JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Montana

Project No. F-5-R-1 Work Plan No. III Job No. III-A

Title of Job: Sheep Creek Fish Population Study.

Objectives:

In order to effect or sustain proper management of waters from a fishery standpoint it is desireable to have information regarding the existing fish population. The objective of this study was to determine the size of the Sheep Creek fish population along with its length, weight, age and species composition.

Techniques Used:

Sampling was done with an electric shocking device and each 300 foot section was blocked off with 1/2-inch, square mesh nets. All fish were weighed and measured and scale samples were taken from a high percentage of each species.

Because of diversity of size and accessibility the stream was divided into Upper and Lower Sheep Creek. The two divisions were further subdivided into one tenth of mile units and by random selection of numbers twenty-two sections were chosen to be sampled. From 7.6 highway miles on Upper Sheep Creek fifteen sections were selected. Fish populations were determined in eleven of the fifteen. From 3.0 road miles on Lower Sheep Creek six sections were chosen and four of the six were actually worked with the electric shocker. This makes a total of twenty-one sections chosen and fifteen actually worked out of 10.6 miles of road paralleling the stream.

Findings:

Sheep Creek, a tributary of Smith River, is approximately 35 miles long, originating above 7,000 feet of elevation on the south slope of Kings Hill in the Lewis and Clark National Forest of the Little Belt Mountains. Approximately thirteen miles of the upper end is paralleled by U.S. Highway 89. A portion of lower Sheep Creek is accessible by a single track forest road.

Considerable cutting of Lodgepole pine is in progress at the present time on the upper end of Sheep Creek. Greater removal is anticipated and the area of logging will probably be increased to include tributaries entering Lower Sheep Creek.

The average width of the sampling sections on Upper Sheep Creek was approximately 12 feet, the depth over this width in riffle areas ranging from 3 to 8 inches. Velocity was crudely calculated to be two feet per second. Stream widths on the Lower Sheep Creek sampling sections were from 25 to 40 feet with depths in riffle areas from 8 inches to one and one-half feet. Several holes were deeper than eight feet.

In the fifteen sections sampled four thousand five hundred feet of the stream were intensively covered with the electric shocking machine. No. reliance can be placed on the numbers of fish smaller than three inches because of considerable loss through the barrier nets.

Seven hundred and sixty-six fish were found in the fifteen sections. Of these 350 were of legal size (7 inches and longer, total length). The number of each species of legal fish, the average length, weight and condition ($C = \frac{100,000W}{L3}$) for each section is shown in table 1. Similar data is listed for the sublegal fish in table 2. There are 415 sublegal fish included, one sublegal brown trout was found but not included in the table.

Fifty-five per cent of the legal fish in the sampled sections were whitefish (figure 1). Two modes can be seen on the length frequency graph (figure 6), one in the 5.0-5.9 inch and the other in the 9.0-9.9 and 10.0-10.9 inch groups. They show the predominance of two distinct age groups in the whitefish population. The average condition of all whitefish was 34.2.

Eastern brook trout make up thirty-two per cent of the total game fish in the sublegal class as shown in figure 2. They make up twenty-two per cent of all species of game fish regardless of size (figure 3) but contribute only 10 per cent to the legal-sized population. The preponderance of small fish of this species can be seen in the length frequency chart (figure 4). The greatest number were in the 5.0-5.9 inch group. Each of the groups in the sublegal class contain more fish than any of the legal sized groups. Few brook trout were found over eight inches long. The average condition of all eastern brook trout was 39.5.

Little can be said regarding the resident rainbow trout population because of hatchery plants made just prior to the population survey. Section 15 (tables 1 and 2) contained mostly rainbow trout although no natural cover could be found here. It was later learned that this section is a common planting location because of accessibility and convenience due to a highway bridge. The average condition factor of all rainbow trout was 39.5.

The numbers of legal-sized fish were uniformly distributed throughout the areas which were sampled. Distribution of brook trout, rainbow trout and whitefish in the sampled sections are shown in figure 7. Sections one through three show practically no legal fish which is attributable to the fact that in these sections the water remains extremely cold much of the year and the volume is much reduced.

The peaks of the whitefish population (figure 7) in sections 7, 10, and 17 are due to large, deep holes in which this species were congregated. The high points in the rainbow population in sections 7, 12, 15, 16 and 21 are believed to be attributable to hatchery planting.

Table 1. Mean total lengths in inches, weights in pounds and calculated condition factor (C) of legal-sized (7 inches and longer) game fish in sampled sections of Sheep Creek, Meagher county, Montana, 1951.

