ESM 223 Soil & Groundwater Quality Management

Assignment #1

Due: Friday 1/27/06 via email to keller@bren

In the report by SFEI on “Contaminant Concentrations in Fish from the Sacramento–San Joaquin Delta and Lower San Joaquin River”, they present their approach for characterizing the contamination in this region. Your task is to analyze the concentrations and determine whether there is an elevated risk to (1) someone ingesting these fish as their main food source, and (2) only for recreational purposes, assuming an avid fisher that catches a fish every other week. You will have to make assumptions about exposure frequency, diet, etc. This is training for real life...

The **objective of this assignment** is to have you understand a site characterization (summarized in the report in terms of sampling approach), then do some calculations to determine the risks, and then determine which pollutant and pathway represent the major risk. The pollutants of interest are organics and metals. Consider only the sum of DDT compounds (DDT, DDD, DDE), the sum of PCBs, chlorpyrifos, arsenic and mercury. Prepare a spreadsheet with your calculation of the risk for ingestion of contaminated fish only.

You can find the RfDs and CRs in Watts, Soesilo, or the USEPA website. You should also compare the concentrations against MCLs, CCC or CMC if they exist. For non-carcinogenic risk, consider an exposure duration of 30 years, and for carcinogenic risk (if there is such risk) a lifetime of 70 years. Be careful with the units. Work out the calculations of DDT out by hand and then use Excel or another spreadsheet program to do the calculations for other pollutants. Add up the risks from different exposure routes and pollutants to calculate the total carcinogenic and non-carcinogenic risk.

**Briefly describe your work in an Executive Summary (max. 2 pages):** short introduction to the problem, analysis performed, results and recommendations: critical pollutant(s), critical population(s), and recommend whether action is necessary or not. Briefly comment on the likelihood that contaminated fish would be used for these activities. Make sure the Executive Summary has a table with your numerical results, but **do not** include equations or the details of every calculation – it is for someone who needs to make a decision, not someone who needs to repeat your calculations. Your hand calculations can be handed in on Monday 1/30 in class, or earlier. They are only so I can track down any potential mistakes or differences in assumptions.