Ref ID: 85923

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of: Montana

Project No: F-12-R-5 Name Western Montana Fisheries Study

Job No: II Title Rock Creek Creel Census

Period Covered: May 1, 1958 through April 30, 1959

Abstract:

A pilot model of a creel census study on a 40-mile section of Rock Creek (east of Missoula) was operated in the summer of 1958 and winter of 1958-59. The purpose of this pilot study was to determine the efficacy of certain census techniques and procedures for a detailed census on this stream section. Methods used are discussed and recommendations for a detailed census study, set up as a separate project, are made. Pressure and catch estimates, based on the pilot study, are presented. These include total estimates of: 14,800 anglers fishing for 55,300 fisherman hours, and harvesting 50,300 game fish (93% trout and 7% whitefish) from the study section during the 1958 summer angling season.

Objectives:

The stocking of catchable-sized, hatchery trout has long been used as a major fish management tool in Montana. Public sentiment has encouraged this management practice to the point where most of the larger, accessible rivers now receive annual plants of catchable-sized fish. Hatchery facilities have been increased to meet the demand for more of these fish; and at the present time, a large amount of the Montana Fish and Game Department's fishery budget is earmarked for the raising and distribution of catchable-sized trout. Although there is general agreement that this type of management will normally produce an increase in fishing success, its economic justification is somewhat questionable. Many fishery biologists now feel that a disproportionately large share of the cost of this type of planting is borne by anglers who do not benefit from it.

An evaluation of these catchable-sized trout, in regard to overwinter survival and competition with native fish, has been carried out in Montana for several years under Federal Aid project F-13-R. However, the return of these fish to the angler's creel and their harvest in relation to the wild trout harvest has never been evaluated with respect to the numbers of fish planted. Fishery managers have long recognized that such an evaluation is essential to good management, particularly since the present stocking rates of catchable-sized fish in Montana are based only on public pressure, past stocking rates, and availability of the hatchery product.

The over-all objective of a long-range, creel study on Rock Creek would be to obtain the necessary harvest and pressure information for an evaluation of the catchable-sized, trout-stocking program; certainly for Rock Creek itself, and likely with considerable application to other western Montana waters as well. Specifically,

the objectives of this first year's pilot study were to determine if it was feasible, by a census of this type, to obtain good estimates of: (1) total pressure, total catch by species, and total number of hatchery trout taken during the general summer season; and (2) total pressure, total whitefish catch and total number of trout hooked and released during the winter "whitefish only" season.

Techniques Used:

Rock Creek, which joins the Clark Fork River about 20 miles east of Missoula, is one of the most popular and perhaps the most productive trout stream in western Montana. Approximately 40 miles of the main stream is served by a single access road -- this 40-miles section of stream was chosen for the creel study area and is shown on Figure 1. Prior to the opening of the general season on May 25, 1958, checking station sites were picked at each end of the study area and the area itself was divided into two sections by the installation of signs. Section one consisted of the lower 26 miles of the study area and section two contained the upper 14 miles. The dividing line between the sections was a road sign at Little Hogback Creek (see Figure 1). This division point was chosen because previous "spot" census and warden checks had indicated that it was somewhat of a natural boundary for anglers fishing this stream. We hoped to determine if enough anglers stayed within section boundaries to eventually permit the testing of different stocking rates or regulations on the two sections of the stream.

Pre-season advertising was carried out in the newspapers of Butte, Anaconda, Philipsburg and Missoula, Montana. Figure 2 is a sample of the advertisement used.

Portable signs were set up 1,000 feet in front of each checking station. These signs informed anglers that a creel checking station was in operation and requested them to stop at the station. When the stations were not operated, the signs were removed. One electrically-operated, pneumatically-activated car counter was placed by each census station. The census technician recorded car counts from this machine at the beginning and end of each census period and once each hour during the census period.

A total of 38,195 catchable-sized, rainbow trout was stocked in Rock Creek during the summer of 1958. Of these fish, 21,795 were planted in section 1 and 16,400 were planted in section 2. It was originally planned to mark the entire Rock Creek plant by removal of the adipose fin. But, due to a liason failure with the hatchery workers, 4,344 of these 38,195 fish were planted in an unmarked condition. However, creel census workers at both stations were able to identify many of these unmarked fish and recorded them as planted, rainbow trout.

The summer angling season was from May 25 through November 30, 1958. The pre-arranged census schedules, which were used for the entire summer season at stations 1 and 2, are presented in Tables 1 and 2, respectively. These tables show the period breakdowns for both stations for the summer season.

Station 1 was censused 18 Saturdays, 20 Sundays, 3 holidays, and 57 weekdays; for a total of 98 days throughout the entire summer season. Station 2 was censused 8 Saturdays, 13 Sundays, 2 holidays, and 37 weekdays, for a total of 60 days during the summer season. The lighter coverage at station 2 was made necessary by the budget limitations of this pilot study.

Table 3 shows the pre-arranged census schedule for the winter whitefish-only season. This schedule includes both census stations. The winter schedule was so arranged that one census taker could operate both stations, and as a result, both stations were never operated on the same day. This schedule was made, using the following criteria: (1) every other weekend day was worked at each station; (2) at least one weekday was worked per station per week; (3) each day of the week was

worked at least once at each station per each four-week period; and (4) no two consecutive non-census days in one week were repeated during the next week.

