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MONTANA FISH AND GAME DEPARTMENT
Helena, Montana

FISHERIES DIVISION
JOB COMPLETION REPORT
INVESTIGATIONS PROJECT

State of Montana

Project No. F-12-R-9 Name Western Montana Fishery Study

Job No. II Title Georgetown Lake Creel Census

Period Covered: May 1, 1962 - April 30, 1963

Abstract:

A partial creel census was conducted on Georgetown Lake during the summer fishing season of 1962. This census was a continuation of the annual investigation of the Georgetown Lake fishery. The season was opened approximately one month earlier than usual, which resulted in decreasing the opening day catch and pressure by 79 and 77 percent, respectively, from 1961 estimates. Total harvest and pressure for the entire season were increased by 65 and 32 percent, respectively. The increase in harvest was due to an unusually large plant of catchable-sized rainbow trout, in addition to the longer season.

The total estimated pressure on Georgetown Lake in 1962 was 174,500 hours, and total harvest was 83,000 fish. The total estimated number of angler trips was 44,500 trips. The catch rate for all anglers on opening day was 0.36 fish per angler hour, and for the remainder of the season was 0.48 fish per hour.

Recommendations:

1. It is recommended that the lake continue to be planted with rainbow trout only.

2. Census schedules and data analysis methods should remain unchanged as much as possible in future censuses.

3. Closer screening and supervision of temporary census personnel is necessary to insure the reliability of information collected.

Objectives:

The objective of the Georgetown Lake summer creel census was to obtain data for reliable estimates of total fishing pressure and game fish harvest. These data will be used in formulating future fishery management practices for this popular recreational water.

Techniques Used:

To obtain a reliable cross-section of creel census data from this 3,000 acre lake, a sampling program based on that described by Neuhold and Lu, 1957, was employed. The same procedures for creel census and analysis of data, as are described in the Georgetown Lake Study report for the 1961 season were followed as closely as possible.

Briefly, this type of census employs both through-angler contacts and instantaneous counts of shore anglers and boats. In addition, counts were made independently of boat and shore angler counts to determine the average number of anglers per boat.

The fishing season was stratified into two-week periods, omitting opening day, which was treated separately. Five instantaneous counts were made on opening day, and census personnel obtained through-angler contact data when not engaged in making counts. Seven days from each two-week period for the remainder of the season were selected randomly for census, with the restriction that each day of the week was included once in a 14-day period. Creel census was conducted as scheduled, with the exception of two days which were inadvertently omitted. Two counts were made each day, at systematically selected times from four strata within each day. The census taker obtained contact data when not involved in making scheduled counts.

The Georgetown Lake summer fishing season was opened on May 20 and closed on October 31, 1962. Prior to 1962, the lake had a special late opening date, usually in the last week of June. The late opening date was employed to protect late spawning cutthroat trout, but since it was determined in 1961 that approximately 87 percent of trout harvested were fish planted as fingerlings, and that rainbow trout provided a better return to the creel than did cutthroat trout, emphasis was placed on management with rainbow trout rather than with cutthroat trout.

The season in 1962 lasted for 165 days. Creel census data were obtained on opening day and 79 other days throughout the season. Information obtained from anglers included the following:

1. Fishing license number
2. Residence
3. Hours fished
4. Total fish caught
5. Species and fin clip of fish caught
6. Boat or shore fisherman

After compiling census data, a question arose concerning the accuracy of species identification by one temporary census technician. Of 536 rainbow and cutthroat trout checked by this individual, 10.8 percent were classified as cutthroat trout. Two other census clerks classified 33.3 percent of these species as cutthroat trout. There is no way to accurately determine if errors in identification were made, but the question does exist.

