MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION
HELENA, MONTANA

# JOB COMPLETION REPORT
# INVESTIGATIONS PROJECTS

State of Montana

Project No. F-7-R-11 Name Northwest Montana Fishery Study

Job No. III Title Survey of Cutthroat and Dolly Varden Trout in Flathead River and Tributaries Above Flathead Lake.

Period Covered: May 1, 1961 - June 30, 1962

Abstract: A crew of four men was employed to capture, tag and release Dolly Varden and cutthroat trout in the 171 miles of the Flathead River Drainage above Flathead Lake. Catch rate for tagged fish was 1.8 fish per hour per man (including float time). The average size of the cutthroat trout tagged averaged 9.0 inches, with a range from 7 to 17 inches. A total of 1,175 cutthroat and 216 Dolly Varden have been tagged and released in the river system.

Recapture information was received on 62 (8.5 percent) wild cutthroat trout. Recapture information was also received on 13 hatchery brood cutthroat trout and 8 Dolly Varden trout. Seventy-five percent of the recapture information was returned by interested fishermen through letters, by phone or personal contact.

Movement patterns were indicated; however, another summer's project is necessary before the complete movements of the cutthroat trout in the Flathead River Drainage can be formulated.

Objectives: The objectives of this investigation are to determine the extent, time and distance which the cutthroat and Dolly Varden trout travel in the Flathead lake and river system, and to develop management measures so that a future fishery can be assured in this area. Incidental objectives would be to obtain additional life history data and information on other species present. This would aid in assessing fish production in these waters and the recruitment of native fishes of the Flathead River system.

Techniques Used: The collection of cutthroat trout in the Flathead River system above Flathead Lake has been a problem to the investigations of this species. Since 1950, studies have employed methods which range from fish weirs to electro-fishing with a 1,000 volt A.C. generator. Positive results were not obtained. High water, moving debris and low conductivity of the water were the main deterring factors. Pirate traps ($\frac{1}{2}$ & $\frac{1}{4}$ inch mesh) have been fished without success for taggable species in the lake where angler catch has shown the presence of cutthroat trout and Dolly Varden.

Since other methods had not given desired results, a crew of four men was organized in 1961 and again in 1962 to float, angle, and tag fish in the 171 miles of river system (76 miles-Middle Fork, 53 miles-North Fork, and 42 miles-Flathead River) above Flathead Lake. Fish were also tagged in the major tributaries on the North and Middle Fork Rivers. Pack animals furnished the transportation in the areas inaccessible by vehicles. In addition to the float crew, series of gill nets were fished (July-August, 1961; April-May, 1962) in

the northern area of Flathead Lake. Depths of net sets ranged from 6 to 170 feet. The crews tagged all cutthroat trout and Dolly Varden collected that were over seven inches (total length) with plastic band around the mandible. Tricaine methanesulphonate ($MS_{222}$) was used as an anesthetic. The tagging information was recorded on a master tagging form and on individual (5" x 8") punch cards. Tagging designations were taken from the sectionized rivers (approximately 2 miles per section). Flathead Lake was divided into 12 tagging areas.

Findings:

Fish collection and tagging: The float crew made 37 individual trips on the river during the months of July, August and September. These trips covered a sampling and tagging area of 171 river miles. Fifteen trips were made on the North Fork of the Flathead River, eleven trips each on the Middle Fork and the main Flathead River. Trip time ranged from 2 to 10 hours. The crew caught an average of 2.8 fish per hour per man (including float time) and tagged 1.8 fish per hour per man. The crew collected 1,045 fish, of which 54% were taggable (over seven inches total length). Although angling procedure was aimed toward cutthroat and Dolly Varden, other species were collected and released. This included mountain whitefish, grayling, brook and rainbow trout.

The average size of cutthroat trout collected in the rivers are as follows:

| North Fork | Middle Fork | Flathead River |
|---|---|---|
| 8.4" | 9.6" | 8.8" |

The grand average size of all cutthroat tagged was 9.0 inches with a range from 7-17 inches.