The lengths of the census days were varied several times throughout the summer season. However, during most of the season, a.m. and p.m. type check days were in effect. An a.m. day consisted of checking from 9:00 a.m. until 5:00 p.m., and a p.m. census day consisted of checking from 2:00 p.m. until 10:00 p.m. From October 1 until October 28 check hours were from 11:00 a.m. until 10:00 p.m. and from October 29 through November 30, 11:00 a.m. until 7:00 p.m. Fishing pressure was extremely light from October 1 through November 30, and angler contacts made by the above schedules were considered complete for the days censused.

As previously mentioned, anglers leaving the Rock Creek study area were requested to stop at the checking stations so that information regarding their catch could be recorded. Upon contacting an angler party at the station, the census taker would record the following information:

1. Time party was contacted.
2. Number of anglers in party.
3. Section in which party fished.
4. Hours fished, and fisherman hours fished.
5. Catch (recorded separately by species, and by marked hatchery trout).
6. Bait or lure used.

When time permitted, fish were weighed by species and scale samples taken from rainbow, cutthroat, Dolly Varden and brown trout.

Essentially the same information was taken from whitefish fishermen, during the winter whitefish-only season, except that anglers were requested to remember how many trout they had hooked and released while fishing for whitefish. These "trout hooked and released" data were used in an effort to determine if the winter whitefish-only season could be likely to have a detrimental effect upon the trout population.

All the above information, except the scale sample data, was recorded on a creel census form made especially for the Rock Creek creel census study. Figure 3 is a sample of this creel census form. Scale sample information was recorded on standard Montana Fish and Game Department scale sample envelopes. These scale samples, along with their recorded information, were sent to the Department's fishery laboratory at Bozeman for age and growth analysis.

Total pressure and catch estimates were derived from the contact data by (1) expanding partial day (a.m. or p.m.) contact figures to full day estimates, and (2) computing total period estimates from total census-day estimates. Data were treated separately for each census period and for each census station. Weekday and weekend-day estimates were computed separately throughout these expansion procedures, until the final step of making total estimates for the period concerned.

The first expansion step above was carried out as follows:

1. All week-day (or week-end-day) "cars contacted" data were divided into a.m. and p.m. categories.
2. Cars contacted in each of the a.m. and p.m. categories of these days were summarized separately for:
   a. Cars contacted in overlap period.
   b. Cars contacted in non-overlap period.
   c. Total cars contacted.
3. The quotient of "total cars contacted", divided by "cars contacted in overlap period", was computed for the a.m. and p.m. categories.

4. These quotients were then multiplied by the overlap car counts of each individual day of the opposite category. (The a.m. quotient by each day of the p.m. group and the p.m. quotient by each day of the a.m. group.) The resulting products (one for each individual census day of the period concerned) were considered estimates of "cars contacted in overlap period" plus cars which would have been contacted in the "missed" portion of each census day. By adding each individual day's product to the "non-overlap" portion of the cars contacted on the same day, estimates of total cars for each individual day were obtained.

Following is an algebraic description of the above described method:

Where: A = overlap portion of cars contacted in an a.m. day
B = non-overlap portion of cars contacted in an a.m. day
A + B = total cars contacted in an a.m. day
X = overlap portion of cars contacted in a p.m. day
Y = non-overlap portion of cars contacted in a p.m. day
X + Y = total cars contacted in a p.m. day

Then:

$$\frac{\Sigma(A + B)}{\Sigma A} \cdot X + Y = \text{Estimated total cars contacted for each individual a.m. day}$$

$$\frac{\Sigma(X + Y)}{\Sigma X} \cdot A + B = \text{Estimated total cars contacted for each individual p.m. day}$$

5. The estimated total cars contacted for each individual day were then divided by the actual cars contacted for the same day. This quotient was then used as a multiplier to expand the rest of the individual days' contact data (fishermen, hours, fish, etc.) to total days' estimates.

These daily estimates were expanded to period estimates by the following procedure:

1. Total census day estimate data were summed, with a.m. and p.m. days combined.
2. Total week-days (or week-end-days) ~~censused~~ in the period were divided by total week-days (or week-end-days) censused in the period. This quotient, multiplied by the summed estimated data from No. 1 above gave estimated total catch and pressure data for all week-days (or week-end-days) in the period.
3. Week-day and week-end-day total estimates were summed for total period estimates.

For the periods during which census coverage was considered complete for each day (May 25-30 and October 1-November 30) no individual, daily expansions for a.m. or p.m. portions of days were applicable, and only the steps of expanding total daily estimates to period estimates were used.

Estimates for the winter census were computed the same as for that portion of the summer season from October 1 through November 30. Census hours from 10:00 a.m. until 5:00 p.m. were considered to cover the total fishing day during this season.

As mentioned previously, creel census technicians were instructed to obtain as many weight samples of fish, by species, as possible during each period of the summer season. This weight by period method was employed so that allowance for weight increase of the fish during the summer growing season could be made. Although a large number of dressed fish were expected, we had hoped to obtain sufficient round and dressed weights to enable

us to compute a conversion factor between the two for the various species in the catch. Unfortunately, data collected by the "lumped" method of weighing (unless time was available for scale sample collections, fish were weighed by species and recorded only as total number and total weight) were found to be inadequate for obtaining any round to dressed weight conversion factors. The inadequacy was illustrated by the fact that the weight of round fish actually averaged less than that of dressed fish for some species in several periods.

