

Belles-Îles, M. and I. Simard, I. 2005. *Dérivation partielle de la rivière Portneuf. Suivi environnemental 2005 en phase exploitation – Passe migratoire Portneuf. (Partial diversion of the Portneuf River. Environmental monitoring in 2005 during operation. Portneuf fish pass.)* Groupe conseil Génivar inc. for Hydro-Québec, Montréal (Qc), 103 pages and appendices.

Context and objectives. In 2002, Hydro-Québec diverted part of the Portneuf River into the Pipmuacan reservoir to the north by closing off the connection between lakes Itomamo and Portneuf. Fisheries and Oceans Canada required that a fish pass be constructed adjoining the control structure to allow brook trout to move freely between Portneuf River and Portneuf Lake, with a monitoring program to ensure that the fish pass was effective. The pass was built in the fall of 2002 and the first monitoring was conducted in summer 2003. This report covers the second year of monitoring. The objective of the monitoring is to ensure, on the basis of physical and biological data, that the flow conditions in the fish pass are suitable for the fish.

Summary. Characterization of flows through the fish pass and in the approach corridors upstream and downstream of the gates showed that the overall hydrodynamic conditions generally correspond to the design criteria. Only the velocities in vertical slots sometimes exceeded the theoretical swimming capacity of juveniles, but there is evidence, in underwater videos and in the large number of juveniles caught in the upstream trap, to indicate that despite these velocities, juvenile and adult brook trout enter the fish pass and ascend the basins without difficulty, in all the flow conditions observed.

Two traps were set in the upstream basin from June 2 to July 12 and from September 14 to October 15, 2005. The first trap caught 17,834 brook trout and 582 white suckers migrating upstream in spring and 1,658 brook trout and 4,650 white suckers in the fall. The second trap caught a total of 69 brook trout and 25 white suckers migrating downstream during the two surveys. Mortality was limited to 9 brook trout. The traps appear to repel the fish. Had the traps not been present, the number of fish migrating upstream may have been much higher.

Data on the total length of individuals caught show a higher abundance of young fish than in 2003 and slower growth in individuals. This may be attributable to the spawning areas put in place in 2002 near the fish pass which promote higher parr recruitment and greater intraspecific competition.

Two tagging-and-recapture surveys were carried out. The goal of the first was to document the spring movement of juveniles through the fish pass; it was conducted from May 31 to July 12, 2005. The second, from September 14 to October 15, documented adult passage through the pass during the spawning period. The fish were tagged with passive integrated

transponders (PIT tags) that were automatically detected by two antennae, one in the downstream basin and the other in the upstream basin.

The data detected by the antennae when the PIT tags passed showed that several individuals remained for a while near the downstream antenna before swimming through the fish pass. Some brook trout made several up and down trips before going on to Portneuf Lake while others (about 15% of the individuals detected) swam upstream twice after descending through the control structure. The travel time through the fish pass varied from 29 minutes to 17 hours and 50 minutes for an average of 2 hours and 34 minutes for juveniles; adults took 7 minutes to 1 hour and 54 minutes with an average of 15 minutes.