



Forest clear-cutting effects on mercury bioaccumulation in Swedish lacustrine ecosystems

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In recent years studies on forest clear-cutting's environmental effect focused on changes in water chemistry, particularly increased methylmercury (MeHg) concentrations. However, few studies have tried to further unravel the response in biological receptors (e.g. fish mercury (Hg) level) to elevated Hg level in water. Initiated in 2010, our study followed 6 Swedish lakes for 5 years, with more than 2000 fish samples collected, to highlight the effects of forest clear-cutting on fish Hg. There was considerable year-to-year and lake-to-lake variation in fish Hg concentrations (– 14%–121%) after forest harvest in the clearcut lakes. The lakes with higher clear-cutting rates (36% and 40%) within their catchments increased in fish Hg concentration ([Hg]) significantly one year post-harvest, whereas the lakes with the lowest clear-cut areas increased less in fish [Hg] post-harvest. Fish [Hg] in the clear-cut catchments were pooled and related to temporal changes of fish [Hg] in selected reference lakes from the Swedish National Environmental Monitoring Programme. An increase of 26% in large fish [Hg] in the clearcut lakes three years post-harvest, contrasted with a decrease of 7% in the reference lake fish [Hg] over the same time period. These results are consistent with previous predictions that fish [Hg] would increase by 10-25% in fish after clear-cutting in boreal catchments and that forest harvest can impact on the lake fish Hg concentrations in boreal ecosystems.