CREEL CENSUS METHODS USED ON CLEAR LAKE RICHLAND PARISH, LOUISIANA

By VICTOR W. LAMBOU and HERBERT STERN, JR.
Louisiana Wild Life and Fisheries Commission
Baton Rouge, Louisiana

The purpose of this report is to describe the creel census methods used in evaluating the Clear Lake sport fishery. The methods employed are somewhat different than those commonly used in the Southeast and we feel that a detailed description of these methods may be of value to other workers in designing creel census studies.

Clear Lake, a 115-acre body of water, is located in Richland Parish in northeastern Louisiana. The primary objective of this creel census was to determine the effects of the removal of rough fishes on the sport fishing success, pressure and harvest.

A stratified random sampling design was followed in conducting the census. One half of a fishing day—dawn to 12 noon or 12 noon to dusk—was the time unit used in sampling the fishing pressure. The checks were stratified by days of the week with more of the sample being allocated to the days which had most of the fishing pressure.

Any day on which the fishing pressure would be abnormally high was classified as a holiday and handled separately from the other days of the week. We considered the Fourth of July, Labor Day and Good Friday as holidays and complete checks were made on these days—from dawn to dusk.

In the Clear Lake creel census, the fishing party was the basic sampling unit. We used this unit rather than the individual fisherman because it was often impossible to determine the individual catch when fishermen were fishing together. The fishing party always consisted of fishermen who were actually fishing together—for example: (1) fishermen who fished out of the same boat or (2) fishermen who fished together from the shore and kept their catches together.

Creels were inspected by a census clerk in the employ of the Louisiana Wild Life and Fisheries Commission and he recorded the data on a field form similar to the one shown in Figure 1.

The census clerk was able to check most fishermen using the lake. A few fishermen objected to their catches being checked and these fishermen were not forced to have their creels recorded. Also, some fishermen were not checked because of other reasons, *e. g.*, the fisherman leaving while the clerk was checking another fisherman. The fisherman who refused to be checked and the fisherman who left without being checked were classified as non-cooperating fishermen. Records of these fishermen were kept by the census clerk on the form illustrated in Figure 2. Non-cooperating fishermen made up an insignificant part of the sample. We believe that all fishermen were accounted for during the time the census was being conducted.

The census clerk was required to summarize each half-day check on a field form (Fig. 3) immediately upon completion of the census in order to have an accurate record of all pertinent information.

Fig. 1 Sample of creel census field form.

A 4004

LOUISIANA WILD LIFE AND FISHERIES COMMISSION
CREEL CENSUS

SERIAL NO.	LOCATION	AREA	DATE	DAY OF WEEK	TIME OF DAY A.M.	TIME OF DAY P.M.

NO. IN PARTY	SEX: RES.	SEX: NON-RES.	SEX: M.	SEX: F.	RACE: W.	RACE: C.	LICENSE: YES	LICENSE: NO	BOAT: YES	BOAT: NO	FINISHED: YES	FINISHED: NO
											(1)	(2)

ANY FISH CAUGHT	YES	NO	PARTY TOTALS	HOURS FISHING	MAN HRS.	NO. CAUGHT	LBS.
	(1)	(2)					

BAIT	LURE: B. CAST.	LURE: SPINNING	LURE: F. CAST.	LURE: TROLLING	LIVE BAIT: FISH	LIVE BAIT: WORMS	LIVE BAIT: CRICKETS	LIVE BAIT: CRAYFISH	LIVE BAIT: GR. SHRIMP	DEAD BAIT: CUT FISH	DEAD BAIT: SHRIMP	OTHER
	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(99)

CODE	HOURS FISHED	MAN HRS FISHED	NO. CAUGHT	LBS.		INDIVIDUAL SPECIES	CODE	NO. CAUGHT	LBS.
						LARGE MOUTH BASS	1		
30					BASS	KENTUCKY BASS	2		
						WHITE CRAPPIE	3		
40					CRAPPIE	BLACK CRAPPIE	4		
						BLUEGILL	5		
						REDEAR	6		
						WARMOUTH	7		
						LONGEAR	8		
						GREEN	9		
						STUMPKNOCKER	10		
						ORANGE SPOTTED	11		
50					SUNFISH				
						YELLOW BASS	12		
60					STRIPPED BASS	WHITE BASS	13		
70					PICKEREL	PICKEREL	14		
75					ROCK BASS	ROCK BASS	15		
						BULLHEAD	16		
80					CATFISH	OTHER CATS	17		
85					CHOUPIQUE	CHOUPIQUE	18		
90					DRUM	DRUM	19		