| Each Section 300 feet | Eastern Brook Trout | | | | Rainbow Trout | | | | Whitefish | | | | Cutthroat | | | | Hybrid (Rb.xCt.) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Wt. | Lgth. | C | No. | Wt. | Lgth. | C | No. | Wt. | Lgth. | C | No. | Wt. | Lgth. | C | No. | Wt. | Lgth. | C |
| Section 1 | 1 | .16 | 7.3 | 41.1 | 0 | .00 | 0.00 | 00 | 0 | 0.0 | 0.0 | 0.0 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 2 | 1 | .19 | 7.3 | 48.8 | 0 | .00 | 0.0 | 00 | 0 | 0.0 | 0.0 | 0.0 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 3 | 0 | .00 | 0.0 | 00.0 | 1 | .27 | 8.5 | 43.9 | 2 | .34 | 9.8 | 36.1 | 1 | .15 | 7.9 | 30.4 | 0 | .00 | 0.0 | 00.0 |
| Section 5 | 5 | .24 | 8.2 | 40.0 | 6 | .22 | 7.9 | 43.4 | 4 | .32 | 9.5 | 36.5 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 7 | 2 | .30 | 8.4 | 44.0 | 11 | .24 | 8.4 | 39.7 | 40 | .41 | 10.4 | 34.9 | 0 | .00 | 0.0 | 00.0 | 1 | .15 | 7.4 | 37.0 |
| Section 9 | 5 | .20 | 7.8 | 40.7 | 6 | .22 | 8.4 | 37.8 | 17 | .27 | 9.1 | 35.5 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 10 | 1 | .24 | 7.6 | 54.5 | 5 | .21 | 8.3 | 35.3 | 26 | .30 | 9.5 | 33.0 | 0 | .00 | 0.0 | 00.0 | 1 | .10 | 7.0 | 29.2 |
| Section 12 | 9 | .23 | 8.2 | 39.7 | 9 | .43 | 9.5 | 39.3 | 18 | .23 | 8.5 | 36.2 | 0 | .00 | 0.0 | 00.0 | 2 | .16 | 7.3 | 41.0 |
| Section 13 | 3 | .22 | 7.9 | 43.4 | 2 | .26 | 8.6 | 38.8 | 10 | .24 | 8.7 | 34.3 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 14 | 3 | .33 | 9.1 | 40.1 | 11 | .27 | 8.4 | 41.7 | 14 | .37 | 10.0 | 36.2 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 15 | 1 | .20 | 7.9 | 40.4 | 12 | .28 | 8.7 | 39.5 | 6 | .26 | 9.0 | 36.5 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 16 | 0 | .00 | 0.0 | 00.0 | 24 | .22 | 8.0 | 39.5 | 9 | .55 | 11.2 | 37.9 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 17 | 4 | .48 | 9.7 | 42.1 | 9 | .24 | 8.4 | 38.0 | 25 | .47 | 10.8 | 34.9 | 1 | .18 | 8.0 | 35.0 | 0 | .00 | 0.0 | 00.0 |
| Section 19 | 0 | .00 | 0.0 | 00.0 | 6 | .19 | 7.8 | 38.4 | 6 | .49 | 10.8 | 37.2 | 2 | .14 | 7.5 | 32.6 | 1 | .19 | 8.1 | 35.7 |
| Section 21 | 0 | .00 | 0.0 | 00.0 | 11 | .19 | 7.9 | 37.5 | 16 | .50 | 10.6 | 37.9 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Total Number | 35 | | | | 113 | | | | 193 | | | | 4 | | | | 5 | | | |
| Mean (Wt.Lg.C) | | .26 | 8.3 | 41.5 | | .25 | 8.3 | 39.3 | | .37 | 9.9 | 35.4 | | .15 | 7.7 | 32.6 | | .15 | 7.4 | 36.8 |

Table 2. Mean total lengths in inches, weights in pounds and calculated condition factor (C) of sub-legal sized (less than 7 inches) game fish in sampled sections of Sheep Creek, Meagher county, Montana, 1951.

| 300' Sections | Eastern Brook Trout | | | | Rainbow | | | | Whitefish | | | | Cutthroat | | | | Hybrid (RbxCt) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Wt. | Lgth. | C | No. | Wt. | Lgth | C | No. | Wt. | Lgth | C | No. | Wt. | Lgth. | C | No. | Wt. | Lgth | C |
| Section 1 | 1 | .03 | 3.8 | 54.4 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 2 | 12 | .04 | 4.3 | 45.7 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 | 2 | .07 | 5.6 | 37.1 | 0 | .00 | 0.0 | 00.0 |
| Section 3 | 6 | .09 | 5.9 | 38.2 | 9 | .02 | 3.6 | 32.3 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 5 | 16 | .06 | 5.2 | 39.1 | 5 | .08 | 5.9 | 38.8 | 4 | .05 | 4.8 | 36.7 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 7 | 24 | .06 | 5.2 | 38.2 | 4 | .08 | 5.8 | 42.8 | 6 | .06 | 5.8 | 27.8 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 9 | 13 | .06 | 5.4 | 35.6 | 11 | .06 | 5.2 | 37.4 | 4 | .05 | 5.2 | 36.6 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 10 | 18 | .04 | 4.8 | 37.9 | 14 | .06 | 5.4 | 36.2 | 20 | .05 | 5.3 | 28.4 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 12 | 21 | .06 | 5.2 | 39.3 | 21 | .08 | 5.6 | 41.0 | 16 | .06 | 5.8 | 31.2 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 13 | 1 | .03 | 4.3 | 37.8 | 9 | .10 | 6.3 | 42.0 | 24 | .06 | 5.8 | 31.5 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 14 | 7 | .07 | 5.7 | 36.4 | 16 | .08 | 5.6 | 42.8 | 2 | .08 | 6.1 | 32.9 | 0 | .00 | 0.0 | 00.0 | 0 | .06 | 0.0 | 00.0 |
| Section 15 | 2 | .08 | 4.9 | 42.5 | 23 | .06 | 4.8 | 42.9 | 4 | .07 | 5.8 | 35.2 | 0 | .00 | 0.0 | 00.0 | 0 | .00 | 0.0 | 00.0 |
| Section 16 | 6 | .06 | 5.4 | 36.9 | 19 | .08 | 5.7 | 38.9 | 2 | .06 | 5.6 | 36.9 | 1 | .06 | 5.6 | 34.1 | 2 | .06 | 5.5 | 35.8 |
| Section 17 | 4 | .05 | 4.9 | 41.5 | 17 | .07 | 5.4 | 39.6 | 9 | .04 | 5.0 | 33.4 | 2 | .08 | 6.0 | 37.0 | 0 | .00 | 0.0 | 00.0 |
| Section 19 | 1 | .05 | 5.0 | 40.0 | 10 | .06 | 5.4 | 36.6 | 1 | .05 | 5.2 | 35.6 | 2 | .06 | 5.4 | 34.7 | 6 | .07 | 5.7 | 36.8 |
| Section 21 | 1 | .03 | 4.4 | 35.2 | 11 | .09 | 6.1 | 38.9 | 3 | .05 | 5.4 | 34.4 | 1 | .09 | 6.1 | 39.5 | 2 | .06 | 5.1 | 41.2 |
| Total Number | 133 | | | | 169 | | | | 95 | | | | 8 | | | | 10 | | | |
| Mean (Wt.Lg.C) | .06 | | 5.1 | 39.0 | .07 | | 5.4 | 39.6 | .06 | | 5.5 | 31.7 | .07 | | 5.7 | 36.4 | .07 | | 5.5 | 37.5 |

