KOKANEE MANAGEMENT IN THE FLATHEAD SYSTEM

By

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Our primary function as biologists for the Department is to protect the aquatic habitat and maintain a quality environment suitable for aquatic life. Most of our studies are directed at identifying the stress tolerance limits for aquatic biota to establish guidelines for water and land developers to work within.

Secondly, we are responsible directly to the constituents - the fishermen. To meet the diverse demands of the various users we attempt to optimize the fisherman's opportunities. An example is the management plan developed for the kokanee fishery in the Flathead Lake and River system. Our goal is to provide a quality kokanee fishery within the dynamic and usually unpredictable constraints of hydroelectric developments.

Managing fish populations in the Flathead system generally requires a broad understanding of the entire system. The Flathead Lake-River system functions as a single unit with each component (lake, river, tributary) contributing to the life history of principle sport fish including the bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*salmo clarki lewisi*) and kokanee (*Onchorhynchus nerka*). Studies are presently underway to understand the spawning migrations and habits, juvenile fish ecology and the quantity and quality of habitat available to bull and cutthroat trout in the tributary and river system (Graham, Read, Leathe, Miller and Pratt 1980 b).

Studies are also underway to understand the influence of river regulation on the success of kokanee spawning in the river (Graham, McMullin, Appert, Frazer and Leonard 1980 a), the abundance of salmon in the lake (Hanzel 1980) and a study of food habits of kokanee beginning in the summer of 1980. Other studies,when funded, would include assessing impact of lake level fluctuations on kokanee salmon spawning on the lakeshore and would assess the total angling pressure and harvest on the lake-river kokanee fishery beginning in 1981. The recreation study would assess the economic value of the fishery.

Kokanee provide the largest fishery in both the lake and river. Statewide mail surveys conducted in 1958 and 1975 showed that fishing pressure had doubled in Flathead Lake over that period. A census conducted on the lake from 1962 to 1964 estimated an average of 123,000 fisherman-days per year with kokanee representing 77 percent of the catch (Robbins 1966). Present annual pressure probably ranges from 100,000 to 200,000 fisherman-days per year on the lake.

The river fishery was censused in 1975 and total pressure was estimated at 63,123 angler trips (Hanzel 1977). The fall and winter fishery from October to April comrpised 45 percent of the total fishing pressure and 72 percent of the total catch. Kokanee were the primary sport fish in the fall and winter fishery.

The value placed on a fisherman-day by different agencies working in the basin during the past year ranged from $15.00 to $40.00 per day. This would put the value of the lake fishery between 1.5 and 8.0 million and the river fishery between 1.0 and 2.5 million annually.

The kokanee fishery can be classed in three categories. The largest is the lake trolling fishery comprised largely of three and four-year-old kokanee. The fishery is conducted from June through August.

Other fisheries for kokanee occur on their spawning migration and spawning grounds. Snagging of these mature fish with weighted treble hooks is the most common method of capture. This occurs in both river and lakeshore areas. From September through November, fishermen concentrate on the banks of the main Flathead River and portions of the lower Middle Fork. There are two main runs into the river. An early run in September is probably destined for the springs and lake outlets upstream from the regulated portion of the river. Another run follows in several weeks and probably makes up most of the spwning in the regulated Flathead River.

A snagging fishery also occurs on lakeshore spawning areas. This fishery occurs in the fall and is presently the smallest of the three fisheries. This was not the case historically, however. Following the introduction of kokanee in 1916, a fishery was recognized in the 1930's. Lakeshore snagging of kokanee on their spawning grounds was popular in the 1950's although initial surveys identified the potential problems of lake level drawdown during the incubation and emergence period (Stefanich 1954). Some spawning was also occurring in the river system including lake outlets and spring areas.

To determine the changes in river and lake level fluctuations that will be needed to meet our kokanee management objectives, we are conducting or plan to conduct, several phases of study. Our studies are aimed at quantifying recruitment into Flathead Lake over several years from the upper river springs and lake outlet streams, the partially regulated portion of the Flathead River and the lakeshore. We will assess the influence of river regulation, lake drawdown and ground water flow on egg survival in natural and artificial redds. We will then make recommendations to modify the operation of Hungry Horse and Kerr Dams to balance kokanee recruitment.

The complexity of management actions significantly increases at this point because of other constraints and agreements on the operation of both Kerr and Hungry Horse Dams. The Bonneville Power Administration has indicated a shift toward increased utilization of existing hydroelectric plants for peaking power which will result in less predictable and stable discharges from these projects. Baseload demand is also important from these upriver plants. Water from Hungry Horse Dam is quite valuable because it passes through 19 other major plants before it enters the ocean. Presently much of the drafting period from Hungry Horse Dam in the fall is left optional to meet energy needs in the system. Flood control and reservoir recreation also puts constraints on the discharge schedule.

Recommended changes in operation of these projects will be made to optimize the utilization of both river and lakeshore spawning areas. This does not mean maximizing recruitment. Maximizing success at all spawning areas would significantly increase the number of kokanee which would reduce juveniles and spawners to a less desirable size. This would not be seen as a suitable compromize for the majority of anglers. Larger kokanee are preferred by fishermen in the lake trolling fishery.

Exploitation is not seen as a factor in limiting recruitment at the present level. The intense snagging fishery appears to have the most potential to limit recruitment on a large scale. The early run of fish is apparently destined for McDonald Creek. These fish are more desirable because of their superior eating quality compared to later spawners and they move up the river in a more distinct time period. An effort is being made to develop a cost-effective census of the snagging fishery.

In a reverse role, increased angler harvest of age II and age III kokanee salmon in the lake might allow for increased recruitment in the system and still maintain a relatively large-sized spawner. If we assume that pressure remains constant, this would

require increased efficiency of harvest. A winter hand-line fishery already popular in North Idaho kokanee lakes (Bert Bowler, Idaho Fish and Game, personal communication) might be promoted to increase the efficiency of anglers presently trolling for kokanee. The concentrated layering of kokanee in the lake during the summer would favor the stationary hand-line fishery over the troll fishery.

SUMMARY

This paper presents a perspective on the management of kokanee in Flathead Lake. The management goal is to provide a consistent harvest of 500,000 to 600,000 kokanee with an average size of 300-350 mm. Recruitment of fry into Flathead Lake appears to correlate with the variability in size of harvestable salmon. Our present management plan is to quantify and if necessary manipulate recruitment of fry through management of lake level and river level fluctuations from Kerr and Hungry Horse Dams respectively.

Studies are underway to 1) assess the influence of discharge from Hungry Horse Dam on the kokanee spawning in the river, 2) monitor the abundance of kokanee in Flathead Lake and 3) assess the food habits of kokanee in Flathead Lake.

Studies which are proposed include: 1) assess impact of lake level fluctuation on kokanee salmon in Falthead Lake and 2) determine recreational use, value and angler preference for the lake and river kokanee fishery.

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