

PHOTOSYNTHESIS TO RESPIRATION RATIOS AND DIATOM ASSEMBLAGES ALONG STREAM LENGTHS IN NORTHERN SWEDEN

Breena Riley¹, David Seekell², Victoria L.S. Chraibi¹

¹Biology Department, Tarleton State University, Stephenville, Texas 76402 USA

²Department of Ecology and Environmental Science, Umeå University, Umeå, Sweden

The region around Abisko, Sweden, is located above the Arctic Circle. Due to its high latitude, it is environmentally vulnerable to the effects of climate change. Waters in northern Sweden are in relatively pristine condition, so the Swedish government does not conduct routine environmental monitoring. Thus, riverine diatom diversity is not well understood because the absence of a need to develop biotic indices. Rivers in the region are highly oligotrophic and nutrient-limited and are exposed to about 24 hours of sunlight daily during the summer season. Many river reaches are reported to be highly turbulent. Prior work with alpine and boreal lakes in Canada and Sweden suggests that lacustrine diatoms are often most strongly associated with pH. Rivers and lakes in the region range from pH ~5.5-7.5. The study sought to understand how diatom assemblages and photosynthesis-to-respiration ratios (P/R) change along the length of autotrophic streams in northern Sweden. P/R was assessed via changes in oxygen isotopes ($\delta^{18}\text{O}$ -DO) as a proxy for dissolved oxygen. The study gathered information about nutrients levels (as a measure of total Kjeldahl nitrogen, total phosphorus, and total silica) at each site to form a more complete understanding of factors that affect diatom assemblages and P/R (with a special focus on carbon cycling) among sites in-stream and across different streams within the same catchment basin. Diatoms were collected from sites in the Miellajokka catchment and from sites in Abisko National Park, both of which drain into Lake Torneträsk. Diatom community structure data from the study were related to environmental and nutrient parameters taken from each site. Data were also compared to prior studies in the same catchment basins that studied carbon fluxes in Lake Torneträsk.