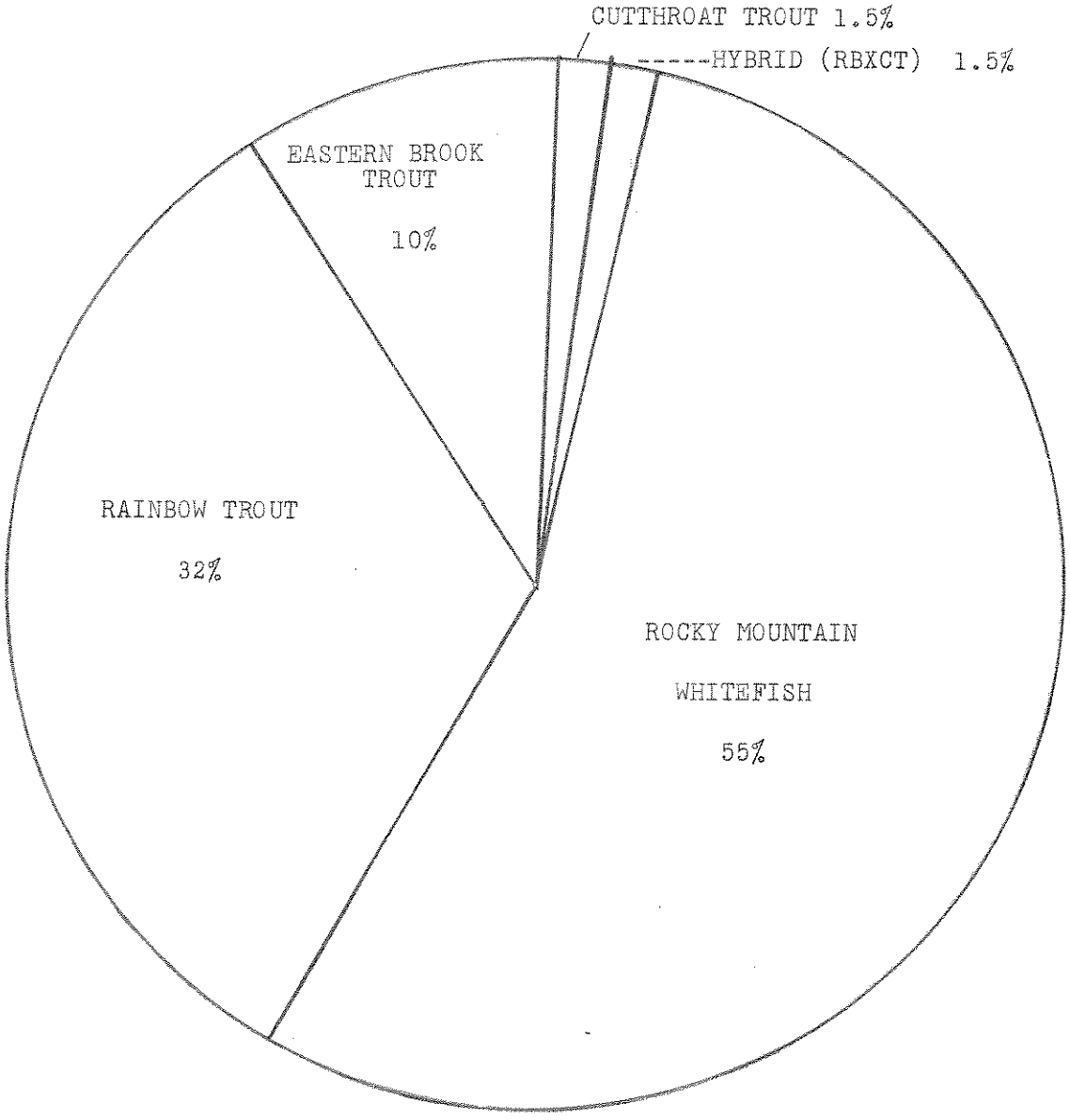


Figure 1. Percent of each species of all legal-sized (7" and longer) game fish found in randomly selected sections of Sheep Creek, Meagher county, Montana, 1951.

