**Lake P modeling:**

1. Run the script and explore: What does the input data consist of? What does the constants describe? What is the initial model values for the zooplankton, phytoplankton, water and sediment P pools?
2. Run the model and plot it (line 42 in the script). Is the lake in equilibrium with the initial values entered into the model?
3. Open the data.R file which contains the model input data. Change some values, save the file and run the lake\_p\_model.R file from the start. How does the changes affect the model?
4. How low does the inlet concentration have to be in order to half (approximately) the P in the phytoplankton pool?
5. How long time will it take before the lake reaches a new equilibrium? Try to change the time settings (dt and tmax in lake\_p\_model.R file) to make the model run for longer time.
6. What happens with the lake if the stream running through the lake is partially diverted?
7. What happens if all of the sediment is removed to remove the internal load? Will this very costly project have an effect on the transparency of the water?
8. What happens if oxygen is added to the bottom water of the lake to ensure oxygenated conditions?
9. What happens with the different P pools if the lake is bio-manipulated through removal of planktivorous fish?
10. Will a single treatment with AlCl be able to improve the trophic state of the lake. Remember that AlCl dissociates into Al3+ that binds PO43- forming insoluble AlPO4 that sinks out to the sediment