ESTIMATION OF STANDING CROP OF FISHES IN THE PREDATOR-STOCKING-EVALUATION RESERVOIRS[1]

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ABSTRACT

The cove rotenone sample technique was used to estimate standing crop of fishes in the 23 reservoirs selected for the Predator Stocking Evaluation (PSE). Estimates of adjusted standing crops were derived by expanding the observed standing crop of fish in a cove sample by compensation factors for incomplete recovery of fish in the sample and for different shoreline-open water distributional patterns of various fish species and size groups. Results of 138 rotenone samples indicated that the mean adjusted standing crop of fishes in the PSE reservoirs was 451.1 pounds per acre, an increase of 79 percent over unadjusted crop. Adjusted crop estimates of major taxa in pounds per acre were: Esox *sp., 0.8; white bass, 3.7; striped bass, 0.6; black bass, 30.2; crappie, 17.8; walleye, 0.4; gars, 2.5; bowfin, 3.3; catfish, 39.2; clupeids, 148.3; minnows and silversides, 3.1; white perch and yellow bass, 1.1; sunfishes, 82.2; darters, 1.7; yellow perch, 6.8; carp and goldfish, 43.1; catostomids, 48.7; drum, 18.7. These data were utilized in other segments of the Predator Stocking Evaluation to establish correlations with environmental factors and to describe predator/prey relationships.*

To meet the basic goals of the Predator Stocking Evaluation (PSE) a quantitative description of the fish populations of candidate reservoirs was necessary. A review of potential techniques indicated that the use of rotenone in blocked-off coves was the most reliable method of sampling fish populations in large reservoirs. Standing crop estimates, expressed as pounds of fish per acre, were therefore derived from 138 cove rotenone samples taken from the 23 PSE reservoirs during the month of August in 1972 and 1973. To obtain comparable data these samples were specifically designed, and field operations were carefully implemented to reduce variations in sampling techniques.

Although the development of improved methods of conducting cove rotenone samples represents a joint effort of many investigators in the southern United States, much of this development has been guided by the Reservoir Committee of the Southern Division, American Fisheries Society. Under the direction of the Reservoir Committee, Surber (1960) reviewed existing procedures and developed a standard reporting format for tabulating and reporting cove rotenone sample data for reservoirs.

Hall (1962), under the auspices of the Reservoir Committee, conducted a survey of fish sampling methods used by investigators working on Southeastern impoundments. Results of this survey indicated that, of all the fish sampling techniques employed, only the cove

[1] Basic data presented in this paper are derived from a cooperative "Predator Stocking Evaluation (PSE)," conducted under the auspices of the Reservoir Committee, Southern Division, American Fisheries Society, 1972-73.

rotenone method was used by all 14 states, and that it was the preferred method of sampling reservoir fish population despite recognized inadequacies.

In 1965, Reservoir Committee member agencies conducted an extensive field evaluation of the cove rotenone techniques by sampling a 115-acre arm of Douglas Lake, Tennessee (Hayne, et al., 1968). All coves in the arm were separately and concurrently sampled. Results of cove samples were then compared to the open water sample to establish shoreline-open water relationships. Results of the Douglas Lake study indicated that the cove rotenone sample did provide useful data on the presence or absence of important groups of fish within a reservoir, that for total weight the coves appeared to fairly represent the entire arm; and that, although cove samples often over-represented or under-represented the true abundance of various species and size classes, this bias could be compensated for by applying adjustment factors to the cove rotenone data.

The standardized procedure established for conducting standing crop estimates of fishes in the 23 PSE reservoirs was designed after reviewing the historical development of the cove rotenone sampling technique. Although field samples were conducted by personnel of various organizations, an effort was made to standardize as much as possible all field operations. Standardized field sheets and report forms were utilized throughout the study and centralized data processing of all samples was conducted by the National Reservoir Research Program, USFWS, Fayetteville, Arkansas.

Data from these samples are presented here to provide a descriptive account of standing crops, species composition and length frequencies of major categories of the fish population. These data were used by Aggus and Lewis (1977) to establish relationships between environmental variation and the fish standing crop, and by Jenkins and Morais (1977) to estimate prey-predator relationships in the PSE reservoirs.