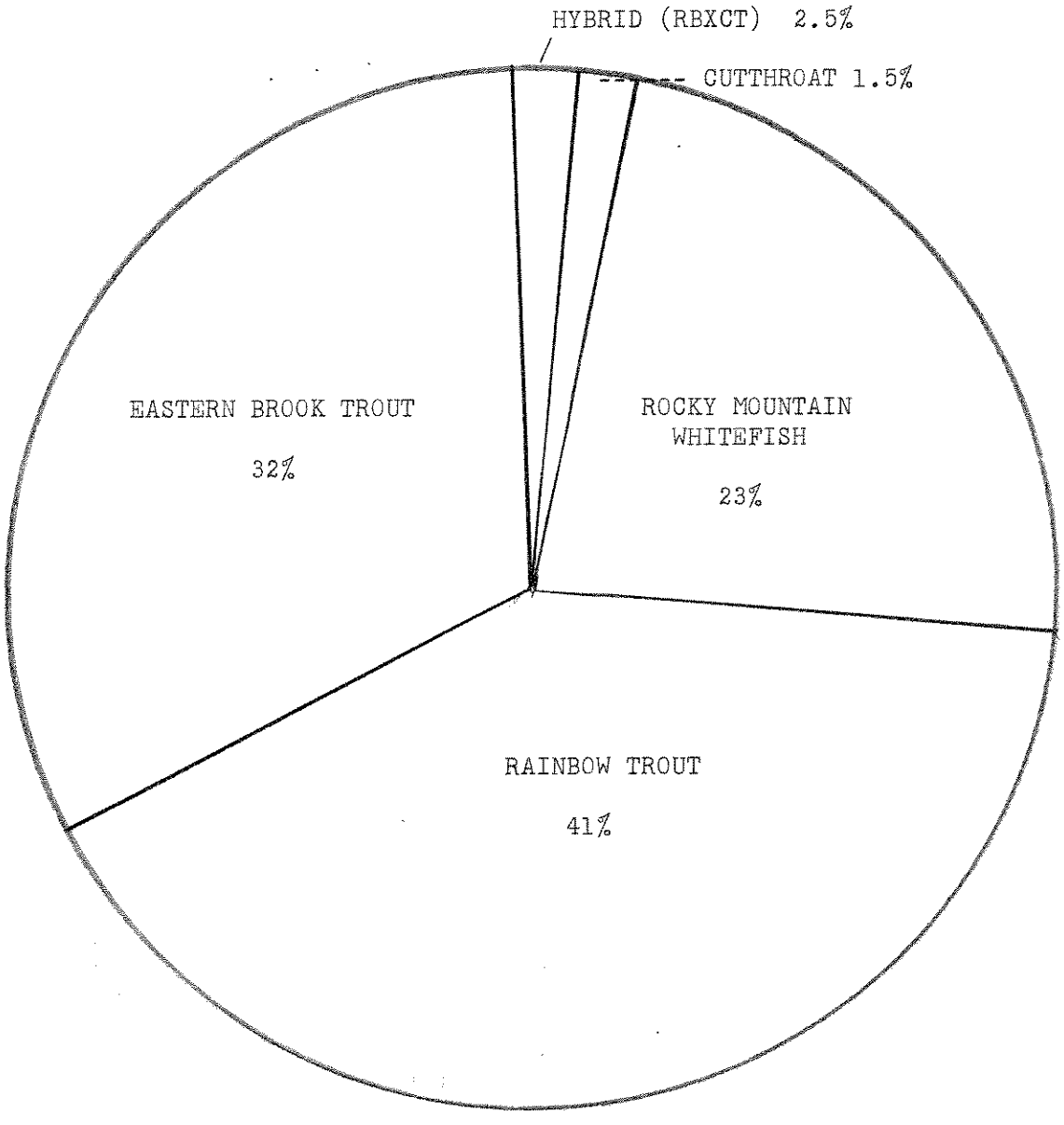


Figure 2. Percent of each species of sub-legal sized (Less than 7") game fish found in randomly selected sections of Sheep Creek, Meagher county, Montana, 1951.

