

# **CATCH STATISTICS AND FISHERMEN COUNTS ON DALE HALLOW AND CENTER HILL RESERVOIRS, JANUARY 1951 - JUNE 1954**

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Dale Hollow and Center Hill Reservoirs are two storage reservoirs in the Cumberland River drainage of the Ohio River Basin. They were constructed by the U. S. Army Corps of Engineers for the combined purposes of flood control and generation of hydroelectric power.

Dale Hollow was impounded in 1943 and is a clear lake on the Obey River amid the northwestern foothills of the Cumberland Plateau. At elevation 651, which is spillway level, the surface area is 27,700 acres, storage volume is 1,353,000 acre-feet, maximum depth is 151 feet, and length of the pool is about 55 miles. Minimum power pool elevation is 631 and the normal annual water level fluctuation is about 18 feet. The drainage area covers 935 square miles of primarily wooded mountainous land in Tennessee and Kentucky.

Center Hill was impounded in 1949 and is located on the Caney Fork River in the eastern Highland Rim of Middle Tennessee. The area at maximum power pool level (elevation 648) is 18,220 acres and the depth is 178 feet. The minimum power pool level is 618 and the normal annual fluctuation is about 25 feet. Length of the reservoir is 64 miles and the drainage area is 2,195 square miles of predominately mixed farm and forest land.

On March 1, 1951, a Federal Aid project was organized to conduct a general inventory of fisheries of these bodies of water. Mr. John Parsons was the project leader until January, 1953, when the author was appointed to the position.

The present report is a summary of the catch statistics and fishermen counts from March, 1951 to June 30, 1954.

## **METHODS**

Originally, the project was set up to gather creel census data from as many fishermen as possible. Dock operators voluntarily submitted creel reports which were collected by a conservation officer. In addition, this officer performed creel clerks duties two days each week. In 1952, creel clerks were hired for weekend census to augment voluntary weekday reports by dock operators. All census takers were visited weekly. Dock operators submitting apparently biased or inadequate reports were urged to improve their census methods. If no improvement was noted, their reports were eliminated from the totals. A similar program was carried out for the first half of 1953. More emphasis was placed on weekend clerks and only those dock operators eager to submit creel cards were contacted. All voluntary census ended in June, 1953.

A scheduled census with one clerk on a dock rotation basis was carried out on Center Hill from July, 1953 through June, 1954. This clerk worked four days a week, rotating among the three largest docks. This census resulted in 0.50 and 0.66 fewer creel reports but presented a more statistically sound sample. Two

clerks rotated among six major docks on Dale Hollow during September through November 15, 1953, and from March through June, 1954. One dock operator on Dale Hollow kept creel records for his own information and his data have been used for creel records in months not covered in the scheduled census. A creel report included the following data: date, locality, number of fishermen in boat, residence of fishermen, species caught by number and weight. Dock operators and creel clerks were furnished dairy scales, 60 pound capacity graduated by tenths. Average weights by species reported by dock operators correlated with those recorded by paid clerks.

Undoubtedly, bias existed in the creel reports for 1951 through June, 1953. A few dock operators recorded only the better catches and forgot the failures. This bias was probably most pronounced in 1951, and diminished steadily through June, 1953 as voluntary reports were eliminated. Bias introduced by voluntary reports is more pronounced in the number of fish caught per fisherman and in total harvest figures (Tables 1 and 2) than in Tables 3, 4, 5, and 6, monthly species composition of the catch and average weights of each species.

In 1953, the author felt that an estimate of total harvest could be made by applying average weights and catches of each fisherman to total reservoir usage figures compiled by the Corps of Engineers. The Engineers assemble their data by traffic meters on some of the major accesses to lakes. These data are augmented by counts made by reservoir rangers using launches on peak fishing days. Project personnel felt that a separate estimate compiled by a different method would provide comparative data.

Forms were supplied to all docks. Dock operators were requested to keep daily tallies of boats rented, moored boats used, number of trailer boats launched, and number of bank fishermen observed. This request came at the same time dock operators were relieved of any creel census duties. Excellent cooperation resulted. At this time creel clerks were told to distinguish among boat docks, moored boats, trailer boats, and bank fishermen. Their figures correlated closely with dock operators' reports.

Operators of large docks on both reservoirs are required to submit a quarterly accounting of income to the Corps of Engineers. Cash registers on the docks are equipped with tapes and special keys for recording a break-down of receipts. The dock operators keep monthly books on income from rental of boats and motors, fishing tackle sales, cabin rentals, etc. By comparing the monthly income from boat rentals with the number of reported boat rentals an average boat rental fee for each large dock was derived. If a dock failed to report the number of boats rented, the average fee from this dock for the closest month was used to determine the number of boats rented. Private boat usage was estimated during months when a dock failed to report by applying direct proportion from the closest month in which the proportion had been reported. Emphasis was placed on securing accurate information from the largest docks on both reservoirs. Boat usage by months was derived on a percentage basis. These percentages were applied to uncooperative docks. The number of boats utilizing public access areas was estimated.

The above procedure gave us a reliable estimate of boat usage. The number of fishermen per boat by months was derived from the creel census. This figure varied between 2.1 and 2.5 for both reservoirs over the entire census. The total number of boat fishermen per month on each reservoir was derived by multiplying the boat usage figure by the average number of fishermen per boat.

Table 1. Total sport fishing harvest from Dale Hollow Reservoir by months, 1951 through June 1954.