METHODS

Three cove rotenone samples were collected from each PSE reservoir during August 1972 and 1973. One sample was taken in each of three general areas of the reservoir, i.e., near the headwater of the major tributary, in the midlake region, and in the main body of the reservoir near the dam.

Since it was impractical to randomly select a study site because of restrictions imposed by other reservoir uses, an attempt was made to select typical coves. A study site was selected with shoreline configurations, cover habitat, and other physical characteristics similar in nature in that particular segment of the reservoir. However, the following limitations were considered. The area of each cove was at least one surface acre, the maximum depth was less than 30 feet and the width of the cove mouth did not exceed 400 feet. Although an effort was made to select study sites that had an average depth comparable to the depth of the littoral region of the reservoir, coves with extensive areas of shallow backwater were avoided.

Surface area of each study cove was estimated utilizing a transit and stadia, plane table and alidade, aerial photographs, or lake engineering data. Depth contours of the cove were constructed, and the volume of water within the cove was calculated to determine the amount of rotenone needed to eradicate the entire fish population of the cove. The mouth of the study cove was blocked with a one-half inch mesh, block net similar to that described by Lambou (1959). The block net was set during the evening prior to the application of rotenone and remained set throughout the two-day study period.

Initial application of rotenone was made in the deeper sections of the cove, parallel to the block net. The dispersing crew then worked toward the head of the cove, pumping rotenone through a perforated hose from surface to bottom in all areas where they could maneuver the outboard motor and boat. Rotenone was sprayed on the surface in those areas where the water was too shallow to operate a boat and motor. An attempt was made to disperse rotenone gradually and evenly throughout the entire cove until a concentration of approximately 1 ppm was obtained.

Fish were picked up throughout the first day of the two-day sample, sorted to species and to inch classes, then counted and weighed. Fish were again picked up on the second day, sorted to species and to inch classes, then counted but not weighed. Weights of fish

picked up on the second day were not considered valid, so estimated weights were calculated utilizing weight data collected during the first day of the sample. However, if length-weight data on a particular species or inch class of a species were not available from first-day collections, weights were estimated from length-weight relationships calculated from fish of that reservoir or other length-weight relationships commonly used by the organization conducting the sample.

ESTIMATE OF ADJUSTED STANDING CROP

To establish the relationship between fish recovered by a cove rotenone sample and the actual standing crop of fish in a reservoir, an estimated recovery rate of fish within the study site and a factor which will compensate for different shoreline-open water distributional patterns of various fish species and size groups are required.

Henley (1967) observed that many of the fish in a rotenone sample would sink to the bottom of the cove and remain unavailable to conventional recovery methods. Within a 52-hour period following the application of rotenone in a series of Lake Cumberland samples, 74 percent of the number and 95 percent of the weight of all fish present were recovered at the surface. He found that species composition and size structure of the population largely determined the number of fish remaining on the bottom 52 hours after application of rotenone. An estimate of recovery rate, based on the species composition of a cove, is therefore necessary to adequately describe standing crop.

The use of marked fish has been widely accepted as the most practical method of estimating recovery rate of fish picked up in a cove rotenone sample. This technique can be used to estimate total standing crop of fish in a particular cove by expanding the observed standing crop measurement by a factor derived from the observed recovery rate of marked fish introduced into that cove. Under carefully controlled conditions, in which a large number of marked fish are used, this technique may represent the best estimate of total standing crop for a particular cove. However, an alternate method can be used when a series of standardized cove rotenone samples are conducted. By this method, the recovery rate of marked fish of all coves sampled during an investigation is combined, and a mean recovery rate of all marked fish is used to expand the observed standing crop of each

Table 1. Percent recovery of fish marked and recovered during cove rotenone samples in 20 PSE reservoirs.

