Hydro Québec

Massicotte, Bernard, Roseline Turgeon and Claude Vézina. 2006. *Aménagement hydroélectrique de la Toulnustouc. Suivi environnemental 2005. Habitats et populations de poissons.* (**Toulnustouc hydroelectric development. Environmental monitoring 2005. Fish habitats and populations.**) Report submitted by Roche Ltd. to Hydro-Québec. 122 p. and appendices.

Abstract

At the Toulnustouc hydroelectric development, both the biophysical and human components of the environment affected by the project are monitored. The objectives of the environmental monitoring are as follows:

- To document changes in the environment affected by the project and thereby verify the impacts anticipated in the environmental impact studies
- To assess the efficacy of mitigation measures
- To determine what adjustments are needed, if any, to achieve the objectives
- To collect scientific knowledge and data that Hydro-Québec can use to assess the impacts of future projects

The conditions prevailing before the Toulnustouc powerhouse was commissioned serve as a baseline for assessing project-related changes. Baseline studies were conducted from 2001 to 2004. The reservoir was impounded and the powerhouse commissioned in 2005: environmental monitoring now documents the resulting changes.

This report presents the 2005 follow-up results for fish habitats and communities in the four river reaches within the project area, as well as the main tributaries. The report contains four distinct studies: (1) abundance and biological characteristics of fish populations, (2) the results of brook trout egg incubation, (3) physical follow-up of fish habitat compensation measures, and (4) fish movements in the area affected by the project.

In the main stem of the Toulnustouc River, experimental fishing yields were within the values observed during the baseline period, before the powerhouse was commissioned. In the new reservoir, impounded in February 2005, the environmental impact study anticipated an initial drop in fish populations as the result of dilution, which often occurs in new reservoirs. In 2005 however, brook trout yields were comparable to and longnose sucker yields significantly higher than the yields obtained prior to impoundment, showing a high fish use of the new reservoir.

Brook trout eggs incubated in 2004 had a fairly low hatching rate (17% on average). This result is comparable to the lowest values reported in water with low pH, similar to the pH at

the incubation sites in the Toulnustouc River tributaries. An estimated 28,050 fry were produced by incubation. To compensate for the relatively low hatching rate, nearly 37,000 additional fry were stocked.

Fish habitat improvements under the fish habitat compensation program were followed up. Physical measurements were carried out on spawning grounds and other improvements upon completion and again during the follow-up to detect possible changes. Overall, the improvements withstood the first floods well, except for a couple of spawning grounds where gravel was washed away in some places. Major sedimentation occurred in some cases, partly as a result of natural streambank erosion. Artificial shelters (boxes and stones) were the least resistant improvements. Corrective measures were implemented at locations where upstream migration or reproduction of trout may have been compromised in 2005 by obstacles to migration or spawning grounds in poor condition.

The Toulnustouc River was also characterized to confirm barriers to fish movement, particularly those related to the reduced flow in the stretch between the dam and the powerhouse. Nine of the eleven barriers had been assessed correctly in the draft design environmental impact study. One site had been deemed impassable but remained passable (kilometre point 55.5). However, potential passageways for fish at the mouth of tributary T13 were greatly reduced during the severe low-flow period in the summer of 2005. In this case, work was done to improve upstream migration for brook trout in the tributary.