		Column					
		1	2	3	4	5	6
Mo.	Yr.	No. of anglers censused	No. of fish per angler	Av. wt. of each fish	Total no. of anglers	Total no. of fish	Total harvest in lbs.
Jan.	51		No Census		935	2,141 <sup>f</sup>	2,055 <sup>f</sup>
	52		No Census		1,105	2,530 <sup>f</sup>	2,429 <sup>f</sup>
	53	139	3.49	0.80	933	3,256	2,605
	54	83	1.08	1.11	982	1,061	1,178
Feb.	51		No Census		1,409	2,114 <sup>g</sup>	2,156 <sup>g</sup>
	52		No Census		1,980	2,970 <sup>g</sup>	3,029 <sup>g</sup>
	53	258	2.22	1.21	3,772	8,374	10,133
	54	253	0.77	0.82	2,682	2,065	1,693
Mar.	51	1,022	2.34	0.81 <sup>d</sup>	9,579	22,415	18,156
	52	355	1.18	0.88	9,255	10,921	9,610
	53	1,548	1.59	1.24	16,160	25,694	31,861
	54	1,120	1.81	0.87	10,397	18,819	16,373
April	51	1,745	2.49	0.81 <sup>d</sup>	25,572	63,674	51,576
	52	2,868	3.84	0.56	21,959	84,323	47,221
	53	1,103	4.46	0.95	29,410	131,169	124,611
	54	2,520	3.38	0.44	24,990	84,466	37,165
May	51	1,216	6.93	0.81 <sup>d</sup>	25,526	176,895	143,285
	52	4,344	2.80	0.75	22,813	63,876	47,907
	53	2,224	2.45	0.73	27,851	68,235	49,812
	54	1,780	2.07	0.45	20,431	42,292	19,031
June	51	1,241	3.45	0.75 <sup>c</sup>	20,384	70,325	52,744
	52	2,729	1.29	1.04	17,217	22,210	23,098
	53	828	2.26	0.74	16,530	37,358	27,645
	54	963	1.93	0.56	13,430	25,920	14,515
July	51	1,223	3.84	0.75 <sup>c</sup>	16,574	63,644	47,733
	52	1,500	1.51	1.00	13,943	21,054	21,054
	53	477	2.17	1.02	13,983	30,343	30,950
Aug.	51	1,327	2.43	0.75 <sup>c</sup>	11,014	26,764	20,073
	52	1,561	3.61	0.65	11,080	39,999	25,999
	53	186	3.28	0.65	11,122	36,480	23,712
Sept.	51	1,603	2.55 <sup>a</sup>	1.09 <sup>b</sup>	14,075	35,891	39,121
	52	5,676 <sup>a</sup>	2.16 <sup>a</sup>	0.95 <sup>a</sup>	12,133	26,207	24,897
	53	1,048	1.83	0.89	13,220	24,193	21,532
Oct.	51	714	1.98	1.09 <sup>b</sup>	14,958	29,617	32,283
	52	5,676 <sup>a</sup>	2.16 <sup>a</sup>	0.95 <sup>a</sup>	17,205	37,163	35,305
	53	1,734	1.44	0.63	15,908	22,908	14,432
Nov.	51		No Census		3,596	5,502 <sup>e</sup>	5,062 <sup>e</sup>
	52	5,676 <sup>a</sup>	2.16 <sup>a</sup>	0.95 <sup>a</sup>	5,143	11,109	10,554
	53	536	0.90	0.89	3,409	3,068	2,731

Table 1. Continued.

		Column					
Mo.	Yr.	1 No. of anglers censused	2 No. of fish per angler	3 Av. wt. of each fish	4 Total no. of anglers	5 Total no. of fish	6 Total harvest in lbs.
Dec.	51	No Census			1,052	1,410 <sup>h</sup>	1,932 <sup>h</sup>
	52	5,676 <sup>a</sup>	2.16 <sup>a</sup>	0.95 <sup>a</sup>	1,027	2,218	2,107
	53	120	0.52	1.78	625	325	579
Jan. -	51	5,224	5.78	0.56	83,405	482,238	269,972
June	52	10,296	2.51	0.71	74,329	186,830	133,294
	53	6,100	2.90	0.90	94,656	274,086	246,667
	54	6,719 <sup>a</sup>	2.39	0.52	72,912	174,623	89,955
July -	51	4,867	2.66	0.90	61,269	162,828	146,204
Dec.	52	8,737	2.28	0.87	60,531	137,750	119,916
	53	3,901	2.01	0.80	58,267	117,317	93,936
Total	51	10,091	4.46	0.65	144,674	645,066	416,176
Year	52	19,033	2.41	0.78	134,860	324,580	253,210
	53	10,001	2.56	0.87	152,923	391,403	340,603

<sup>a</sup> Monthly data unavailable: values in columns 1, 2 and 3 for Sept. - Dec. 1952, were applied for the four-month period.

<sup>b</sup> Average for Sept. - Oct. 1951.

<sup>c</sup> Average for June - Aug. 1951.

<sup>d</sup> Average for March - May 1951.

<sup>e</sup> Derived by using mean of values in columns 2 and 3 for Nov. 1952 - 53.

<sup>f</sup> Derived by using means of values in columns 2 and 3 for Jan. 1953 - 54.

<sup>g</sup> Derived by using mean of values in columns 2 and 3 for Feb. 1953 - 54.

<sup>h</sup> Derived by using mean of values in columns 2 and 3 for Dec. 1952 - 53.

Table 2. Total sport fishing harvest from Center Hill Reservoir by months, 1951 through June 1954.