Findings:

The following species of game fish contributed to the Georgetown Lake fishery:

Common name	Abbreviation	Scientific name
Cutthroat trout	Ct	Salmo clarki Richardson
Rainbow trout	Rb	Salmo gairdneri Richardson
Brook trout	Eb	Salvelinus fontinalis(Mitchill)
Arctic grayling	Gr	Thymallus arcticus (Pallas)
Kokanee	KOK	Onchorhynchus nerka (Walbaum)

Census technicians recorded the species of 1,854 fish caught by Georgetown Lake anglers. Rainbow trout composed 60.5 percent of these fish (Table 1). In 1961, 410,000 fish were planted in the lake. Of these, 89,000 were 7- to 9-inch rainbow trout, and the remainder were fingerling cutthroat and rainbow trout. None of the fish were marked, as plants from 1958 through 1960 had been. In 1962 225,927 rainbow were planted, of which 125,927 were catchable size. Of these catchables, 33,055 were marked by the removal of the right premaxillary bone. Thirty-four thousand of the 1961 fingerling plant were marked with the same clip.

Table 1. SPECIES COMPOSITION OF RECORDED CATCH, GEORGETOWN LAKE, 1962.

	Ct*	Ct**	Ct***	Ct****	Rb*	Rb**	Rb***	Rb****	Eb	Gr	KOK	Total
No.	343	17	30	56	1122	33	68	72	88	1	24	1854
%	18.5	0.9	1.6	3.0	60.5	1.8	3.7	3.9	4.7	0.1	1.3	100.0

* No fin clip **1958 fin clip ***1959 fin clip ****1960 fin clip

The analytical procedure for obtaining total harvest and pressure estimates were presented in detail in the 1961 Georgetown Lake Creel Census report (Boland and Leik,1962). This detail will not be repeated in this report, but values obtained from the various calculations are included in Appendix A. Symbols used in calculations are identical to those used in 1961, and are included to facilitate comparison of values.

Estimates of harvest, pressure, and success rates for each major strata were totaled to obtain season total estimates (Table 2).

Table 2. SHORE AND BOAT FISHING PRESSURE, SUCCESS RATE, AND HARVEST, GEORGETOWN LAKE, 1962.

		Confidence Interval ($t_{.95}$)		
		Lower Limit	Point Estimate	Upper Limit
Opening Day				
	Shore fishing pressure	1,482	2,972	4,462
	Boat fishing pressure	1,862	2,392	2,922
	Combined shore and boat fishing pressure	4,186	5,364	6,542
	Combined shore and boat rate of success	.2998	.3559	.4120
	Combined shore and boat total harvest	1,481	1,909	2,337
May 21 - Oct. 31				
	Shore fishing pressure	73,882	84,588	95,294
	Boat fishing pressure	76,890	84,677	92,464
	Combined shore and boat pressure	156,260	169,265	182,270
	Combined shore and boat rate of success	.3827	.4789	.5751
	Combined shore and boat total harvest	74,834	81,061	87,288
Season Totals				
	Hours pressure	160,446	174,629	188,812
	Harvest	76,315	82,970	89,625

The average length of trips on opening day was 5.49 hours. The total pressure on opening day was 5,364 hours, hence, an estimated 977 angler trips were made to Georgetown Lake on this day. The average length of trips for the remainder of the season was 3.89 hours, and the total pressure was 169,265 hours. The estimated number of fisherman trips for the remainder of the season is then 43,512. The total number of angler trips was 44,489, an increase of over 14,000 angler trips from 1961.

It is of interest to note the effects of lengthening the fishing season by the early opening date. The point estimate of the opening day rate of success is virtually identical with the 1961 rate for the same period. By opening the Georgetown Lake season coincident with the general season opening date, pressure was reduced by 77 percent. The harvest on the opening day was reduced by 79 percent.

During the remainder of the season, the point estimate of pressure increased by 55 percent and the harvest was increased by 97 percent. For the total season, there was an increase in pressure of 32 percent, and an increase in harvest of 65 percent. It is likely that the increase in harvest was primarily due to the larger number of catchable-sized rainbow planted that year in addition to the lengthened season.

LITERATURE CITED

Boland, R. W. and Leik, T. H.
1962 Western Montana Fishery Study, Georgetown Lake Study, Montana Fish and Game Department, Job Completion Report, Project No. F-12-R-8, Job III, 18 pp. mimeo.