CHECKED BY: _____

REMARKS: _____

Fig. 2. Field Form to Record Non-Cooperating Fishermen

CREEL CENSUS

Fishermen Not Cooperating or Not Checked

By_____ Lake_____ Area_____ Date_____

Time of Day_____ Were All Parties Not Checked, Recorded? Yes_____ No_____ Remarks_____

Party	Number in Party	Reason Not Checked				Remarks
		Left When Not There	Refused	Did Not Have Time	Other	

Approved_____ Date_____

Fig. 3. Field Form Used to Summarize Half-Day Creel Census

CREEL CENSUS

BY_____ LAKE_____

AREA CHECKED _____

TIME START_____ FINISH_____ DATE_____

WEATHER _____

CHECKED ANY FISHERMEN? YES_____ NO_____

NUMBER OF DATA FORMS_____ NUMBERS_____

OTHER DATA CHECKED FOR LIST: NONE_____

DATA FORM INCLUDED

1. _____ YES____ NO____ NUMBER____
2. _____ YES____ NO____ NUMBER____
3. _____ YES____ NO____ NUMBER____
4. _____ YES____ NO____ NUMBER____
5. _____ YES____ NO____ NUMBER____
6. _____ YES____ NO____ NUMBER____

REMARKS: _____

APPROVED_____ DATE_____

The census clerk determined all information, by inspection, with the exception of residence status, license status, type of bait used, total hours fished and hours fished for the various classes of fish. The fishermen were asked if they were a resident of the state, if they possessed a fishing license and what type of bait they used. No attempt was made to check the accuracy of their answers; however, we are of the opinion that this information contained no serious bias. The anglers were asked to estimate the total number of hours fished to the nearest quarter-hour and the time spent fishing for each class of fish (*i. e.*, bass, crappie, sunfish, etc.). Studies were not made to determine the accuracy of the fishermen's estimates of the time spent fishing; however, in Minnesota, Johnson (1956) found that fishermen did error in their estimates of time fished, but these errors were compensating and if the sample was reasonably large, the sum of the fishermen's estimates would be fairly close to the actual fishing pressure for a given period of time. In addition to the above information, the total number and weight of each species of fish caught were recorded. Weights were recorded to the nearest tenth of a pound.

All data recorded on the creel census form (Fig. 1) were transferred to punch cards (Fig. 4). The punch card methods used in handling the creel census data were described in a previous report (Leeper, Stern and Lambou, 1958).

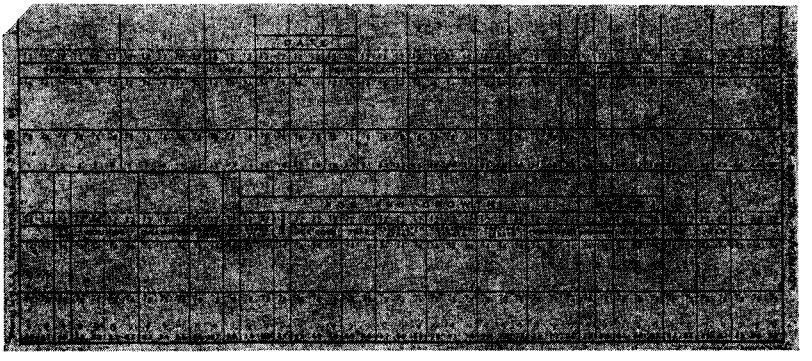


Fig. 4. Creel Census Punch Card

Estimates of the total man-hours of fishing and number of fisherman trips were made for each month in the following manner. A separate estimate of the man-hours of fishing and fisherman trips was made for each day of the week. The estimates for Mondays for a given month were made according to the formulas:

$$a = \frac{ce}{f} \text{ and } b = \frac{de}{f}$$

where a = estimated number of fisherman trips on Mondays
b = estimated man-hours of fishing on Mondays
c = total number of fisherman trips checked on Mondays
d = total man-hours of fishing checked on Mondays
e = number of half-days which were Mondays not including holidays
f = number of half-days checked on Mondays

Estimates for each day of the week were made in this same manner. A complete check was made on all holidays. The estimates for each day of the week and the data for holidays were summed to arrive at the monthly estimates, and these were summed to arrive at the yearly estimate. In estimating the total man-hours of fishing, non-cooperating fishing parties were assumed to have fished the mean length of time that other parties fished during the month.