		Column					
Mo.	Yr.	1 No. of anglers censused	2 No. of fish per angler	3 Av. wt. of each fish	4 Total no. of anglers	5 Total no. of fish	6 Total harvest in lbs.
Jan.	51	No Census			2,192	2,784 <sup>e</sup>	4,343 <sup>e</sup>
	52	No Census			2,704	3,434 <sup>e</sup>	5,357 <sup>e</sup>
	53	629	1.50	1.89	2,590	3,885	7,343
	54	114	0.84	1.23	2,058	1,729	2,127
Feb.	51	No Census			2,939	3,791 <sup>f</sup>	5,232 <sup>f</sup>
	52	No Census			5,028	6,486 <sup>f</sup>	8,951 <sup>f</sup>
	53	1,710	1.20	1.30	6,608	7,930	10,309
	54	541	1.37	1.46	6,723	9,211	13,448

Table 2. Continued.

		Column					
Mo.	Yr.	1 No. of anglers censused	2 No. of fish per angler	3 Av. wt. of each fish	4 Total no. of anglers	5 Total no. of fish	6 Total harvest in lbs.
Mar.	51	1,045	3.67	0.56	8,072	29,624	16,589
	52	398	7.75	0.53	10,208	79,112	41,929
	53	3,963	2.13	0.83	12,487	26,597	22,076
	54	926	1.35	0.96	11,044	14,909	14,313
April	51	2,734	5.22	0.56	16,555	86,417	48,394
	52	4,224	5.10	0.50	20,495	104,524	52,262
	53	5,737	5.58	0.68	22,537	125,756	85,514
	54	1,626	2.89	0.74	26,004	75,152	55,612
May	51	2,734	6.86	0.56 <sup>b</sup>	20,619	141,446	79,210
	52	8,295	6.42	0.44	24,409	156,706	68,951
	53	8,683	3.68	0.68	27,088	99,684	67,785
	54	1,741	1.30	0.72	22,898	29,767	21,432
June	51	2,473	6.73	0.50 <sup>c</sup>	15,583	104,874	52,437
	52	2,570	6.03	0.41	16,642	100,351	41,144
	53	2,841	2.94	0.87	16,010	47,069	40,950
	54	1,104	0.49	0.88	16,272	7,973	7,016
July	51	2,290	5.22	0.50 <sup>c</sup>	15,081	78,723	39,362
	52	1,239	5.22	0.43	12,087	63,094	27,130
	53	919	1.49	0.55	12,919	19,249	10,587
Aug.	51	1,621	6.53	0.50 <sup>c</sup>	10,780	70,393	35,197
	52	2,274	3.56	0.56	10,128	36,056	20,191
	53	1,116	1.68	0.53	11,609	19,503	10,337
Sept.	51	1,310	5.18	0.56 <sup>d</sup>	13,501	69,935	39,164
	52	8,427 <sup>a</sup>	2.13 <sup>a</sup>	0.64 <sup>a</sup>	11,883	25,311	16,199
	53	1,187	1.55	0.62	10,153	15,737	9,757
Oct.	51	606	5.59	0.56 <sup>d</sup>	11,756	65,716	36,801
	52	8,427 <sup>a</sup>	2.13 <sup>a</sup>	0.64 <sup>a</sup>	10,827	23,062	14,760
	53	1,222	1.39	0.61	11,618	16,149	9,851
Nov.	51	No Census			3,863	6,915 <sup>g</sup>	5,186 <sup>g</sup>
	52	8,427 <sup>a</sup>	2.13 <sup>a</sup>	0.64 <sup>a</sup>	4,482	9,547	6,110
	53	743	1.45	0.86	6,406	9,289	7,989
Dec.	51	No Census			2,641	3,882 <sup>h</sup>	3,300 <sup>h</sup>
	52	8,427 <sup>a</sup>	2.13 <sup>a</sup>	0.64 <sup>a</sup>	1,382	2,944	1,884
	53	243	0.80	1.05	1,517	1,214	1,275
Jan. - June	51	8,986	5.59	0.56	65,960	368,936	206,205
	52	15,487	5.67	0.49	79,486	450,613	218,594
	53	23,563	3.56	0.75	87,320	310,921	233,977
	54	5,996	1.63	0.82	84,999	138,741	113,948

Table 2. Continued.

		Column					
Mo.	Yr.	1 No. of anglers censused	2 No. of fish per angler	3 Av. wt. of each fish	4 Total no. of anglers	5 Total no. of fish	6 Total harvest in lbs.
July -	51	5,827	5.13	0.54	57,622	295,564	159,010
Dec.	52	11,940	3.15	0.54	50,789	160,014	86,274
	53	5,436	1.50	0.61	54,222	81,141	49,796
Total	51	14,813	5.38	0.55	123,582	664,500	365,215
Year	52	27,427	4.69	0.50	130,275	610,627	304,868
	53	28,999	2.77	0.72	141,542	392,062	283,773

<sup>a</sup> Monthly data unavailable: values in columns 1, 2 and 3 for Sept. - Dec. 1952, were applied for the four-month period.

<sup>b</sup> Average for March - May 1951.

<sup>c</sup> Average for June - Aug. 1951.

<sup>d</sup> Average for Sept. - Oct. 1951.

<sup>e</sup> Derived by using mean of values in columns 2 and 3 for Jan. 1953 - 54.

<sup>f</sup> Derived by using mean of values in columns 2 and 3 for Feb. 1953 - 54.

<sup>g</sup> Derived by mean of values in columns 2 and 3 for Nov. 1952 - 53.

<sup>h</sup> Derived by using mean of values in columns 2 and 3 for Dec. 1952 - 53.

Dock operators were willing to submit their ledgers so that boat rentals could be estimated from 1951 through early 1953. Average rental fees were applied to income on a monthly basis. Private boat usage was unknown during that period. However, it was known to have been lighter in 1951 and 1952 than in 1953 and 1954. Estimates based on the known figures for 1953 and 1954 were applied to deduce private boat usage for the earlier years.

