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TERRIEN, J., SCHETAGNE, R. 2005. *Réseau de suivi environnemental du complexe La Grande (2003-2004) – Évolution du mercure dans la chair des poissons*. Joint report by GENIVAR Consulting Group inc. and Hydro-Québec. 82 p. and appendices.

**Abstract:**

Although Hydro-Québec's commitments concerning the monitoring of mercury have been fully satisfied in relation with the various Authorization Certificates of the La Grande Complex, additional surveys were conducted in 2003 and 2004 for the management of potential health risks to fish consumers. These surveys would also permit a better assessment of the duration of the temporary increase in mercury levels in piscivorous species. The main results are:

*Reservoirs*

The results of the 2003 survey in the eastern sector of the complex, and of the 2004 survey in the western sector confirm that for non piscivorous fishes of standardized length, the return to mean natural mercury levels is usually achieved between 10 and 20 years after impounding. For piscivorous fishes of standardized length, the evolution pattern of the mean mercury levels indicates that the return to background levels will be achieved after 20 to 30 years, except for Northern Pike in the Robert-Bourassa Reservoir for which this return will take 30 to 35 years.

*Immediately downstream of the generating stations*

In Lake Whitefish and Longnose Sucker, two non piscivorous species, mean mercury levels, in 2003 and 2004, are often higher immediately below the La Grande generating stations than above, due to a switch to a piscivorous diet. However, the values obtained downstream are not significantly different from those measured in the natural lakes of the complex, except for the levels observed immediately below the generating stations of the Robert-Bourassa, Laforge 1 and La Grande 1 (Longnose Sucker only) reservoirs. Similar observations are made for Northern Pike and Lake Trout downstream of the generating stations in the eastern sector of the complex, but the mean levels in 2003 remain significantly higher than those in the natural lakes of the region.

*Diversions*

The 2003 and 2004 results confirm that there are no cumulative effects in the mercury levels in the main fish species along the EOL and Laforge diversions.

*La Grande River Estuary*

The mercury levels in the main fish species in the estuary of the La Grande River have evolved like the levels observed in the Robert-Bourassa Reservoir. However, the levels measured in 2004 immediately downstream of the La Grande-1 generating station, remain significantly higher than the values observed in the natural lakes for Longnose Sucker, Cisco, Brook Trout and Walleye.

*Fish consumption*

In most reservoirs and sectors immediately downstream of the generating stations, the mean mercury levels found in piscivorous fishes of consumption sizes still entail additional consumption restrictions in comparison to advisories for natural lakes of the area. Considering the mean mercury levels observed in consumption size fishes in 2003 and 2004, the following consumption advisories can be issued in compliance with the criteria of the *Guide de consommation des poissons de pêche sportive en eau douce du Québec*:

## Reservoirs

For non piscivorous fishes of the reservoirs, the recommended consumption is generally 12 meals or more per month, or unrestricted consumption. The only exceptions are : 4 meals per month for Lake Whitefish of the La Grande 3 Reservoir, and 8 meals per month for Lake Whitefish of the Laforge 2 Reservoir and Longnose Sucker of the La Grande 1 Reservoir. For piscivorous species of the reservoirs, the recommended consumption is generally 2 meals per month. The only exception is Northern Pike in the La Grande 1 Reservoir for which the recommendation is 4 meals per month.

### Immediately downstream of the *generating* stations

For Lake Whitefish, the recommended consumption is 4 meals per month immediately below the Robert-Bourassa generating station, 8 meals per month immediately below the La Grande-1, Brisay, Laforge-1 and La Grande-4 generating stations, and 12 meals or more (unrestricted consumption), immediately below the Laforge-2 generating station. For Longnose Sucker, the recommended consumption is 4 meals per month immediately below the Robert-Bourassa generating station, 8 meals per month immediately below the La Grande-1 and Laforge-1 generating stations, and 12 meals per month or more (unrestricted consumption) immediately below the Brisay, Laforge-2 and La Grande-4 generating stations. For piscivorous fishes, the recommended consumption immediately below the generating stations is 2 meals per month except for Northern Pike immediately below the La Grande-1 generating station where it is 4 meals per month.

**Keywords:** Mercury, fish, stomach contents, La Grande complex, reservoir, diversion, ecological monitoring network.

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