A COMPARISON OF POPULATION SAMPLING RESULTS WITH THE TOTAL FISH POPULATION OF A 90-ACRE GEORGIA RESERVOIR[1]

by

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ABSTRACT

The results from gill nest samples, a series of cove rotenone samples, and a creel census were compared to the total fish population obtained through the drainage of Lake Russell, a 90-acre reservior in Northeast Georgia. An extended period of gill netting yielded the best representation of the various fish species present in the reservoir, but gave a poor estimate of the relative abundance of the fish species. Cove rotenone samples of known acreage gave a good representation of the total weight per acre of the reservoir. The three coves sampled yielded 45.3 pounds per acre, 48.5 pounds per acre, and 73.0 pounds per acre. The three cove samples combined yielded a value of 54.1 pounds per acre. Upon drainage of the reservoir the total weight per acre of all fish was 48.4 pounds per acre. The deepest of the three coves, lacking an abundance of aquatic vegetation, was overestimated in terms of the actual weight per acre. The creel census gave a fair representation of the fish species present in the reservior but poorly represented their relative abundance. In general, none of the sampling methods gave satisfactory estimates of the relative abundance of fish species. The cove rotenone samples were more reliable in representing bass and bluegill than any of the other sampling methods.

INTRODUCTION

Reservoirs are becoming increasingly important as a fishery resource in the United States. Some 8,900,000 reservoir acres exist at the present with about 40 percent located in the Southeast alone. In 1960 the national sport fishing yield from all the reservoirs totaled some 121,000,000 pounds of fish (Stanberry, 1967).

Because of the abundance of reservoirs and the high fishermen use that the Southeastern reservoirs receive, intensive management programs are being conducted in an attempt to provide better fishing. The first step toward management of the fishes in a reservoir is to obtain some idea of the fish populations present in that particular body of water. Reservoir population studies are conducted to inventory and follow changes in the fish population, and to locate and evaluate potential management problems.

A question exists concerning population sampling in large bodies of water. Which method of sampling best represents the true population of the reservoir? The need to evaluate errors associated with various sampling methods led to the Douglas Reservoir study in Tennessee by Hayne, Hall, and Nichols (1967). A 115-acre arm of the reservoir was blocked off, small coves within this arm were subsampled, and finally the entire arm was treated with rotenone. Comparisons were made between the coves and the large arm, and among the small coves. A similar study was conducted in Oklahoma by Bennett and Brown (1968) on Lake Raymond Gary. Their study involved diversified sampling of the 263-acre reservoir and comparing the results with bag seine samples taken at drainage when the lake was drawn down to the stream

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channel. Barry (1967) conducted a study on Lenape and Bischoff Reservoirs in Indiana which involved sampling by creel census, rotenone, gill nets, traps, and electro-fishing gear before complete drainage of both reservoirs. Comparisons were made between the samples and the drainage data, which was assumed to be the standing crop of fishes.

This study compared the results of three sampling methods with the total population of the lake obtained through complete drainage and recovery of the fish population. Gill netting, cove rotenone samples, and a creel census were conducted prior to the drainage.

DESCRIPTION OF STUDY AREA

Lake Russell is located in the southeastern corner of Habersham County in the upper Piedmont of Georgia. It lies in the Chattahoochee National Forest at the base of the Blue Ridge Mountains near the towns of Baldwin, Cornelia, and Mt. Airy. Lake Russell was constructed in 1938 by the Work Project Administration principally for recreational use and is presently managed by the U. S. Forest Service.

Lake Russell has a normal pool level of 957 feet above mean sea level with a surface area of approximately 90 acres. Maximum pool elevation is 967 feet with a surface area of about 135 acres. The maximum depth of the reservoir is 35 feet. Two-thirds of the impoundment ranges from 20 to 30 feet in depth, while the other one-third is from 4 to 10 feet deep. Volume at normal pool level is approximately 1,500 acre feet. A control valve is incorporated in the dam at a depth of 35 feet below normal pool level and is manipulated from a concrete tower at the surface of the reservoir.

