Monitoring Toxic Contaminants in Large Ecosystem: PCB in the Great Lakes

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Abstract: Monitoring large aquatic ecosystem for toxic contaminants is a complex challenging task. A Canadian Monitoring Program for the Great Lakes is used to provide an example for monitoring large ecosystems. One component of this program is monitoring the concentrations of Persistent Toxic Substances (PTS) in biological organisms. We focus on PCBs, a member of PTS, accumulation in the whole tissue of lake trout, the top predator of the food chain. We describe the: a) program elements and its objectives; b) characteristics of the collected data, and c) difficulties associated with data analysis, and in communicating the results to stakeholders. The data sets discussed were collected from Lakes Superior, Huron, Erie and Ontario during the years 1977 to 2005. The response variable represents the PCBs concentration in a single fish composite sample and the explanatory variable includes the age, weight and length of the fish. In each year and lake these measurements were made on a number of lake trout. The outcome of the analysis is to account for the changes in PCB concentration spatially and temporally and to compare the concentration to the fish consumption guidelines.

Keywords: Great Lakes, Guidelines, Prediction, Temporal and Spatial Trends, Toxic Contaminants, Upstream/Downstream.