DEVELOPMENT OF AN OPTIMAL MACROINVERTEBRATE BIOASSESSMENT INDEX FOR PRAIRIE LAKES IN NORTHEASTERN SOUTH DAKOTA

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ABSTRACT

Biological monitoring is a necessary tool used for assessing the quality of fresh water ecosystems. Accurate biological assessments allow for determining the exposure of aquatic communities to different classes of stressors (e.g., domestic waste, agricultural runoff and sedimentation, pesticides, habitat alteration). Biomonitoring can guide managers toward the proper preventative or restorative actions for impaired ecosystems. Despite the widespread use of multimetrics for bioassessment in streams, little work has been published on multimetric indices for lakes.

This study examined the macroinvertebrate communities and water quality of Enemy Swim Lake, Clear Lake and Lake Minnewasta in northeastern South Dakota during May-September 2006. The macroinvertebrate communities were collected using sweep-nets, Hester-Dendy subsamplers, and Eckman dredges and individuals were identified to genus. Taxa richness and composition, feeding habits and habitat use were used to develop metrics. Metric scores were compared to the water quality status of the lake. Trophic status of the lakes correlated with metric scores. These lakes ranged in trophic status (TSI) from mesotrophic (moderate levels of nutrients) to hypereutrophic (high levels of nutrients) during the sampling period. Enemy Swim was found to have the highest water quality based on TSI and received high scores in metrics related to taxa diversity and pollution intolerance. Clear Lake had intermediate water quality and metric scores. Lake Minnewasta had the lowest water quality based on TSI scores and also the lowest metric scores out of the three lakes in the study.