The total watershed area for Lake Russell is approximately 4300 acres consisting of mature hardwood and coniferous forest with relatively little development in the area. The mean annual precipitation is 58.28 inches. The reservoir is fed by three smaller streams of which Nancytown Creek is the largest. A small impoundment on Nancytown Creek, Nancytown Lake, occurs immediately above Lake Russell.

METHODS AND MATERIALS

Fish collected by gill nets, rotenone, and drainage were identified to species, measured in total length to the nearest inch, and weighed to the nearest tenth of a pound when possible, following procedures recommended by Surber (1959). In samples with large numbers of fish of the same species, collective weights by inch classes were taken. Length and weight measurements were not available for those fish reported in the creel census and estimates were made under the assumption that all fish kept by anglers were at least of the Intermediate class for that particular species. The common and scientific names of the fishes collected are those approved by the American Fisheries Society (Bailey, 1960).

Gill Nets

During the summer of 1969, 300 foot by 6 foot sinking type nylon gill nets were used having a constant mesh size throughout their length. Three mesh sizes were used: 1″, 1.5″, and 2″ square. These nets were fished in two sets of three nets of different mesh sizes run perpendicular to the shoreline as described by Heard (1959). They were fished in water varying in depth from about 2 feet near the shore down to 35 feet near the middle of the lake.

The gill nets were set for a 4 day or 96 hour duration each month and were checked every 24 hours. Fish caught were recorded as to species, length, weight, and location in the lake.

Rotenone

Three coves were selected and physical measurements were made. The surface area of each cove was determined. Of the coves selected, two were shallow and had an abundance of the aquatic plant *Ceratophyllum spp.* present. These coves were 1.1 and 1.0 surface acres and were designated Coves A and B, respectively. The other cove, designated Cove C, was considerably deeper and had much less vegetation present. Cove C was .8 surface acres in size. Both Coves A and B were approximately 10 feet deep in their deepest portions while Cove C was approximately 16 feet deep.

The coves were sampled separately beginning on September 8, 1969, and continuing through September 19, 1969. A blockoff net was used to increase the efficiency of each sample. The net was placed in position at dawn on the first day of each study and remained in position during a three day sampling period for each cove. Five percent emulsified rotenone was applied at a rate of 1.27 quarts per acre-foot of water to achieve the effective dosage of 1.0 ppm suggested by Krumholz (1948) and others. The toxicant was dispensed in the prop-wash of an outboard motor to mix the rotenone in the sample area.

Pickup began as soon as the fish came to the surface. Fish were then separated according to species and inch class (i.e. - a three-inch fish: 2.5-3.4 inches). As groups of the same species and size class were accumulated they were counted, weighed, and recorded. Weights for the second and third days were estimated from length-weight relationships established from the first day's pickup.

Creel Census

A systematic stratified creel survey was conducted on Lake Russell by the State Game and Fish Commission between the dates of April 17, 1969 and September 28, 1969. One weekend day and two week days were randomly chosen from each week during the sampling period. Days of the week were designated "heavy" days (Saturday, Sunday, and Wednesday) and "light" days (Monday, Tuesday, Thursday, and Friday) according to relative fishing pressure. Wednesday was classified as a "heavy" day due to the closing of the business establishments in the nearby towns.

The creel clerk made total fishermen counts and interviewed anglers between the hours of 7:00 a.m. and 7:00 p.m. in much the same manner as described by Charles (1965). The 12-hour fishing day was divided for survey purposes into four 3-hour time periods. Because total fishermen counts could be made at Lake Russell in less than an hour the counts were considered as being instantaneous and interviews were conducted simultaneously. This was feasible considering only twelve fishermen were present on the reservoir at any one time during the entire creel census.

Drainage

A recovery structure was constructed using the basic design described by Zurbuch (1965). This was built below the dam in order to capture the fish as they came through the outlet (Figure 1). Upon completion and testing of the structure, the reservoir began to drain on November 16, 1969. The drainage of the reservoir took approximately one week under full flow, and very few fish came through until the last two days.

The fish were placed in small buckets suitable for weighing. Every tenth bucket was subsampled to determine variation in the species composition and size of the fishes. Approximately two hundred and fifty buckets of fish were weighed.