## RESERVOIR USAGE

Fisherman counts made by this project were considerably lower than those obtained by the Corps of Engineers (Fig. 1 and 2). Respective total estimates for Center Hill Reservoir were: 1951, Engineers 159,395, project 123,892; 1952 Engineers 213,966, project 130,275; 1953 Engineers 211,203, project 141,534; and January through June 1954, Engineers 201,487, project 84,999. On Dale Hollow the differences were more pronounced: 1951, Engineers 213,350, project 144,674; 1952, Engineers 202,500, project 134,870; 1953, Engineers 401,500, project 152,923; and January through June, 1954, Engineers 192,500, project 72,912.

The author does not claim the project figures are more accurate than those of the Engineers. The data show the difference which may result when separate organizations undertake similar tasks but use different approaches. Project estimates were used to compute total harvest and fishing pressure information.

Dale Hollow has relied on its nation-wide fame for prize-winning smallmouth bass, walleye, and largemouth bass to bring in non-resident fishermen. These out-of-state visitors comprised 65 percent of fishermen checked during the scheduled rotation census of 1953 and 54; 50 percent in January - June of 1953; 62 percent in 1952; and more than 50 percent in 1951.

Table 3. Species composition of anglers' catch by months, March 1951 - June 1954, Dale Hollow Reservoir.

Species	Yr.	Months											
		J	F	M	A	M	J	J	A	S	O	N	D
Largemouth bass	51	No Census		20	12	6	9	2	6	5	8	No Census	
	52	No Census		4 <sup>c</sup>	6	8	15	6	3		11		
	53	15 <sup>b</sup>	25 <sup>b</sup>	20	8	9	6	4	4 <sup>b</sup>	14	15	13 <sup>b</sup>	44 <sup>b</sup>
	54	31 <sup>b</sup>	33 <sup>b</sup>	23	6	7	7	Termination of project					
Smallmouth bass	51			16	6	11	11	4	9	32	34		
	52			7 <sup>c</sup>	6	17	16	5	4		18		
	53	6 <sup>b</sup>	11 <sup>b</sup>	10	5	11	2	4	4 <sup>b</sup>	21	25	18 <sup>b</sup>	15 <sup>b</sup>
	54	1 <sup>b</sup>	1 <sup>b</sup>	4	5	7	4						
Spotted bass	51			12	3	2	1	a	2	1	4		
	52			6 <sup>c</sup>	3	3	2	a	1		3		
	53	4 <sup>b</sup>	5 <sup>b</sup>	3	1	2	a	a	ab	2	6	5 <sup>b</sup>	2 <sup>b</sup>
	54	1 <sup>b</sup>	0 <sup>b</sup>	3	3	4	1						
White and black crappie	51			36	40	42	28	32	27	32	40		
	52			42 <sup>c</sup>	78	54	31	49	78		58		
	53	66 <sup>b</sup>	53 <sup>b</sup>	52	71	62	66	65	69 <sup>b</sup>	37	35	51 <sup>b</sup>	35 <sup>n</sup>
	54	63 <sup>b</sup>	64 <sup>b</sup>	40	72	58	63						
Bluegill	51			6	3	9	19	38	25	22	9		
	52			2	4	12	29	32	13		6		
	53	8 <sup>b</sup>	5 <sup>b</sup>	4	8	9	19	22	18 <sup>b</sup>	17	10	11 <sup>b</sup>	2 <sup>b</sup>
	54	0 <sup>b</sup>	2 <sup>b</sup>	8	8	17	17						
Channel catfish	51			a	1	1	1	a	2	1	a		
	52			0 <sup>c</sup>	a	a	1	1	a		1	0 <sup>b</sup>	0 <sup>b</sup>
	53	0 <sup>b</sup>	0 <sup>b</sup>	a	a	1	1	a	ab	a	a		
	54	0 <sup>b</sup>	0 <sup>b</sup>	a	a	a	1						

Table 3. Continued.

Species	Yr.	Months											
		J	F	M	A	M	J	J	A	S	O	N	D
Yellow catfish	51			1	a	a	1	1	4	1	1		
	52			ac	a	a	1	2	a		1		
	53	0 <sup>b</sup>	0 <sup>b</sup>	a	2	1	3	0	1 <sup>b</sup>	1	a	0 <sup>b</sup>	0 <sup>b</sup>
	54	0 <sup>b</sup>	0 <sup>b</sup>	0	a	a	1						
Walleye	51			1	1	1	1	a	1	1	1		
	52			38 <sup>c</sup>	2	3	2	2	1		2		
	53	ab	1 <sup>b</sup>	3	2	2	1	3	1 <sup>b</sup>	1	2	1 <sup>b</sup>	2 <sup>b</sup>
	54	3 <sup>b</sup>	0 <sup>b</sup>	6	1	2	1						
Bullhead	51			11	33	29	31	21	25	4	1		
	52			1	1	1	1	1	a		a		
	53	0 <sup>b</sup>	ab	0	a	a	0	a		1	0	0 <sup>b</sup>	0 <sup>b</sup>
	54	0 <sup>b</sup>	0 <sup>b</sup>	0	a	a	a						
White bass	51			0	0	0	0	0	0	0	0		
	52			0 <sup>c</sup>	0	0	0	0	a		2		
	53	0 <sup>b</sup>	ab	7	2	a	0	a	ab	5	3	1 <sup>b</sup>	2 <sup>b</sup>
	54	0 <sup>b</sup>	0 <sup>b</sup>	16	2	1	2						

<sup>a</sup> Indicates less than 0.5 percent.<sup>b</sup> Sample of less than 1000 fish.<sup>c</sup> Bias introduced by sampling specialized fisheries.