Taxa	*Marked*	*Recovered*	*Percent Recovered*
Gars	9	5	56
Bowfin	5	1	20
Clupeids	715	537	75
Esox sp.	24	15	63
Carp	376	230	60
Minnows and silversides	320	159	50
Catostomids	520	345	66
Flathead catfish	29	23	79
Other catfish	311	157	53
White bass	—	—	82*
Sunfishes	8,699	4,708	54
Black basses	1,643	985	60
Crappie	83	51	61
Darters	—	—	50*
Yellow perch	166	72	43
Walleye	—	—	63*
Drum	23	14	60
TOTALS	12,923	7,302	

* Recovery rates derived from National Reservoir Research Program data.

sample. Since a larger total number of marked fish are available under such a procedure, particular species or groups of similar species and designated size classes can be analyzed separately, and recovery rates of various categories of fish can be established. This procedure alleviates the problem of different recovery rates for various species and size groups recognized by Henley (1967).

The latter approach was selected for estimating standing crops of fishes in the PSE reservoirs. To provide these data, fish collected by electrofishing from areas outside of the study cove were marked, most commonly by clipping the upper lobe of the caudal fin, and introduced into the study cove following the placement of block net. An introductory rate of approximately 100 marked fish per acre were used. Of the 12,923 fish which were marked and introduced into the study sites, 7,302 were recovered during the cove rotenone samples. The recovery rate of different taxa sampled during this investigation (Table 1) varied from a low of 20 percent (bowfin) to a high of 79 percent (flathead catfish). Since white bass, darters, and walleye were not marked during this investigation, recovery rates for these species were derived from National Reservoir Research Program data.

Adjustment factors designed to compensate for differences in distributional patterns of fish between cove and open water areas, based on the Douglas Lake study, were derived by Jenkins and Morais (1977). These conversion factors and the marked fish corrections were both applied to the observed standing crop measurements to derive adjusted standing crop.

RESULTS

Although PSE reservoirs exhibit a wide range of morphological and chemical characteristics, they are considered representative of the broad range of southern

Table 2. Two-year (1972-73) mean observed and adjusted standing crop estimates of fishes in 23 PSE reservoirs.

	Pounds Per Acre	
Taxa	*Observed*	*Adjusted*
Esox sp.	0.5	0.8
White bass	1.5	3.7
Striped bass	0.2	0.6
Black bass	15.3	30.2
Crappie	6.2	17.8
Walleye	0.5	0.4
	24.2	53.5
Gar	1.4	2.5
Bowfin	0.5	3.3
Catfish	18.5	39.2
	20.4	45.0
Clupeids	111.2	148.3
Minnows and silversides	1.5	3.1
White perch and yellow bass	0.4	1.1
Sunfish	47.5	82.2
Darters	0.9	1.7
Yellow perch	2.9	6.8
	164.4	243.2
Carp and goldfish	21.7	43.1
Catostomids	15.7	48.7
Drum	5.2	18.7
	42.6	110.5
TOTAL	251.7	451.1

impoundments, (Aggus and Lewis, 1977). Standing crop data derived from all PSE reservoirs have been combined and are presented here as a descriptive account of standing crop, and relative abundance of size groups and fish in a typical southern reservoir.

The mean unadjusted and adjusted standing crops of major fish taxa, expressed as pounds of fish per acre, in the 23 PSE reservoirs are presented in Table 2. The mean adjusted standing crop of all fish in the PSE reservoirs was 451.1 pounds per acre. This represents a 79 percent increase in the observed or unadjusted standing crop of 251.7 pounds per acre. The adjusted standing crop of fish varied from a low of 99.6 pounds per acre in Deep Creek Lake, Maryland, to a high of 1550.4 pounds per acre in Cherokee Lake, Tennessee. A frequency distribution of adjusted standing crop estimates for combined samples of each reservoir (Figure 1) is skewed with a majority of the adjusted standing crop estimates being less than the mean, i.e., 26 estimates of adjusted crops are less than the mean, whereas 20 are greater than the mean.

