

Surface Water Quality has Important Ecological Implications for Amphibian Survival.

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A number of studies from around the world including the Great Lakes basin have reported amphibian population declines. The nature, cause and extent of the decreases remain unclear. This review investigates the direct and indirect effects of agricultural chemicals on amphibian populations by a simple comparison of environmental concentrations of the chemical to known toxicological effects on amphibians and other species that play an important role in amphibian ecology. Nitrate concentrations found in agricultural watersheds of the Great Lakes region have the potential to adversely impact remaining populations of amphibians through direct lethal and development effects. Lethal and sublethal effects in amphibians are detected at 2.5 to 100 mg/L. Amphibian food sources, such as insects, and predators, such as fishes, are also affected by elevated nitrate concentrations. We found environmental concentrations of nitrate in surface waters of watersheds in the Great Lakes basin area ranging from <1 mg/L to > 100mg/L. These nitrate levels fall within the range that can kill amphibian eggs and larvae. Currently no federal or provincial freshwater guidelines for the protection of aquatic life exist for nitrate. These data will also be discussed in relation to possible agricultural management strategies that might reduce nitrate concentrations in surface waters of the Great Lakes basin.