The estimates of the man-hours of fishing by class of fish (bass, crappie, sunfish, etc.) were made as follows:

$$a = b \cdot c$$

where a = estimated man-hours of fishing for a class of fish
b = percent the man-hours of fishing for a class of fish made up of the total man-hours of fishing checked
c = the estimated total man-hours of fishing

The units of fishing quality employed were: (1) the number of fish caught per man-hour of effort by class of fish while fishing for that class of fish, (2) the pounds of fish caught per man-hour of effort by class of fish while fishing for that class of fish and (3) the average weight of fish caught by class of fish while fishing for that class of fish.

It was obvious to us that the total number of fish (or total pounds of fish) caught per man-hour of effort was a poor measure of the quality of the fishing. The fishing effort was directed toward several different classes of fish—on Clear Lake the fishermen angle mainly for bass, crappie or sunfish. Since the purpose of the census was to determine the effects of the removal of rough fish on bass, crappie and sunfish fishing, any pooling of the data can mask some of the changes occurring in the quality of the sport fishing.

The comparison of the number of crappie caught per man-hour of effort while fishing for crappie with the total number of fish caught per man-hour of effort (Fig. 5) shows that there is little agreement between the two measures of fishing quality. Sometimes the two measures vary together and in the same direction, but often the opposite situation occurs. When the crappie fishing comprised most of the total fishing on the lake, there was good agreement between the two measures.

The number of crappie caught per man-hour of effort while fishing for crappie and the total number of fish caught per man-hour of effort were plotted on a scatter diagram (Fig. 6). The coefficient of correlation (r) was 0.233. The null hypothesis that $r = 0$ could not be rejected at a probability of 0.05. Only 5.4 percent ($r^2 = 0.054$) of the variation in the number of crappie caught per man-hour of effort while fishing for crappie could be attributed to changes in the total number of fish caught per man-hour of effort. Thus it can be seen that the total number of fish caught per man-hour of effort would be of little use in evaluating the effects of experimental fish management practices on the crappie fishing.

In computing the quality of the fishing for the year, monthly estimates were made of the total number and pounds of fish caught by class of fish while fishing for that class of fish. These statistics were summed to obtain the totals for the year. They were used with the total estimated man-hours of fishing for the year for each class of fish to calculate the units of fishing quality for the year. This

Figure 5. Comparison of number of crappie caught per man hour of effort while fishing for crappie with the total number of fish caught per man hour of effort, September, 1953 through August, 1957.

