Chapter 25: Conducting Tabular Ecological Risk Assessments in SADA

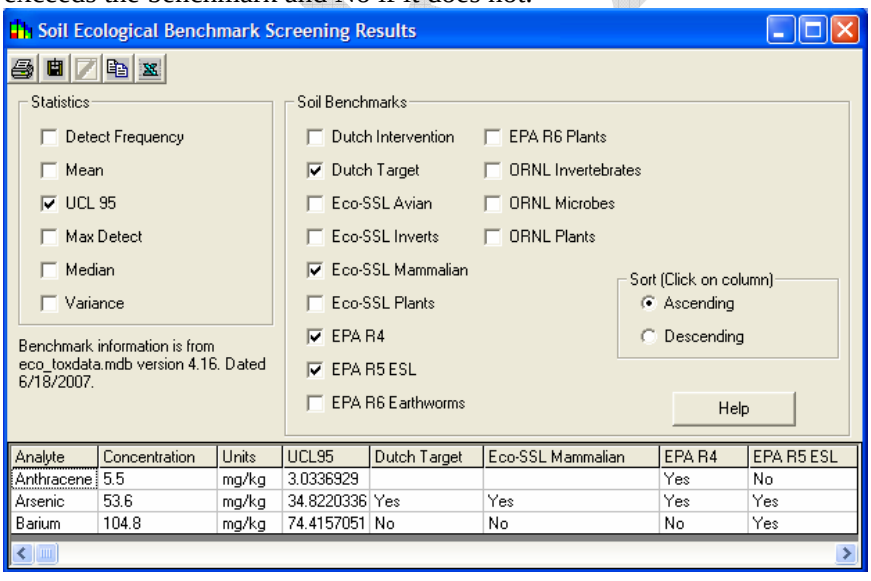
Assuming you have already explored your data (see Chapter 11: Visualizing and Exploring Your Data), you may want to screen observed contaminant concentrations against benchmark values. This is the screening step in ecological hazard identification, or Step 2 in the EPA ecological risk assessment process.

Benchmark Screening

To conduct the benchmark screening, you need to select a contaminant(s), select a screening statistic (usually the maximum detected concentration), and a benchmark(s). In the previous chapter, we discussed how to set the screening statistics option. The simplest screen is a pass/fail comparison of the maximum concentration against a conservative screening benchmark. SADA allows you to specify the screening statistic (default is maximum detected value) and choose a single benchmark source.

If you do not already have EcologicalRisk.sda open (created in an earlier ecological chapter), open it now. From the main menu select select Ecological→Benchmark Screens. SADA will respond with the Soil Ecological Benchmark Screening Results window. This includes a column listing contaminants, a column showing the screening exposure concentration, a units column, the option of showing additional statistics (i.e., mean, UCL95, max detect), and columns for each benchmark selected.

You select the benchmarks you want used by clicking the appropriate box. SADA responds by comparing the exposure concentration to the benchmark and reporting Yes if the concentration exceeds the benchmark and No if it does not.



Analytes with maximum concentrations below a conservative benchmark do not need to be evaluated further in an ecological assessment. Those that failed the screen, having maximum concentrations above the benchmark as indicated by Yes, merit further investigation. If no

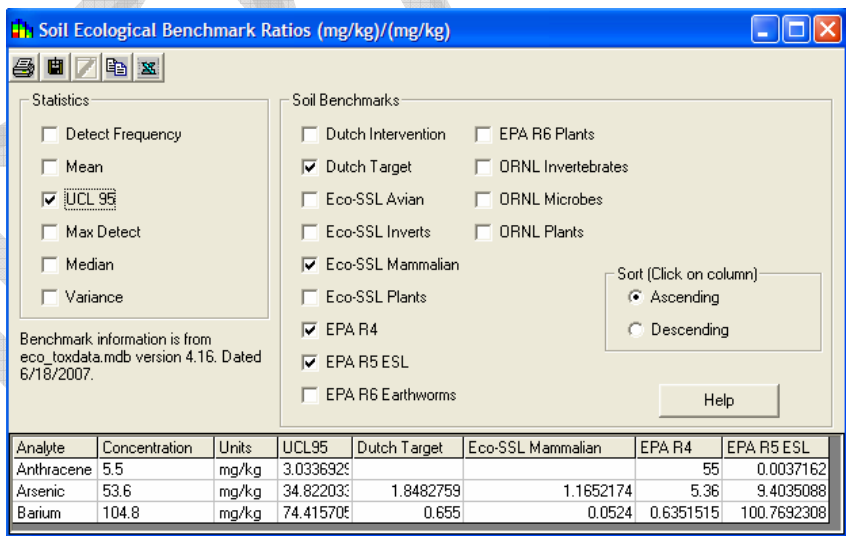
analytes at a site exceed the screening benchmark, the entire site can be dropped from further investigation.

Tip: It is rare for a single benchmark source to have values for all analytes in a site data set. It may be desirable to create a custom analysis data set that draws from a number of benchmark sources to populate the benchmark database. This could involve selecting a primary source and then filling in the gaps using other sources. SADA allows users to select a benchmark hierarchy for single contaminants when plotting screening results but not for tabular results which can contain multiple contaminants. For tabular screens you need to create a custom analysis or edit an existing benchmark field in the ecotox database so that it represents the screening values to be used for your site. Essentially you are manually creating the benchmark hierarchy. Any time you tweak SADA like this it is important to fully document what you have done, and it is best to reach agreement with regulators and stakeholders ahead of time.

A simple pass/fail screening analysis does not provide any information about the magnitude of exceedances. Often it can be more illuminating to conduct the screen similarly but output ratios of maximum concentrations to benchmark values. The interpretation of the results is similar, but instead of Yes/No, it is >1/<1. Ratios less than 1 indicate the maximum concentration was below the benchmark value; those greater than 1 indicate the concentration exceeded the benchmark value.

Benchmark Ratios

Tabulation of the ratios is set up the same way as for Benchmark Screens. Select Ecological→Benchmark Ratios, then select the benchmarks to screen against. SADA responds with the Ecological Benchmark Ratios window with numeric benchmark ratios instead of Yes/No values. These can be printed, saved to a file, copied, or exported to Excel.



Important Note: The default exposure statistic for Benchmark Ratios is the lower of the maximum detect and the UCL95. If computing ratios for screening purposes, be sure to change the exposure statistic (not the screening statistic) to that you want used for the ratio screen. To change the exposure statistic, select Ecological→Configure Ecological Risk→Set Exposure Statistics.

See Chapter 25 for information on conducting a spatial ecological screening (i.e., mapping the screening results generated above).