

Fisheries Bulletin #15
Director - Minor E. Clark
Division of Fisheries

January 1955

THE HARVEST AND MOVEMENT
OF GAME FISHES IN KENTUCKY
LAKE AND ITS TAILWATERS

by

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Federal Aid to Fisheries, Project F-2-R

Introduction

In order to further study the populations of crappie and other game fishes in Kentucky Lake and its tailwaters, the Tennessee River, a program of netting and tagging of principal game species was begun on January 5, 1953. This program was to supplement previously acquired information with data on movement and percentage of harvest of adult crappie and other game fishes in these waters. In addition, determinations were to be made regarding the amount of movement of these fishes through the navigation locks of the Kentucky Lake Dam.

Kentucky Lake is a 260,000 acre impoundment, is 184 miles long and has an average depth of 23 feet at conservation pool level. The lake has 2600 miles of shoreline, and is primarily eutrophic in character.

The tailwaters of Kentucky Lake run north from the dam at Gilbertsville, Kentucky, a distance of 22 miles and empty into the Ohio River. The river is approximately 1/4 mile wide with depths up to 35 feet, and has a rapid rate of flow.

Previous study of the fishes in these waters has shown the game fishes, particularly crappie, to be relatively abundant. This study was undertaken in an effort to determine:

1. The percentage of harvest of the adult population of game fishes in these waters.
2. The amount and direction of movement occurring within these populations.
3. The extent to which these game fishes use the navigation locks as a means of interchange between the lake and its tailwaters.

I Materials and Methods

Fish tagged and released in Kentucky Lake were captured in eight net types - hoop nets, fiddler nets, wing nets, gill nets, trammel nets, wooden baskets, lead nets and heart-lead nets. Captured fish were removed from the nets, tagged, and released immediately at a point near the site of capture. Nets were set in five different areas on both sides and near the middle of the lake in a section approximately seven miles above Kentucky Dam.

In the Tennessee River only hoop and wing nets were used. These nets were most suited for use in the river, were easily maintained, and yielded fish in good condition for tagging.

Nets were raised and fish removed daily. This schedule not only provided maximum catch, but also reduced the chances for fish to be injured while held in the nets. Total length, in inches and tenths of inches, and weight, in pounds and tenths of pounds, date of capture, and point of release were determined and recorded along with the tag number at the time the fish was tagged. All fish were tagged in the jaw with metal strap tags bearing an identification number and inscribed, "Game and Fish, Frankfort".

Radio and newspaper releases, as well as notices posted in the area, explained the tagging program and requested return of data pertaining to a tagged fish in the event of recapture by a fisherman. Cards were made available to the public through dock operators, and those who caught tagged fish were asked to complete and return cards to dock operators or personnel of the Kentucky Department of Fish and Wildlife Resources.

These cards asked for date and point of recapture by the fisherman, tag number, and the name and address of the fisherman. This person was later mailed original release data concerning the recaptured fish.

II Netting and Tagging Areas

Netting sites in the lake consisted of five areas in and around Big Bear Embayment, which is located seven miles above Kentucky Lake Dam. These areas may be described as follows:

	<u>Time Fished</u>
1. Malcolm Creek	
Shallow cove within Big Bear Embayment.	Net days - 248
2. Mouth of Big Bear	
A large embayment opening on main lake.	Net days - 382
3. Scout Cove	
Shallow cove on main lake.	Net days - 198
4. Middle of Main Lake	
Includes channel and shelf areas.	Net days - 81
5. Main Lake Channel	
Deep water channel area.	Net days - 35

Tagging of Kentucky Lake fishes was begun on March 13, 1953 and continued until July 13, 1953.