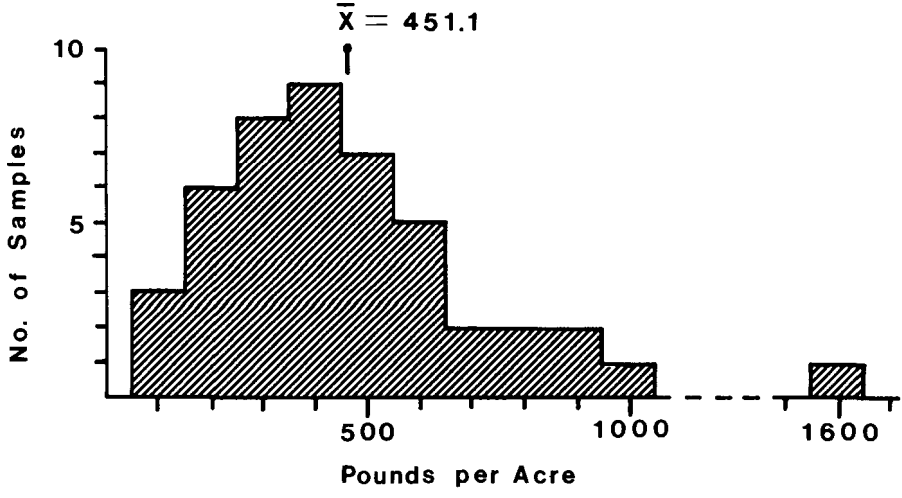

Figure 1. Frequency distribution of adjusted standing crop estimates of PSE reservoirs sampled during 1972 and 1973.

The various taxa of fish were categorized following the recommendations of Surber (1960). An exception to his classification is the combination of non-predatory game fish and forage fish into a category termed prey. Our classification, therefore, considers *Esox* sp., white bass, striped bass, black bass, crappie, and walleye as predatory game fish; gar, bowfin, and catfish as predatory food fish; clupeids, minnows, silverside, white perch, yellow bass, sunfish, darters, and yellow perch as prey; and carp, catostomids, and drum as non-predatory food fish.

Adjusted standing crop estimates for fish in these categories were calculated for each reservoir and are presented in Table 3. Standing crop, expressed as pounds of fish per acre, in each inch class is presented for each taxon in Tables 4 through 7. A summary of the adjusted standing crop from the 23 reservoirs, arranged by fish of available, intermediate and fingerling sizes as recommended by Surber (1960) is presented in Table 8.

The adjusted standing crop of predatory game fish from all reservoirs was 53.5 pounds per acre, which represents 12 percent of the adjusted standing crop of all fish (Table 4). The adjusted standing crop of predatory game fish from individual samples varied from 9.4 pounds per acre in Deep Creek Lake, Maryland, to 163.6 pounds per acre in Grenada Lake, Mississippi. The relative abundance, i.e., percentage of total adjusted standing crop made up of predatory game fish, varied from 3 to 33 percent. Black bass and crappie were

Table 3. Adjusted standing crop (pounds/acre) of fish in 23 PSE reservoirs based on three cove samples per reservoir.

