i> )	7	1,896	14.2	10.9-19.3
<b>Totals</b>	<b>215</b>	<b>41.68 pounds</b>		

TABLE II

Summary of average calculated lengths of fishes taken in  
Salt Creek, 28-29 July, 1954.

Species	No. in sample	Average calculated length at end of year					
		1	2	3	4	5	6
Largemouth bass	16	5.5	9.1				
Spotted bass	10	4.9	7.6	10.0			
White crappie	4	3.0					
Black crappie	1	3.3	6.0				
Green sunfish	21	3.2	5.2	6.7			
Bluegill	10	2.3					
Redear sunfish	1	2.7					
Longear sunfish	4	2.6	3.9				
Warmouth	2	3.3					
Carp	7	5.8					
Drum	7	3.9	8.1	12.4	12.8	16.0	18.0
Black buffalo	3	4.3	7.6				
River carpsucker	3	4.4	7.2				
Golden redbhorse	5	5.8	8.2	10.6			
River redbhorse	4	5.4	8.0	10.8	13.2		
Spotted sucker	3	4.4	8.1				
Channel catfish	2	4.7	7.9	11.8	13.8		
Black bullhead	1	5.0	6.7	8.0	9.2		
Yellow bullhead	3	3.0	5.9	8.7			
Flathead catfish	9	4.2	8.0	10.9	16.8		
Gizzard shad	4	4.5	8.2				

TABLE III

Comparison of the growth of spotted bass in Salt Creek and in  
eight other Oklahoma streams.

Body of water	Date of Collection	No. of fish	Average calculated length (inches)					
			1	2	3	4	5	6
Salt Creek	7/28/54	10	4.9	7.6	10.0			
Salt Creek	9/11/48	7	4.2	8.1	10.8	12.3	13.9	
Fort Gibson Reservoir tributaries	7/52	18	4.3	7.3	8.8			
Illinois River	7/52	173	4.5	7.6	9.9	12.1	13.6	
Grand River	1/6/53	8	4.0	6.3				
Blue River	6/27/50	5	3.2	5.8	8.0	10.1	11.5	
Poteau River	1949	49	3.7	6.4	8.8	11.6	12.9	13.3
Fourche Maline Creek	8/20/47	3	4.4	8.3	10.6			
Big Greenleaf Creek	7/1/50	17	5.0	7.7	11.3	13.1		
Spring Creek	5/18/47	3	3.4	6.4	9.3	11.5	13.2	