Similarity of microbial communities in lakes and ponds of Mount Desert Island, Maine

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Microbial communities play important roles in aquatic ecosystems and may be bioindicators of water quality. This study was designed to determine if lakes on Mount Desert Island have similar microbial communities, and if presence and abundance of specific microbes can be correlated with water quality.

During the summer of 2011 we collected 209 surface water samples from 35 lakes and ponds on Mt. Desert Island. We focused our sampling on water bodies previously characterized in a study by the National Park service[1]. 100 – 500 ml from each sample was drawn through a GF/F filter and the filters stored in a CTAB buffer. DNA was extracted and purified, and stored in TE buffer. Samples will be probed for a suite of prokaryotic and eukaryotic microbes[3] using quantitative PCR that have been used previously to compare aquatic microbial communities over a global scale[3]. Sørensen (presence/absence) and Bray-Curtis (abundance) similarity indices will be calculated for paired comparison of lakes.

To date we have probed a single late summer sample from 35 lakes and ponds for target microbes. We found low frequency and abundance of target microbial taxa. Two targets were not found in any lakes and most targets were found in less than one-third of the lakes. The two most abundant targets *Vorticella campanula* and *Acinteobacter* AcIB1, were found in 45% and 91% of the lakes, respectively. Most lakes had few target species present (average = 3) and four lakes had no targets. Sørensen and Bray-Curtis indices ranged from 0 (no similarity among lakes) to 1 (identical presence of microbial targets) among pairs of lakes. Plots and regressions of the indices across environmental gradients (lake area, lake depth, lake elevation, trophic state, relative human impact) or distance between watersheds showed no significant trends (Fig 1).

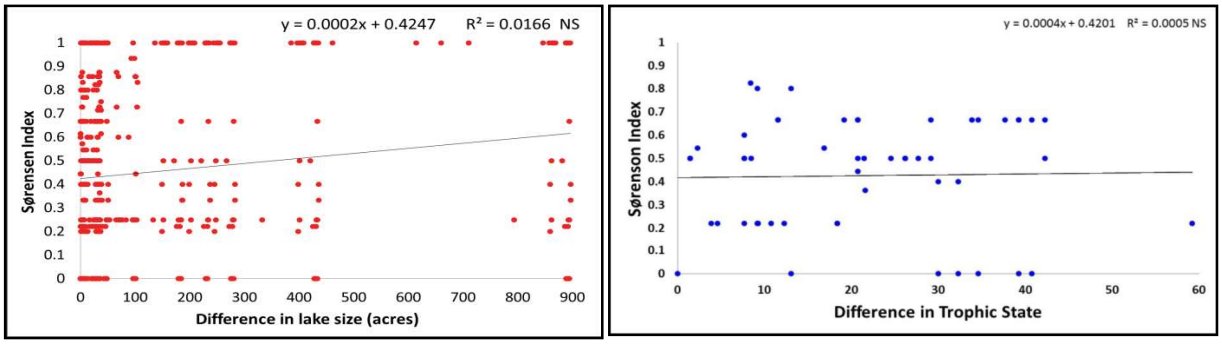

Figure 1. Typical results of Sørensen Index comparisons across environmental variables. Left: Sørensen Index *vs*. lake area. Right: Sørensen Index *vs*. difference in trophic state based on Maine Trophic State Index[1].

Although these preliminary results suggest that there are few differences among the lakes and ponds on Mount Desert Island, our targets were derived predominantly from mesotrophic to eutrophic lakes in more temperate climates[2,3] and were from a single sample per lake. Development of a suite of target taxa from Maine lakes would likely provide better insight into local and regional microbial community profiles.

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