

## POSTER PRESENTATION

### DEVELOPMENT OF A MULTIMETRIC LAKE DIATOM CONDITION INDEX FOR THE CONTINENTAL UNITED STATES

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Diatoms are powerful indicators of water quality and are often used in biological assessments of aquatic systems. Much work has gone into development of multimetric indices for assessing the condition of rivers and streams. Less work has gone into index development of broadly applicable indices for lake condition. This study, based on the EPA National Lake Assessment, aims to build a nationally applicable diatom-based lake condition index. Lakes were selected using a probability based design. 1030 lakes were sampled for surface sediments, as well as other biological, chemical and physical properties. Sediment samples were processed for diatoms and a minimum of 500 diatom valves were identified and enumerated for each sample. Lakes were then grouped based on similarities in physical and chemical attributes, such as depth, alkalinity, and climate to help refine definitions of reference condition. Lakes within each of these groups with lowest indication of human alteration were then selected as reference lakes. Candidate metrics were calculated from the diatom data based on taxonomic and morphological groups, growth forms, community attributes, and the presence and abundance of indicator species. Final metrics were then selected from each category of metrics for their ability to separate reference from impaired lakes, lack of correlation with other metrics, and for low signal/noise ratio. A model was developed to predict natural variation in LDCI at reference sites based on lake attributes that were not affected by human activities. Expected LDCI could then be calculated for all lakes based on this model. Deviation between expected LDCI after accounting for natural variation and actual measured LDCI was used to assess lake condition. Adjusted LDCI values in the best 75th percent of reference lakes were considered good, while values in the range of the 5th to 25th percent were considered fair, and lakes below the 5th percentile of the reference distribution were considered poor. Nationally, based on the LDCI, the percentage of lakes in good biological condition is 47%, while the percentage of lakes in poor condition is 22%. The Eastern Highlands displays the largest proportion of lakes in good condition (>60%), while the Plains and Lowlands display the highest proportions of lakes of fair or poor condition (54%). The West is characterized by the lowest proportions of lakes in poor condition and a higher proportion of unassessed lakes.