Reclaiming Salmon Gold

(By VERNON McMAHON, Biologist)

Object of the fisheries research board operation at Lakelse lake is to develop methods of increasing sockeye salmon production. If these methods are found feasible, they will be employed as lake fertilization, partial or complete elimination of undesirable species of fish from lakes, improvement of spawning streams or a combination of these.

Before measures for improvement can be implemented, however, it is essential first to know what is production of sockeye; what factors are responsible for production, and to what extent factors are limiting production.

One of the main basic industries in British Columbia—on which Prince Rupert was founded and has since grown—commercial fishing today presents some serious problems. Perhaps the most serious of these, affecting the entire industry, all allied industry and directly or indirectly the income of thousands is the steady decline of salmon (especially sockeye) returning to the Skeena river system.

To determine reasons why these salmon are diminishing and to do everything possible to bring back or even increase the "big runs," the federal department of fisheries in 1944 launched a five-year investigation program.

Some general things of importance were discovered in that period and with the results biologists realized that only through an intense research in localized areas was there a hope in determining basic factors which controlled the propagation of the salmon.

At Lakelse lake, 20 miles south of Terrace, such a program is in its second year, under year-round supervision of Vernon McMahon, assistant biologist of the federal department of fisheries.—Editor's Note

To assess the present rate of propagation, fish-counting fences have been constructed on main streams in the Lakelse area. At Williams creek there is an adult fence; at Scully creek, a combined adult and fry fence, and under construction in Lakelse river, a combination adult and yearling fence.

With all fences in operation it will be possible to tell exactly how many adult sockeye enter the lake and streams to spawn, approximately how many fry result from the eggs planted (based on Scully creek counts), and exactly how many of these fry survive to the yearling stage to leave the lake for the ocean.

Any improvements made in subsequent years will therefore be immediately apparent in the numbers of fish passing through the fences.

STREAMS

Factors which control or limit sockeye production in fresh water are numerous and varied. Water temperatures, silting conditions, predation by other fish, birds or mammals, water levels, winter conditions and types of gravel are important factors in the stream phase. These factors and their influence are being investigated at Scully creek by Jack McDonald, a member of the fisheries department.

Through setting up experimental areas in the stream bed and through other forms of experimentation, he hopes to show where and when the greatest mortality to young sockeye occurs in the streams, and how this may be remedied.

Sockeye fry enter the lake in spring and remain there for about one year before migrating to salt water. Of the original number of eggs laid in the streams by adults, anywhere from two to 30 per cent may survive to the fry stage. In general, this percentage is cut to a drastic figure by the time fish reach the yearling stage.

During their lengthy period in the lake, survival of the small fish is governed by such factors as availability of plankton food, competition for food by fish of other species, predation by certain fish, disease and the chemical environment. The problem is to analyze and evaluate these factors and that is the program carried out at Lakelse.

The "lake work" is conducted mainly by Thomas Bolton through his creel census studies, and by the author, who is primarily concerned with the sockeye food situation in the lake. Assistance in the summer and fall—the busy season—is given by temporary employees.

From data gathered to date it appears that the greatest single factor responsible for the high mortality rate of sockeye between the fry and yearling stages can be attributed to predation by other fish—chiefly the squawfish at Lakelse. In order to make an accurate evaluation of this, however, it is essential first to know approximately how many predatory fish there are in the lake and to what extent they utilize young sockeye in their diets.

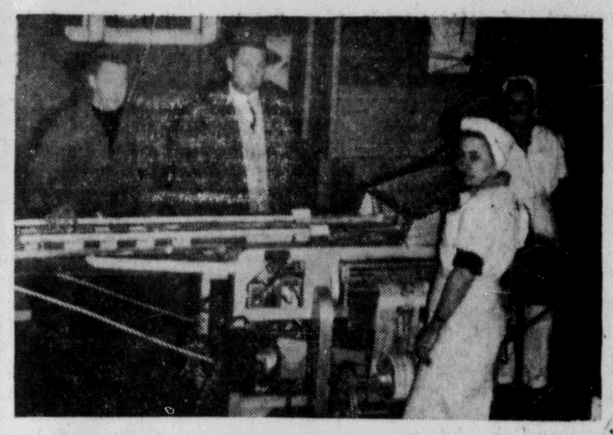
This year it is hoped to initiate at Lakelse a tagging and recovery program which will supply the information. As many predatory fish as possible will be tagged throughout the year and returned to the lake. Then, at some time in the future, nets will be set again and the population of predatory fish calculated by the proportion of tagged and untagged fish taken.

The accuracy and dependability of this method will be checked by results from the creel census which will be carried out concurrently.

By periodically sampling the minute organisms (plankton) in the lake on which the young sockeye feed, it is hoped to establish a relationship between the quantity of plankton and the fluctuation in fish population. Plankton is taken by the young of nearly all fish as well as by the adults of some species, such as the Peamouth chub, and it is important to know to what extent these fish are competitive with the sockeye in their feeding habits.

The volume of food in the lake depends upon the volume of basic chemicals, a study of which was initiated at Lakelse last year.

The objective of the research program at Lakelse lake is to attain as complete an understanding as is possible of the behaviour controlling factors and fluctuation of the sockeye salmon population, with a view to aiding nature's work and to increase the production of these fish.



FILLET OF SOLE is big business in Prince Rupert, for more than $1,000,000 worth of fillets are produced in local fish plants each year. Here the packaged fillets are covered with a colorful wrapper by an automatic wrapping machine, after which they are frozen in 40 degrees below temperatures.

Chief sources of food for the Canadian Eskimos are the seal, walrus, white whale, caribou and Arctic sea trout.

Canada's forest output in 19 was the highest ever recorded; cut of 3,198 million cubic fe valued at $586 million.

From 1939 to 1948 gross value of Canada's manufactured goods rose from $3.5 billion to more than $11.8 billion.

The proposed Turnover Tax, 3 per cent at retail level, would raise the cost-of-living index by 5.4 points.

University enrolment reached the all-time peak of 85,000 in Canada in 1947-48; it is now about 70,000.