

Tagging as a method for estimating the spawning population of adult sockeye at Williams Creek, Lakelse Lake, B.C.

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~~In 1939 and from 1944 to the present, assessments of the sockeye spawning run to Williams Creek have been made. From 1944 to 1948, the size of the ^{spawning} populations were estimated from tagging experiments. From 1949 to 1952 the stream was partially blocked by a system of fences. The runs to Williams for these years have been estimated from partial counts of spawners moving into the creek. In ^{1939 and in} 1953 and 1954 the creek was completely fenced off, permitting a more or less ^{accurate} complete count of the spawners entering the stream. In conjunction with these ~~rough~~ counts, a series of tagging experiments have ^{were} been conducted to permit assessment of the tagging experiments conducted in former years and to increase the accuracy of estimates derived from these experiments. Data presented by Pritchard. ^{The} purpose of this paper is to ^{present} ~~examine~~ the results of the 1953-1954 experiments, and to determine the ~~draw~~ ^{draw} from them ~~information~~ ^{on} the ~~determine~~ ^{assess} from them ~~the~~ ^{the} ~~validity~~ ^{validity} of tagging as a method for estimating the size of spawning populations. Data from Pritchard and Cameron's 1939 work has been included. The findings of the studies conducted in 1939 ~~and~~ and in 1953 and 1954 form the major part of the present paper.~~

early

Schaeffer (1951) has proposed a method of estimating populations where tagging cannot be carried out proportionately and tagged fish do not mix thoroughly with the untagged segment of the population. The probability of a fish being tagged varies with the time of tagging and the probability of being included in the subsequent sample varies with the time of sampling, i.e. where tagging and/or recovery is not proportionate. Ricker (priv. comm.) has questioned the theoretical basis on which this method is based and has pointed out that ~~the~~ estimates obtained using this method do not ~~yet~~ tend to vary ^{greatly} significantly from estimates based on the simple Petersen ~~method~~ ^{formula}. The fiducial limits of ~~est~~ estimates made using Schaeffer's formulae are much wider than those calculated for Petersen estimates, indicating that relative lack of precision of the ~~former~~ ~~Schaeffer~~ method.¹

~~A critical exam~~ review of Schaeffer's method has been

~~In cases where either or both tagging and recovery cannot be carried out proportionately,~~

~~adjustments~~ On Williams Creek, it has ^{not} been ^{feasible} impossible to ~~mark~~ tag in proportion to the numbers of fish entering the creek, nor has ^{it} been possible to inspect the spawning grounds in a ^{proportionate} regular way. To obtain population estimates spot taggings were carried out

¹ A critical review of Schaeffer's method has been included in a full report of the Pacific Biological Station