Notes for revising the PeerJ submission involving fish and invertebrate communities along the Texas precipitation gradient.

The reviewers and editor concluded that the original analyses did not adequately test the hypotheses outlined in the introduction. Additionally, simple univariate regressions on a site x environment matrix are inappropriate.

So, I reviewed methods in multivariate data analysis and find the following modifications warranted:

* The scale of this study is limited by the number of sampling locations. In a multivariate analysis, the number of variables should not exceed the sample size. Upon reviewing the dataset, there are redundant environmental variables that are not needed in order to test the hypotheses at hand. For example, Annual precipitation and Relative Humidity both quantify the same aspect of climate. Therefore, Relative Humidity should be removed since it does not contribute new information and increases the risk of overparameterization.
  + Remove Relative Humidity for redundancy with Annual Precipitation.
  + Remove Potential Evapotranspiration; although it is indicative of interactions between precipitation, temperature, and landscape, it is derivative and will exhibit undesired correlation with Annual Precipitation.
  + Remove Soil.Org; Soil permeability is informative regarding soil effects driven by precipitation and can coincide with hydrological effects (flashiness). While Soil organic content may explain variation in soil permeability, but it is not intuitively connected to stream processes in the scope of this study.
  + Water temperature
  + pH
  + bank height
  + Basin developed
  + Basin planted
  + Average Flow

New Analysis (separate for fish and invertebrates)

* Test relationship between precipitation and community diversity using linear regression
* I will perform a Principle coordinate analysis to identify the variable that maximize variation among the site environmental profiles
* Use multivariate regressions using the top 3 identified variables from the PCA to identify significant environmental relationships with diversity and create predictive models
* Visualize the community compositions PCoA
  + Unconstrained to identify model variables
  + Constrained to test precipitation hypothesis