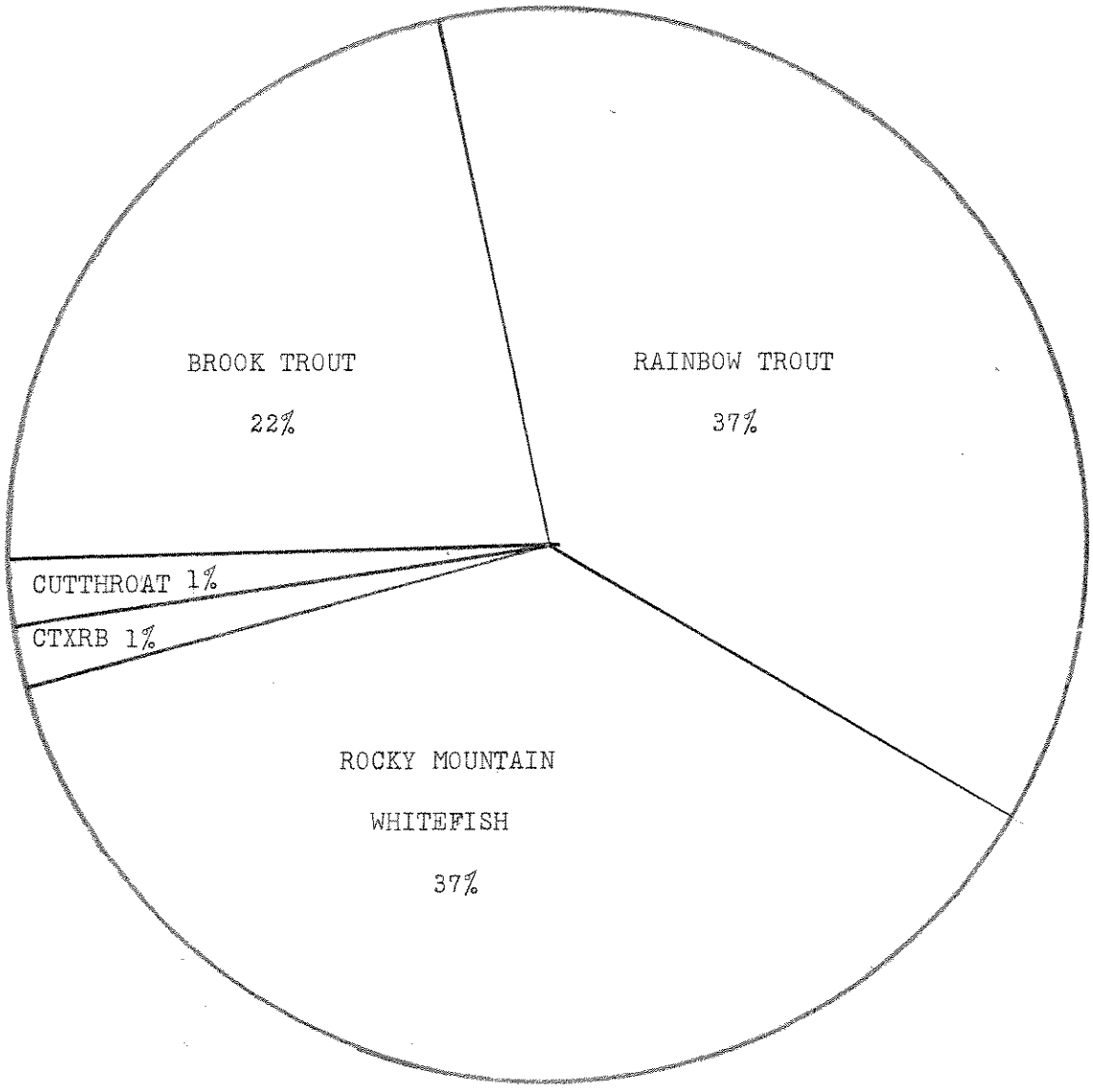


Figure 3. Percent of each species of all game fish recovered from randomly selected sections of Sheep Creek, Meagher County, Montana, 1951.

