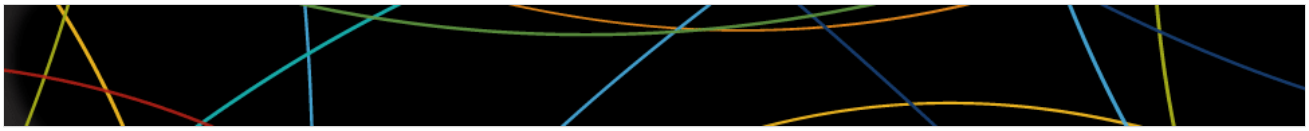

Article

Production and Loss of Methylmercury and Loss of Total Mercury from Boreal Forest Catchments Containing Different Types of Wetlands‡

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Abstract

Four terrestrial boreal forest catchments containing different types of wetlands were studied to determine their strength as sources or sinks of methylmercury (MeHg) and total mercury (THg) to downstream ecosystems and to determine if patterns seen in one year were consistent over several years. All catchments were sinks for THg. The wetland type, percentage wetland area (0–25%), or annual water yield did not appear to have a consistent effect on the magnitude of this retention. Wetland areas of the catchments were always net sources of MeHg. Unlike for THg, there were large and consistent differences in the source

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strength among wetland types for MeHg. These differences appeared to be related to differences in the internal hydrology of the wetlands. All types of wetlands were greater sources of MeHg during years of high water yield, but even during years of low flow all wetland types were sources of MeHg. Thus, we conclude that wetlands are important sites of MeHg production in boreal ecosystems on the long term. Upland areas of catchments were consistently sinks for MeHg, and so whole catchment sink/source values were strongly affected by the percentage of wetland areas within a catchment. Mass balance estimates of MeHg input from wetland areas to a lake indicate that the annual input of MeHg from wetlands is larger than the annual uptake of Hg by fish and is similar to the amount of MeHg produced in the lake. Because of the predictable patterns between terrestrial catch ments in their strength as sources or sinks of MeHg, it is possible to model inputs of MeHg from lake catchments with knowledge of the percentage wetland area in a catchment, the type of wetland contained in a catchment, and the annual water yield of a catchment.

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