**Paleoecology Lab Report**

**Bio 580 – Dr. Whitenack**

**Due Friday Oct. 29**

**Analyses to complete on your own samples**

* Keep bryozoans and crinoids in your analyses
* Calculate n, S, Shannon-Weaver’s H, and Pilou’s E (in PAST, it’s called “Equitability J”) for all of your samples (bulk and targeted). Put these into a table to be included in your lab report.
* Using the diversity t-test, compare the pairs of samples taken from each location (the big bag and small bag from Site A, for example), as well as the targeted bag and the big bulk bag from the same site. Make a table similar to that from your homework.
* Calculate Sorensen’s B for pairs of samples taken from each location, and also for the targeted bag vs. the big bag from that same site. Again, put the results of these tests into a table.

**Analyses to complete to compare your samples to other groups’ samples**

* Combine the small and big bulk bag data into one data group per site (1 sample for A, 1 sample for B, etc.) for your sites and all other sites. You will not be using any of the targeted data in these analyses, so do not include them. This should give you 3 samples/group, for a total of 9 samples.
* Remove the bryozoans from the dataset, but keep the crinoids.
* Run rarefaction curves for the 9 samples, including error bars. Using those curves, calculate the expected diversities at the lowest common sample size (just like #16 in the homework) and compare the 3 different groups’ data using the error bars (#18 in the homework). Make a table of the expected diversities to be included in your lab report. Also, be sure to include your rarefaction curves in your lab report.

**Writing the lab report**

Just like any other lab report, this should have an abstract, introduction, methods, results, discussion, conclusions, and work cited. You may combine the results and discussion sections into one if that makes more sense to you and helps you write. Since we’re working on a diverse array of analyses, I encourage you to use subheadings within each section to aid in organization. Here’s minimally what needs to be in each section:

Intro:

* Info about the Hamilton Group in general
* Specific info on *your* formation and what’s been previously done in terms of paleoecology
* A statement of the goals of this project:
  + To determine the paleoecology of your specific formation
  + To compare collecting techniques

Usually with paleo papers in general, there is no hypothesis statement, so you do not need it here. This is more of an exploratory study, so a statement of goals will suffice.

Methods

* Describe where we went (state, county, city, etc.). You may include a map as a figure.
* Go over the collecting methods:
  + Where in the quarry were you? Where were your samples taken? Include the map that you drew at the quarry as a figure.
  + How many samples? Size of the samples? What kind of samples? How did you take each sample?
* Go over processing
  + How did you go from bag of stuff to specimen identification?
  + How did you count things? For example, brachiopods and trilobites were counted differently. Tell me how each was done.
* Go over which indices you calculated and how you did (including the programs)
* Go over which comparisons you did (and the programs to do them)

Results/Discussion

Remember, the results section is just results (e.g. We found a difference. We found these types of critters. Etc.). Wait until the discussion to go through the *whys* of your results – what caused any differences you saw (or why you didn’t see any differences).

* Describe the paleoecology of your site. Use what you’ve learned in lecture to figure out the energy of the site, how deep the water may have been, which might be missing from your samples, etc.
* Talk about the method comparisons (bulk vs. targeted, small vs. large samples)
* Report results of comparisons and various indices, including tables/graphs as indicated above.
* Talk about how your site compares to the others in terms of diversity, evenness, etc. and *why* you may or may not have seen differences.
* How do you think the overall results would have changed if we left out the crinoid stems and why?
* What would you do differently if we did this again, and why?