Second Paper – Comparison of ecological communities at Hopkins and Pt. Lobos

For this paper you will be using data collected at Hopkins and at Point Lobos (Whaler’s Cove). All the data collected were counts taken in 10 meter sections of 30 meter transects. Data from both days at Hopkins and both days at Pt. Lobos were used in the graphs and stats that follow.

There are three questions we want you to address: (THESE ARE THE QUESTIONS WE EXPECT YOU TO ADDRESS AND FOR WHICH WE WILL EVALUATE YOUR PAPER)

1) Does the algal community (benthic community) differ between Hopkins and Point Lobos?
2) Does invertebrate community (benthic community) differ between Hopkins and Point Lobos?
3) Does the fish community differ between Hopkins and Point Lobos?

These questions need to be motivated in the Introduction (i.e. why do ecologists compare communities of the same ecosystem at different locations?). While we did not assess the physical attributes at Point Lobos, you can use qualitative assessment of rugosity and substrate to motivate questions 1 and 2. You can also refer to the seafloor maps that you can download from the webpage for the lab. In addition you can use any other geological, oceanographic (e.g. swell, temperature) or legal (level of protection) differences between sites that you can find in the literature. As noted, you can use these features to motivate why you are comparing these two kelp forests in the Introduction. You also need to use the same motivating attributes in the Discussion to provide context for your results. A key ancillary question is whether the answers for the three questions (algae, inverts, fishes) are the same and why this should or should not be the case.

Two pieces of information are useful to address these three questions. The first is the result of a PERMANOVA analysis comparing communities at the two sites. PERMANOVA is an approach that compares communities, rather than individual species. It evaluates whether there are differences in species composition (which species are present or absent between sites) and their relative abundances. There are other multivariate approaches to this question, but PERMANOVA is considered the most robust approach. One difference between a PERMANOVA approach and traditional approaches is that the p-value is based on permutations rather than an underlying distribution (like a t or F). Interpretation of the p-value is the same as in other statistical analyses. The p-value is related to the null hypothesis – so first figure out the null hypothesis and use the p-value to guide your decision as to whether to reject the null hypothesis.

The second elements are graphs of species abundances (per segment) for both sites. The data are shown in square root format because this transformation was used for the PERMANOVA analysis to diminish the disproportionate influence of very abundant species (like Balanophylias). Also, the abundances are easier to see in the transformed format. The error lines shown are 95% confidence intervals. If the error line of one bar overlaps the height (mean) of the adjacent bar (the top of the bar), the species do not differ between sites. In contrast, if the error lines of one mean do not overlap the mean (i.e. height) of the adjacent bar, then they are significantly different.

Be sure to refer to feedback, especially the grading rubric, used in the first paper to guide your writing of this paper!