Reservoir	*State*		*Predatory Game Fish*	*Predatory Food Fish*	*Prey*	*Non-predatory Food Fish*	*Adjusted Standing Crop*
Jordan	AL	1972	86.41	48.30	476.83	166.59	778.13
		1973	98.63	25.49	310.96	159.10	594.18
Mitchell	AL	1972	37.64	57.18	290.03	261.85	646.70
		1973	25.93	33.75	254.75	94.24	408.67
Beaver	AR	1972	15.71	19.77	272.64	177.08	485.20
		1973	30.36	23.41	230.67	199.28	483.72
Bull Shoals	AR	1972	18.69	10.54	99.37	89.90	218.50
		1973	106.28	27.56	274.29	152.94	561.07
Greeson	AR	1972	39.85	31.89	54.99	40.47	167.20
		1973	26.23	18.34	90.71	12.85	148.13
Jackson	GA	1972	65.85	80.14	694.83	12.36	853.18
		1973	30.45	69.01	476.99	13.23	589.68
Sinclair	GA	1972	43.17	54.76	214.24	43.42	355.59
		1973	22.76	32.94	123.89	21.29	200.88
Deep Creek	MD	1972	10.92	6.91	87.66	3.83	109.32
		1973	9.40	5.11	84.80	.30	99.61
Barnett	MS	1972	148.59	91.83	562.57	52.41	855.40
		1973	88.52	65.65	317.44	35.25	506.86
Enid	MS	1972	54.12	35.66	114.07	54.44	258.29
		1973	78.31	40.68	113.78	127.46	360.23
Grenada	MS	1972	70.09	48.58	49.41	233.56	401.64
		1973	163.58	96.58	82.22	436.54	778.92
Okatibee	MS	1972	129.78	37.10	348.39	19.19	534.46
		1973	35.47	6.10	173.05	0	214.62
Sardis	MS	1972	38.31	37.10	166.57	57.95	299.93
		1973	132.55	69.88	113.02	89.07	404.52
Badin	NC	1972	24.92	97.62	311.93	56.84	491.31
		1973	25.75	111.68	301.09	77.44	515.96
Gastron	NC	1972	36.11	92.97	206.74	82.76	418.58
		1973	59.73	63.82	312.92	79.72	516.19
Canton	OK	1972	24.13	4.51	50.89	40.43	119.96
		1973	26.05	14.75	149.96	50.93	241.69
Keystone	OK	1972	26.00	27.59	282.26	324.74	660.59
		1973	43.15	63.62	585.18	285.94	977.89
Cherokee	TN	1972	52.87	18.14	341.66	165.22	577.89
		1973	116.65	82.30	960.71	390.75	1,550.41
Dale Hollow	TN	1972	20.42	7.05	88.16	174.29	289.92
		1973	13.05	8.21	84.81	101.75	207.82
Watauga	TN	1972	28.36	16.31	97.59	158.01	300.27
		1973	81.52	16.37	150.46	178.24	426.59
Bastrop	TX	1972	43.29	47.64	122.51	61.31	274.75
		1973	70.01	26.45	107.24	65.34	269.04
Cypress Springs	TX	1972	63.48	121.29	163.73	7.70	356.20
		1973	54.55	72.85	518.08	12.71	658.19
Spence	TX	1972	27.25	18.98	111.52	164.76	322.51
		1973	13.47	34.80	161.92	51.60	261.79
Mean			53.44	43.94	243.21	110.55	451.13

the most common predatory game fish; both were collected from every reservoir in the sample. The adjusted standing crop of black bass, the most abundant predatory game fish in these reservoirs, was 30.2 pounds per acre, which represents 57 percent of the predatory

Table 4. Adjusted standing crop, expressed as pounds per acre, for each inch class of predatory game fish from 23 PSE reservoirs sampled during 1972 and 1973.

Inch Class	*Esox sp.*	*White Bass*	*Striped Bass*	*Black Bass*	*Crappie*	*Walleye*
1				t	0.16	
2		0.04	t	0.33	1.38	t
3	0.02	0.29	0.01	0.61	1.23	t
4	0.03	0.09	t	0.23	0.30	t
5	0.03	0.31	0.01	0.48	0.61	0.01
6	0.03	0.70	0.01	0.67	1.36	0.01
7	0.02	0.81	0.01	0.86	1.42	t
8	0.04	0.22	0.01	0.88	2.12	t
9	0.03	0.10		1.32	3.00	0.01
10	0.04	0.15		2.18	2.42	0.05
11	0.06	0.24		2.55	1.32	0.18
12	0.05	0.44		3.14	1.06	0.09
13	0.05	0.21		3.25	0.58	0.04
14	0.07			3.05	0.51	0.01
15	0.08	0.06		2.49	0.22	0.01
16	0.05	0.02		1.68	0.06	0.01
17	0.07			1.09	0.01	
18	0.04			1.29		0.01
19	0.07			0.97		
20	0.03		0.27	0.54		
21	0.02		0.02	0.73		
22			0.07	0.64		
23			0.02	0.52		
24			0.08	0.11		
25						
26			0.04			
Total	0.83	3.68	0.55	30.24	17.76	0.43

t < .005 pound/acre

game fish population. The adjusted standing crop of available size predatory game fish was 41.7 pounds per acre, which represents 79 percent of the total predatory game fish population and 9 percent of adjusted standing crop of all fish (Table 8).

The adjusted standing crop of predatory food fish from all reservoirs was 45.0 pounds per acre, which was 10 percent of the adjusted standing crop of all fish. The adjusted standing crops of predatory food fish from individual samples ranged from 4.5 pounds per acre in Canton Lake, Oklahoma, to 121.3 pounds per acre in Cypress Springs Reservoir, Texas. The relative abundance of predatory food fish varied from 2 percent in Dale Hollow Reservoir, Tennessee, to 34 percent in Cypress Springs. Catfish, the most abundant predatory food fish, had an adjusted standing crop of 39.2 pounds per acre (Table 5). The adjusted standing crop of available size catfish was 27.6 pounds per acre, which represents 63 percent of the adjusted standing crop of all predatory food fishes.

