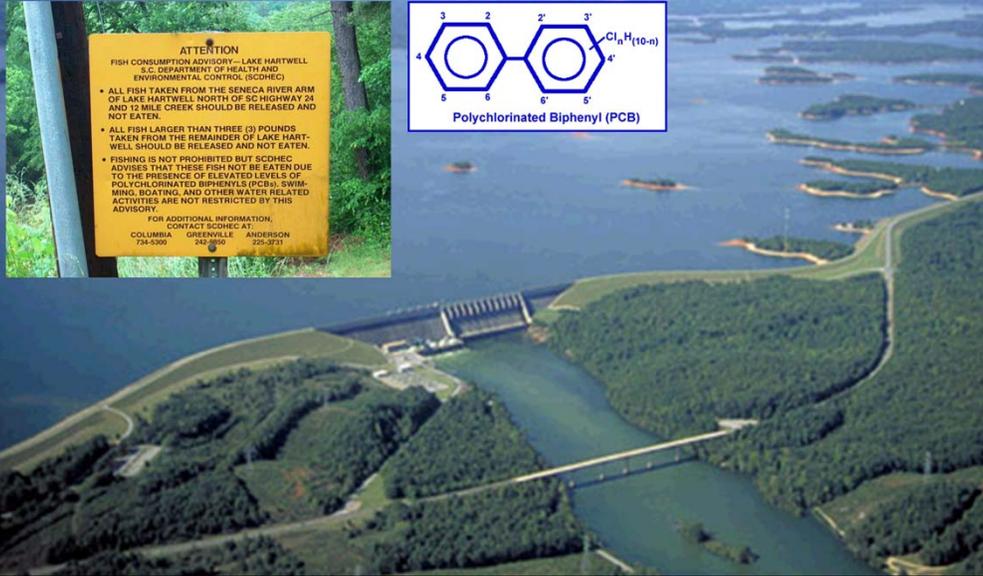
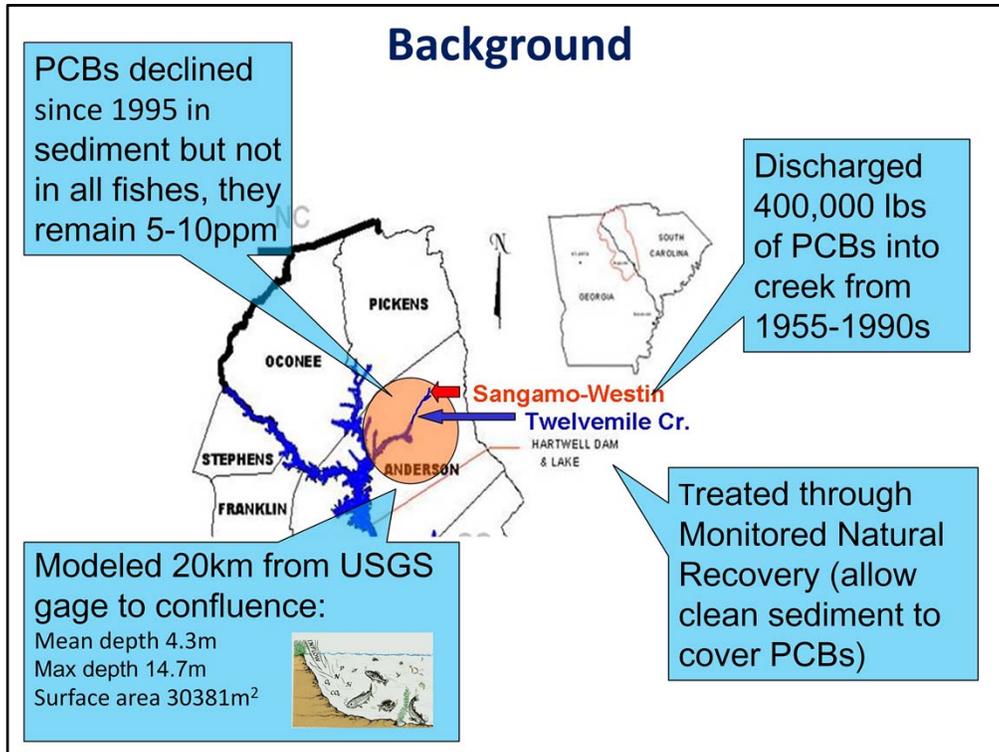


