DIFFERENT METHODOLOGIES EMPLOYED IN THE ANALYSIS OF ICE EFFECTS ON INCUBATING CHINOOK SALMON IN THE NECHAKO RIVER, BC

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ABSTRACT

In 1987, the Federal and BC governments and Alcan Aluminum Ltd., signed an agreement which established a program of monitoring, remedial measures and research to conserve salmon stocks on the Nechako River. One of the areas identified for monitoring was the winter hydraulic regime and its potential effects on the survival of overwintering incubating chinook in the river with reduced flows. Since the early 1980's, a number of methods have been employed by the Department of Fisheries and Oceans and the Nechako Fisheries Conservation Program in an attempt to measure the biological and physical parameters associated with winter conditions on the Nechako River. This paper presents the methods used, and their success or failure as useful tools to determine the winter hydraulic regime and its potential effects on the salmon.

One of the concerns is the potential formation of anchor ice, which has been documented almost every year in the major spawning and incubation areas on the river. In an attempt at determining if the anchor ice penetrated the substrate and harmed the incubating eggs, a number of different methods were employed, including monitoring of egg to fry survival in egg baskets and intergravel temperature and dissolved oxygen measurements. The ability to measure results depended both on the capability of the equipment to detect a change in the intergravel environment and the

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ability to link that change to a biological event.In addition, baseline data on the ice conditions at or near major spawning areas were collected on both a daily basis and once a month in an aerial overflight. This program gave information on ice types, formation rates and ice thickness.

Preliminary results indicate that the most effective method to determine the effect of ice on the overwintering chinook may be to continuously monitor the D.O. levels at remote sites. The linkages between biological and physical events in the winter are not yet fully understood, therefore a controlled laboratory experiment is one potential method to examine the processes and validate the equipment prior to field testing.