After complete drainage and removal of all fish from the structure, a number of "potholes" or depressions filled with water remained in the floor of the lake. These bodies of water containing fish were isolated with small earth dams to prevent contamination of the stream channel and were treated with a heavy

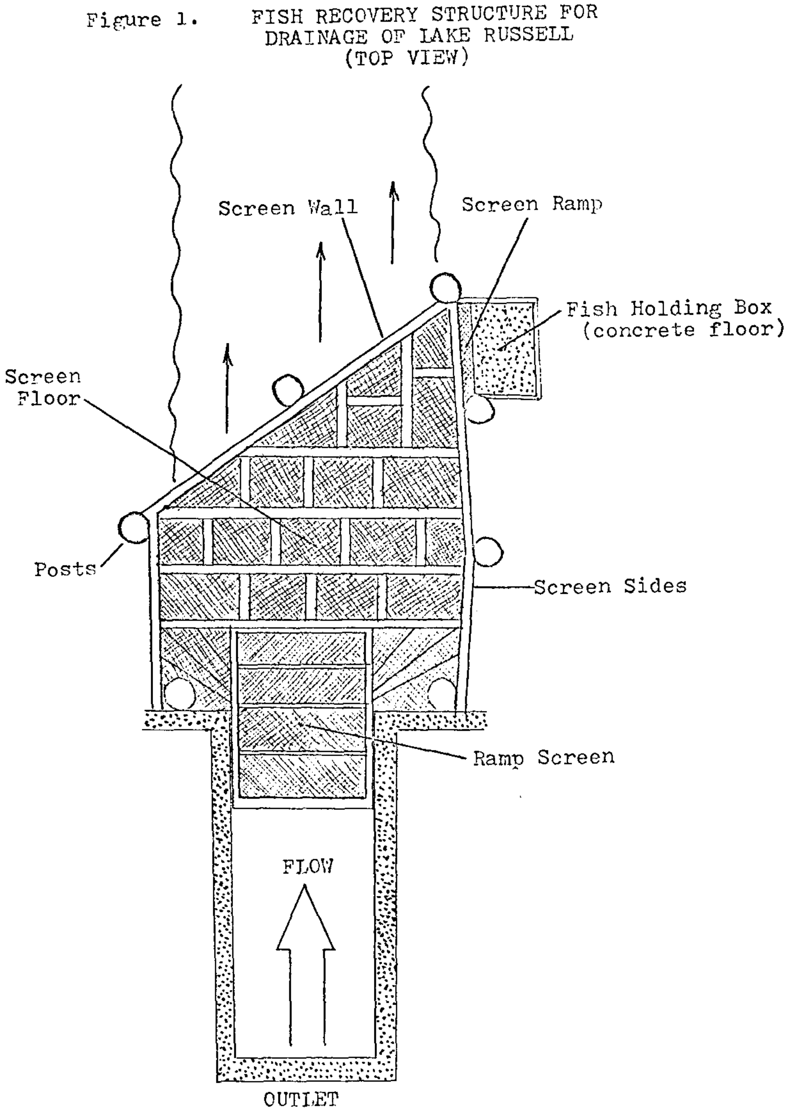

FIGURE 1. Fish Recovery Structure for Drainage of Lake Russell (Top View)

concentration of CHEM FISH COLLECTOR, a rotenone compound designed for cold water use. Fish recovered were recorded as to species, length, and weight.

RESULTS AND DISCUSSION

Comparisons were made using the Chi-square Test of Goodness of Fit as described by Ostle (1963) to determine if a significant degree of similarity existed between the observed results of the different sampling methods and the drainage data. The drainage data was assumed to be the actual standing crop of fishes present in Lake Russell at that time and comparisons were based upon this assumption. Tables II and III summarize and compare the results of all sampling methods with the drainage data. Those values which significantly represented the standing crop at drainage are noted.

Gill Net Samples

Bennett and Brown (1967) found that gill net samples prior to drainage gave a good representation of fish species present in Lake Raymond Gary, Oklahoma, and this study supports their findings. Gill nets proved to be the best method in determining the species types present in Lake Russell (Table I). It is interesting to note that eleven species of fish were obtained from the gill net samples while only ten species were found in the cove samples and the drainage. Only nine species of fish were reported in the creel census. Rainbow trout were caught in the gill net samples but did not appear in the other samples or the drainage.