We believe this could have been due to any one, or a combination of the following reasons: (1) some anglers tended to dress only their largest fish; (2) there may be a difference in the percent weight loss from dressing, between large and small fish; and (3) the number of dressed fish weighed was far larger than that of round fish. Whatever the reason for it, our inability to obtain a conversion factor for changing dressed to round weights imposes two rather serious limitations on the weight estimates presented in this report. First, the estimates had to be based on a far smaller number of fish than were actually weighed; and second, the fish which could be used for weight estimates may well have had a lower average weight than did the total catch. Methods to overcome these limitations in next year's study are suggested under "Recommendations".

The following method was used for estimating total weight of the catch:

1. A minimum of 20 fish per species for each period of the season were required for an average weight sample.
2. If 20 fish per species were not available for a period, then the total amount of fish weighed during the preceeding and following period were added to the fish weighed during the period concerned, and the average weight computed.
3. During the first period, when there was not a preceeding period, average weights were computed by addition of those fish weighed during the next period.
4. No fish were weighed at station 2 during the last period of the season. Thus, only one brown trout was checked at station 2 during the summer. This one fish was not weighed. Thus, average weight of the brown trout, checked at station 1 during the same time of the season, was used to determine the average weight of the total estimated brown trout checked at station 2.
5. Because there were too few Dolly Varden trout weighed during the summer, their weights were lumped, and an all season weight average was computed.

After computing average weights per species, per station, for each period of the summer season, these average weights were multiplied by the estimated number of fish by species taken during each period. This result gave the total estimated weights of fish by species for each period.

Average weight computation for whitefish taken during the winter whitefish-only season were computed from all whitefish weighed during the entire winter season. Anglers did not dress whitefish in the field during the winter season.

All weights were taken with a 20 pound capacity scales, registering in pounds and ounces. For the average weight computation, ounces were converted to tenths of pounds.

Findings:

Analysis of the summer creel census data shows that the following game fish species were taken by anglers in Rock Creek:

Rainbow trout Salmo gairdneri
Cutthroat trout Salmo clarki
Brown trout Salmo trutta
Dolly Varden trout Salvelinus alpinus malma
Whitefish Prosopium williamsoni

During the summer trout season, census technicians contacted 2,762 fishermen parties, or 5,330 individual fishermen at station one. At station two, 436 fishermen parties, or 800 individual anglers were contacted.

Due to repeated mechanical failure of the car counters, the data recorded from them were not used to determine total pressure on Rock Creek. Estimated pressure data were computed as explained under the "Techniques Used" section of this report. Incomplete car counter data for stations 1 and 2 were 11,292 and 4,420 cars, respectively.

Total estimates for both stations during the summer season show that 14,841 fishermen fished for 55,324 fishermen hours, and caught 50,320 fish. Tables 4 and 5 show the estimated pressure and catch by species and periods for stations 1 and 2 respectively, for the summer season. Ninety-three percent of the fish taken were trout. The remaining 7 percent were whitefish. Percentages of total catch by species were:

Rainbow trout (wild)	38.4
Rainbow trout (hatchery)	26.4
Cutthroat trout	7.3
Brown trout	1.2
Eastern brook trout	14.6
Dolly Varden trout	5.0
Whitefish	7.0

An analysis of these data indicates that 13,284 (or 34.8 percent) of the 38,195 catchable-sized, hatchery fish planted in Rock Creek were taken by anglers during the summer season. These hatchery fish were first planted in section 2 on June 16, and in section 1 on June 17. Planting dates, and numbers of fish planted are as follows:

Date	Section	Number
June 16	2	8,000
June 17	1	5,645
June 18	1	4,800
June 27	1	4,800
July 24	2	8,400
July 28	1	6,550

A comparison of daily average catch to fishermen, by periods, for station 1 indicates that the greatest catch per fisherman per day took place during the second period of the season (June 1 to July 4). During this period, 15,242 catchable-sized rainbow trout were liberated in section 1. A graph of the comparison of average catch to fishermen for station 1, during each period of the summer season is presented in Figure 4.

The highest catch per fisherman per day from station 2 also took place during the second period (June 1 to June 30) of the summer season. During the middle of this period, (June 16) 8,000 hatchery trout were liberated in section 2. Figure 5 is a graphic illustration of the average numbers of fish and fishermen per day, by periods. The average catch and fishermen decreased by one-half between the second and third periods of the season; however, the average catch of hatchery fish per day increased slightly during this same time.

Both pressure and catch were extremely light during the last period of the season (November 1-30); and the average catch for this period was less than one fish per man per day.

During the entire summer season, the average catch per fisherman was 3.2 and 4.3 fish for stations 1 and 2 respectively. The estimated all season average catch for both stations combined was 3.4 fish per fisherman. The average length of trip for both stations combined was 3.7 hours. The average catch per man-hour of fishing time was 0.9 fish for station 1 and 1.1 fish for station 2. The average for both stations combined was 0.9 fish per hour.

Age and growth data, analyzed from scale samples collected at both stations, are presented on Table 6. These data show that brown trout had the fastest growth rate of all trout species in Rock Creek. Rainbow trout showed a slightly faster growth rate than did cutthroat and Dolly Varden trout from station 1; while cutthroat trout appeared to grow slightly faster than rainbow trout from station 2.

During the winter whitefish-only season, 210 fishermen parties and 417 individual anglers were contacted at station 1. Only 20 fishermen parties, or 40 individual anglers, were contacted at station 2.

