Abstracts - Juvenile Outmigration

Juvenile Outmigration 1989 (M89-3)

The primary focus of this study was to establish effective downstream trapping techniques for the monitoring of juvenile chinook outmigration in the Nechako River. Modified inclined plane traps (IPT) and fyke nets were used with the goal of developing a standard trap configuration which could be implemented to index downstream migration on an annual basis and characterize the life histories of the migrating juvenile chinook (Oncorhynchus tshawytscha Walbaum).

IPT and fyke nets were set up at two locations on the Nechako River, one site at Fort Fraser and one site at Diamond Island. The IPT were moderately successful at capturing fish but the fyke nets were totally ineffective. The reason for the failure of the fyke nets to capture fry is probably related to location and timing of installation.

Fishing efficiency of the inclined plane traps appeared to be adversely affected by low river velocities and fluctuating water levels. While a profile of the timing of the downstream migration was obtained using the IPT, insufficient information was collected to allow for an accurate estimate of the population size of the downstream migrants. Furthermore, the fishing efficiency of the IPT appeared to have been a function of fish size. Biological data obtained from captured fish suggested that the majority (79%) of the fish captured in the 4' x 4' IPT in April through July were newly emerged fry under 41 mm in length. The 2' x 3' IPT at Diamond Island was effective at capturing fry up to 68 mm in length. Fishing efficiency of the IPT dropped off dramatically once fish grew beyond these lengths. Finally, both the IPT and fyke nets were ineffective at capturing chinook smolts.

Juvenile Outmigration 1990 (M90-3)

Prepared by Triton Environmental Consultants Ltd. March 1996

An Early Warning Monitoring program was developed by the NFCP in 1989 to provide a framework to identify changes in the chinook (Oncorhynchus tshawytscha) stock prior to the eventual return of spawners. The objective of the juvenile outmigration project is to develop an index based on an estimate of the size and timing of the chinook population that migrates from rearing habitats of the upper Nechako River. In 1990, a combination of index sampling (seining and electrofishing) and trapping was performed. The seining and electrofishing conducted throughout Reaches 1 to 4, were initiated due to forced releases experienced in April which precluded the use of a partial fixed 'W' fence during this period. The 1990 index, derived from trapping, of the estimated abundance of chinook fry migrating from the upper Nechako River during late spring and early summer was an order of magnitude less than that estimated for the

same time period in 1989. This suggests that the forced releases may have been responsible for a premature migration of chinook in the early spring of 1990.

The Rotary Screw Trap (RST), testing this season, captured chinook similar in size to those captured at the 'W' fence as well as larger two year old coarse fish species and adult rainbow trout (Oncorhynchus mykiss). In addition, the rotary screw trap captured a greater number of chinook than the 'W' fence per volume of river discharge sampled.

Juvenile Outmigration 1991(M91-3)
Prepared by Triton Environmental Consultants Ltd. March 1996

In 1991, the size, distribution and abundance of juvenile chinook salmon (Oncorhynchus tshawytscha) was measured in the upper 100 km of the Nechako River as part of the third year of the NFCP. Average date of 50% emergence of juveniles, as estimated from their growth in length and weight, ranged from April 30 to May 20. Electroshocking and seine net surveys showed that the centre of distribution of chinook (0+) moved upstream from April to July and then moved downstream in the fall and early winter. Maximum density of electroshocked chinook (0+) occurred in mid-May and then decreased exponentially over May to November at a rate of 0.72%·d-1 for day catches and 1.3%·d-1 for night catches. Maximum density of fish captured by rotary screw traps peaked in mid-May and then decreased at an instantaneous rate of 2.2%·d-1. A total of 21,423 chinook (0+) were captured by the rotary screw traps, which, when expanded by the proportion of river volume sampled by the traps, was equivalent to a total downstream migration index of 105,702 chinook (0+).

Juvenile Outmigration 1992 (M92-3)
Prepared by Triton Environmental Consultants Ltd. March 1996

In 1992, the size, distribution and abundance of juvenile chinook salmon (Oncorhynchus tshawytscha) was measured in the upper 100 km of the Nechako River as part of the fourth year of the NFCP. The average dates of 50% emergence of juveniles, as estimated from their growth in length and weight, bracketed the April 20 date estimated from emergent fry trapping studies. Electroshocking and seine net surveys showed that the centre of distribution of chinook (0+) moved upstream from April to June. Maximum density of electroshocked chinook (0+) occurred in mid-May and then decreased exponentially over May to November at a rate of 0.54%·d-1 for day catches and 0.98%·d-1 for night catches. Maximum numbers of chinook (0+) captured by rotary screw traps at Diamond Island also occurred in mid-May, but subsequent loss rates were twice as high: 1.5%·d-1 for day catches and 2.5%·d-1 for night catches. A total of 8,247 chinook (0+) were captured by the rotary screw traps which, when expanded by the proportion of river volume sampled by the traps, was equivalent to a total downstream migration index of 119,860 fish.

Juvenile Outmigration 1993 (M93-3)

In 1993, the size, distribution and abundance of juvenile chinook salmon (Oncorhynchus tshawytscha) was measured in the upper 100 km of the Nechako River as part of the fifth year of the Nechako Fisheries Conservation Program. Average date of 50% emergence of juveniles, as estimated from their growth in length and weight, ranged from April 26 to May 7. Electroshocking surveys showed that the centroid of the chinook (0+) distribution moved upstream from April to June, as outmigrants left the upper river and resident fish moved upstream in search of rearing habitat. In the fall, chinook (0+) redistributed themselves evenly along the length of the upper river in preparation for overwintering. Maximum density of electroshocked chinook (0+) occurred in mid-May and then decreased exponentially from May to November at a rate of 0.33%•d-1 for day catches and 0.89%•d-1 for night catches. Maximum numbers of chinook (0+) captured by rotary screw traps at Diamond Island also occurred in mid-May; loss rates were 2.30%•d-1 for day catches and 2.46%•d-1 for night catches. A total of 6,709 chinook (0+) and 133 chinook (1+) were captured by the rotary screw traps, which, when expanded by the proportion of river volume sampled by the traps, was equivalent to a total downstream migration index of 146,170 chinook (0+) and 2,358 chinook (1+).