Lab 8: PCBs in Lake Hartwell, SC

prepared by Brenda Rashleigh, ORD USEPA, Athens GA



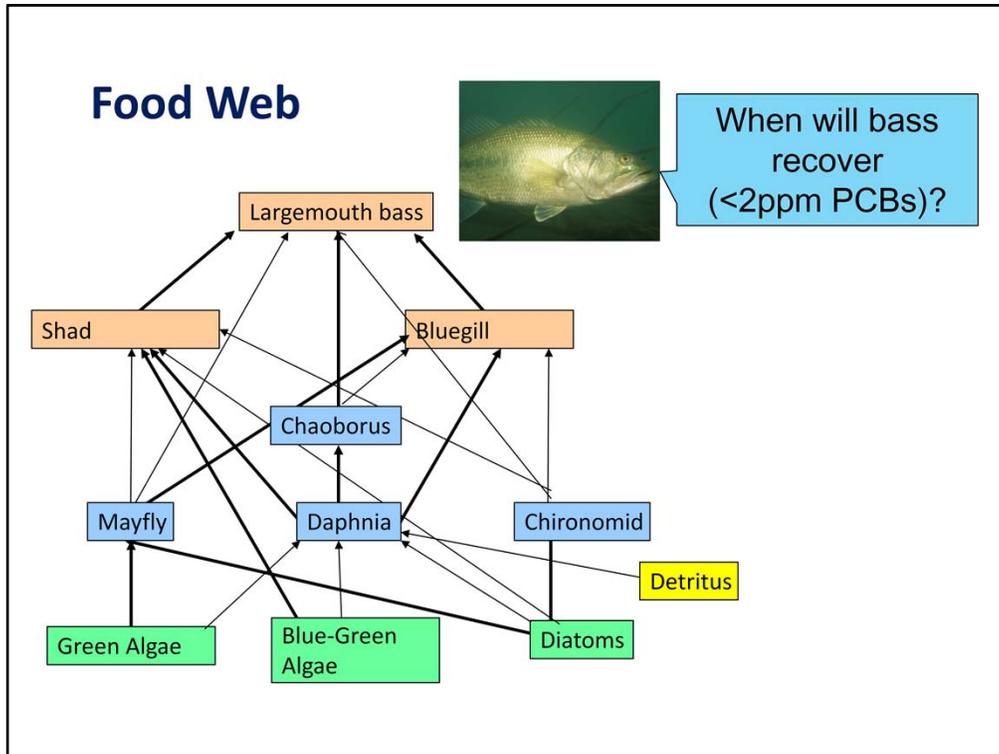
We will use **Lab8_Lake_Hartwell_PCBs.aps** in the Data directory.



Sangamo manufactured PCB-containing electrical capacitors there during 1955-76.

They removed wastes and treated soil and groundwater. Creek and lake treated by MNR (Monitored Natural Recovery), letting incoming sediment cover and bury the deposited PCBs

Sediments – 1 ppm level set by the Record of Decision (ROD) in 1994



This graph shows the feeding relationships among the biota.

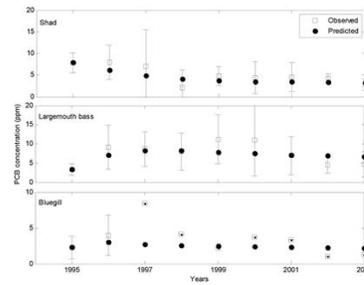
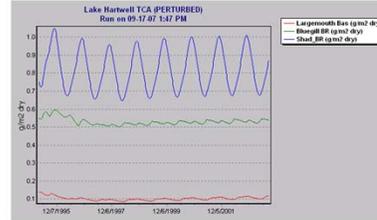
Thick lines are strong interactions, thin lines are weak interactions.

