

Impacts of Climate Change on the Recovery of Acid-Damaged Ecosystems in the Sudbury Area

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The impacts of climate change may dramatically affect the recovery potential of acid-damaged ecosystems in the Sudbury mining area. Our long-term monitoring program provides strong climate signals in several of our study lakes. In Swan Lake, drought events have led to oxidation of stored sulphur in wetlands and littoral zone sediments, resulting in reacidification and increased metal concentrations in lake waters. Metal levels may also be affected by higher evaporation rates and slower water renewal rates in warm years. Drought has also significantly increased the clarity of water in some lakes by reducing the dissolved organic carbon (DOC) input from catchment areas, thus allowing potentially damaging UVB radiation to penetrate to much greater depths. Extreme climate events, are predicted to be more common in the future. The particularly warm year associated with the 1998 El Nino events appears to have been responsible for the loss of young lake trout in Gullrock Lake, an formerly acidified lake that was being rehabilitated through hatchery stocking. Less subtle than lethal events, but potentially more important in a regional context, is the effect of warming conditions on competition among species. For example, expansion of warm water fish populations (e.g. smallmouth bass) appears to limit the potential for reestablishing cold water species (e.g. lake trout) in lakes where they were lost because of acidification.

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