

Hydroinformatics

Individual Learning Opportunity 5

Querying, Visualizing, Transformation, and Analysis

Due Date: October 11th

Learning Objectives

1. Store, retrieve, and use data from important data models used in Hydrology such as the CUAHSI Observations Data Model (ODM)
2. Design and use relational databases to organize, store, and manipulate data
3. Query, visualize, transform, and analyze data using Structured Query Language (SQL), Excel, R, and other software systems
4. Create reproducible data visualizations

Computer and Data Requirements

1. A copy of the Little Bear River ODM database is available on the class server. See the instructions for completing this ILO for information on how to connect to the Little Bear River ODM database to retrieve data.
2. R statistical computing software available in the 3rd floor Engineering computer lab or downloaded for free from <http://www.r-project.org>.

The Problem

Agricultural runoff and pollution from other sources have contributed to elevated phosphorus concentrations in the Little Bear River. State of Utah regulators are concerned that this loading may be causing total phosphorus concentrations to exceed the in-stream numeric water quality standard of 0.05 mg/L and allowable daily load of 9 kg/day to Cutler Reservoir set forth in the Total Maximum Daily Load (TMDL) for the Little Bear River. Use the data for the Little Bear River at Mendon Road and the instructions provided to determine the percent of time during the calendar year 2007 (January 1, 2007 to December 31, 2007) that: 1) estimated total phosphorus concentrations in the Little Bear River at Mendon Road exceeded the in-stream standard of 0.05 mg/L; and 2) estimated daily total phosphorus loads to Cutler Reservoir exceeded the allowable daily load of 9 kg/day. Can you draw conclusions about the timing or frequency of the exceedences? Based on your analyses, are water quality standards being met in the Little Bear River?

Deliverable

Provide a one-page briefing report to State of Utah Regulators that reports the total phosphorus concentrations and loads for the year 2007 in the Little Bear River at Mendon Road, your calculated percent exceedences of the water quality criteria for concentrations and loads, and your conclusions about whether water quality standards are being met. Include any plots or tables as appendices.