

SKOKOMISH INDIAN TRIBE

and

U.S. FISH AND WILDLIFE SERVICE  
FISHERIES ASSISTANCE OFFICE  
OLYMPIA, WASHINGTON

Preliminary Report

POPULATION ESTIMATION OF THE 1976-77  
SKOKOMISH RIVER CHUM RUN

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#### INTRODUCTION

The Skokomish Indian Tribe, with technical assistance from the Fisheries Assistance Office of the U. S. Fish and Wildlife Service and with the cooperation of the Washington Department of Fisheries, conducted a population study to estimate the size of the 1976-77 chum salmon run returning to the Skokomish River. In addition to estimating run size, the study was designed to improve the fishery management capabilities of the Tribe relative to their cooperative management role with the State of Washington Departments of Fisheries and Game in U. S. v. Washington, Civil 9213. This report has been prepared in order to make the preliminary results of the study available for use in the management of the 1977 salmon runs and to satisfy the requirements of Bureau of Indian Affairs' contract (#14-20-0500-4784) to the Skokomish Indian Tribe for funding of the study.

In this type of "terminal area" population study, fish are tagged in the lower river or off the mouth of the river. Samples are taken in the river net fishery, at any hatcheries in the system, and on the spawning grounds to determine the percentage of the run tagged. With the tagging and tag recovery information, a run size estimate can be calculated. The escapement of naturally spawning fish is estimated by subtracting the river catch and hatchery return from the run size estimate. Data on sex ratios, size composition timing of stocks to various tributaries and fishery exploitation rates are also obtained.

The run size and escapement estimates presented in this report are preliminary due to time limitations and because compilation of the final commercial catch data has not been completed. Any changes in the estimates resulting from the final catch data, however, will probably be minor. More detailed analysis of the data will be presented in a final report to be completed by September 30, 1977.

#### METHODS AND MATERIALS

The chum salmon were captured at Ball Point across Hood Canal from the Skokomish River. Tagging was conducted on a three-day per week schedule. Fish were tagged on 21 days between November 7 and December 23, 1976. A purse seine 167 fathoms in length and 8 fathoms deep was used to capture the chums. Captured fish were dipnetted from the bunt end of the seine and were placed in a padded tagging box. The fork length and sex were recorded and metal butt-end jaw tags (National Band and Tag Company, 4-1242 and 4-1242 M) were clamped onto the right mandible of the fish. Metal jaw tags were chosen because they are not selectively taken by gill nets and because we have found that they have a higher retention rate than the spaghetti tags which were used in previous studies. In order to determine tag loss, the adipose fin was removed.

Chum salmon were examined for tags, missing adipose fins and tag scars in the Skokomish River net fishery and on the spawning grounds. Nearby streams, hatcheries and marine area fisheries were also sampled for returning tagged chum. At all spawning ground recovery locations, the caudal fin was cut on dead fish to avoid duplication in counting.

Straying of tagged fish to areas other than the Skokomish River was estimated in order to determine the number of tags that entered the Skokomish River. Tagged fish recoveries were made in the Hood Canal "males only" fishery; at the Hoodspout and Walcott Slough hatchery operations; and in DeWatto Creek, the Little Mission River, and the Tahuya River. Table 1 shows the number of stray tags recovered in the various areas and the total number of tagged fish that strayed to these areas. The total number of strays to an area was estimated by expanding the number of tagged fish mark sampled in each area by the total return to the area.

The preliminary run size estimates were calculated using the Petersen method. Confidence intervals were calculated using a method described by Cochran (1963).<sup>1/</sup>

