

**Estimating Hg Risk to the Common Loon (*Gavia immer*) in the
Rangeley Lakes Region of Western Maine:
A Regression Based GIS Model**

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Abstract

This research relates Hg levels in the Common Loon (*Gavia immer*) to a variety of physical factors. Constructed within the framework of a GIS system, this model analyzes the spatial relationships and the influence of physical land cover factors as a function of distance from the individual loon territories. Thiessen polygons were used to generate the territory for each loon. Buffering of the Thiessen polygons was done to establish the boundaries of the individual distance classes and to gather information on the percentage of individual land cover classes within each distance class. Information on precipitation was also gathered. Results from the regression analysis ($R^2 = 57.3\%$ at the 150m distance class) performed on the variables suggest that the proximity of certain land use types such as cropland, shrub land, and wetlands influence the rates at which Hg is available within an individual territory. Within the 150m and 300m buffers, crop land, shrub land, and wetland exhibited the strongest relationship with the Hg levels in the common loon, with cropland exhibiting a negative relationship suggesting that the proximity of cultivated lands plays a role in decreasing the amount of available Hg in a territory.

Keywords

Mercury (Hg), Common Loon, GIS, Spatial Relationships, Regression

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