

DIATOM COMMUNITY DYNAMICS ACROSS ECOREGIONS IN GEORGIA, US

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Diatom community dynamics (e.g., species abundance and richness) are controlled by climate, habitat, human activities and species interactions. Few studies address primary producers' responses to multiple factors simultaneously, while accounting for species morphologies and ecological preferences. Within the U.S., the State of Georgia is divided into seven ecoregions: Southwestern Appalachian Plateau, Valley & Ridge, Blue Ridge, Piedmont, Interior Plateau, Southeastern Plains and Southern Coastal Plains. The objectives of the study were to predict water quality of aquatic habitats throughout the state based on diatom species composition and to compare algal communities between the ecoregions. 155 samples from wadeable streams and rivers were enumerated following standard protocols; in addition data from published river and stream surveys was utilized when collection and processing protocols were deemed comparable with the survey. Nutrient data was provided by the state agencies or measured in the field. Algal communities were dominated by diatoms in 97% of the sites. More than 500 diatom species were reported with varied abundances and distributions within the State. Measurable differences within community indices varied primarily due to habitat structure between ecoregions. Taxa with higher than 10% abundance occurring in at least 3 ecoregions were compared with published literature and taxonomic evaluation and ecological inferences were reported. The northern ecoregions of Georgia had low diatom species density and were dominated by *Achnantheidium minutissimum*. Piedmont communities were dominated by several *Achnantheidium* species, together with taxa from *Eunotia*, *Gomphonema*, *Frustulia* and *Pinnularia*. Rivers and streams located in the Piedmont ecoregion had the highest diatom densities, total abundances varied across sites potentially without density compensation. Taxonomic diversity of freshwater, brackish and marine diatoms was highest at the Coastal areas with higher nutrients due to anthropogenic influence, no droughts and presence of multiple habitats.