Environmental Determinants of Lake Trophic Status in the Conterminus United States

Jeffrey W. Hollister, Betty J. Kreakie, W. Bryan Milstead

Jeffrey W. Hollister (hollister.jeff@epa.gov), US EPA, Office of Research and Development, National Health and Environmental Effects Research Lab, Atlantic Ecology Division, Narragansett, RI, 02882

Abstract

Keywords: National Lakes Assessment, Cyanobacteria, Chlorophyl a

Introduction

What are the primary determinants of lake trophic status? Determinants include, chemical and physical paramenters of the lake water column and land use/land cover. Lake trophic status defined by Chl a.

Methods

Data

The two primary sources of data for this study are the National Lakes Assesment data and the National Land Cover Dataset (Environmental Protection Agency) 2009)

Predictor Variables **Water Column** N,P

Landscape

We defined the surrounding landscape of a lake with four different buffer distances: maximum in-lake distance (Hollister, Milstead, and Urrutia 2011), 300 meters, 1500 meters, and 2500 meters. The various distances were used to tease out differences in local landscape effects versus larger landscape-level effects. For each of these distances, we used the National Land Cover Dataset (NLCD) and calculated the percent impervious and total area of each landcover class.

Independent Variables Chl a Trophic status from NLA. What are the cut-offs.

Dimension Reduction

Expert opinion Correlation matrix random forests on subsets (i.e. buffer sizes)

factor analysis of landscape factor analysis of watercolumn

Statistical Analyses

Random Forest

variable selection TS Probability

PCA visualization

Results and Discussion

Acknowledgements

References

Environmental Protection Agency), USEPA (US. 2009. "National Lakes Assessment: a Collaborative Survey of the Nation's Lakes. EPA 841-r-09-001." Office of Water; Office of Research; Development, US Environmental Protection Agency Washington, DC.

Hollister, Jeffrey W., W. Bryan Milstead, and M. Andrea Urrutia. 2011. "Predicting Maximum Lake Depth from Surrounding Topography." *PLoS ONE* 6 (9) (September): e25764. doi:10.1371/journal.pone.0025764. http://dx.doi.org/10.1371/journal.pone.0025764.