The purpose of this assignment is to give you hands-on experience working with multivariate grouped data; specifically, testing for significant differences among groups, describing those differences and potentially predicting group membership using a variety of statistical procedures. As such, you will not be expected to analyze the data set from every possible angle and using every possible analytical procedure discussed in class. Rather, the purpose of this project is to give you some basic experience in how some of these techniques work and how R can be used to do the analysis. The specific objectives for this project are:

(1) Test for differences among a priori groups and describe those differences in ecological terms using a variety of statistical procedures (e.g., multi-response permutation procedures, MRPP; analysis of group similarities, ANOSIM; nonparametric multivariate analysis of variance, NPMANOVA; Mantel’s test, MANTEL; discriminant analysis, DA; and classification and regression tree analysis, CART).

(2) Identify the limitations in the data set pertaining to the use and/or misuse of the statistical procedures for meeting objective 1. For example, evaluate the data set for adherence to test assumptions and sample size requirements, and suggest possible solutions or strategies that might be employed to counter or deal with any violations of assumptions.

(3) Evaluate the performance of the statistical procedure(s) employed in meeting objective 1. For example, with DA, assess the degree of canonical discrimination achieved using the canonical correlation criterion and classification accuracy, and evaluate the stability of the results.

IMPORTANT!!!!!! It is not necessary for you to actually do every possible analysis in order to meet the above objectives. It IS important that you recognize the things that should be done and would be done if you had unlimited time and all the necessary statistical procedures implemented in R. If you feel that it would be appropriate to analyze the data set in a particular manner but either do not have the R tools to do so or the extra time to do it, then simply outline what you would do.

Prepare a 20-30 minute oral or 3-4 page written (excluding figures) presentation of your findings. Be concise in your reporting and be sure to address each of the questions above. The quality of visual aids (e.g., tables and figures) will not be a consideration in your grade, so focus on the content. All members of the group must participate equally in the report and a single grade will be assigned to all members in a group.