

Methods

I. Location of species in multivariate space, as defined by microhabitat use, was examined using ordination.

- 1) Specifically, nonmetric multidimensional scaling (NMS) was used to examine the spatial patterns of microhabitat use among species.
- 2) NMS was chosen because it is based on calculations of ranked distances, which is useful when analyzing nonnormal ecological data (McCune and Grace 2002).
- 3) NMS ordinated 29 turtles (16 bog, 8 spotted, 5 snapping) in multivariate space defined by microhabitat coverages.
- 4) Resource (microhabitat coverage) data for each turtle were averaged over the study period.

II. NMS was conducted using PC-ORD following procedures outlined by McCune and Grace (2002).

- 1) The Sorensen distance method was used as well as random starting configurations using real and randomized data sets.
- 2) The final number of dimensions used in the final analysis was determined by examining plots of stress versus number of dimensions.
- 3) A Monte Carlo test determined whether the final NMS solution was significantly different than random.
- 4) Correlations of microhabitat coverages with ordination axes were determined by examining Pearson correlation coefficients.

III. Differences in microhabitat use among species were examined using multi-response permutation procedure (MRPP) with PC-ORD software.

- 1) MRPP is a nonparametric procedure that compares observed mean within-group distance with expected distance calculated from randomized shuffling of the data.
- 2) Pairwise comparisons of species were conducted using MRPP at an alpha level corrected for multiple comparisons ($\alpha = 0.05/3$).

Results

I. The final NMS solution consisted of 2 axes, which unlike other ordination techniques (i.e., PCA), axis numbers are random and variability will change with the number of dimensions included.

- 1) Axis 1 and 2 represented 92% of the variability among species, with the majority represented by Axis 1 (68%) in the horizontal plane (Figure 1).
- 2) Bog turtles were positively oriented along Axis 1 and were highly correlated ($r > 0.6$) with microhabitat converges that were routinely found in the core of the wetland.
- 3) However, snapping and spotted turtles were negatively oriented along Axis 1 and were correlated with reed.
- 4) Snapping turtles were negatively oriented along Axis 2 and were highly correlated with water, whereas spotted turtles were positively oriented and highly correlated with goldenrod.

II. MRPP analyses indicated that microhabitat coverages differed significantly between bog turtles and the other species, but not between spotted and snapping turtles.

- 1) In other words, bog turtles occupied significantly ($p < 0.016$) different multivariate space than spotted turtles and snapping turtles.
- 2) However, snapping turtles and spotted turtles did not occupy statistically distinct multivariate space.