EEB 3898 – Field Methods in Fish Biology – Summer 2014
Final Report Guidelines
Due Wednesday, July 2, 2014

General guidelines:

Follow the "*Guidelines to Writing a Scientific Paper*" posted on the course website. You will need an abstract, introduction, materials and methods, results, discussion, and references sections. This report should be a more detailed and thorough version of your field exercise reports. This report is worth 50 points.

Your paper should go from broad to specific, then back to broad. A scientific paper is like an hourglass. Your intro should have broad information that ends in your specific hypothesis. Your methods and results are about your data. Your conclusion begins by addressing your specific data, but then should end in a broader generalization. ***How does your study fit into our broader understanding of fish biology?***

Your report should be 5-7 pages double-spaced with figures

Specific guidelines:

For this report, you will analyze and discuss data on fish assemblage structure in relation to stream order. Use Sheldon 1968 as your primary reference. Find and use at least **ONE OTHER REFERENCE** that is appropriate for this paper. Use data from Eldredge Brook (headwater stream, 1^{rst} order), Willimantic River (mid-sized stream, 4th-6th order), and the Connecticut River (large river, 7+ order).

- In your **introduction,** introduce the idea of fish assemblage structure and habitat use in lotic (flowing water) systems. Introduce the idea of stream order. Explain how fish assemblage structure and size structure should be related to stream order.
  - Make a *hypothesis* based on your knowledge of the fish assemblage structure of lotic systems. Your hypothesis should include predictions on **how species diversity, the types of species, and the size of overlapping species** should differ between the three stream systems we sampled.
- Explain in your **materials and methods** how you tested that hypothesis.
  - What methods did you use and when?
  - How did you conduct your analyses?
    - For example, how did you calculate species richness, CPUE, etc.
- Your **results** section should contain the following:
  - A **table or graphic or figure** showing the species that we captured at all locations.
    - This is where you highlight differences in the types of species found between sampling locations.
      - This is an important point to highlight. For example, even if there are no differences in species richness between sites,

there may be important differences in the types of species that live there.

- A **plot(s) (i.e., a graphical representation)** demonstrating differences in species richness and species evenness between sampling sites.
  - For example, three **rank abundance plots** (one for each system sampled) shown side by side
  - Pool data from all mesohabitats.
- A **plot(s)** showing differences in the distribution of lengths for species that inhabit all stream sampling sites.
  - Determine which species inhabit all sampled streams abundant species in both locations
  - This is where you investigate how fish size distributions differ between the stream systems
  - You decide how to best visualize length distribution differences
    - Recommendation: You can plot three length frequency histograms in one graph to show differences.
- While not necessary, maps of the study sites would be appropriate here.

- Your **discussion** section needs to address your hypothesis – does your data support or refute it. Then discuss **WHY**
  - Avoid saying "proved" – instead use "supports"
    - We rarely will prove something as scientists – proof denotes something factual. We will have support for a hypothesis.
  - Make sure you explain how ALL of your analyses (i.e., all of the figures you make) support or refute your hypothesis.
  - If your data do not support your hypothesis, explain **WHY**. IT IS OK IF YOUR DATA DO NOT SUPPORT YOUR HYPOTHESIS. Is this due to sampling bias or was your hypothesis incorrect?
  - As always, explain what biases are associated with your research. For example, how does the fact that we used different sampling methods in each location bias the results?
- **Cite** references appropriately
  - See Sheldon 1968 for examples