Table 4. Species composition of anglers' catch by months, March 1951 - June 1954, Center Hill Reservoir.

Species	Yr.	Months											
		J	F	M	A	M	J	J	A	S	O	N	D
Largemouth bass	51	No Census		22	34	24	11	11	8	20	34	No Census	
	52	No Census		22	28	16	5	2	7		11		
	53	53 <sup>c</sup>	59	21	7	11	7	3	6	12	11	25	29 <sup>b</sup>
	54	53 <sup>b</sup>	73 <sup>b</sup>	28	9	12	47 <sup>b</sup>	Termination of project					
Smallmouth bass	51			3	4	3	2	2	1	3	4		
	52			1	1	1	1	1	1		3		
	53	3 <sup>c</sup>	3	2	1	2	2	1	a	3	3	8	11 <sup>b</sup>
	54	8 <sup>b</sup>	2 <sup>b</sup>	6	3	2	1 <sup>b</sup>						
Spotted bass	51			1	a	a	a	0	0	a	0		
	52			a	a	a	0	a	a		1		
	53	1 <sup>c</sup>	4	1	1	1	a	a	a	2	1	3	7 <sup>b</sup>
	54	8 <sup>b</sup>	5 <sup>b</sup>	2	1	1	ab						
Crappie	51			23	22	19	18	10	6	18	29		
	52			39	45	46	21	17	49		70		
	53	25 <sup>c</sup>	23	66	82	62	41	66	63	66	59	54	52 <sup>b</sup>
	54	27 <sup>b</sup>	16 <sup>b</sup>	62	78	71	32 <sup>b</sup>						
Bluegill	51			32	24	39	57	68	77	53	30		
	52			35	24	33	69	76	52		14		
	53	1 <sup>c</sup>	9	9	7	20	42	28	28	14	24	10	2 <sup>b</sup>
	54	3 <sup>b</sup>	2 <sup>b</sup>	2	9	13	19 <sup>b</sup>						
Channel catfish	51			1	1	1	1	2	1	1	a		
	52			a	a	a	1	1	2		14	a	0 <sup>b</sup>
	53	0 <sup>c</sup>	a	a	a	1	3	2	2	1	1		
	54	0 <sup>b</sup>	0 <sup>b</sup>	0	a	a	1 <sup>b</sup>						

Table 4. Continued.

Species	Yr.	Months											
		J	F	M	A	M	J	J	A	S	O	N	D
Yellow catfish	51			a	a	a	1	1	a	a	a		
	52				a	a	a	a	1			a	
	53	0 <sup>c</sup>	0	0	a	1	3	1	1	a	a	0	0 <sup>b</sup>
	54	0 <sup>b</sup>	ab	0	0	a	ab						
Walleye	51			1	1	a	a	a	a	1	a		
	52			a	a	a	a	a	a			a	
	53	9 <sup>c</sup>	a	a	a	a	a	0	0	a	a	a	0 <sup>b</sup>
	54	0 <sup>b</sup>	0 <sup>b</sup>	0	a	a	0 <sup>b</sup>						
Bullhead	51			13	9	6	6	5	6	4	2		
	52			3	1	3	4	3	1		a		
	53	0 <sup>c</sup>	a	a	a	1	a	a	0	0	0	0	0 <sup>b</sup>
	54	0 <sup>b</sup>	0 <sup>b</sup>	0	0	a	ab						
Suckers	51			3	6	7	3	1	1	0	0		
	52				No census in sucker fishing areas								
	53				No census in sucker fishing areas								
	54				No census in sucker fishing areas								

<sup>a</sup> Less than 0.5 percent.<sup>b</sup> Sample of less than 1000 fish.<sup>c</sup> Bias introduced by sampling specialized fisheries.

Table 5. Average weights of species taken by angling from Dale Hollow Reservoir from March 1951 through June 1954.

Species	Period					
	1951	1952		1953		1954
	March - May	March - June	July - Dec.	Jan. - June	July - Dec.	Jan. - June
Largemouth bass	1.52	1.60	1.64	1.62	1.16	1.21
Smallmouth bass	1.27	1.32	1.61	1.51	1.02	1.04
Spotted bass	0.81	0.83	1.29	1.10	0.70	0.56
White and black crappie	0.41	0.41	0.47	0.44	0.44	0.30
Bluegill	0.35	0.33	0.26	0.35	0.27	0.30
Drum		2.69	3.08	3.44	2.38	2.55
Longeared sunfish				0.17	0.22	0.23
Walleye	1.65	1.74	3.13	2.83	2.36	1.97
Channel catfish	2.22	2.29	3.49	3.79	2.83	2.52
Yellow catfish	3.14	6.81	10.21	12.45	8.46	5.31
Bullheads	1.06	1.10	0.92	1.00	0.65	0.62
Rock bass		0.29		0.40	0.35	0.30
White bass			0.97	1.67	0.83	0.98

Table 6. Average weights of species taken by angling from Center Hill Reservoir from March 1952 through June 1954.