## RESULTS

A total of 1,349 chum were tagged in the Skokomish study. In a mark sample of 14,380 fish in the river fishery and on the spawning ground, 336 tags were recovered. However, the total mark sample was not used in making the run size estimate of 44,355. Only the spawning ground recovery data was used in estimating the run size. The commercial fishery sampling showed a wide weekly variation in the percentage of the run tagged. In particular, during a two-week period in late November and early December, very few tags were recovered in a large sample of fish (10 tags on 3,346 chum). This variation in tag ratios was not observed in the spawning ground recovery data. It appears that we put few tags on one segment of the run and these fish were still segregated as they moved through the river fishery. By the time the fish died on the spawning grounds, however, they had mixed with other fish. If the commercial fishery sampling from late November and early December is excluded from the total fishery mark sample, the tag ratios from the fishery and spawning grounds are nearly equal; one tag in 33.6 fish in the fishery as compared to one tag in 34.1 fish on the spawning grounds. Therefore, because of the variation in the tag ratios in the fishery, we feel that the spawning ground tag ratio is more representative of the tag ratio for the population.

The run size estimate includes 1,008 fish caught in the river between October 25 and the time that we began tagging. Small catches of chums were taken in September and early October in the river but these were not included in the run size estimate. The exploitation rate estimate is the total catch, both the commercial and the ceremonial and subsistence, divided by the total run size including the river catch from October 25 until the start of tagging.

<sup>1/</sup> Cochran, W.G. 1963. Sampling Techniques, 2nd. ed. John Wiley and Sons: New York.

TABLE 1. Tagged fish recoveries, mark samples and estimated total returns to areas other than the Skokomish watershed.

<u>AREA</u>	<u>TAGS RECOVERED</u>	<u>CHUM MARK SAMPLED</u>	<u>TOTAL STRAY TAGS</u>
Hoodsport Hatchery	25	21,593	25
Hood Canal Fishery	13	6,785	22
Walcott Slough	4	25,549	4
Dewatto Creek	4	714	14
Tahuyah River	2	692	9
Little Lilliwaup River	1	100	4

Catch data for the years 1957 to 1976 are presented in Table 3. Escapement estimates are presented for 1968 through 1975. The escapement estimates are based on spawning habitat availability and past measures of chum spawning intensity in the system. 2/ No real trend is apparent in the catch and escapement information presented in Table 3 although the escapements are generally below the escapement goal of 15,000 established for 1976. The escapement goal was 20,000 in 1974 and 1975. The catch and escapement information for 1976 indicates that the 1976 run was one of the better runs in recent years.

2/ Status of the salmon resource of the Puget Sound and coastal regions, Washington (1975), Washington Department of Fisheries.

TABLE 2. The tagging and recovery information and the population estimates for the 1976-77 Skokomish River study.

TAGGING

# Tagged	1,349
Strays	<u>78</u>
TOTAL	1,271

MARK SAMPLE

Fishery	9,162
Spawning Ground	<u>5,218</u>
TOTAL	14,380

TAG RECOVERY

Fishery	183
Spawning Ground	<u>153</u>
TOTAL	336

Population Estimate	44,355 <sup>1/</sup>
Confidence Interval	( $\alpha = .05$ ) 37,772 - 51,829
Freshwater Commercial Catch	22,670
Ceremonial & Subsistence Catch	2,400
Escapement	19,285
Exploitation Rate	57%

<sup>1/</sup> Includes 1,008 chum caught between October 25 and the beginning of tagging.

TABLE 3. Commercial catch and escapement information for the Skokomish River chum run.

<u>Year</u>	<u>Catch</u>	<u>Escapement</u> <u>1/</u>	<u>Escapement Goals</u> <u>2/</u>
1957	9,004		Not Established
1958	27,647		"
1959	23,464		"
1960	8,903		"
1961	14,514		"
1962	21,202		"
1963	14,706		"
1964	3,443		"
1965	9,886		"
1966	18,080		"
1967	15,219		"
1968	13,266	13,800	"
1969	5,813	7,600	"
1970	10,254	10,800	"
1971	6,693	10,100	"
1972	18,421	15,100	"
1973	14,378	7,600	"
1974	19,166	10,500	20,000
1975	5,858	6,700	20,000
1976	24,454		15,000

1/ Provided by Charles Morrill of the Washington Department of Fisheries. These estimates are subject to change as new information becomes available.

2/ From 1974, 1975, and 1976 Status of the Salmon Resource Reports, Washington Department of Fisheries.

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