Nets in the tailwater areas were fished in three sections of the river and at one point above and one point below the mouth of the Tennessee River in the Ohio

River. Tagging of fishes was carried on in five major areas as follows:

	<u>Time Fished</u>
1. Kentucky Dam	
Extends one mile downstream and includes both sides of the stream.	Net days - 462
2. Three miles below Dam	
Both sides of stream-area 1/2 mile in length.	Net days - 35
3. Ten miles below Dam	
Both sides of stream - area 1/2 mile in length.	Net days - 173
4. Ohio River	
One mile below mouth of Tennessee River - South shore.	Net days - 59
5. Ohio River	
One mile above mouth of Tennessee River - South shore.	Net days - 72

Tagging of tailwater fishes was begun on January 5, 1953, and continued until December 7, 1953.

Tagged fishes were released within the immediate area in which they were captured and none of the areas was larger than one-half mile in radius. Tagged fishes were released behind the net, in order to minimize immediate recapture of a fish in the same net from which it was taken for tagging. All fish recaptured in nets were re-released immediately and are not considered in the recapture data.

III Species Tagged

Seven species of game and pan fishes were tagged in Kentucky Lake and released within the netting area (Table I). Nine species of fishes were tagged in the tailwaters of Kentucky Lake.

Table I

	<u>Lake</u>	<u>Tailwater</u>
Northern Pike, <u>Esox lucius</u> Linnaeus	-	1
White Bass, <u>Lepibema chrysops</u> (Rafinesque)	4	547
Yellow Bass, <u>Morone interrupta</u> Gill	251	701
Eastern Sauger, <u>Stizostedion c. canadense</u> (Smith)	-	176
Largemouth Bass, <u>Micropterus salmoides</u> (Lacépède)	7	2
Kentucky Bass, <u>Micropterus punctulatus</u> (Rafinesque)	5	19
White Crappie, <u>Pomoxis annularis</u> Rafinesque	1,752	3,552
Black Crappie, <u>Pomoxis nigro-maculatus</u> (LeSueur)	147	113
Bluegill, <u>Lepomis macrochirus</u> Rafinesque	4	14
Total	2,170	5,125

IV Movement of Recaptured Fishes

Lake:

Seven species of fish representing 2,170 individuals were tagged in Kentucky Lake. Only four of these seven species were recaptured - largemouth bass,

yellow bass, white crappie, and black crappie. Two of these, white crappie and black crappie, were recaptured in nets.

One hundred forty-two fishes or 6.6 per cent of the total number tagged were recaptured by sportsmen. Two tagged fish, both white crappie, were recovered dead, representing 0.1 per cent of the 2,170 fishes tagged.

Given in Table II is the percentage of recovery by fishermen with respect to the total number of each species tagged that was recaptured. Although only a small number of largemouth bass were tagged, 14.3 per cent of those fish tagged were recovered by fishermen.

The extent and direction of movement is given for each of the four species recaptured. Five fish, all white crappie, moved downstream through the lock chambers of Kentucky Dam. These fish represented 3.5 per cent of the total number of fish recaptured by fishermen.

Fifty fishes, or 35.2 per cent of the number recaptured by fishermen, moved more than one mile from the point of release after tagging. This represents 2.3 per cent of the total number tagged. These 50 fishes averaged moving 5.1 miles per individual fish, as may be derived from Table III. Of the 48 crappie known to have moved more than one mile, 34 moved downstream, and five moved downstream at least seven miles and passed through the lock chambers of Kentucky Dam. Of the remaining 92 fishes recaptured by fishermen, 36 moved more than one-half mile but less than a mile, and 56 moved less than one-half mile. The most extensive movement was recorded for a yellow bass that was recovered 29.3 miles up the lake from the release point. One white crappie traveled 19.8 miles in 42 days.

Table II Movement Of Tagged Kentucky Lake Fishes

Species	Number Tagged	Movement		Downstream Through Lock Chamber *	Recovered Dead *	Fishes Recaptured By Fishermen	
		Less Than One Mile	More Than One Mile			Total Number	% Of Number Tagged
Largemouth Bass	7		1			1	14.3
Yellow Bass	251	1	1			2	0.8
White Crappie	1,752	82	44	5	2	126	7.2
Black Crappie	147	9	4			13	8.8
All Species	2,157	92	50	5	2	142	6.6

* Not included in totals.