The prey adjusted standing crop of 243.2 pounds per acre represents 54 percent of the adjusted standing crop of all fish (Table 6). The crop of prey from individual samples ranged from 49.4 pounds per acre in Grenada Lake, Mississippi to 960.7 pounds per acre in Cherokee Lake, Tennessee. The relative abundance of prey varied from 12 percent in Grenada Lake, Mississippi, to 85 percent in Deep Creek Lake, Maryland. It is interesting to note that prey species in Deep Creek Lake were yellow perch (51.8 pounds per acre), sunfish (20.3 pounds per acre), minnows and silversides (12.7 pounds per acre). Clupeids, which were not collected in Deep Creek Lake, were the principal prey in most PSE reservoirs. The mean clupeid standing crop of 148.3 pounds per acre represents 61 percent

Table 5. Adjusted standing crop, expressed as pounds per acre, for each inch class of predatory food fish from 23 PSE reservoirs sampled during 1972 and 1973.

Inch class	*Gar*	*Bowfin*	*Catfish*
1			t
2			0.21
3			0.22
4			0.12
5	t		0.34
6	t	t	1.38
7	t		2.03
8	t	0.02	3.65
9	0.01	0.08	3.59
10	0.04	0.19	2.60
11	0.03	0.12	2.17
12	0.05	0.19	1.90
13	0.02	0.19	1.96
14	0.03	0.14	1.80
15	0.02	0.16	1.71
16	0.04	0.20	1.82
17	0.06	0.11	1.51
18	0.09	0.15	1.63
19	0.08	0.12	1.22
20	0.07	0.37	1.71
21	0.24	0.22	0.98
22	0.24		0.87
23	0.37	0.03	1.19
24	0.27	0.76	1.15
25	0.22	0.21	0.54
26	0.06		0.73
27	0.17	0.08	0.31
28	0.05		0.50
29	0.03		0.36
30	0.12		
31	0.11		
32	0.02		0.46
33			0.42
34	0.04		0.10
35			
36			
37	0.02		
Total	2.48	3.34	39.18

t < .005 pound/acre

of the adjusted standing crop of all prey. Sunfish, with an adjusted standing crop of 82.8 pounds per acre, also contribute significantly to the prey base.

The adjusted standing crop of non-predatory food fish was 110.5 pounds of fish per acre, which represents 24 percent of the adjusted standing crop of all fish. The adjusted standing crop of non-predatory food fish varied from none in Okatibee Lake, Mississippi, to 436.5 pounds per acre in Grenada Lake, Mississippi. The relative abundance of non-predatory food fish ranged from zero (Okatibee) to 60 percent (Dale Hollow) of the total adjusted standing crop. Adjusted standing crops of the major taxa of non-predatory food fish were: carp and goldfish, 43.1 pounds per acre; catostomids, 48.7 pounds per acre; and drum, 18.7 pounds per acre (Table 7). The adjusted standing crop of available size non-

Table 6. Adjusted standing crop, expressed as pounds per acre, for each inch class of prey fish from 23 PSE reservoirs sampled during 1972 and 1973.

Inch Class	*Clupeids*	*Minnows and Silverside*	*White perch and Yellow bass*	*Sunfish*	*Darters*	*Yellow perch*
1	0.14	0.10		0.55	t	
2	10.30	0.56	0.03	2.69	0.22	0.05
3	20.42	0.79	0.06	7.50	0.64	0.43
4	9.97	0.30	0.01	21.30	0.76	0.50
5	6.72	0.24	0.31	22.18	0.09	2.59
6	17.39	0.36	0.29	17.27	0.02	2.18
7	19.48	0.28	0.23	7.20	t	0.73
8	17.48	0.42	0.09	2.61		0.25
9	14.49	0.04	0.06	0.66		0.06
10	11.38		0.02	0.20		t
11	8.57			0.02		0.02
12	7.97					0.02
13	3.18					
14	0.64					
15	0.11					
16	0.03					
17	0.03					
Total	148.30	3.09	1.10	82.18	1.73	6.83

t < .005 pound/acre

predatory food fish was 96.9 pounds per acre, which represents 88 percent of the non-predatory food fish.