Spring sampling during April and May in the main Flathead River and Flathead Lake employed gill net sets, pirate trap operation and angling. Angling in the lake was incidental to tending the nets and was in the vicinity of the sets, but was found to be the most effective method of collecting and tagging cutthroat and Dolly Varden trout. Gill nets were fished for 238 hours, the pirate trap operated for 590 hours and total angler time was 282 hours. Taggable fish for each method were as follows:

| | *DV | CT | Rb | Lt | Total |
|---|---|---|---|---|---|
| Gill nets | 23 | 4 | 1 | 0 | 28 |
| Pirate trap | 9 | 0 | 0 | 0 | 9 |
| Angling | 142 | 24 | 6 | 2 | 174 |

*DV-Dolly Varden, CT-Cutthroat, Rb-rainbow, Lt-Lake trout

In addition to the tagging of wild fishes in the Flathead River system, 411 hatchery brood west slope cutthroat trout were tagged and released (216 in Flathead River and 195 in Flathead Lake). The fish were four and five year old brood fish which ranged in size from 12 to 14 inches.

Total tagged fish in the river and lake system (including those tagged by sportsmen) are as follows:

| | Ct | DV | *Others | Total |
|---|---|---|---|---|
| Middle Fork | 239 | 3 | 1 | 243 |
| North Fork | 411 | 18 | 0 | 429 |
| Flathead River | 310 | 12 | 2 | 324 |
| Flathead Lake | 215 | 183 | 8 | 406 |
| Total | 1,175 | 216 | 11 | 1,402 |

*Rainbow, rainbow X cutthroat hybrids, brook trout, lake trout

Returns

Wild cutthroat trout: Tag return information was dependent on voluntary fishermen returns, catch data from the float crew, and creel checks made by wardens and personnel of the Fish and Wildlife Service operating on Flathead Lake. Newspaper articles and posters advertized and explained the tagging program to local sportsmen. In order to present a complete picture of fish movements in the river system, 12 returns described by Johnson, 1961* were included.

Sixty-three recaptures (8.5 percent) of 744 tagged wild cutthroat trout in the Flathead River drainage have been recorded. Three-fourths of the recaptures were returned by interested fishermen, through letters, by phone or personal contact.

In the North Fork of the Flathead River, 28 returns were received from the 411 available tagged fish or 6.8 percent return. Thirteen of the returns were retaken in the same general area, from 0 to 3 miles up or down from the point of tagging. The time lapse between tagging and recapture ranged from 1 day to 25 months. Six were retaken between 1 and 4 days, the remaining between 1 and 25 months. The cutthroat retaken after 25 months was captured both times in Hay Creek and both times was assumed to be spawning, based on its size (15.5 inches when tagged). This particular stream was checked periodically during the spring and summer seasons the following year and no fish of spawning size was either collected or observed.

Two recaptures showed upstream movements. One fish moved from the North Fork River to a lake on a tributary stream (11 miles up river and 6 miles up the tributary to the lake) in a period of 12 months. The other fish traveled 10 miles upstream in $9\frac{1}{2}$ months.

Downstream movements were recorded on thirteen cutthroat trout in the North Fork River.

*Johnson, Howard, 1961. Observations on the life history and movement of cutthroat trout (Salmo clarki) in Flathead River drainage, Montana. Comp. Report Job III, Project F-7-R-10. pp 17-18.

Their movement and time were as follows:

| Miles | No. of Fish | Movement in Miles/Time between Captures |
|---|---|---|
| 4 - 10 | 4 | 4/12days, 6/10mo., 9/½mo., 10/11mo. |
| 11 - 20 | 5 | 12/½mo., 12/7days, 14/1mo.,17/9mo.,19/1½mo. |
| 21 - 50 | 3 | 29/½mo., 40/6 days, 40/10mo. |
| 51 - 70 | 1 | 54/17 days |

Four of the above fish (movements of 19-54 miles) moved from the North Fork River into the Flathead River; two fish moved downstream (10 & 17 miles) from a tributary stream into the North Fork River. Individual movements of the fish are plotted on Figure 1.

In the Middle Fork of the Flathead River, 28 returns were received from the 239 available tagged cutthroat trout. This is a 11.7 percent return. Sixteen of the returns were recaptured in the same general area, from 0 - 1/4 mile up or down from the tagging point. Ten of these fish were recaught from 1 - 5 days after being tagged; the remainder were taken after a time lapse from 19 days to 11 months. Fish showing no movements between tagging and recapture were represented by both river and tributary tagged fish.

