Optimal Drinking Water Depths

Rebecca Kessler[1] (rkessler18@ku.edu), Ted Harris[2], Javier Morales[3] , Karah Kinola[4], and Atefeh Hosseini[5]
[1-4] Kansas Biological Survey, University of Kansas, Lawrence, Kansas
[5] Department of Civil, Environmental, and Architectural Engineering, University of Kansas, Lawrence, Kansas

Problem:

Blue-green algae (cyanobacteria) cause economic and ecological harm to our communities
Geosmin, the taste and odor compound associated with cyanos, is expensive to remove
Focused on Geosmin trends with depth versus lake function
Cyanobacteria like warm, non mixing lakes whereas diatoms like cold highly mixed lakes

Hypothesis:

There is a goldilocks zone, which is an ideal zone below the thermocline depth but above the decaying matter in the water column.
Changes in zone will occur in response to changes in temperature, wind speeds and precipitation because those factors affect which algal group dominates

Sampling:

Sampled light, algal communities, water temperature, and geosmin concentration, monthly
Collected high frequency data on temperature and oxygen

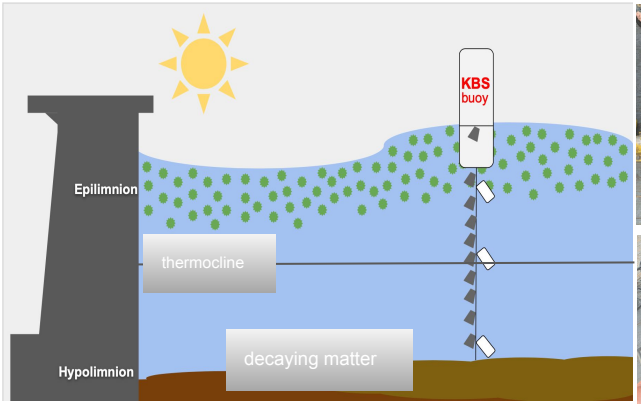


Image 1. Major aspects of water column with buoy and sensor locations

Image 2. Secchi (light) measurement

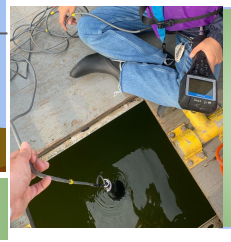
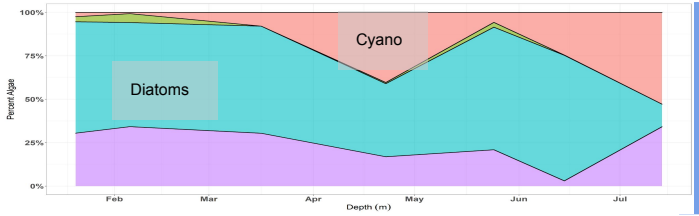
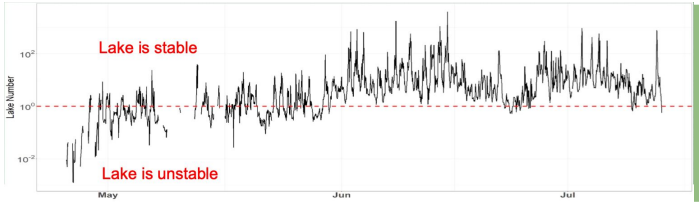


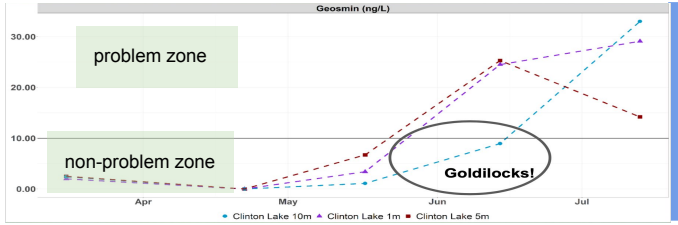
Image 3. Water temp. measurement



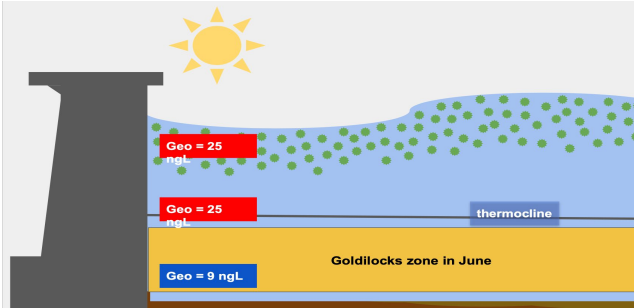
Algal community concentration vs. time
- diatoms dominate in winter
- bluegreen dominate in summer



Lake number vs. time
- increasing lake number = greater lake stability
- lake stability increase = bluegreen dominate



Geosmin vs. time
- periods of time where geosmin is found in the upper levels but not lower



Conclusion:

1) diatoms dominate in winter with high mixing, cyano dominate in summer with low mixing
2) In winter, water is similar throughout, in summer goldilocks zone is dynamic
3) If climate is changing, lake stability will change and in turn so will goldilock zone