Species	Period				
	1952		1953		1954
	March - June	July - Dec.	Jan. - June	July - Dec.	Jan. - June
Largemouth bass	0.74	1.27	1.46	1.37	1.60
Smallmouth bass	0.92	1.53	1.61	1.26	1.60
Spotted bass	0.68	0.98	1.15	1.06	1.52
White and black crappie	0.38	0.49	0.58	0.47	0.63
Bluegill	0.31	0.35	0.34	0.36	0.39
Drum			2.79	2.33	1.66
Longeared sunfish			0.27	0.11	
Walleye	3.71	5.00	7.07	7.50	7.75
Channel catfish	1.73	2.47	2.31	2.27	3.11
Yellow catfish	2.56	5.10	7.93	6.55	5.91
Bullheads	0.52	0.57	0.92		1.32
Rock bass			0.35		0.63
Sauger			2.41		

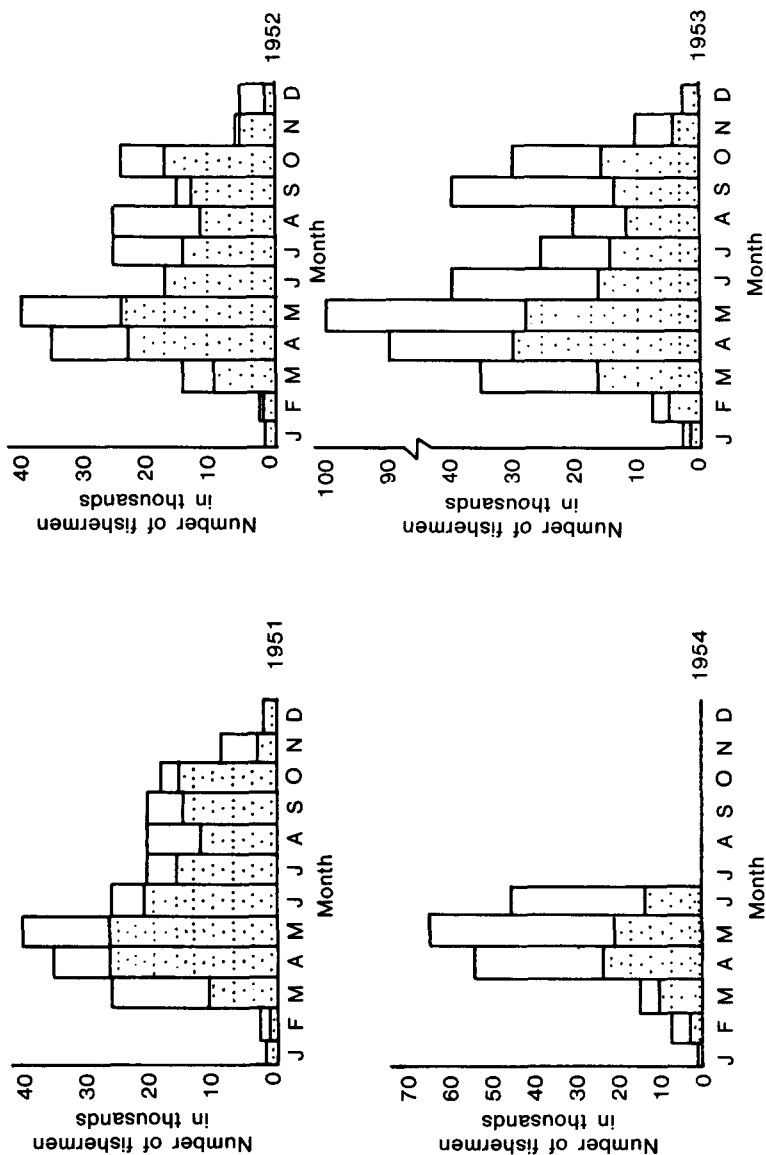


Fig. 1. Monthly fisherman count, Dale Hollow Reservoir, January 1951 through June 1954. Dotted bars represent project estimates. Clear bars represent Corps of Engineer estimates in excess of project estimates. Solidly dotted bars indicate project estimates exceeded Engineer figures.