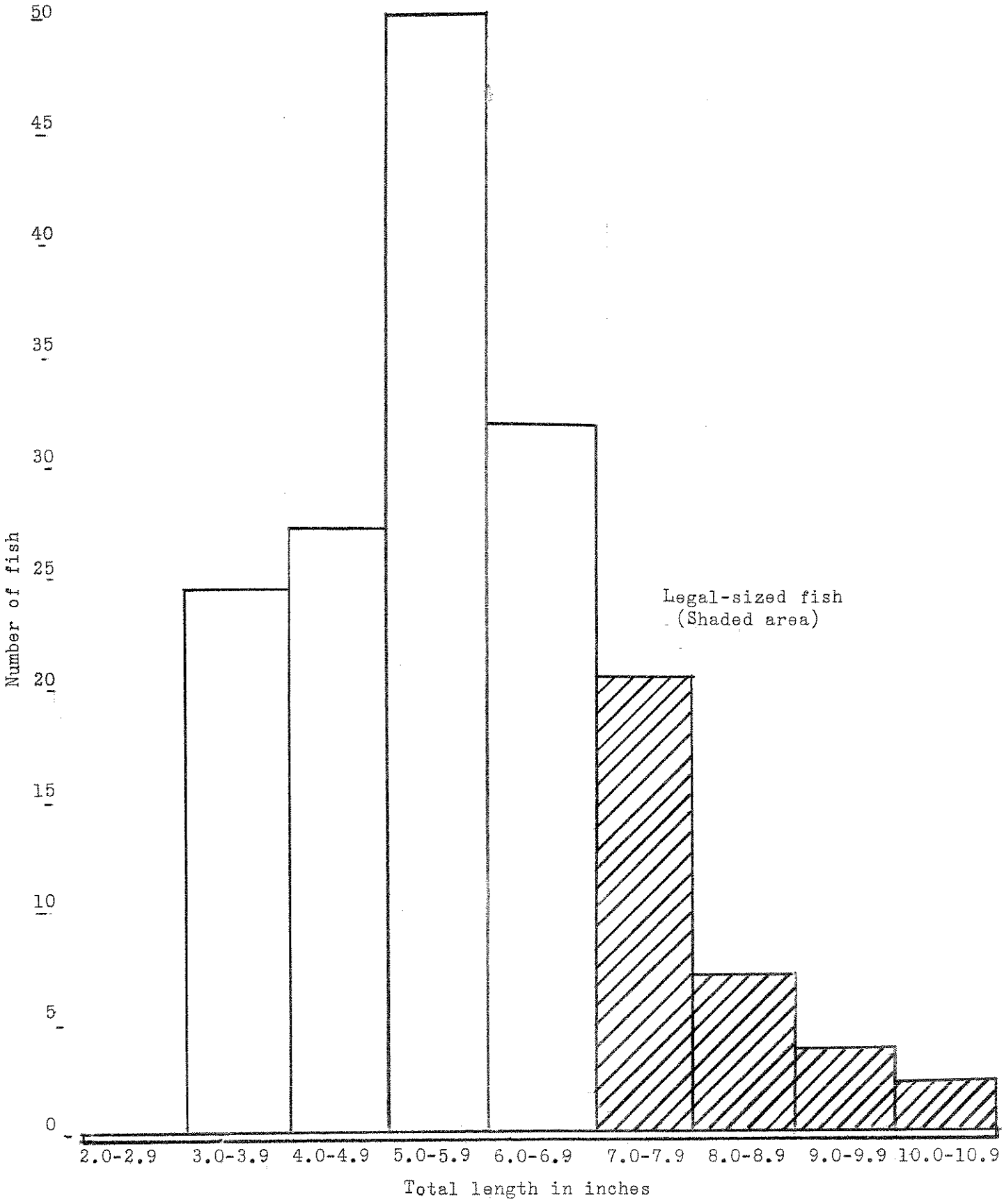


Figure 4. Length frequencies of eastern brook trout from sampled sections of Sheep Creek, Meagher county, Montana, 1951.

