HOMEWORK #8 Due **MON OCT 24**

INSTRUCTIONS:

- Include a:
  - summary output table and/or graphs, as appropriate
  - short statement about how you handled assumptions and those outcomes
  - short answer that clearly answers the question, based on the results.
- Provide your code: if in an Appendix, organize it so that we can relate it to questions
- Submit a pdf (with your name in the file name).

A hint: if you use SMA regression and want to use AICctab, include this inside the parentheses: nobs=length(X) - where X is one of the variables, and length(X) just gives a count of the *n*umber of *obs*ervations (nobs) for AICctab to use (this is not needed for lm).

Fishery Background: The North Atlantic cod fishery (think fish sticks) is heavily fished, and the variables Recruits, Density, and Fishery are three measures of the North Atlantic cod fishery (see `fishery` data set). Commercial fishing is assigned to mapped zones (Fishery; estimated tons harvested per zone). Each of those zones is evaluated annually for fish density (Density; estimated number of adult fish per $100m^2$) and recruitment (Recruits; estimated number of juvenile fish per $100m^2$). Log-transforms may be expected to help.

1. Which *one* of the two estimates (Density or Fishery) in the data (fishery.txt) best predicts Recruits, which could then be used to organize next year's harvest of adults? **[2 pts.]**

2. What is the model for that most plausible variable and its coefficient of determination? **[1 pt]**

3. Provide general recommendations to the National Marine Fisheries Service for cod fishing in the following year. Use graphs and statistical results from the fishery data above to justify your recommendations. **[2 pts.]**

Zebrafish Background: An experiment was conducted with zebrafish (see `zebrafish` data set) to test the hypothesis that zebrafish respiration rate (Respiration; mg dissolved oxygen / L / hr) is a function of size (as Weight, in grams) and Sex (male or female).

4. How much does Activity increase with Weight after accounting for Sex? Where does your answer come from? **[1 pts.]**

5. Does Respiration differ between sexes. Show graphical evidence for your answer. **[2 pts.]**

6. How well did the model fit statistical assumptions? **[2 pts.]**