Table III Details Of The Movement Of Fifty Kentucky Lake Fishes
Traveling More Than One Mile

Species	Total Number Recovered	Accumulated Movement (Miles)	Release to Recapture (Days)	Average Miles Per Day	Average Movement Per Fish (Miles)	Greatest Movement For An Individual Fish (Miles)	Downstream Through Lock Chamber
Largemouth Bass	1	2.7	11	0.3	2.7	2.7	None
Yellow Bass	1	29.3	410	0.1	29.3	29.3	None
White Crappie	44	202.8	2,110	0.1	4.6	19.8	5
Black Crappie	4	21.6	99	0.2	5.6	7.8	None
All Species	50	256.4	2,630	0.1	5.1		

Tailwater:

In Kentucky Lake tailwaters, 5,125 fish were tagged and released, of which 144 were recaptured and reported by fishermen. Nine species were tagged, of which six species - Kentucky bass, white bass, yellow bass, sauger, white crappie and black crappie - were recaptured by fishermen. Five fishes, 0.1 per cent of the number tagged, were recovered dead, including four white crappie and one black crappie. Although 22 river miles were included in the study area, 86.2 per cent of the fishes were tagged and released in the area within one mile of the dam.

The number and percentage of each species recaptured may be seen in Table IV. There is a difference of less than 0.5 per cent between the fisherman's harvest of white bass and white crappie. The harvest of black crappie was slightly less. A higher return is noted for Kentucky bass than for any other species; however, the sample for this species is too small to be considered conclusive. A total of 2.8 per cent of the total number of fishes tagged were recaptured by fishermen.

Eighty-two of the 144 fishes recaptured by fishermen were recovered less than 1/2 mile from the point of release. Twenty-nine fishes, or 21.4 per cent of the number recaptured by fishermen, were found to have moved more than one mile. Twenty-two fish, traveling more than one mile, moved upstream. This represents 75.9 per cent of the total number of fish leaving the area of release. Eleven of these 22 fishes moved upstream through the lock chambers of Kentucky Dam into the lake.

Table IV Movement of Tagged Fishes - Kentucky Lake Tailwater

Species	Number Tagged	Movement				Upstream Through Lock Chamber *	Recovered Dead *	Fishes Recaptured By Fishermen	
		Less Than One-Half Mile	One-Half To One Mile	More Than One Mile	Upstream Or Down			Total Number	% of Number Tagged
Kentucky Bass	19	1		1	Up	1		2	10.5
White Bass	547	8	8	3	Up	2		20	3.7
				1	Down				
Yellow Bass	701	1		2	Up	2		4	0.6
				1	Down				
Sauger	176	1		1	Down			2	1.1
White Crappie	3,552	70	25	14	Up	5	4	113	3.2
				4	Down				
Black Crappie	113	1		2	Up	1	1	3	2.7
All Species	5,108	82	33	29		11	5	144	2.8

* Not included in totals

Table V Further Details of Movement of
29 Tailwater Fishes Traveling More Than
One Mile

Species	Total Number Recovered	Accumulated Movement (Miles)	Release To Recapture (Days)	Average Miles Per Day	Average Movement Per Fish (Miles)	Upstream	Down- Stream	Upstream Through Lock Chamber
Kentucky Bass	1	7.5	351	0.02	7.5	1	None	1
White Bass	4	79.0	291	0.3	19.8	3	1	2
Yellow Bass	3	49.2	430	0.1	16.4	2	1	2
Sauger	1	70.0	180	0.4	70.0	None	1	None
White Crappie	18	249.7	1,128	0.2	13.9	14	4	5
Black Crappie	2	39.0	84	0.5	19.5	2	None	1
All Species	29	494.4	2,464	0.2	17.1	22	7	11

Table V lists the six species of recaptured fishes and gives the total travel amassed by each species. One sauger traveled downstream 70 miles. No other fish was recorded moving quite this far during the time of this study. Extensive movement, 67 miles, is noted for a white bass which went down the Tennessee River 22 miles to its mouth, then traveled up the Ohio River 45 miles. One yellow bass went downstream 22 miles in 20 days and one white crappie traveled downstream 35 miles. Most extensive travel for a black crappie was 30 miles. Tailwater fishes recovered more than one mile from the point of release traveled an average of 17.1 miles per fish.

