

Author(s) and title (for reference):

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Abstract:

The year 2005 represents the first year of monitoring of fish communities since the impoundment of Sainte-Marguerite 3 (SM 3) reservoir in 1998, and the second year of monitoring of mercury in the flesh of fish.

The density of fish in SM 3 reservoir followed the generally observed post-impoundment pattern, namely an initial increase associated with the water's enrichment as a result of the decomposition of flooded organic matter. In 2005, fishing yields rose by a factor of 5, mainly because of the substantial increases in lake whitefish and northern pike fishing yields, a phenomenon previously observed in the same species at the La Grande complex. In addition, brook trout is absent from 2005 catches in this reservoir, in line with what is generally observed in water bodies dominated by Coregoninae and Esocidae. However, no increase in overall fishing yields was observed in SM 2 reservoir, which receives the inflows from SM 3 reservoir.

Of the fish populations' biological characteristics (size, mass and condition factor), only the changes in condition factor can be associated with the impoundment of SM 3 reservoir. Mean values of this factor show significant increases in longnose sucker and lake whitefish in SM 3 reservoir, and in longnose sucker, white sucker and lake whitefish in SM 2 reservoir. No trend can be confirmed in the other characteristics, despite certain significant differences, due to the large interannual variations observed in natural environments.

Fish dominate in the stomachs of northern pike in all environments, and in lake trout in the control lake; the latter species was not caught in the reservoirs in 2005. Contrary to the 2001 observations, there were no piscivorous species in the stomachs of northern pike in 2005. For northern pike coming from SM 3 reservoir, the main prey were lake whitefish, whereas the stomachs of those from SM 2 reservoir and the control lake mainly contained lake whitefish and white sucker.

For the two main species monitored at the Sainte-Marguerite complex, mean mercury levels for a standardized length have increased by a factor ranging from 5 to 8 in SM 3 reservoir since its impoundment, and by a factor of 2 to 3 for the same period in SM 2 reservoir. They are significantly different from the range of mean levels in natural environments. In SM 3 reservoir, mean levels reached 0.78 mg/kg in lake whitefish and 1.56 mg/kg in northern pike. In SM 2 reservoir, they rose to 0.55 and 1.85 mg/kg, respectively. The increase observed in SM 3 reservoir is related to mercury methylation as a result of the decomposition of organic plant matter flooded following impoundment, which is a temporary phenomenon. In SM 2 reservoir, the increase is associated with the export of mercury, and of organisms that have bioaccumulated it, from SM 3 reservoir. The 1991 predictions proved optimistic, probably because the prediction model takes into account only the pelagic chain of mercury transfer, and not the benthic component.

The potential impacts on fish consumption are known, and the guide map produced in 2003 is still valid, except for the status of lake whitefish in SM 2 reservoir, for which the recommended consumption would decrease from 8 to 4 meals per month.

Keywords: mercury, fish community, stomach contents, Sainte-Marguerite 2 reservoir, Sainte-Marguerite 3 reservoir, Sainte-Marguerite complex, environmental monitoring, fish consumption.

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