One fish showed an upstream movement of 6 miles in 5 days.

Downstream movements were shown by 10 recaptures in the Middle Fork River. Their movements and time were as follows:

| Miles | No. of Fish | Movement in Miles/Time between Captures |
|---|---|---|
| 2 - 10 | 2 | 2/24 days, 6/5 days |
| 11 - 20 | 2 | 12/9 mo., 18/13½ mo. |
| 21 - 50 | 5 | 25/1mo., 39/5days, 40/11½mo.,44/1½mo.,47/1½mo. |
| 51 - 70 | 2 | 66/1½mo., 67/1 mo. |

Three of the above fish (movements of 39, 66, and 67 miles downstream) moved from the Middle Fork River into the Flathead River; one fish moved 18 miles downstream from a tributary stream into the Middle Fork River.

In the Flathead River, 6 returns were received from the 94 available tagged fish. This is a 6.4 percent return. Two of the returns were captured in the same general area (½ mile up or down from the tagging point) after a time lapse of one and nine months.

One fish showed upstream movement of 3 miles in 1 month's time.

Downstream movements were shown by 3 recaptures in the Flathead River. Their movements and time were as follows:

| Miles | No. of Fish | Movement in Miles/Time between Captures |
|---|---|---|
| 0 - 10 | 1 | 10/18 days |
| 11 - 20 | 0 | |
| 21 - 50 | 1 | 40/8 mo. |
| 51 - 70 | 1 | 55/12 mo. |

