

DSM2 Bay-Delta Tutorial 3: Source Tracking (Fingerprinting)

Purpose: The purpose of this tutorial is to use the source tracking capabilities of the model to create a fingerprinting study. We will set up both volumetric and concentration-based fingerprinting and visualize the results.

1. Reopen the historical tutorial

- a. In windows, navigate to `\{DSM2_home\}\tutorial\historical`.
- b. In the GUI, open `historical_tutorial`.

2. Create a model for source tracking:

In the background, source tracking imposes a computational cost on QUAL that is the same as one additional constituent per source. For this reason, it is useful to comment out source tracking.

- a. In `historical_qual_ec.inp`, locate the GROUPS include section.
- b. Uncomment the group definitions for source tracking. You may wish to review this file to see how the groups are identified.
- c. Similarly uncomment the two finger printing files – the ones that have “source_track” in their names.

3. Define volumetric inputs

- a. Create a file called `tutorial_volumetric_fingerprint.inp`. Go through each of the time series input files for QUAL and create an equivalent input that has a constant value of 100 with the constituent called `volume`. This step is conceptually simple, but will produce a large file – feel free to break it into several files if you prefer.

4. Define the fingerprinting output

- a. Specify Clifton Court concentration output for each of the source groups that you defined for both EC and for `volume`. The name should be `clifton_court`, the concentration should be `ec` or `volume` and the interval should be 1day. Avoid

redundancy -- you do not need to put the constituent name or the source into the output name: ie, use "clifton_court" for the name, not "clifton_ag" or "clifton_ec"

5. Run HYDRO and QUAL for One Year

- a. Change the model name in qual_ec.inp and run HYDRO and QUAL for one year in 2002. Start QUAL a day later to avoid mass conservation errors in the first hour. Make sure the init_conc variable is set to zero so that there will be no initial condition contribution for any variables (note: for a volumetric fingerprint, it may be useful to make this concentration 100 if you want to include initial conditions in the fingerprint analysis).

6. Process the output

- a. Use VISTA or HEC-DSSVUE to open up the output file. Copy May-September concentrations for each location. Paste the output into a new sheet in the Excel provided called excel_fingerprint.xls, which you can use as a reference. Use the "stacked area plot" in Excel (one of the standard Excel plot types) to plot up the fingerprint results.