

Methyl mercury in pristine and impounded boreal peatlands, Experimental Lakes Area, Ontario 1

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Abstract: Methyl mercury (MeHg) concentrations were measured in peat and peat porewater of pristine wetlands and an impounded riparian wetland at the Experimental Lakes Area in northwestern Ontario, Canada. In pristine wetlands, MeHg concentrations in peat ranged from 0.1 to 60 ng·g⁻¹ and in peat porewater from 0.02 (the detection limit) to 7.3 ng·L⁻¹, with higher concentrations in wetlands that received upland runoff. Impoundment increased the average MeHg concentration in the near-surface peat porewater from 0.2 to 1.0 ng·L⁻¹. As the increase was most dramatic near the peat – surface water interface, we suggest that the elevated MeHg concentrations resulted from an increase in net MeHg production associated with the decomposition of inundated vegetation. Impoundment increases the area of potential Hg methylation by imposing anoxia over the entire wetland surface and by facilitating the exchange of nutrients and MeHg between the peat surface and the surface water. No clear chemical control on MeHg concentration was observed among the pristine wetlands or in the impounded wetland. However, in laboratory incubations of peat, porewater MeHg concentration increased upon the addition of sulfate. We propose that sulfate availability is an important variable in Hg methylation in pristine northern wetlands.

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