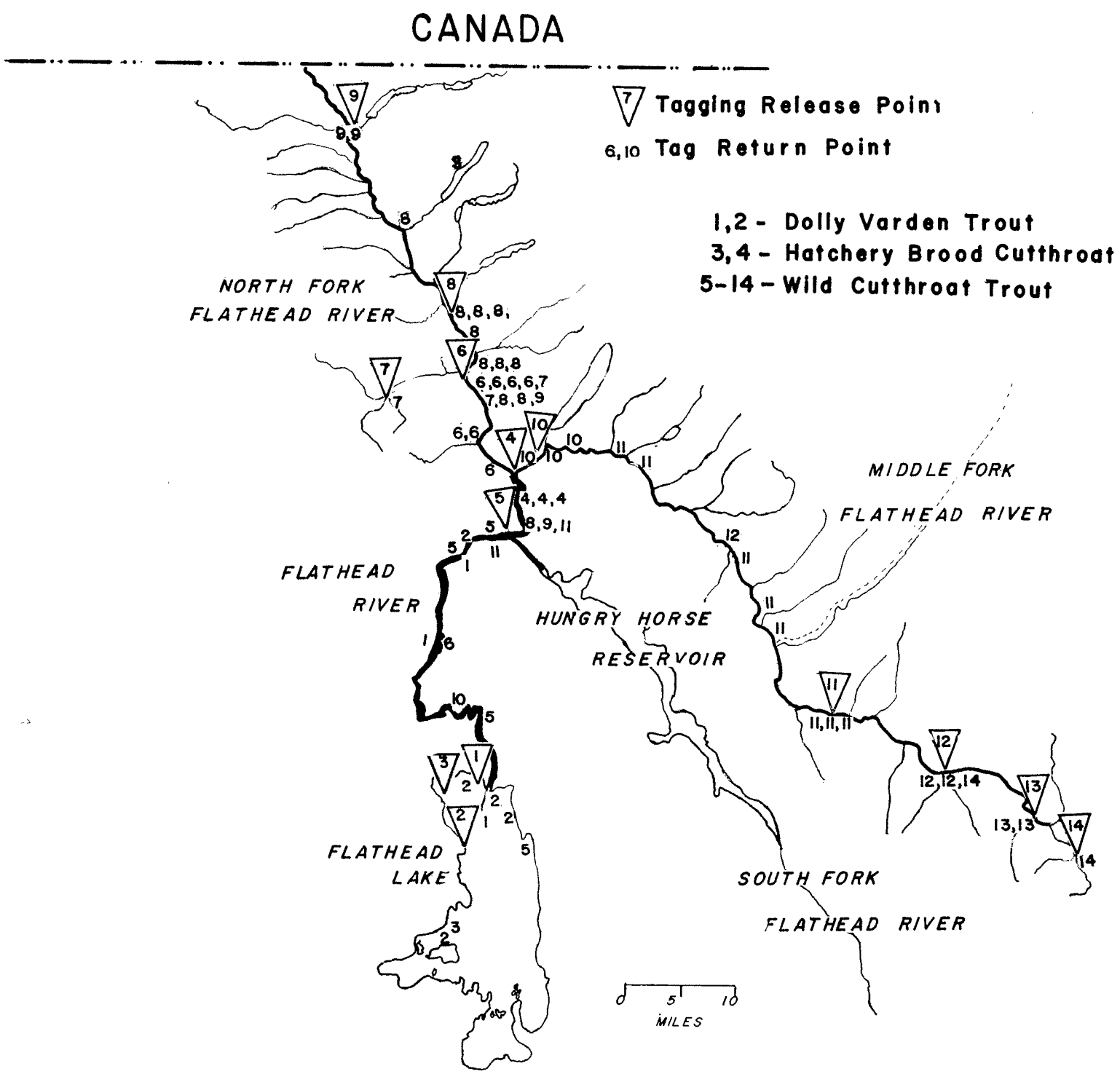


Figure 1. Graphical movements of cutthroat and Dolly Varden trout in the Flathead River system and Flathead Lake.

One of the above fish (55 miles downstream) traveled from the mouth of the South Fork River to the Woods Bay area in Flathead Lake (Figure 1).

One recapture was recorded from 20 available tagged cutthroat trout in Flathead Lake. This fish traveled in the lake 2 miles north of the tagging point in one month.

One tagged cutthroat trout was found dead after 46 days, 35 miles below the release point. This fish moved from the North Fork River downstream into the Flathead River.

Hatchery Brood Cutthroat Trout: These particular brood fish were all males and were planted immediately after being culled at the hatchery. It was the intent of this early plant in June to avoid the skinned and scuffed up appearance which occurs in spawning males in hatchery troughs. At this particular time the waters of the river were still being influenced by spring rains and run-off which could have affected the survival and catch of the river planted fish. Thirteen of the available 411 tagged fish were recaptured for 3 percent return. Five of these were found dead.

Seven tags from the 216 fish planted in the Flathead River were returned. Three of the returns were found dead. Two of the dead fish were found 10 days later 2 miles below the release point, the other 8 miles downstream after a period of 1 month. The remaining four returns were reported by fishermen and were all taken in the vicinity of 1/4 mile downstream within four days after planting.

Six returns were reported from the 195 fish released in Hatchery Bay, Flathead Lake. Two of these returns were found dead. Both of these fish were found in the general vicinity of the planting point. One was found 7 days later, the other after 2 months. The latter was quite unique, in that only the lower mandible with the tag intact was recovered from the bottom of the bay by a SCUBA diver. Three of the four returns by fishermen were caught the following day in the planting area, the other 12 months later 20 miles south of the release point (Figure 1.).

Dolly Varden: Eight recaptures of Dolly Varden were reported from the available 216 tagged fish. Four of these returns were from the 32 fish tagged prior to the spring tagging (April, May, June 1962).

Although Dolly Varden were collected and tagged in both the river and lake, only lake tagged fish have been recaught.

Seven of the eight returns were taken during the months of May and early June, the other fish was caught in early September.

Movement within the lake were recorded on five fish; their movements were as follows:

| Time between Recaptures | (Miles) Distance-Direction/Movement |
|---|---|
| 2 days | 8E/West shore to east shore |
| 3 days | 12S/West shore |
| 6 months | 3E/North shore to river mouth |
| 10½ months | 5NE/West shore to north shore |
| 12 months | 5 NE/West shore to river mouth |

Lake to river movements were recorded on three fish; their movements were as follows:

| Time between Recaptures | Distances Upstream |
|---|---|
| 19 days | 50 miles |
| 1½ months | 46 miles |
| 2½ months | 30 miles |

No dead tagged Dolly Varden have been reported.

Recommendations:

It is recommended that the movement phase of the cutthroat trout and Dolly Varden in the Flathead River system be continued. Through the recent tagging efforts, general locations and productive fishing times were established. With this information next year's project will permit greater emphasis on fish tagging. Another summer's activities is required before the final formulation of fish movements and new management procedures can be applied in the Flathead River system.

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Date October 1, 1962