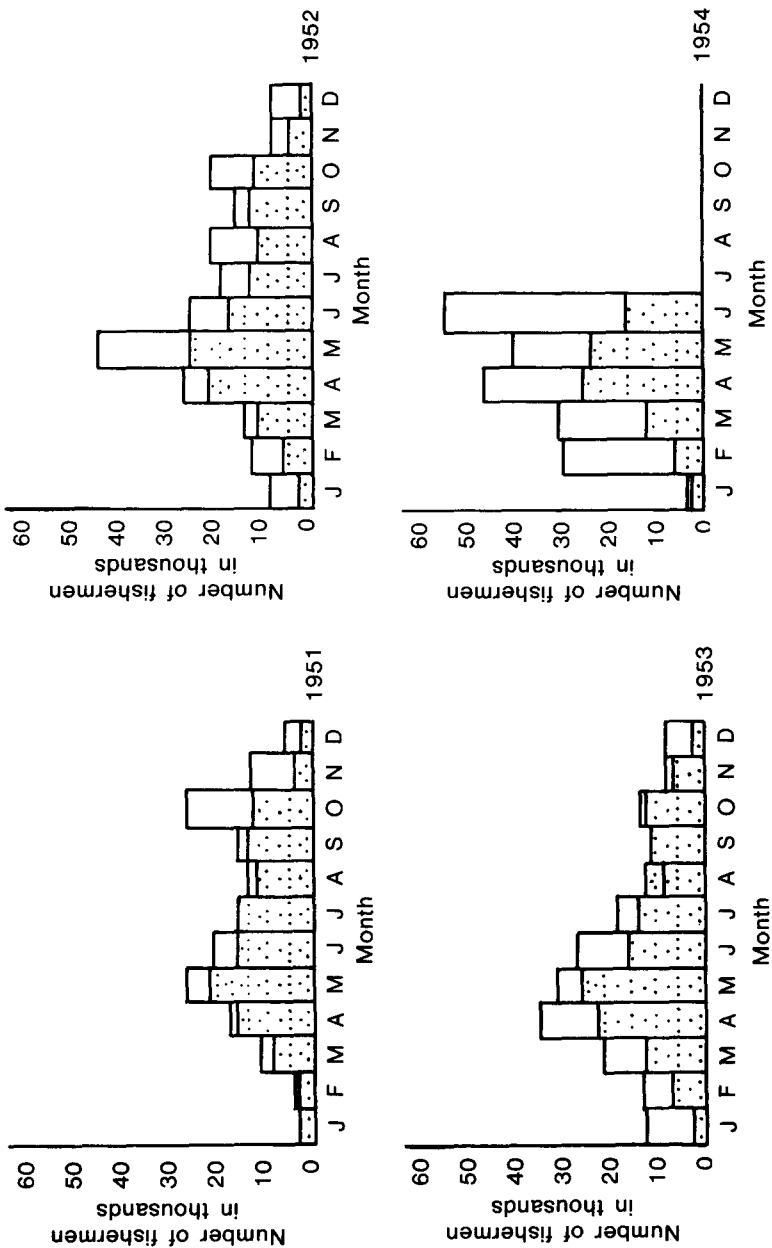


Fig. 2. Monthly fisherman count, Center Hill Reservoir, January 1951 through June 1954. Dotted bars represent project estimates. Clear bars represent Corps of Engineer estimates in excess of project estimates. Solidly dotted bars indicate project estimates exceeded Engineer figures.

Center Hill, more recently impounded, has not produced many exceptionally large fish and has not received the publicity of Dale Hollow. Consequently, less than 10 percent of the fishermen contacted during the census were non-residents. In addition, Dale Hollow, situated on the Kentucky-Tennessee state line cuts off much of the tourist trade from Center Hill, located 50 miles south.

Since 1951 the number of bank fishermen on both reservoirs has declined. Creel census has shown that their success ratio is similar to that of boat fishermen. Bank fishermen usually catch more pan fish and fewer bass and walleye than boat fishermen. In 1951, on Dale Hollow, bank fishermen were estimated to be 14 percent of all fishermen; in 1952, 11 percent; 1953, 9 percent; and 1954, 7 percent. On Center Hill the following estimates were made: 1951, 20 percent; 1952, 16 percent; 1953, 13 percent; and 1954, 11 percent.

## CHANGES IN SPECIES COMPOSITION AND AVERAGE WEIGHTS

The species composition of anglers' catch by months (Tables 3 and 4) and average weights of species by one-half year periods (Tables 5 and 6) shows marked trends for most species during the census period. The half year periods January through June and July through December will be referred to as early and late parts of the year, i.e., early 1952 would be the first six months of that year.

Black bullheads, prominent in 1951 catches on both reservoirs, were a rarity in 1953 and 1954. This population decline, probably due, in part, to an increase in bass predation, was largely responsible for the drop in number of bank fishermen who had harvested tremendous numbers of fish prior to 1951. The rapid increase and subsequent sudden decrease of bullhead populations in newly formed Tennessee impoundments is a common occurrence, but has not been documented.

The percent of largemouth bass in Dale Hollow creels has remained about the same, while the average weight of this species increased from 1.52 pounds in the first half of 1951 to 1.64 pounds in the second half of 1952. The average weight diminished to 1.16 and 1.21 in the second half of 1953 and the first half of 1954 (Table 5).

The average weights of smallmouth bass have approximately paralleled this fluctuation, finally dropping to 1.02 and 1.04 in the final census periods. The percent of smallmouth in the species composition has dropped appreciably during the census from about 10 percent during the spring of 1951 to about 5 percent during the spring of 1954.

No distinction was made between black and white crappie in the census. Both species are common in both reservoirs, but white crappie make up a large majority of the crappie catch. This species has become increasingly abundant, percentagewise, in the creels of both reservoirs. Percentages for Dale Hollow have varied from 36, 40, 42, and 28 in March, April, May, and June of 1951 to 40, 72, 58, and 63 in like months of 1954. During the period of the project the average weights fluctuated between a high of 0.47 pounds in late 1952 to 0.30 pounds in early 1954.

Dale Hollow bluegills have shown a gradual decrease in species composition percents since 1951. A similar trend is expressed by the average weights which dropped from 0.35 pounds in early 1951 to 0.27 and 0.30 in late 1953 and early 1954.

Walleye fishing in Dale Hollow is important only during early spring at the head of the lake. In March 1952, the census was biased toward this fishery, resulting in a disproportionate percentage figure. The March 1953 and 1954 figures of 3 and 6 percent of the monthly species composition reflect the importance of this fish. Average weight and species composition percentages show no general trends.

Two hundred adult white bass were introduced in Dale Hollow in January 1951. In the fall of 1952, a white bass fishery developed at the head of the lake. White bass from the 1951 hatch made up two percent in the creels during September, October, and November. These fish averaged 0.97 pounds. A white bass fishery developed in each successive spring and fall. In March of 1954, these fish made up 16 percent of all fish creeled over the entire lake. Average weights have fluctuated from 0.97, 1.67, 0.83, to 0.98 pounds for six-month periods including late 1952 and through early 1954.

Largemouth bass on Center Hill have generally declined in the species composition of creels. However, a heavy bass harvest occurs annually during January and February when most fishermen on the reservoir are "jig" fishing with night crawlers and cane poles for bass only. In June of 1954, 47 percent of the fish creeled were largemouth bass. This catch resulted from heavy fishing pressure on schools of bass feeding on gizzard shad young and schools of brook silversides. The average weight of this species has increased regularly from 0.74 pounds in early 1951 to 1.60 in early 1954.

Center Hill bluegills, while dropping slightly in species composition over the three-year period have increased in weight from 0.31 pounds in early 1951 to 0.39 pounds in early 1954.