Estimates of pressure and catch for the winter whitefish season are presented on Table 7. These data show that an estimated 1,179 fishermen caught a total of 5,165 whitefish during the winter whitefish-only season (December 1, 1958 to March 31, 1959).

Anglers were cooperative on trying to recall the number of trout, by species, hooked and released while fishing for whitefish. This estimated trout hooked and released data is also presented on Table 7.

The Montana Fish and Game Department has received considerable opposition concerning the winter whitefish season. Much of this opposition is centered around the belief that during the latter part of this season, especially during the month of March, a disproportionately large number of trout are injured by being hooked and released. The data collected during the 1958-59 whitefish season on Rock Creek do not substantiate this claim. An analysis of the winter season data reveals the following:

1. Nineteen percent of the total fishing pressure for the entire season was applied during March.
2. Twenty-one percent of the total whitefish were harvested during March.
3. Only 8 percent of the total trout were hooked and released during March.

Recommendations:

The methods used in this pilot study are applicable to an intensive creel census study on the 40-mile study section of Rock Creek. However, more intensive coverage and closer supervision of census technicians will be required than was obtained by conducting this study as one job under a district project. It is, therefore, recommended that the study be set up for an initial three-year period, as a separate research project. One project biologist, in addition to the regular district project biologists, should be in direct charge of this Rock Creek creel study. This project leader's duties should not entail the regullar manning of one of the checking stations, but should include the following:

1. Supervision of the operation of both stations, including the addition of extra help for rush periods and for experimental additions to coverage periods.

2. Responsibility for maintaining the census schedule through personnel changes.
3. Supervision of the planting operation in the study area.
4. Collection of sufficient round to dressed fish weight data from individual fish to enable the making of valid conversions of dressed fish weight records to round fish weight estimates, by species. Two possible methods are suggested: (1) angler contacts on the stream; and (2) use of fish collected during the survey, recommended under point 6 below.
5. Collection of scale samples from certain sizes of fish, not in the angler's catch; which may be required for good age and growth analysis.
6. General survey of the Rock Creek study section and its tributary streams.
7. Responsibility for collecting and filing the contact data, analysis of the data, and preparation of the completion report and future project documents.
8. Responsibility for keeping abreast of current creel census literature and the incorporation of new ideas and techniques into the study.
9. Responsibility for maintaining census equipment.
10. Responsibility for the design of future census schedules.

The following recommendations are made for the 1959-60 season:

1. The plant, which has previously been 25-35,000 rainbow for the entire 48 miles of Rock Creek, should be reduced on a stream-mile basis to 29,000 and only the study section should be planted. No hatchery fish should be liberated in the Rock Creek drainage above the study section.
2. The 1959 plant should be marked with an adipose and left pelvic fin clip.
3. The project leader should designate and be responsible for each fish plant in Rock Creek.
4. Personnel from the project should accompany the hatchery truck on each plant.
5. Census technicians should determine from anglers whether their catch was made in the main stem of Rock Creek, or from one of its tributary streams. Catches made in the tributary streams should be listed as such by a notation on the margin of the creel census form. This notation should contain the name of the tributary stream, or an abbreviation or symbol used to designate the tributary stream, where the catch was made. This information will be valuable in determining: (1) fish species in the tributary streams of Rock Creek; (2) angler pressure on the tributary streams; and (3) more accurate age and growth analysis from the main stem of Rock Creek.
6. A set of standard creel census instructions should be printed for use by Rock Creek creel census technicians. These instructions should explain exactly what information is needed, how it should be gathered, and how to record it. With such a set of instructions available, substitute census technicians could be placed on the job with a minimum of confusion and time loss. Also, census technicians would be more inclined to record all data in a similar manner.
7. A more dependable make and type of car counter, which will record hourly totals, should be used at station 1 in 1959-60 to determine its feasibility. Even though such a car counter is employed, the a.m.-p.m. division of days should also be used. If the counter proves to be accurate and reliable, its record should be used for expansion of contact data. If it does not, then the a.m.-p.m. expansion method should be used.