The gill net samples poorly represented the relative abundance of the various fish species at drainage. Four important species, largemouth bass, bluegill, black crappie, and channel catfish, were notably misrepresented.

The percentages of numbers and weight for largemouth bass in the gill net samples were considerably greater than the actual percentages of bass at drainage. The gill net sample was efficient in capturing this species, and indicated a much higher percentage of largemouth bass than either of the other sampling methods.

The gill net samples produced a much lower percentage of bluegill than the other sampling methods. A comparison of percentages from the net samples with the actual percentage of bluegill at drainage produced high Chi-square values denoting a definite misrepresentation by this sampling method.

The percentages of black crappie were very low when compared to the actual values of crappie at drainage. The gill net samples were similar to the other samples in that the crappie population was consistently underestimated.

The percentage of numbers and the percentage of weight for redbreast significantly represented the actual percentages of redbreast at drainage.

The percentage of numbers for other sunfish, green and redear, tended to overestimate the actual value while the percentage of weight of these fish proved to significantly represent the actual value found at drainage.

The percentages of channel catfish were very high when compared to the actual values of channel catfish at drainage. The nets were the most efficient sampling method in capturing this fish species, and therefore misrepresented their actual abundance.

Gill nets were efficient in harvesting bullheads also. The percentages of bullheads were high when compared to their actual abundance at drainage, resulting in an overestimate of these species.

The percentage of numbers for shiners represented the actual value found at drainage to a high degree of statistical significance but the percentage of weight was an underestimate.

Rainbow trout were obtained in the gill net samples but did not occur in any of the other samples or the drainage.

TABLE I

OCCURRENCE OF FISH SPECIES IN INDIVIDUAL SAMPLING METHODS AND DRAINAGE, LAKE RUSSELL, 1969

SPECIES	GILL NETS	COVE A	COVE B	COVE C	COMBINED COVES	CREEL CENSUS	DRAINAGE
Largemouth bass	X	X	X	X	X	X	X
Bluegill	X	X	X	X	X	X	X
Black crappie	X	X	X	X	X	X	X
Green sunfish	X	X	X	X	X	X	X
Redbreast	X	X	X	X	X	X	X
Redear sunfish	X	X	X	X	X	X	X
Channel catfish	X	O	O	X	X	X	X
Yellow bullhead	X	X	X	X	X	X	X
Brown bullhead	X	X	X	O	X	X	X
Golden shiner	X	X	X	X	X	O	X
Rainbow trout	X	O	O	O	O	O	O

X = presence in sample
O = absence in sample

TABLE II

COMPARISON BETWEEN ALL SAMPLING METHODS AND STANDING CROP AT DRAINAGE BY PERCENTAGES OF THE TOTAL NUMBERS OF FISHES IN EACH SAMPLE AND DRAINAGE, LAKE RUSSELL, 1969.

SPECIES	GILL NETS 1969	COVE A	COVE B	COVE C	COMBINED COVES	CREEL CENSUS	DRAINAGE
Largemouth Bass	27.0	** 1.7	** 1.8	* 1.9	** 1.7	5.5	1.6
Bluegill	17.0	** 69.4	* 71.7	32.4	60.0	* 71.6	69.0
Black Crappie	8.0	2.0	4.1	9.7	4.7	8.2	18.0
Redbreast	** 4.0	* 4.1	12.1	11.0	* 8.4	2.7	6.5
Other Sunfish	4.0	17.3	5.7	43.7	21.0	5.1	1.9
Channel Catfish	4.0	0.0	0.0	** .1	trace	2.0	.1
Bullheads	26.0	5.3	3.9	** .9	3.7	4.9	.8
Other Fish Species	10.0	.2	.7	.3	.4	0.0	2.1
Golden Shiner	** (2.0)	(.2)	(.7)	(.3)	(.4)	(0.0)	(2.1)
Others	(8.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
TOTALS	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE: Level of significance in the Chi-square Test is indicated above the figure thus: * = X2 .95; ** = X2 .99.

TABLE III

COMPARISON BETWEEN ALL SAMPLING METHODS AND STANDING CROP AT DRAINAGE BY PERCENTAGES OF THE TOTAL WEIGHT OF FISHES IN EACH SAMPLE AND DRAINAGE, LAKE RUSSELL, 1969.

