



March 6, 2014

Lower Boise Watershed Council

Subject: Lower Boise Watershed Council Support for the AQUATOX Model Calibration:
"2014_0203_ATX_LBR_Linked_Existing_Conditions_DDS.als"

Dear Council Members:

The Idaho Department of Environmental Quality (DEQ) respectfully requests the Lower Boise Watershed Council (LBWC) vote to support the AQUATOX model calibration, *"2014_0203_ATX_LBR_Linked_Existing_Conditions_DDS.als,"* as an appropriate tool to help:

- Evaluate periphyton-phosphorus relationships, among other relevant environmental and anthropogenic factors in the lower Boise River (LBR), and
- Develop appropriate phosphorus allocations in the LBR Total Phosphorus (TP) Total Maximum Daily Load Addendum (TMDL), designed to achieve the mean benthic chlorophyll a target of $\leq 150 \text{ mg/m}^2$ in the phosphorus-impaired assessment units of the LBR.

Background

On February 5, 2014, with help from LBWC and other inter-agency model workgroup participants, DEQ completed the AQUATOX model calibration, *"2014_0203_ATX_LBR_Linked_Existing_Conditions_DDS.als"* (hereafter referred to as, 2014_0203 Model Calibration). DEQ then notified the LBWC and other stakeholders of the 2014_0203 Model Calibration, and provided them access to the model, draft model report, model import files, and other model documentation via email and links on the DEQ LBR Watershed Advisory Group (WAG) webpage. All draft model information was previously made available to the LBWC and stakeholders via email and links on the WAG webpage.

The AQUATOX calibration process began April 2013, and involved 29 model workgroup meetings. A core group of participants, including the Environmental Protection Agency (EPA), LBWC and Technical Advisory Committee (TAC) members, the AQUATOX model developers, and others helped DEQ develop, review, and provide feedback throughout the calibration process. DEQ also dedicated 3 TAC meetings to present, discuss, and inform TAC members of the calibration process and the 2014_0203 Model Calibration.

Model Accuracy and Goodness-of-Fit

For the 2014_0203 Model Calibration, DEQ evaluated and described the model accuracy, error, and goodness-of-fit using multiple lines of evidence, including the examination of:

- Absolute mean error (AME) for 15-day rolling means of daily model output for periphyton biomass
- R^2 correlations between monthly mean simulated, measured, and historical periphyton biomass

- Differences in periphyton monthly mean simulated biomass relative to measured and historical data
- AME for daily model output of nutrient concentrations/loads

Model accuracy goals that were achieved include:

- The AME target of ≤ 71 for 15-day rolling means of daily model output for periphyton biomass
- Positive correlations between all monthly modeled periphyton simulations and measured data, except at Eckert Road
- Simulated mean monthly and annual periphyton biomass that reflect measured data
- Simulated periphyton community compositions that reflect measured data and DEQ's conceptual understanding of the biotic community
- Simulated time-series periphyton biomass within the range of measured and historical data
- The AME target for daily model output of nutrient concentrations/loads within 25% of the range of measured field data

Model Application

DEQ intends to use the 2014_0203 Model Calibration as a tool, among multiple lines of evidence, to help identify appropriate modeling scenarios and phosphorus allocations designed to achieve the mean benthic chlorophyll a target of ≤ 150 mg/m² in the LBR. DEQ acknowledges that models, like AQUATOX, are very useful tools to better understand complex environmental relationships, such as those among nutrients, periphyton, and other environmental and anthropogenic factors.

Other Considerations

1. *Snake River-Hells Canyon TMDL*: DEQ recognizes that in addition to identified or modeled nutrient-periphyton relationships, the LBR TP TMDL is required to identify TP allocations that meet the May-September Snake River-Hells Canyon TMDL target of 0.07 mg/L.
2. *Idaho Water Quality Standards*: In addition to the benthic chlorophyll a target, statewide numeric Idaho Water Quality Standards must be met, as well as those specific to the LBR Subbasin (58.01.02.278.01-05). These include standards for dissolved oxygen, pH, and others that may indicate the impairment of beneficial uses due to excess nutrients or other pollutants.

Available Resources

All documentation, including the 2014_0203 Model Calibration, draft model report, import files, presentations, comments and responses, etc., are available via the DEQ LBR WAG webpage: <http://www.deq.idaho.gov/regional-offices-issues/boise/basin-watershed-advisory-groups/lower-boise-river-wag.aspx>. Additionally, DEQ staff are available to assist the LBWC, TAC members, or other stakeholders in locating available information.

Sincerely,



Troy G. Smith
Watershed Coordinator