Prepared by Robert C. Averett and Arthur N. Whitney

Approved by George D. Holton

Date October 1, 1959

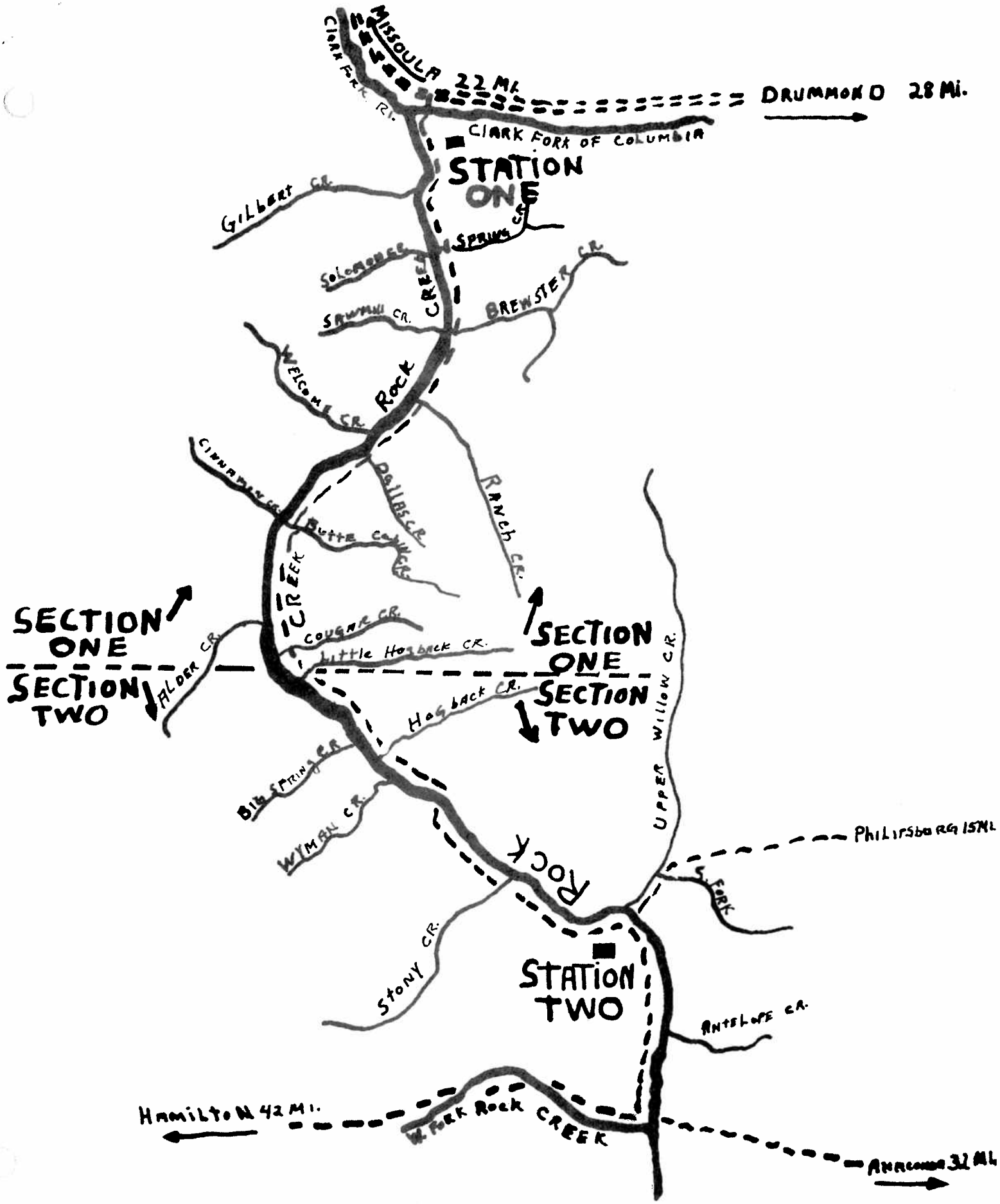

FIGURE 1. Rock Creek Project Area.

Rock Creek Fishermen!

THE FISH AND GAME DEPARTMENT WILL OPERATE CREEL CHECKING STATIONS ON BOTH ENDS OF THE ROCK CREEK ROAD THIS FISHING SEASON.

Help to insure future good fishing on Rock Creek and other Montana Streams by giving your full cooperation to the personnel at the checking stations.

For further information on this project, write to:

MONT. FISH and GAME DEPT.

FISHERIES, DIST. 2
P. O. BOX 1022
MISSOULA, MONTANA

Figure 2. Sample Advertisemt Used to Publicize Rock Creek Creel Census Study

Table 1. Summer Rock Creek Creel Census Schedule, Station 1.

Month	Period	Sa	Su	M	Tu	W	Th	F
May	1	31A	25*	26*	27	28	29	30*
June	2	7 14P 21A 28P	1P 8A 15 22P 29A	2 9A 16 23P 30	3A 10 17P 24	4 11P 18 25A	5P 12 19A 26	6 13A 20 27P
July	3	5P 12P 19 26A	6P 13 20A 27P	7P 14 21A 28P	1P 8 15A 22 29A	2 9A 16 23P 30	3P 10P 17 24A 31	4A 11 18 25
August	4	2 9P 16A 23P 30P	3A 10 17P 24A 31A	4A 11 18A 25	5 12P 19 26A	6P 13A 20 27P	7A 14 21P 28	1P 8 15P 22 29A
September	5	6P 13A 20 27P	7 14P 21A 28A	1P 8 15A 22 29P	2A 9 16P 23A 30	3 10A 17 24P	4P 11P 18 25A	5 12A 19P 26
October	6	4 11* 18 25*	5* 12 19* 26	6 13* 20 27	7 14 21* 28	1 8 15 22 29*	2* 9 16 23 30	3 10* 17 24 31
November	7	1 8* 15 22* 29	2* 9 16* 23 30*	3 10 17* 24	4 11 18 25*	5 12 19 26*	6 13* 20 27	7* 14 21 28

* Non-overlap check days.
A=a.m. check - 9 a.m. to 5 p.m.
P=p.m. check - 2 p.m. to 10 p.m.

Table 2. Summer Rock Creek Creel Census Schedule, Station 2.