This is a fairly standard lake foodweb. Of primary concern is the concentration of PCBs in largemouth bass.

Model Application

✓ Calibrated fish biomass to Dept. of Natural Resources data

✓ Compare to measured PCB data

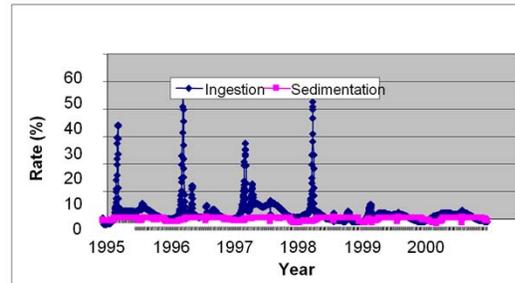
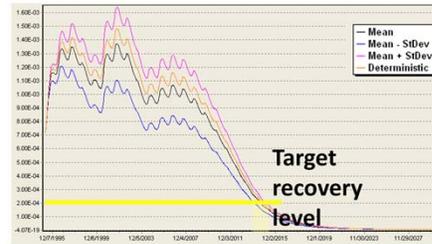


Model Analysis

✓ Ran future scenarios with uncertainty

✓ Sensitivity analysis

✓ Examined rates

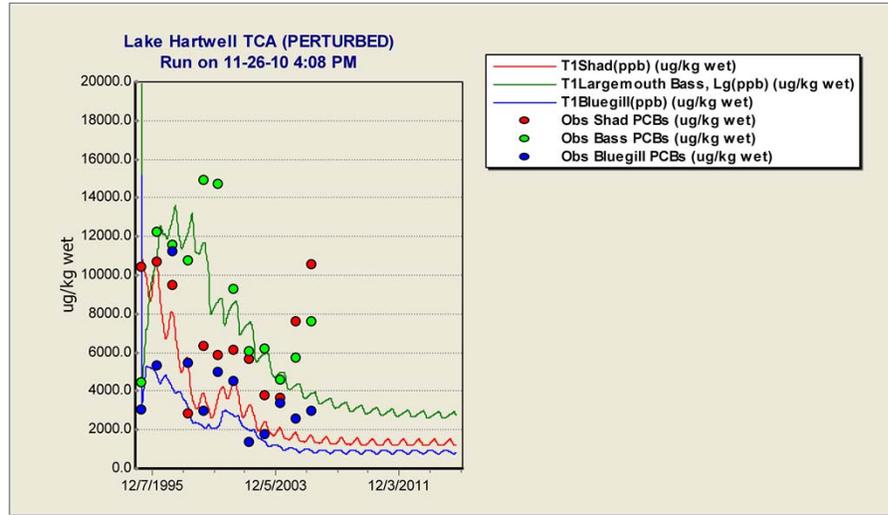


For Lab

- We will use in the Data directory:
Lab8_Lake_Hartwell_PCBs.aps.
- Run model with alternative inputs for PCBs in Suspended and Dissolved Detritus
 - Examine PCBs in Fish
 - compare to 2000 ppb recovery level

In order to look at the effects of alternative PCB inputs from Suspended and Dissolve Detritus, multiply the dynamic inflow loadings of chemical exposure by 2. Be sure to set the simulation to run until 2012 in the Setup menu.

