Agenda for ESRP 310 Lab, October 2, 2007

Salmon Model Exercises

1. Verify Model Operation and Results

Check to see if the Tucannon Model is on the computer. If it is not, visit the book's website and go to the "cases and models" page to download the model. Check whether you are operating a "secure" version of the model. (You will know that it is secure if you are unable to go below the interface layer to make changes in the model.) When a model is "secure," you don't have to worry that a previous student has made some unexpected changes in the model. Then verify that you are operating a model with the sliders and graphs as shown on page 166 of the book. (Some of the information for the harvesting exercise may be presented in somewhat different form, but the model should be the same.)

Verify that the sliders are set to the "predevelopment" values (the values shown in Table 14.2 on page 153). For example, the smolt migration loss fraction should be 0.9. If the sliders are set to a different value click on the "U" to undo values that may be on the screen from a previous simulation.

Run the model to verify that there are just over 20 thousand for the equilibrium population of adults returning to the Columbia. Run the model again with randomness turned on after the 120th month. Your model should show the large swings in the "adults in migration" shown on page 156.

2. 85% Harvesting Under Predevelopment Conditions

The Table on page 161 of the book shows annual harvest that could be expected with different harvest fractions. What to you expect for the annual harvest if the harvest fraction is 85%?

_____

Suppose each fish is valued at $40 for the region. How many years of 85% harvesting would be required to generate $10 million in value to the region? _____

Run the model with predevelopment conditions and 85% harvesting after the 120th month.
Does the annual harvest match your estimate from interpolation? _____

3. 95% Harvesting for Short-Term Benefits

You know from Figures 14.8 and 14.11 that 95% harvesting is not sustainable, even under predevelopment conditions. Run a simulation with 95% harvesting after the 120th month to verify that the number of returning adults will continue to decline if you harvest at this high fraction. Suppose you face pressing short-term considerations as the "harvest manager." These pressures force you to harvest the salmon population in a very aggressive manner. You decide to harvest at 95% even though you know it is not sustainable. Extrapolate from the Table on page 161 to estimate the annual harvest if the harvest fraction were set at 95%: _____ How many years of 95% harvesting would be required to get $10 million in value to the region? _____

4. Verify Results with Development in the Watershed on the Main Rivers

Run the model for 120 months, then change the positions of the four sliders to represent the changes in watershed parameters and migration parameters. (Check out the advice on the "?" button on each slider.) Complete the simulation to verify the results in Figure 14.12 in the book. Do you see a drop from over 20 thousand to around 4 thousand returning adults? _____
Run a simulation with "Development" assumptions for the four sliders from the outset of the simulation. Do you get approximately the same number of returning adults as in the previous simulation? _____

Main Exercise for Teams of Two:

Who Is The Best Harvest Manager?

Form teams of two, and pick a name (any name will do: *sustainable salmon*, *salmon 'R us*, etc.):

Team Name: _____

Which student is the harvest manager? _____

The other student's job is to create challenging conditions for the harvest manager, as explained on page 165 of the book. Conduct multiple experiments with the model. You are looking to see if the harvest manager can achieve a high and sustainable harvest in the face of difficult changes in the two "river development parameters" and the two "watershed development parameters." You can also make conditions more difficult by turning on randomness at different times in the simulation.

Signal Prof. Ford when you have conducted your best simulation to demonstrate the harvest manager's ability to achieve a sustainable harvest under difficult conditions. He will come be to take notes on your best result:

Cumulative Harvest by the end of the simulation: _____

Notes on Difficult Conditions Imposed:

Notes on the Harvest Manager's Strategy:

We will then discuss your strategy and results at the next class meeting. **Take notes on your best result** because we may try to recreate your best results in class on Tuesday.