ABSTRACT

The relationship between fen vegetation and water and soil chemistry gradients in an alkaline slope fen was studied during the growing season of 2005. Owned by Irving Materials Inc. (IMI), the fen is a two hectare property in north-central Henry County, Indiana. The objectives of the study were (1) to conduct a floral inventory of the site and determine the floristic quality index for the site; (2) to visually characterize and stratify the site into areas of similar vegetation or community types; (3) to characterize relationships, if any, existing between vegetation and chemical and hydrological gradients; and (4) to quantify spatial and temporal patterns of ground water alkalinity throughout the fen. The floral inventory revealed 287 species, representing 180 genera in 79 families. Of the documented flora, 246 are native, 41 are adventives, and 20 represent Henry County records. The Floristic Quality Index and the mean Coefficient of Conservatism suggest that the site is of nature preserve quality and contains noteworthy remnants of the region’s natural heritage. They also suggest that the adventives are having a minimal negative impact on the native flora. For quantitative vegetation analysis, fixed transects were monitored three times during the growing season (spring, summer, fall). Basic subsurface water chemistry and levels were monitored bi-weekly and 30 soil and 30 surface water samples (10 each to coordinate with the vegetation survey) were analyzed for over 35 physical parameters. In all cases, the parameters fell...
within the ranges of typical Midwestern fens, but most noticeably for calcium carbonate. Applying the Floristic Quality Assessment to the vegetation occurring along fixed transects, 26 species were identified with an importance value greater than one. Non-metric, multidimensional scaling analysis of fen species dominance delineate spatial and temporal patterns in vegetation. Joint plot vectors indicate the strength and direction of correlations between soil and water chemistry variables. Nine physical parameters were useful to separate vegetation into groups. The relationship between the plants and these nine parameters is described and discussed.