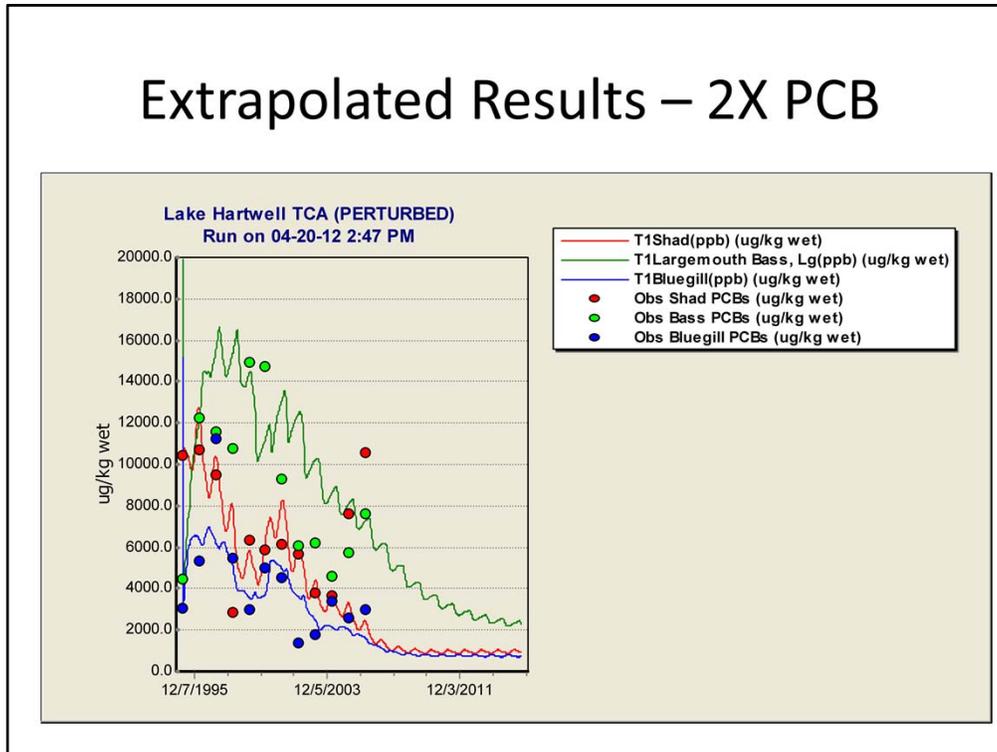
Extrapolated Results - Original



You can see one approach by loading: **Lab8_Lake_Hartwell_PCBs_extrapolated.apr** and **Lake_Hartwell_PCB_Idgs.xlsx.xls**

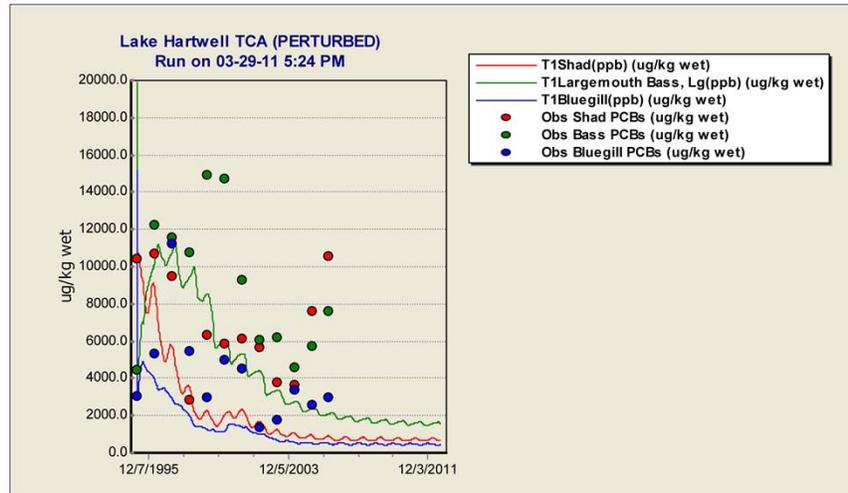
How might you improve on the extrapolation?

Extrapolated Results – 2X PCB



Previous results showed that both Bluegill and Shad would be reduced to PCB levels below 2000 ppb by 2003. When the PCB loadings from the suspended and dissolved detritus is doubled, Shad does not reach the recovery level before 2005, and it takes Bluegill until 2004 to be under 2000 ppb.

Extrapolated Results – 0.5X PCB



Previous results showed that both Bluegill and Shad would be reduced to PCB levels below 2000 ppb by 2003, while Largemouth Bass (LMB) would not arrive to concentrations lower than 2000 ppb before 2012 . When the PCB loadings from the suspended and dissolved detritus is halved, Shad reaches the recovery level in mid 2001, and Bluegill is under 2000 ppb by mid 1998. In addition, a lower PCB loading from the sediment allows the LMB concentration be below the recovery limit by the end of 2006.