CONCLUSION

Results of this investigation indicate that standing crop of fish in southern reservoirs is substantially larger than many investigators have previously assumed. The adjusted standing crop of 451.1 pounds of fish per acre in PSE reservoirs was derived by expanding the observed measure of 251.7 pounds of fish per acre to compensate for recovery rate and different shoreline-open water distribution patterns. Adjustment factors used to make these compensations need further verification.

Although studies to refine techniques of estimating marked fish recovery rates can certainly be justified, the more critical problem is one of accurately describing the relationship of cove rotenone samples to the total fish population of a reservoir. Presently, the Douglas Lake study is the best available source of information from which these factors can be derived. Obviously, samples from one reservoir are not adequate to properly describe adjustment factors for all reservoirs. Investigations similar in nature to the Douglas Study should, therefore, be undertaken on other types of reservoirs and results used to establish a more accurate description of on-shore versus open water fish distribution patterns.

Table 7. Adjusted standing crop, expressed as pounds per acre for each inch class of non-predatory food fish from 23 PSE reservoirs sampled during 1972 and 1973.

Inch class	*Carp and Goldfish*	*Catostomids*	*Drum*
1		t	t
2	t	0.01	0.30
3	t	0.06	0.67
4	0.04	0.02	0.21
5	0.11	0.05	0.27
6	0.09	0.06	0.82
7	0.15	0.17	0.71
8	0.71	0.22	0.63
9	1.16	0.69	1.47
10	0.57	1.09	1.79
11	0.51	1.02	1.95
12	1.57	1.16	2.07
13	1.64	5.32	2.10
14	1.38	6.45	1.42
15	1.60	5.37	1.12
16	3.28	4.16	0.80
17	4.70	4.53	0.33
18	4.05	4.13	0.45
19	2.60	4.49	0.22
20	2.81	2.56	0.76
21	1.96	1.02	0.19
22	2.25	1.64	
23	4.06	0.66	
24	2.60	0.66	
25	1.74	0.24	0.02
26	1.44	0.19	
27	0.59	0.46	
28	0.68	0.63	0.27
29	0.46	1.05	
30	0.33		
31	0.02	0.31	
32	0.02	0.23	
33			
34			0.15
Total	43.12	48.65	18.72

t < .005 pound/acre

Table 8. Summary of adjusted standing crop data from 23 PSE reservoirs.

Taxa	*Fish of Available Size*		*Intermediate*		*Fingerlings*	
	inch class	*pounds per acre*	*inch class*	*pounds per acre*	*inch class*	*pounds per acre*
Predatory Game Fish						
Esox sp.	>11	0.53	6-11	0.22	0-5	0.08
White bass	> 6	2.25	5-6	1.01	0-4	0.42
Striped bass	> 9	.50	5-9	.04	0-4	0.01
Black bass	> 8	25.55	5-8	2.89	0-4	1.17
Crappie	> 6	12.72	5-6	1.97	0-4	3.07
Walleye	>11	.17	5-11	.26	0-4	0
Predatory Food Fish						
Gar	>23	1.11	7-23	1.39	0-6	0
Bowfin	>13	2.55	5-13	.79	0-4	0
Catfish	> 9	27.64	5-9	10.99	0-4	.55
Prey						
Clupeids		—		—		—
Minnows and Silversides		—		—		—
White perch and Yellow bass	> 5	.69	4-5	.32	0-3	.09
Sunfish	> 4	50.14	3-4	28.80	0-2	3.24
Darters		—		—		—
Yellow perch	> 5	3.26	4-5	3.09	0-3	.48
Non-predatory Food Fish						
Carp and Goldfish	>13	36.57	7-13	6.31	0-6	.24
Catostomids	>11	45.26	5-11	3.30	0-4	.09
Drum	> 8	15.11	5-6	2.43	0-4	1.18

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