SPECIES	GILL NETS 1969	COVE A	COVE B	COVE C	COMBINED COVES	CREEL CENSUS	DRAINAGE
Largemouth Bass	45.0	* 15.8	25.8	** 13.4	18.0	17.4	12.4
Bluegill	4.3	** 45.0	29.5	24.9	32.7	** 50.2	48.4
Black Crappie	6.5	14.4	** 22.8	33.5	** 24.1	5.7	23.5
Redbreast	** 2.7	* 2.3	5.5	5.4	* 4.4	1.5	3.3
Other Sunfish	* 1.1	9.1	2.4	14.7	9.1	2.9	.7
Channel Catfish	9.7	0.0	0.0	2.8	** 1.0	6.4	.9
Bullheads	19.2	11.9	9.6	3.8	8.3	15.9	6.0
Other Fish Species	11.5	1.5	** 4.3	1.5	2.4	0.0	4.8
Golden Shiners	(.8)	(1.5)	** (4.3)	(1.5)	(2.4)	(0.0)	(4.8)
Others	(10.7)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
TOTALS	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE: Level of significance in the Chi-square Test is indicated above the figure thus: * = X2 .95; ** = X2 .99.

Cove Rotenone Samples

Cove A (1.1 acres) yielded 7518 fish weighing 49.87 pounds, or 45.34 pounds per acre. Cove B (1.0 acres) yielded 5241 fish weighing 48.54 pounds, or 48.54 pounds per acre. Cove C (.8 acres) yielded 4785 fish weighing 58.42 pounds, or 73.03 pounds per acre.

Both Barry (1967) and Hayne, Hall, and Nichols (1967) found that the total weight per acre in the coves sampled closely represented the actual weight per acre of standing crop of fishes in a reservoir. This was also the case in the Lake Russell study. Two of the three coves sampled closely represented the actual weight per acre of 48.4 pounds while the third cove, somewhat deeper and void of an abundance of aquatic vegetation, contained mostly adult fish and yeilded a definite overestimate. The weight per acre for all three cove samples combined tended to reasonably represent the true value. This suggests that an accurate weight per acre estimate might be obtained for a reservoir through a larger number of cove samples varying in depth, abundance of aquatic vegetation, and other physical factors including size.

A good representation of the individual fish species present in Lake Russell was obtained in the cove samples. All species known to be in the reservoir occurred in the cove samples, with the exception of rainbow trout. Wilkins, et. al. (1967) found that trout generally inhabit the deeper, cooler waters of the reservoirs in the southeast during the warmer months, and this is the probable reason why no trout were encountered in the relatively shallow coves.

The studies on Lenape and Bischoff Reservoirs in Indiana, Lake Raymond Gary in Oklahoma, and Douglas Reservoir in Tennessee all indicated that cove rotenone samples often overestimate or underestimate the relative abundance of the various fish species present in a reservoir. The Lake Russell study exhibits this phenomenon also. In general, none of the sampling methods gave reliable estimates in this respect, but the cove samples gave the best indication of the actual proportional abundance of some of the major fish species present in Lake Russell, such as largemouth bass and bluegill.

The percentages of numbers for largemouth bass in all three cove samples proved to accurately represent the actual percentage of numbers for bass at drainage. The percentage of numbers for bass in the combined cove sample also gave a good representation of the relative abundance of bass at drainage. Only the percentages of weight for largemouth bass in Coves A and C proved to accurately represent the percentage of weight for bass at drainage. Cove B and the combined cove samples overestimated the percentage of weight at drainage for this species.

Bluegill constituted the majority of the numbers of fishes in all cove samples and the combined cove sample, as well as in the standing crop at drainage. The values from Coves A and B proved to closely represent the percentage of numbers for bluegill obtained in the drainage. Cove C and the combined cove sample underestimated the actual standing crop of bluegill at drainage. The percentages of weight for bluegill in the cove samples poorly represented the actual value of bluegill at drainage. Only Cove A proved to significantly represent the actual percentage of weight for this species in the Chi-square Test. Cove B, Cove C, and the combined cove sample underestimated the percentage of weight for bluegill at drainage.