Crappie on Center Hill have become increasingly prominent in creels and show typical characteristics of an expanding population. The average weights have increased steadily from 0.38 pounds in early 1952 to 0.63 pounds in early 1954. Species composition percents in creels have increased from 23, 22, 19, and 18 in March, April, May and June 1951 to 62, 78, 71, and 32 during a like period of 1954.

Walleye fishing in Center Hill, as in Dale Hollow, is important only at the head of the lake in early spring. It is doubtful if the catch will ever exceed one percent of the total monthly harvest. This species has shown remarkable growth since impoundment. Average weights have risen steadily from 3.71 pounds to 7.75 pounds from 1952 through 1954. The catch has shown a lack of recruitment; subsequently most of the fish caught are from the walleye population present when the lake was impounded. A large percentage of the walleye captured are females. Although unimportant in the total harvest figures, the psychological importance of the walleye as a trophy fish cannot be underestimated.

## FISHING PRESSURE AND TOTAL HARVEST

The surface area of reservoirs changes with seasonal fluctuations in water level caused by rainfall and power drawdown. Dale Hollow's area varies from 27,700 acres at full power pool (elevation 651) to 21,880 acres at minimum power pool (elevation 631). Center Hill's area is 18,220 acres at full power pool (elevation 648) and drops to 14,590 acres at minimum power pool (elevation 618).

Total harvest figures must be based on a uniform area for purposes of comparison between years and other bodies of waters. Perhaps yields should be calculated from the acreage at the annual mean water level, but this area would vary from year to year. For simplicity I have selected the area at full power pool as representative of the annual, constant, reservoir acreage. This results in data representing a lower fishing pressure and total harvest per acre than is actually the case. However, creel census is most valuable for showing trends and one representative area must suffice for all years.

Throughout this study, Center Hill has supported a heavier fishing pressure than Dale Hollow (Table 7). On Center Hill man-days of angling per acre per year have risen from 6.8 to 7.8 from 1951 through 1953. A leveling off was indicated when usage dropped from 4.8 man-days per acre for the first six months of 1953 to 4.7 for a like period of 1954. Fishing pressure on Dale Hollow fluctuated slightly from 1951 through 1953 and a drop was indicated by only 2.6 man-days of fishing per acre during the first six months of 1954 as compared with 3.4 during the corresponding period of 1953.

Table 7. Fishing pressure and yield in pounds of fish per acre on Dale Hollow and Center Hill Reservoirs from January 1951 through June 1954.

Year	Man-days of angling per acre		Yield in pounds per acre	
	Dale Hollow	Center Hill	Dale Hollow	Center Hill
First six months 1951	3.0	3.6	9.7	11.3
Last six months 1951	2.2	3.2	5.3	8.7
Entire year 1951	5.2	6.8	15.0	20.0
First six months 1952	2.7	4.4	4.8	12.0
Last six months 1952	2.2	2.8	4.3	4.7
Entire year 1952	4.9	7.2	9.1	16.7
First six months 1953	3.4	4.8	8.9	12.8
Last six months 1953	2.1	3.0	3.4	2.7
Entire year 1953	5.5	7.8	12.3	15.6
First six months 1954	2.6	4.7	3.2	6.3

Annual yield of fish on Center Hill has dropped steadily from a high of 20.0 pounds per acre in 1951 to 15.6 pounds in 1953. A further drop was indicated by a harvest of 6.3 pounds for early 1954 as compared with 12.8 pounds in early 1953. Total harvest from Dale Hollow fluctuated from 15.0 pounds of fish per acre for 1951 to 9.1 pounds in 1952 and to 12.3 pounds in 1953. A sharp drop occurred from 8.9 pounds per acre in early 1953 to 3.2 pounds in early 1954.

## TRENDS

During 3.5 years of creel census and fisherman counts on Dale Hollow and Center Hill Reservoirs from January 1951 through June 1954, the following trends have been noted:

1. Fishing pressure on Dale Hollow remained relatively stable, fluctuating from 5.2 man-days of angling per acre in 1951 to 4.9 in 1952 to 5.5 in 1953. There were 6.8 man-days per acre on Center Hill throughout 1951. Fishing pressure rose steadily to 7.8 man-days in 1953.



2. Total harvest by sport fishermen on Dale Hollow fluctuated from 15.0 pounds per acre in 1951 to 9.1 pounds in 1952 to 12.3 pounds in 1953. Sport fishing harvest in pounds of fish per acre from Center Hill dropped from 20.0 pounds in 1951 to 16.7 in 1952 to 15.6 in 1953. On both reservoirs a drop in fishing pressure and harvest was noted in the first six months of 1954.
3. During the years 1951 through 1953, 48 percent of the fishing, which accounted for 53 percent of the number of fish caught, occurred during April, May, and June on Dale Hollow. On Center Hill, during the same time, 48 percent of the fishing trips occurred which accounted for 58 percent of the catch.
4. On Dale Hollow the average catch per trip has dropped from 4.5 fish in 1951 to 2.6 in 1953. The catch per trip on Center Hill has dropped from 5.4 in 1951 to 2.8 in 1953. This downward trend continued in the first six months of 1954 on both reservoirs.
5. On both reservoirs the most important trend in species composition of catch is the increase in crappie and decline of bluegills and bullheads. Neither largemouth nor smallmouth bass shown any pronounced trends.
6. Fishermen are attempting to increase their success by turning in night fishing for crappie, walleye, and white bass. Others are turning their attention toward winter fishing for bass with night crawlers.
7. The introduction of white bass in Dale Hollow has resulted in the advent of a new fishery. They are beginning to make up a significant portion of the catch, although the fishery is seasonal.