Month	Period	Sa	Su	M	Tu	W	Th	F
May	1	31A	25*	26*	27	28	29	30*
June	2	7 14 21A 28	1P 8 15 22P 29	2 9 16 23P 30	3A 10 17 24	4 11P 18 25	5 12 19A 26	6 13 20 27P
July	3	5 12 19 26A	6 13 20 27P	7 14 21P 28P	1A 8 15 22 29A	2 9A 16 23P 30	3 10 17 24A 31	4 11 18P 25
August		2 9 16A 23 30P	3 10 17P 24 31A	4 11 18A 25	5 12 19 26P	6P 13A 20 27P	7 14 21 28	1 8 15 22 29
September	4	6 13A 20 27	7 14P 21A 28	1P 8 15A 22 29P	2 9 16 23 30	3 10A 17 24	4P 11P 18 25A	5 12 19P 26P
October		4 11* 18 25*	5* 12 19* 26	6 13* 20 27	7 14 21* 28	1 8 15 22 29*	2 9 16 23 30	3 10* 17 24 31
November	5	1* 8 15* 22 29*	2 9* 16 23* 30	3 10* 17 24	4* 11 18 25	5 12 19* 26	6 13 20* 27	7 14 21 28

* = Non-overlap check days.
A = a.m. check days - 9 a.m. to 5 p.m.
P = p.m. check days - 2 p.m. to 10 p.m.

Table 3. Combined Creel Census Schedule for Stations 1 and 2, Rock Creek Winter Whitefish Only Season.

Month	Period	Su	Su	M	Tu	W	Th	F
				1	2	3	(4)	(5)
		(6)	7	8	9	(10)	11	(12)
December		13	(14)	(15)	16	17	18	19
		(20)	21	22	(23)	24	25	26
		27	(28)	29	30	31		
	1						(1)	2
		(3)	4	5	6	(7)	8	(9)
		10	(11)	(12)	13	14	15	16
January		(17)	18	19	(20)	21	22	23
		24	(25)	26	27	28	(29)	30
		(31)						
			1	2	3	(4)	5	(6)
		7	(8)	(9)	10	11	12	13
February		(14)	15	16	(17)	18	19	20
		21	(22)	23	24	25	(26)	27
		(28)						
	2							
			1	2	3	(4)	5	(6)
		7	(8)	(9)	10	11	12	13
March		(14)	15	16	(17)	18	19	20
		21	(22)	23	24	25	(26)	27
		(28)	29	30	31			

__ Upper station.

( ) Lower station.

ROCK CREEK CREEL CENSUS

Date _____

Sheet _____ of _____

Car Counter Reading

Start _____ at _____ hrs.

End _____ at _____ hrs.

Water Temp.

