

Belgrade Lakes aluminum content and land cover

Eli Dupree – ES212 – spring 2013

Introduction

Iron in lakes promotes sedimentation, but only in the presence of oxygen; aluminum does so without oxygen. Sedimentation helps prevent algal blooms, but blooms deplete oxygen. To avoid a vicious cycle, the presence of aluminum, rather than iron, is desirable. (Whitney King, pers. com.)

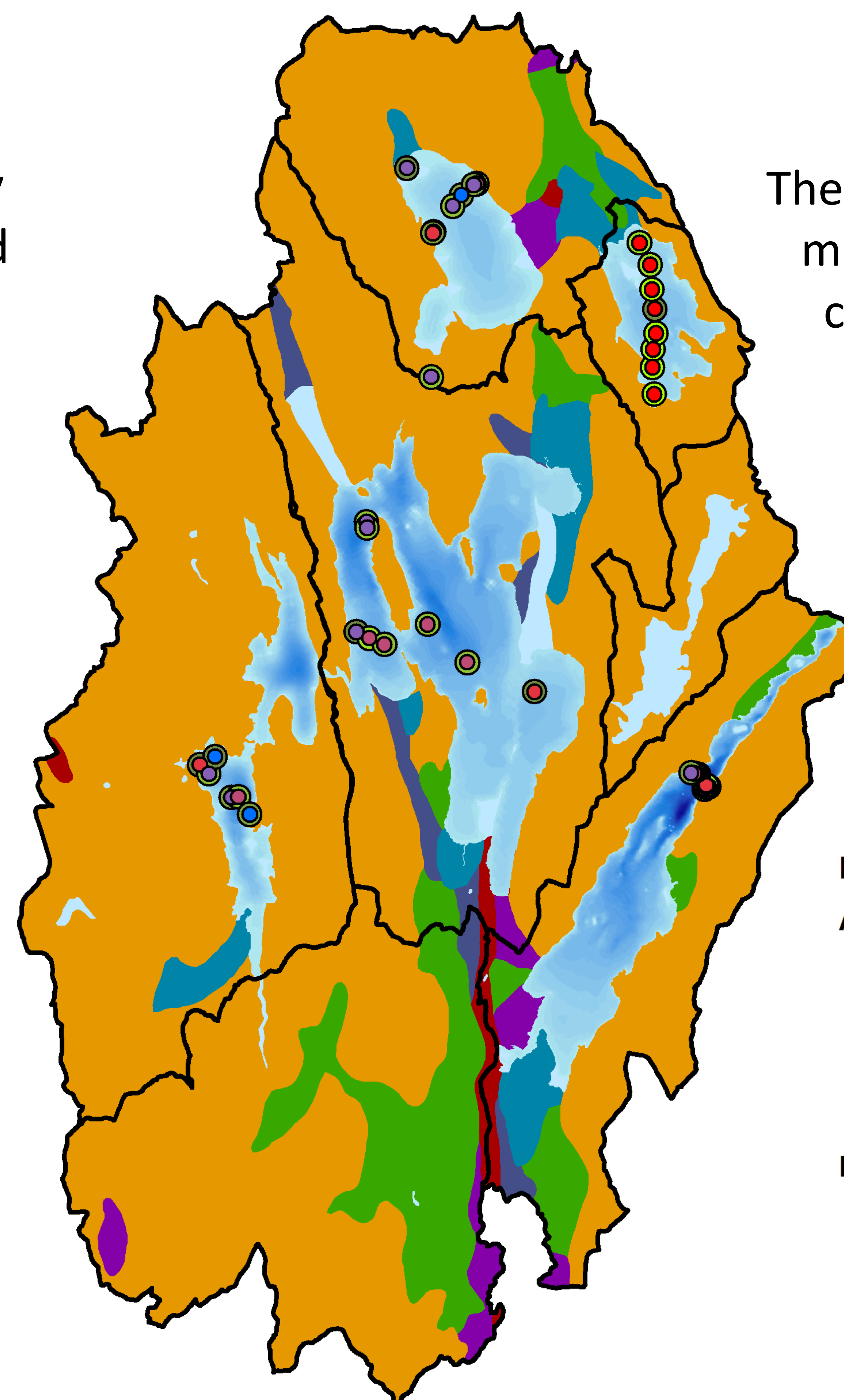
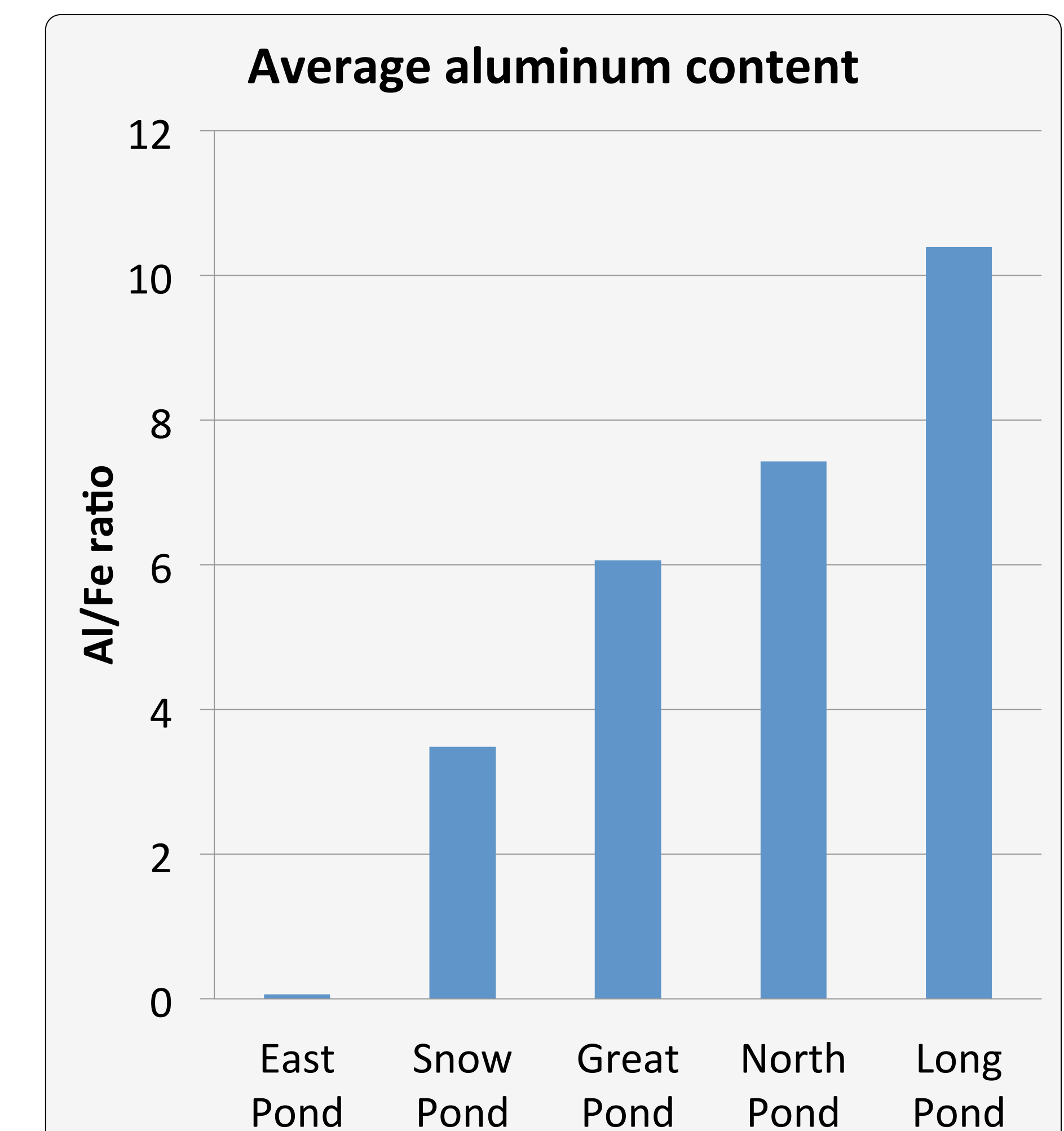
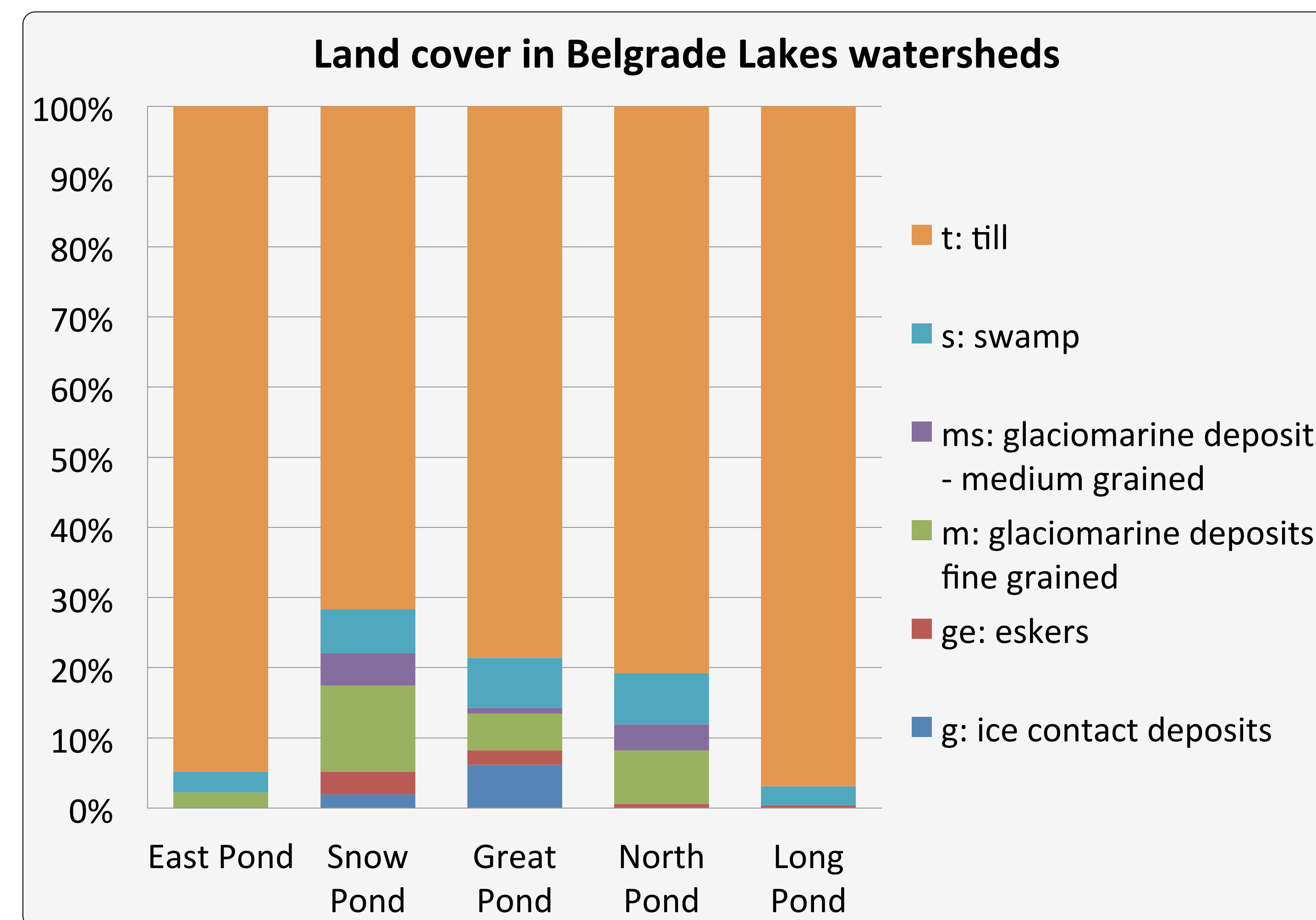
Whitney King gave me point data representing measured aluminum and iron concentrations in the Belgrade Lakes. We hypothesized that they were determined by runoff from the surrounding land and would be correlated with the nearby land cover.

Methods

Within the watershed around each lake, I used ArcGIS to compute the total area of each soil type. I used land cover and watershed boundary data from the Maine Office of GIS.

Results

There was **no apparent relationship** between the aluminum concentrations in the lakes and the soil types in their watersheds.



Discussion

The relationship of aluminum concentration to soil must be more complicated than this simple land-cover analysis allows for. Further work could try things that are more clever, like knowing more geology than I do, or like directly measuring aluminum in the soil or in runoff.

Personal communication: Professor Whitney King, Department of Chemistry, Colby College

Legend

Aluminum-iron ratios

- 0 - 1
- 1 - 3
- 3 - 6
- 6 - 11
- 11 - 21

Phosphorus concentrations

- 0 - 2.5
- 2.5 - 3.5
- 3.5 - 6.0
- 6.0 - 13.5
- 13.5 - 36.0

□ Watershed boundaries

Land cover

- wa: water
- g: ice contact deposits
- ge: eskers
- m: glaciomarine deposits - fine grained
- ms: glaciomarine deposits - medium grained
- s: swamp
- t: till