

## AQUATOX Model Calibration on the Lower Boise River

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Two Assessment Units (AUs) of the lower Boise River, Middleton to Indian Creek and Indian Creek to the mouth, are currently identified as impaired due to excess nutrients in the form of Total Phosphorus. Idaho DEQ, in consultation with the Lower Boise Watershed Council (LBWC), is currently developing a Total Maximum Daily Load (TMDL) for the river to address phosphorus-related impairments. During this process, Idaho DEQ and the LBWC have identified a numeric nuisance aquatic algae target for the impaired AUs of the lower Boise River: mean benthic chlorophyll a biomass (periphyton or attached algae) of < 150 mg/m<sup>2</sup>.

Biotic responses to nutrients often depend on temporally- and spatially-varying site specific characteristics such as, stream morphology, hydrology, turbidity, temperature, and nutrient loads. Because these complex interactions are also evident on the lower Boise River, DEQ is utilizing the AQUATOX model as a means to effectively and efficiently help identify the quantitative relationships between nutrient loads and site-specific water quality and ecological response indicators, such as attached algae, for the development of phosphorus allocations in the TMDL.

DEQ, in consultation with the Environmental Protection Agency (EPA) and the LBWC Model Workgroup, has calibrated the AQUATOX model for current conditions on the lower Boise River. This calibration effort focused on utilizing the best available data and professional judgment from various experts to appropriately adjust model parameters for improving the fit of model simulations with observed data, while also clearly documenting the quantifiable variability of model results.

From here, DEQ hopes to utilize the current model calibration to develop phosphorus reduction scenarios in the TMDL, as appropriate, that will meet the 150 mg/m<sup>2</sup> periphyton target and result in full support of associated beneficial uses.