Neuhold, J. M. and Lu, K. H.
1957 Creel Census Method, Utah State Dept. of Fish and Game, Pub. No. 8 of Federal Aid Division, 36 pp.

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Appendix A

SYMBOL DEFINITIONS* AND VALUES OBTAINED FOR PERIOD FROM MAY 21 TO OCTOBER 31, AND OPENING DAY, GEORGETOWN LAKE, 1962

		May 21 - Oct. 31	Opening Day
N	= Number of counts	157	5
P_s	= Shore fishing pressure in hours	84,588	2,972
$\bar{X}_s$	= Average number of shore fishermen per count	30.34	174.8
H	= Possible fishing hours in period	2,788	17
S_s^2	= Variance of shore angler counts	607	4,983
$S_{\bar{x}s}$	= Standard error of mean shore anglers per count	1.96	31.57
P_b	= Boat fishing pressure in hours	84,677	2,392
$\bar{X}_b$	= Mean number of boats per count	13.38	62.0
$\bar{X}_r$	= Mean number of anglers per boat	2.28	2.27
S_b^2	= Variance of boats per count	230.8	1,260
$S_{\bar{x}b}$	= Standard error of mean number of boats per count	1.21	15.87
S_r^2	= Variance of anglers per boat	38.23	.57
$S_{\bar{x}r}$	= Standard error of the mean number of anglers per boat	.6	.928
$S_{\bar{x}br}$	= Combined standard error for boats per count and anglers per boat	1.35	15.90
T.P.	= Combined shore and boat pressure in hours	169,265	5,364
$S_{\bar{x}T.P.}$	= Standard error combined shore and boat pressure	2.38	35.35
R_b	= Rate of success for boat anglers, expressed as fish per hour	.6533	.5385
F_b	= Total fish caught by boat anglers contacted	959	42
H_b	= Total hours fished by boat anglers contacted	1,468	78
N_b	= Number boat anglers contacted	433	19
$\bar{X}_{bh}$	= Mean number of hours fished by boat anglers	3.3903	4.1053

* Identical to those used in 1961 report.

Appendix A (Continued)

S_{bh}^2	= Variance of hours fished by boat anglers	3.2384	.6666
$S_{\bar{x}bh}$	= Standard error for hours fished by boat anglers	.0861	.187
$\bar{X}_{bf}$	= Mean number of fish caught by boat anglers	2.2148	2.2105
S_{bf}^2	= Variance of fish caught by boat anglers	4.6412	2.3889
$S_{\bar{x}bf}$	= Standard error fish caught by boat anglers	.1034	.3546
$S_{\bar{x}bhbf}$	= Combined standard error of hours fished and fish caught by boat anglers	.0027	.0278
R_s	= Rate of success for shore fishermen, expressed as fish per hour	.3043	.2089
F_s	= Total fish caught by shore anglers contacted	807	33
H_s	= Total hours fished by shore anglers contacted	2,652	158
N_s	= Number of shore anglers contacted	625	24
$\bar{X}_{sh}$	= Mean number of hours fished by shore anglers	4.2432	6.5833
$\bar{X}_{sf}$	= Mean number of fish caught by shore anglers	1.2912	1.3750
S_{sh}^2	= Variance of hours fished by shore anglers	5.2516	4.6956
$S_{\bar{x}sh}$	= Standard error of hours fished by shore anglers	.9165	.4424
S_{sf}^2	= Variance of fish caught by shore anglers	2.6426	4.6087
$S_{\bar{x}sf}$	= Standard error of fish caught by shore anglers	.0648	.4382
$S_{\bar{x}shsf}$	= Combined standard error of hours fished and fish caught by shore anglers	.0491	.0055
$S_{\bar{x}sb}$	= Combined standard error of hours fished and fish caught for shore and boat anglers	.0491	.0278
HA_s	= Harvest by shore anglers	25,740	621
HA_b	= Harvest by boat anglers	55,319	1,288
HA	= Total harvest of game fish	81,059	1,909
R_{sb}	= Combined rate of success for boat and shore anglers	.4789	.3559
$S_{\bar{x}HA}$	= Standard error of harvest	2.38	35.35