The cove samples agreed with the other sampling methods in that they underestimated the relative abundance of black crappie at drainage. The percentages of weight for crappie in Cove B and the combined cove sample significantly represented the percentage of weight for crappie at drainage. Cove A underestimated the actual percentage of weight for this species at drainage while Cove C was an overestimate.

The percentages of total numbers for redbreast in the combined cove sample significantly represented the actual percentage of redbreast at drainage. Cove A also proved to be significant in the Chi-square Test. Cove B and Cove C overestimated the actual value. In terms of the percentage of weight Cove A and the combined cove sample significantly represented the actual weight value for redbreast at drainage. The values for Cove B and Cove C tended to overestimate the actual percentage.

The percentages of both numbers and weight for other sunfish, green and redear, in the three cove samples and the combined cove sample overestimated the actual abundance of other sunfish at drainage.

No channel catfish were recovered in Coves A and B. The percentage of the total numbers for channel catfish in Cove C coincided exactly with the percentage of numbers for channel catfish at drainage resulting in the lowest possible Chi-square value and the highest degree of accuracy. The percentage of the total weight, however, overestimated the actual percentage of weight for this species at drainage. The percentage of the total numbers for channel catfish in the combined cove sample was too small for comparison. The percentage of the total weight of channel catfish for the combined cove sample significantly represented the actual percentage of weight for this species at drainage.

Only the percentage of numbers for bullheads from the Cove C sample significantly represented the actual percentage of numbers for these fish at drainage. Cove A, Cove B, and the combined cove sample all overestimated the actual percentage of numbers for bullheads at drainage. Cove A, Cove B, and the combined coves overestimated the actual percentage of weight for bullheads at drainage, while Cove C was an underestimate.

Golden shiners and rainbow trout were the other species of fish present in Lake Russell. No trout occurred in any of the cove rotenone samples or the drainage. The percentage of numbers for all coves tended to underestimate the actual percentage of golden shiners at drainage. Only the percentage of weight for shiners in Cove B proved to significantly represent their actual weight value at drainage. Cove A, Cove C, and the combined cove sample all underestimated the actual percentage of the total weight for shiners at drainage.

Creel Census

Unfortunately, size and weight data was not included in the creel census for 1969. As a basis of comparing the proportional abundance of fish species in the creel it was necessary to arrive at a weight estimate for the data. It was assumed that all fish harvested and kept by anglers were at least of the Intermediate size class for that particular species as described by Hayne, Hall, and Nichols (1967). An average weight for the Intermediate size class of each fish species was computed using length-weight relationships established during the drainage.

In this manner weight estimates were obtained for fish species in the creel census, even though they may be somewhat conservative. The estimated total weight for sport fishing harvest was 432.03 pounds, or approximately 10 percent of the standing crop at drainage.

Barry (1967) found the creel census to yield a poor representation of the relative abundance of fish species in Bischoff Reservoir, Indiana. The creel census data from Lake Russell also proved to misrepresent the relative abundance of fish species in the reservoir and strongly supports Barry's work.

The creel census did, however, yield a fair representation of the individual species present in Lake Russell. Nine of the eleven species known to be present in the reservoir occurred in the creel census (Table I).

The creel census poorly represented the relative abundance of all species except bluegill. Both the percentages of numbers and weight for bluegill significantly represented the actual percentages of bluegill at drainage.

Concerning the other fish species, bass were overestimated in both numbers and weight by the creel data. Percentages of redbreast were underestimated while other sunfish were overestimated. The percentages of numbers and weight at drainage for both channel catfish and bullheads were overestimated. No golden shiners or rainbow trout were reported in the creel census.

CONCLUSIONS

A 90-acre Northeast Georgia reservoir was sampled from June, 1969, through November, 1969 utilizing gill nets and rotenone. A creel census was also conducted during the spring and summer of 1969. Results of the sampling methods were compared with the standing crop of fishes when the reservoir was drained in November, 1969.