Max. ____ °F

Min. ____ °F

Weather

-1200: _____

1200-1800: _____

1800-___: _____

CATCH

Car No.	Time	F'men	S	F'man Hrs.	RB* N	RB* W	RB N	RB W	CT N	CT W	EB N	EB W	WF N	WF W	OTHER SP	OTHER N	OTHER W	OTHER SP	OTHER N	OTHER W	OTHER SP	OTHER N	OTHER W	Type Lure H	Type Lure B	Type Lure F
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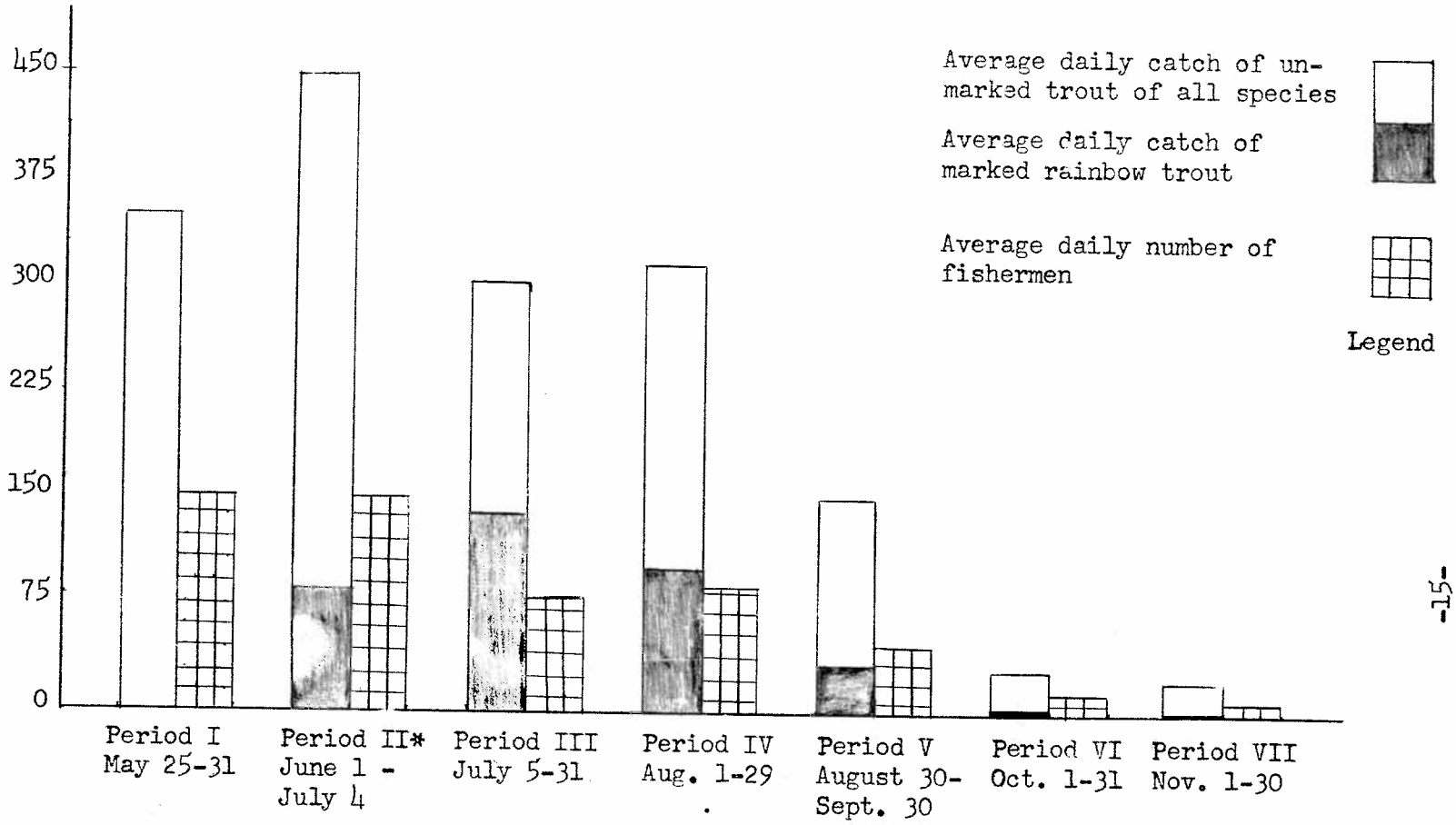
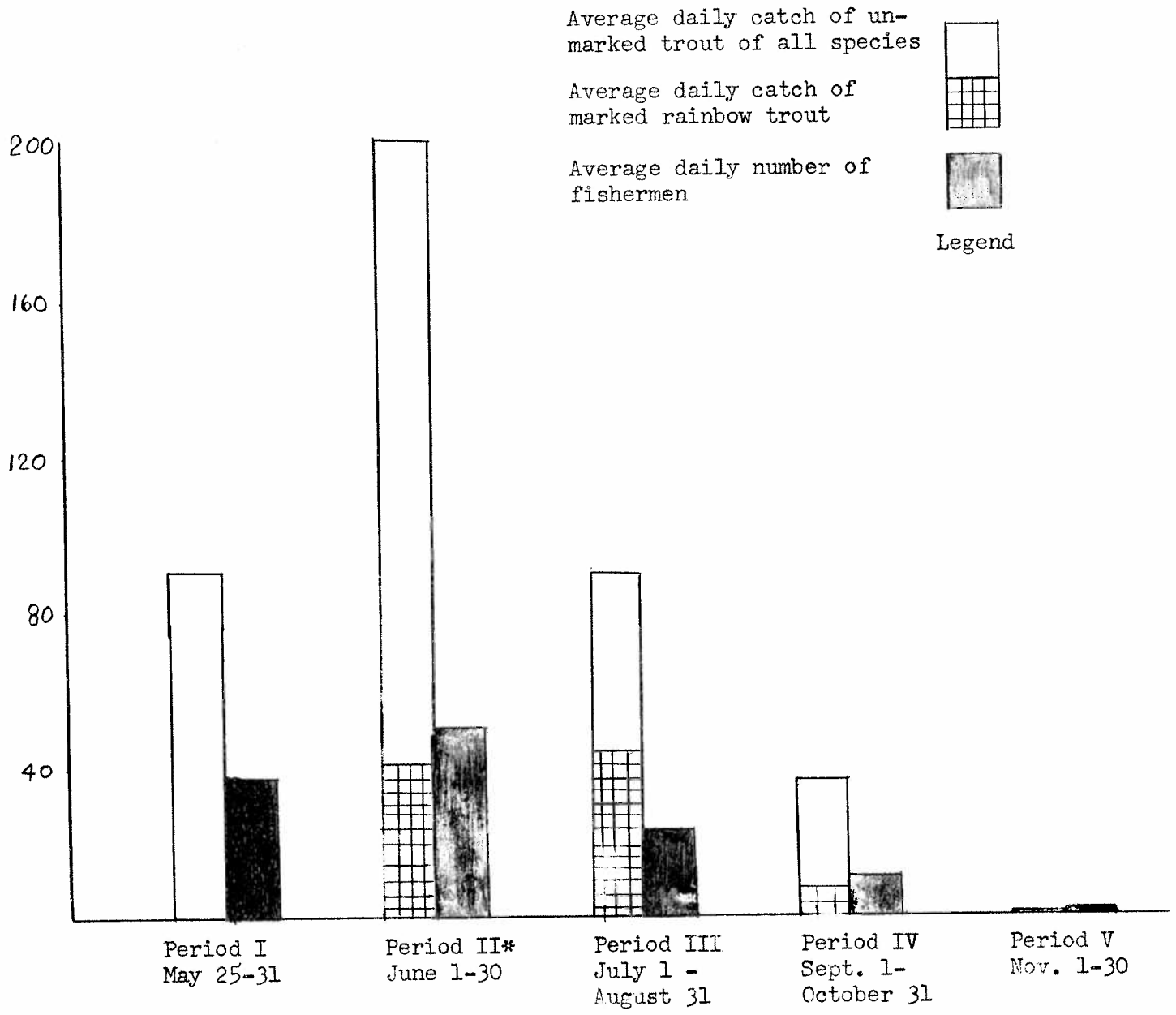
Figure 3. Census Form Used on Rock Creek Creel Census



* Hatchery (marked) trout contributed to the total harvest for only 18 days during Period II, but the average catch is calculated for the entire period.

