

## **Chester Morse Lake Temperature and Sediment Modeling**

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Chester Morse Lake is a drinking water reservoir located approximately 25 miles east of Kent, Washington. This reservoir, managed by Seattle Public Utilities (SPU), provides 2/3 of the drinking water supply to some 1.3 million residents of the region. In addition to water supply, this reservoir also provides hydroelectric power generation, water storage, instream flow management, and flood control for the Cedar River.

Temperature and turbidity conditions in the reservoir are of considerable concern for both drinking water and the wellbeing of various fish species, including salmon and bull trout that inhabit the lake, its tributary streams, and the Cedar River downstream of the dam. The reservoir is currently being managed with the objective of safeguarding both drinking water quality and viable fish habitat. The operation of the dam is currently limited in effectiveness by being reactive to observed conditions without the ability to look ahead to see how various management schemes could affect temperature and turbidity.

In order to address these concerns, a hydrodynamic and water quality computer model, CE-QUAL-W2, is being developed for the Cedar River system. Using turbidity and temperature data collected by SPU as well as flow and meteorological data provided by the U.S. Geological Survey, this model will be used as a tool to describe present conditions and to predict future reservoir conditions (temperature, turbidity, etc.) under various management schemes.

Considerable work has been carried out by SPU to document the seasonal behavior of three salmonid species in the reservoir system. These data will be used in conjunction with CE-QUAL-W2 to develop a fish bioenergetics model of the Cedar system. This model will allow decision makers to gage how various management strategies could impact sensitive fish populations.

### **Vanessa Wells**

Vanessa Wells received a Bachelor of Science Summa Cum Laude degree in Civil and Environmental Engineering from Portland State University (PSU) in 2008. While completing her Bachelor's degree, Vanessa worked with the Water Quality Modeling group at PSU as an undergraduate research assistant. She continues her research with this group as a graduate research assistant while pursuing her Master's degree in Civil and Environmental Engineering. Her research interests include hydrodynamic and water quality modeling as well as fish behavior and bioenergetics. She has participated in projects modeling Lake Roosevelt and the lower Spokane River, Washington; Tenkiller Reservoir, Oklahoma; Tolt Reservoir, Washington; and the Pend Oreille River, Washington. Her Master's thesis focuses on the integration of a hydrodynamic and temperature model with a fish bioenergetics/transport model of Chester Morse Lake, Washington. Vanessa is a member of Chi Epsilon, the national Civil Engineering Honor Society.