Table VI is a direct comparison of the recapture of lake and tailwater fishes.

Table VI Summary Of Tagging and Recoveries

Kentucky Lake		Kentucky Lake Tailwaters	
<u>Total Fish Tagged</u>	<u>2,170</u>	<u>Total Fish Tagged</u>	<u>5,125</u>
Total Fish Recaptured	142	Total Fish Recaptured	144
Recovered Dead	2	Recovered Dead	5
Number Passing Downstream Through Locks	5	Number Passing Upstream Through Locks	11
Per Cent Recaptured	6.6	Per Cent Recaptured	2.8
Per Cent of Recaptured Fish Passing Through Locks	3.5	Per Cent of Recaptured Fish Passing Through Locks	7.6

Summary and Conclusions:

During tagging studies on Kentucky Lake, 2,170 fishes of seven species were netted, tagged and released in the Big Bear area. One hundred forty-two fishes of four species (largemouth bass, yellow bass, white crappie and black crappie) were recaptured by fishermen. Thirty-one white crappie and black crappie were recaptured in nets, but are not included in the recapture data because they were re-released. Two fish, 0.1 per cent of the number tagged, were found dead in the Big Bear area and are not included in the recapture data.

Of the tagged fishes released in Kentucky Lake, 6.6 per cent were recaptured by fishermen. This is possibly indicative of the total harvest of game fishes in this section of Kentucky Lake. Largemouth bass were retaken in greater relative numbers than other species, 14.3 per cent of tagged bass being recaptured. Although the sample for largemouth bass is insufficient, this could indicate a higher degree of exploitation.

Fifty-six fish, or 39.4 per cent of the fishes recaptured, moved less than one-half mile from the point of release and 64.8 per cent moved less than one mile. The 50 tagged fish moving more than one mile averaged 5.1 miles per fish. Five fish, all white crappie, moved downstream at least seven miles and passed through the lock chambers of Kentucky Dam. The greatest distance traveled by any fish tagged in the lake was that of a yellow bass that was recovered 29.3 miles up the lake from the release point.

In the Tennessee River, tailwaters of Kentucky Lake, 5,125 fish of nine species were collected, tagged, and released. One hundred forty-four fish of six

species (Kentucky bass, white bass, yellow bass, sauger, white crappie and black crappie) were recaptured by fishermen. Thirty-nine fish were recaptured in nets and re-released, this number not being considered in the recapture data. Five fishes, 0.1 per cent of the number tagged, were found dead and are not considered in recapture data. Catch by fishermen was 2.8 per cent of the number tagged, and this percentage may be indicative of the harvest of the total population. A greater percentage of Kentucky bass was recaptured than any other fish - 10.5 per cent; however, the sample for this species is admittedly small.

Eighty-two individuals or 56.9 per cent of the 144 tailwater fishes recaptured by fishermen moved less than one-half mile from the point of release, while 115 fish or 79.9 per cent moved less than one mile. The 29 fishes moving more than one mile averaged 17.1 miles per fish. Most extensive movement was noted for a sauger which moved 70 miles from the release point. One white bass traveled 67 miles.

Eleven fishes, 7.6 per cent of the total number recovered, went upstream through the lock chambers of Kentucky Dam.

Acknowledgements:

Sincere thanks to Douglas Boren and John McClintock for their work in the field and in analysis of data, and to Bill Tompkins for his supervision of field work. Many thanks also to Bernie Carter for guidance and help with the manuscript, and to Jim Charles, Mercer Peters, James Kirkwood and Mayo Martin for their willing aid.