Figure 4. Average number of fishermen and average total catch per day, per period, Rock Creek Creel Census, Station 1, summer census, 1958.



* Hatchery(marked) trout contributed to the total harvest for only 15 days during Period II but the average catch is calculated for the entire period.

Figure 5. Average number of fishermen and average total catch per day, per period, Rock Creek Creel Census, Station 2, summer census, 1958.

Table 4.* Estimated Pressure and catch for summer fishing season, Rock Creek station 1.

Period	Cars Contacted	Fishermen	Fisherman Hours	Rainbow		Rainbow (marked)		Cutthroat	
				No.	Wt.	No.	Wt.	No.	Wt.
25 May 31 May	426	811	3,252	1,184	710	0	0	172	52
1 June 4 July	2,368	4,615	16,851	5,557	3,334	2,691	807	537	161
5 July 31 July	1,003	1,913	7,099	2,094	838	3,387	1,016	351	105
1 August 29 August	1,237	2,326	9,012	3,862	1,931	2,640	528	447	134
30 August 30 September	718	1,317	4,413	2,014	1,007	855	171	285	57
1 October 31 October	223	367	1,023	290	145	56	11	40	8
1 November 30 November	81	149	330	144	72	12	2	5	1
TOTAL	6,056	11,498	41,989	15,145	8,037	9,641	2,535	1,837	518

* Continued on following page.

Table 4 (cont'd). Estimated pressure and catch for summer fishing season, Rock Creek Station 1.

Eastern brook		Dolly Varden		Brown trout		Whitefish		Total	
No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
244	49	101	60	37	74	188	150	1,926	1,095
2,331	466	872	523	254	508	543	434	12,785	6,233
878	175	361	181	67	134	140	112	7,278	2,561
730	146	277	139	152	304	208	166	8,316	3,348
542	108	128	64	62	124	236	189	4,122	1,720
64	13	32	16	39	78	289	231	810	502
0	0	5	3	12	24	429	343	607	455
4,789	957	1,776	989	623	1,246	2,033	1,625	35,844	15,904

Table 5.* Estimated pressure and catch for summer fishing season, Rock Creek Station 2.

Period	Cars Contacted	Fishermen	Fisherman Hours	Rainbow		Rainbow (marked)		Cutthroat	
				No.	Wt.	No.	Wt.	No.	Wt.
25 May 31 May	97	181	599	158	79	0	0	83	25
1 June 30 June	675	1,359	5,306	1,714	857	915	275	694	208
1 July 31 August	611	1,262	5,731	1,916	575	2,483	497	586	175
1 September 31 October	269	521	1,649	369	111	266	53	478	95
1 November 30 November	10	20	50	0	0	0	0	0	0
TOTAL	1,662	3,343	13,335	4,157	1,622	3,664	825	1,841	503

* Continued on following page.

Table 5 (cont'd). Estimated pressure and catch for summer fishing season, Rock Creek Station 2.

Eastern brook		Dolly Varden		Brown trout		Whitefish		Total	
No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
170	51	33	17	0	0	83	25	527	197
1,590	318	299	149	3	6	718	215	5,933	2,028
508	152	258	129	0	0	233	70	5,984	1,598
291	58	167	84	0	0	447	134	2,018	535
0	0	2	1	0	0	12	4	14	5
2,559	579	759	380	3	6	1,493	448	14,476	5,570

Table 6. Age and growth analysis, stations 1 and 2, Rock Creek summer creel census.

Species	ANNULUS I	II	III	IV	V	VI
Rainbow trout	2.8 (147)	6.9 (140)	11.0 (78)	13.7 (36)	16.1 (6)	17.0 (2)
Cutthroat trout	2.7 (78)	6.3 (72)	9.7 (23)	12.4 (4)	15.4 (2)	
Dolly Varden trout	3.5 (35)	6.7 (35)	9.6 (32)	12.9 (5)		
Brown trout	3.5 (31)	8.5 (21)	12.9 (9)			
			STATION 2			
Rainbow trout	2.7 (118)	6.5 (113)	10.1 (66)	12.6 (19)	15.6 (3)	
Cutthroat trout	2.7 (60)	6.5 (58)	10.2 (14)	14.1 (1)		

Numbers in parentheses indicate sample size.

Table 7. Total estimated pressure and catch, with trout hooked and released during Rock Creek winter whitefish season, on Station 1 and 2.

STATION 1

Period	Cars Contacted	Fishermen	Fisherman Hours	Whitefish		Rb*	Trout hooked and Released				
				No.	Wt.		Rb	Ct	Eb	DV	L.L.
December 1 February 1	317	601	1,817	2,498	999	4	370	12	41	8	55
February 2 March 31	236	445	1,218	1,991	796	0	205	4	30	6	17
Total	553	1,046	3,035	4,489	1,795	4	575	16	71	14	72

STATION 2

December 1 February 1	29	65	171	212	85	0	0	0	0	0	0
February 2 March 31	34	68	202	464	186	0	5	0	0	0	0
Total	63	133	373	676	271	0	5	0	0	0	0
GRAND TOTAL	616	1,179	3,408	5,165	2,066	4	580	16	71	14	72

Rb* = Marked rainbow trout
Rb = Rainbow trout
Ct = Cutthroat trout
Eb = Eastern brook trout
DV = Dolly Varden trout
L.L.= Brown trout