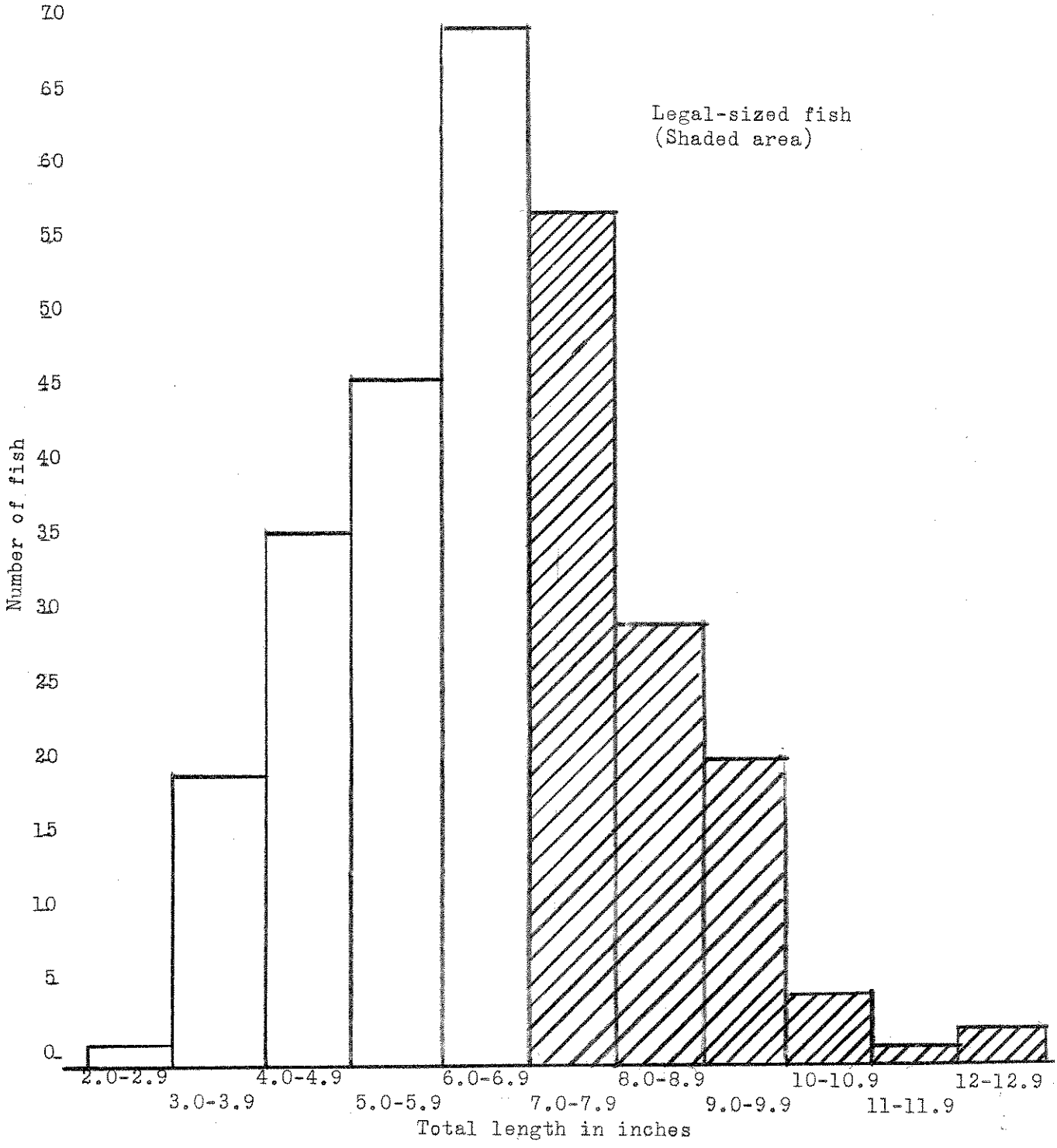


Figure 5. Length frequencies of rainbow trout from sampled sections of Sheep Creek, Meagher county, Montana 1951.

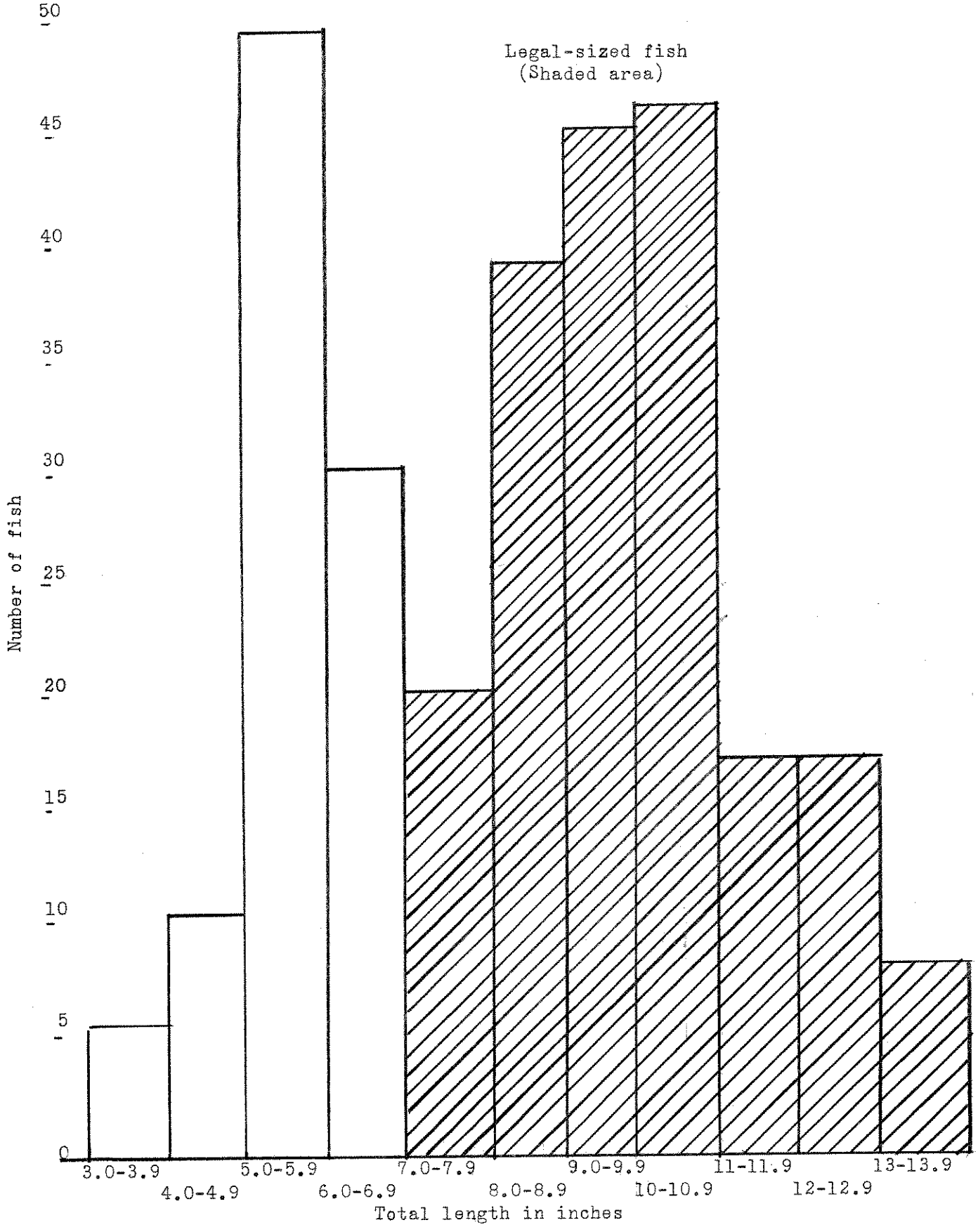


Figure 6. Length frequencies of whitefish from sampled sections of Sheep Creek, Meagher county, Montana, 1951.

