EFFECTS OF TAGGING ON RED SALMON

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EFFECT OF TAGGING ON THE SUBSEQUENT BEHAVIOR AND CONDITION OF RED SALMON

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Large numbers of adult salmon have been tagged in a variety of ways for the purposes of tracing their further actions and destinations; however, little investigational work has been directed toward determination of the effects of the tagging operation itself on the subsequent behavior and condition of the fish. This neglect could be harmful, since the tagging effects influence the accuracy of results obtained from tagging experiments.

In order to appraise these effects on red salmon spawning in Bristol Bay streams, an experiment was proposed for 1949 on a stream of such small size that it could be under almost constant surveillance, so that any differences of behavior and condition between tagged and untagged fish could readily be noted. Hidden Creek, a tributary to Brooks Lake on the Naknek River system, was chosen for the purpose. It was accessible, open in character, could be surveyed easily, and was of representative size and length for the Brooks system. Flow was approximately eight cubic feet per second, and length from the mouth to a beaver dam that formed an impassable barrier was two and one-eighth miles.

This stream was first surveyed physically, and later divided into half-mile intervals with station markers. A trap was installed at the mouth, blocking passage of all fish to the stream. Plans included tagging and releasing approximately 200 spawners, simultaneously releasing a like number of untagged fish, one tagged fish accompanied by one untagged, so that distribution would be equal. Tagging was done with Peterson type plastic discs, connected by a nickel pin below the dorsal fin.

On August 17, tagging began at 1:15 pm. on the first group trapped (163 fish), of which 82 were tagged. Tagging of the group was completed at 2:00 pm. and the trap opened. By 5:15 a second group, numbering 231 fish had been handled, of which 115 were tagged, making a total of 197 each tagged and untagged.

Immediately upon completion of tagging, two men started up the stream on survey. They covered all of the area up to the beaver-dam barrier, arriving there at 7:50 pm. On the following morning they surveyed back down to the trap, which had been closed to prevent passage of other salmon.

On the first survey, about 80 fish were noted directly above the trap, apparently resting, or undergoing orientation after handling. Between these fish and the half-mile station, the other salmon were observed grouped in schools of from 8 to 20, all of which were moving upstream. Beyond the half-mile station, the salmon were more dispersed, occurring in groups of two and three, but still moving about.

The survey of the following morning revealed a large number of fish paired and beginning nest excavations. A diminished upstream movement was evident, and very few schools were noted.

Five surveys were made in all. By the time of the fourth survey, three days after the tagging, at least 80 percent of the fish were settled and spawning. Between the fourth and fifth surveys flood conditions had damaged the trap, permitting the passage of more fish from below, and making further observations difficult. Results are summarized in Table 1.

It had been planned to make daily surveys after August 19; however, weather conditions on Brooks Lake made it impossible to return to the creek until the 25th, at which time the washout of the trap was discovered. The creek was surveyed notwithstanding, the search revealing totals of 95 tagged and 699 untagged fish.

Results of the four earlier surveys are fairly significant, however. As can be seen from Table 1, there was little disparity in movement or selection of spawning area. In addition, close scrutiny by the observers revealed no noticeable difference in vigor, or inability to find a mate, between the two classes. Selection of mates seemed indiscriminate.

Some of the fish were examined after natural death for degree of spawning. Of four female and one male tagged fish examined, all were totally spawned. Of 14 female and 8 male untagged salmon examined, 10 females and 7 males were totally spawned, and 4 females and 1 male were partially spawned.

A statistical treatment of the survey tabulations yielded Chi-square values of 2.082, 4.928, 1.596 and 0.307, with values for P of approximately .70, .50, .90, and .95 for the first through the fourth survey respectively, indicating a high degree of homogeneity in the data.

While the experiment indicates that, on streams of the character and size of Hidden Creek, tagging has little effect on the subsequent life of the fish, it should be borne in mind that the same results might not obtain where longer distances and more time were involved, with possible tag loss, differential orientation, and modified physiological reactions induced by tags and the tagging operation.

Table 1.--Numbers of salmon counted in Hidden Creek above point of tagging

First Survey--August 17, 1949; afternoon

Distance surveyed	Tagged	Untagged
1/2 mile	121	118
1 mile	38	38
1 1/2 miles	15	13
2 miles	1	0
	175	175

Second Survey--August 18, 1949; morning

Distance surveyed	Tagged	Untagged
1/2 mile	8	13
1 mile	45	48
1 1/2 miles	84	76
2 miles	23	25
	160	162

Third Survey--August 18, 1949; afternoon

Distance surveyed	Tagged	Untagged
1/2 mile	4	4
1 mile	46	46
1 1/2 miles	71	79
2 miles	67	65
	188	194

Fourth Survey--August 19, 1949; morning

Distance surveyed	Tagged	Untagged
1/2 mile	0	2
1 mile	41	44
2 miles*	135	146
	176	192

* Station between 1 and 2 mile points was missed by survey crew. Last figure is the aggregate of these.

SUMMARY

1. An experiment to determine the effects of tagging with disc tags on the subsequent life of adult red salmon was conducted on a small creek in western Alaska by stopping all migration to the stream except for the simultaneous passage of 197 tagged and 197 untagged salmon, whose further actions were observed on succeeding days.

2. Within three days, 80 percent of the fish were settled and spawning.

3. Movement up the stream was virtually the same for tagged as for untagged fish.

4. No noticeable difference in spawning behavior was detected between the tagged and untagged salmon.

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