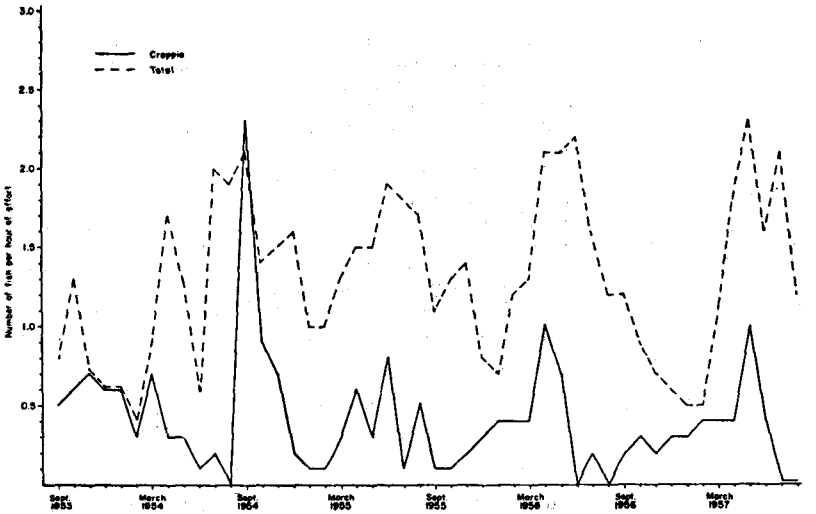
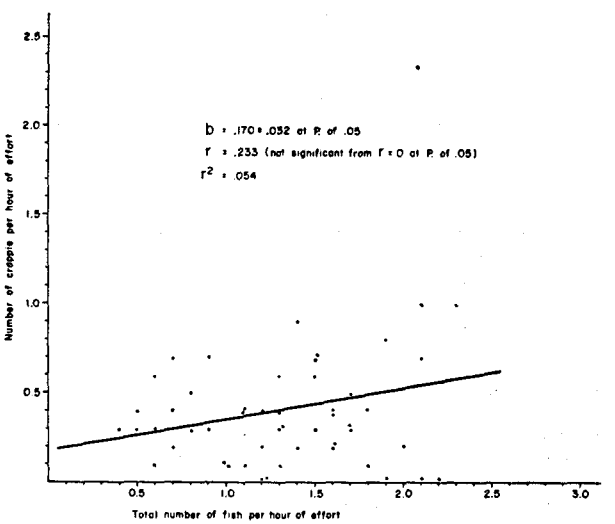


Figure 6. Scatter diagram of number of crappie caught per man hour of effort while fishing for crappie against total number of fish caught per man hour of effort, September, 1953 through August, 1957. The data for individual months were used in plotting and in determining the regression equation.



weighting was necessary due to the fact that there were differences in the sampling effort among the months.

The estimates of total harvest of fish for any given month were made according to the following formulas:

$$a = \frac{ce}{f} \text{ and } b = \frac{de}{f}$$

where a = total estimated number of fish caught for a given month
b = total estimated pounds of fish caught for a given month
c = total number of fish checked during the month
d = total pounds of fish checked during the month
e = total estimated man-hours of fishing during the month
f = total man-hours of fishing checked during the month

The estimates of the number and pounds of fish caught by species and class of fish were made as follows:

$$a = b \cdot c$$

where a = estimated number or pounds of fish caught for a species of fish or class of fish
b = percent a species or class of fish made up of the total number or pounds of fish checked
c = the estimated total number or pounds caught

The values for the monthly estimates were summed to arrive at the yearly estimates. The estimated total number and pounds of fish harvested from the lake included all fish of each class regardless of whether the fish were caught while the angler was fishing for that class of fish.

The average weights of the fish caught by species were determined for each month. In calculating the average weights of the fish caught by species for the year, the data for each month were weighted by the estimated number of fish caught. This weighting was necessary due to the fact that there were differences in the sampling effort among the months.

Estimates were made of the percent of successful fishing parties, resident fishermen, male, fishermen, white fishermen, fishermen with license and fishermen fishing from a boat. These statistics were determined by direct tabulation of the empirical data. Estimates were also made of the number of fishermen per party and hours fished per fisherman. These statistics were determined by direct tabulation of the empirical data.

We believe the estimates of the various statistics were accurate enough to meet the primary objective of the census—to evaluate the effects of the removal of rough fishes on the sport fishing success, pressure and harvest. The census data will also be analyzed to furnish information which will be useful in the future planning of creel census studies. Such studies will allow us to plan the Clear Lake creel census more efficiently in the future.

ACKNOWLEDGMENTS

We wish to thank Dr. Leslie Glasgow and Dr. Bryant A. Bateman, Louisiana State University, for their criticisms and suggestions on an earlier draft of the manuscript.

This report is a contribution of Louisiana Federal Aid in Fish Restoration, Project F-1-R.

LITERATURE CITED

Johnson, M. W. 1956. Statement on Minnesota Creel Census. In Symposium on Sampling Problems in Creel Census. Iowa Coop. Fish Res. Unit., Ames, Iowa (processed).

Leeper, Ben, Herbert Stern, Jr. and Victor W. Lambou. 1958. Some Uses of Punch Card Methods in the Tabulation and Analysis of Fishery Research Data. Proceedings of the Eleventh Annual Conf. S. E. Assoc. Game and Fish Comm., Oct., 1957.