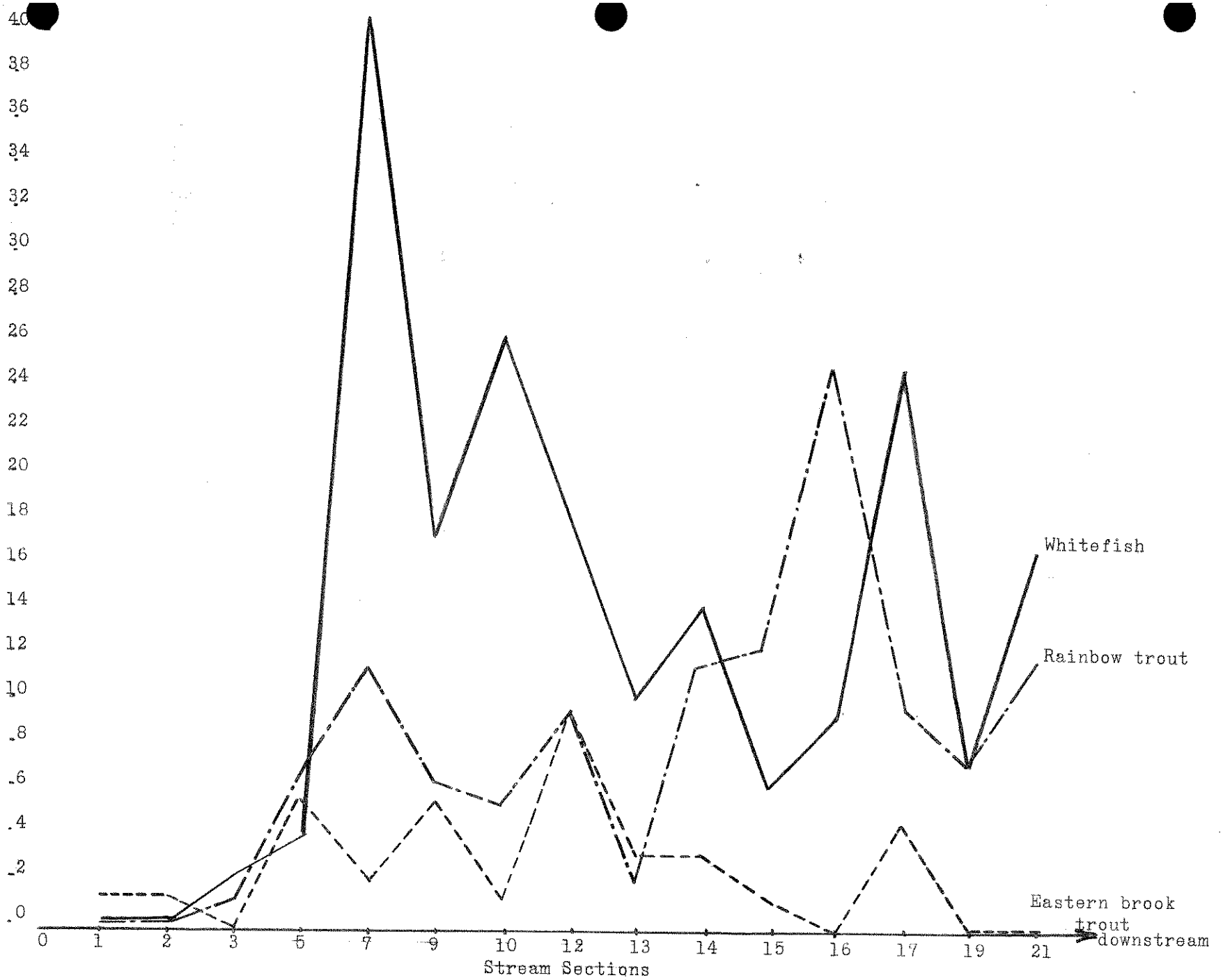


Figure 7. Distribution of legal-sized brook trout, rainbow trout and whitefish in sampled sections of Sheep Creek, Meagher county, Montana, 1951.

It is felt that the number of sections sampled in the two areas is adequate and because there is uniformity of numbers it is not considered hazardous to convert them into fish per mile. Numbers of legal game fish per mile is calculated to be four-hundred and sixty. By species the legal number per mile are as follows: Whitefish, 260; Rainbow trout, 150; Eastern Brook trout, 44; Cutthroat and Hybrid (RbxCt), 6.

The five year plan of fish distribution and management call for a planting of 10,000 yearling rainbow trout each year.

Analysis and Recommendations:

Whitefish definitely predominate in the legal-sized population of the stream. Their contribution to the creel will be studied.

Less than one-fifth of the Eastern Brook trout in the stream are of legal length. The greatest number being from 5 to 6 inches in total length. It is recommended that the minimum size limit on Eastern Brook trout be removed on Sheep Creek.

Summary:

By stratified random selection of sections (300 feet long) and sampling with an electric shocker, a population study was conducted on Sheep Creek. Fifteen sections (4,500') were worked and seven hundred and sixty fish were weighed and measured.

Approximately one-fifth of the brook trout were of legal size. Whitefish comprised fifty-five per cent of the legal-sized population. Very few fish of legal length were found in the three sections farthest up the stream. The calculated number of legal game fish per mile was four hundred and sixty.

Data and Reports:

The original data is with the fisheries biologist at Belt, Montana.

Prepared by Nels A. Thoreson Approved by R. L. Lambert

Date: February 28, 1952