None of the sampling methods could be considered to accurately represent all the different aspects of the population. Each method tended to be selective or biased in its own way. Gill nets gave the best indication of the species present in the reservoir while neither the cove rotenone samples nor the creel census were quite as efficient. On the other hand, the cove rotenone samples gave a good estimate of the total weight per acre of the standing crop of fishes in the reservoir. Also the proportional abundance of some of the major species was well represented by the cove work. The creel data did not prove to be of much merit as a sample of the population, but it did yield a good representation of the sport fishes present in the reservoir.

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LITERATURE CITED

Bailey, R.M. et. al. 1960. A list of common and scientific names of fishes from the United States and Canada. Am. Fish. Soc., Special Publication No. 2, 2nd edition; 102 p.

Barry, James J. 1967. Evaluation of creel census, rotenone embayment, gill net, trap, and electro-fishing gear samples, by complete drainage of Lenape and Bischoff Reservoirs. Indiana Dept. Nat. Res.; 36 p.

Bennett, C. D. and Bradford E. Brown. 1968. A comparison of fish population sampling techniques on Lake Raymond Gary, Oklahoma. Proc. 22nd An. Conf. S. E. Assoc. of Game and Fish Comm., (1968); 26 p.

Charles, James R. 1965. Annual progress report for Dingell-Johnson Project F-22-R-1. Ky. Dept. Fish and Wild. Res.; 83 p.

Hayne, D. W., Gordon E. Hall, and Hudson M. Nichols, 1967. An evaluation of cove sampling of fish populations in Douglas Reservoir, Tennessee. Am. Fish. Soc. Pub.: Reservoir Fishery Resources Symposium, Athens, Ga.; 444-452.

Heard, Wm. 1959. The use of hobbled gill nets in a commercial fishery of Lake Carl Blackwell, Oklahoma. Proc. 13th An. Conf. S. E. Assoc. Game and Fish Comm., (1959): 90-95.

Krumholz, Louis A. 1948. The use of rotenone in fisheries research. Jour. Wildl. Mgt. 12(3): 305-317.

Ostle, Bernard. 1963. *Statistics In Research.* Iowa State University Press, Ames, Iowa: 585 pp.
Stanberry, Fred W. 1967. The role of reservoirs in state fisheries management programs. Am. Fish. Soc. Pub.: Reservoir Fishery Resources Symposium, Athens, Ga.; 21-25.
Surber, Eugene W. 1959. Suggested standard methods of reporting fish population data for reservoirs. Proc. 13th An. Conf. S. E. Assoc. Game and Fish Comm. (1959): 313-325.
Wilkins, Price, Leon Kirkland, and Andrew Hulsey. 1967. The management of trout fisheries in reservoirs having a seflsustaining warm water fishery. Am. Fish. Soc. Pub.: Resevoir Fishery Resources Symposium, Athens, Ga.; 444-452.
Zurbuch, Peter E. 1965. A structure for easy fish recovery during drainage of an impoundment. Prog. Fish-Cult. 27(4): 237-238.

A MODIFIED FOLSOM PLANKTON SPLITTER FOR ANALYSIS OF METER NET SAMPLES[1]

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ABSTRACT

The large number of meter net samples needed to determine the spawning success of various species of fish in Canton Reservoir, Oklahoma, made subsampling advantageous. The basic Folsom plankton splitter was enlarged and modified so that meter net samples with volumes up to 4,000 ml. could be split into 10 approximately equal subsamples.

The splitter was constructed from a 12 inch diameter Plexiglas[2] cylinder. Construction was accomplished using common shop tools.

Chi-square tests (0.05 level) showed that there were no significant differences between the observed subsample counts and the expected counts. A nonparametric sign test showed that each chamber did not consistently have higher or lower counts than any other chamber.

The minimum total number of organisms per sample that could be subsampled yielding estimates of the total sample number with less than a 10 percent error 95 percent of the time were determined for larval gizzard shad and larval Chaoborinae. Determination of the minimum number of organisms per sample needed for subsampling other organisms can be completed as necessary.

INTRODUCTION

The use of meter net samples to determine the 1968 spawning success of various species of fish in Canton Reservoir, Oklahoma, required an estimated 1,200 manhours to sort and enumerate. The average volume of a standard 5 minute haul was 800 ml. and over 300,000 ml. were collected. Therefore, a subsampling method was desirable that would save time while producing similar results.

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[2]Registered trademark.