Lower Boise Watershed Phosphorus TMDL Technical Advisory Meeting

Modeling Status Update

May 23, 2013

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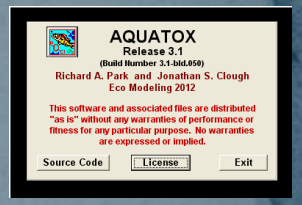
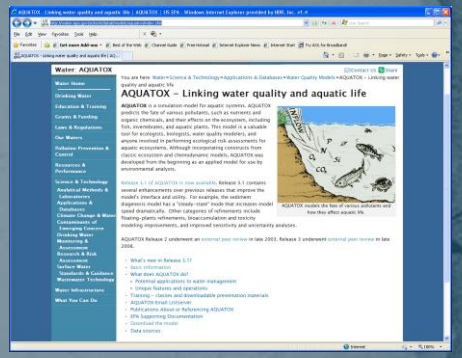
Status of Modeling

- USGS efforts for DEQ (Alex Etheridge will present)
- DEQ efforts and support from TAC members
- DEQ established Modeling Group
  - October 11th Council Meeting - "Recommend establishing a working group to look at models to see what will work for our plan. Start sooner than later with this effort. DEQ will send out an email to determine interest. Ben from EPA is available and will help with the modeling."
  - DEQ posted information and provided updates at TAC and Council meetings
- DEQ held Modeling Workgroup Meetings
  - November 28, 2012
  - January 17, 2013
  - February 21, 2013
  - March 21, 2013

Modeling Workgroup Meetings

- November 28, 2012
  - Discussed history of Lower Boise River modeling efforts
- January 17, 2013
  - Discussed preliminary results of mass balance model
- February 21, 2013
  - Continued discussion of mass balance model
  - Discussed periphyton dynamics and modeling with AQUATOX and QUAL2Kw
- March 21, 2013
  - Continued discussion of mass balance model
  - DEQ announces model selection – AQUATOX
    - Publically available model from EPA
    - http://water.epa.gov/scitech/datait/models/aquatox/index.cfm





Modeling Process

- Model development
  - DEQ will own, house, and be responsible for the model
  - DEQ will tap the expertise of the TAC members
  - DEQ plans to build the model from the ground up and use previous work for reference
- DEQ held Weekly Modeling Work Sessions
  - April 2, 2013
  - April 9, 2013
  - April 16, 2013
  - April 23, 2013
  - April 30, 2013
  - May 14, 2013

Modeling Work Sessions: April 2, 2013

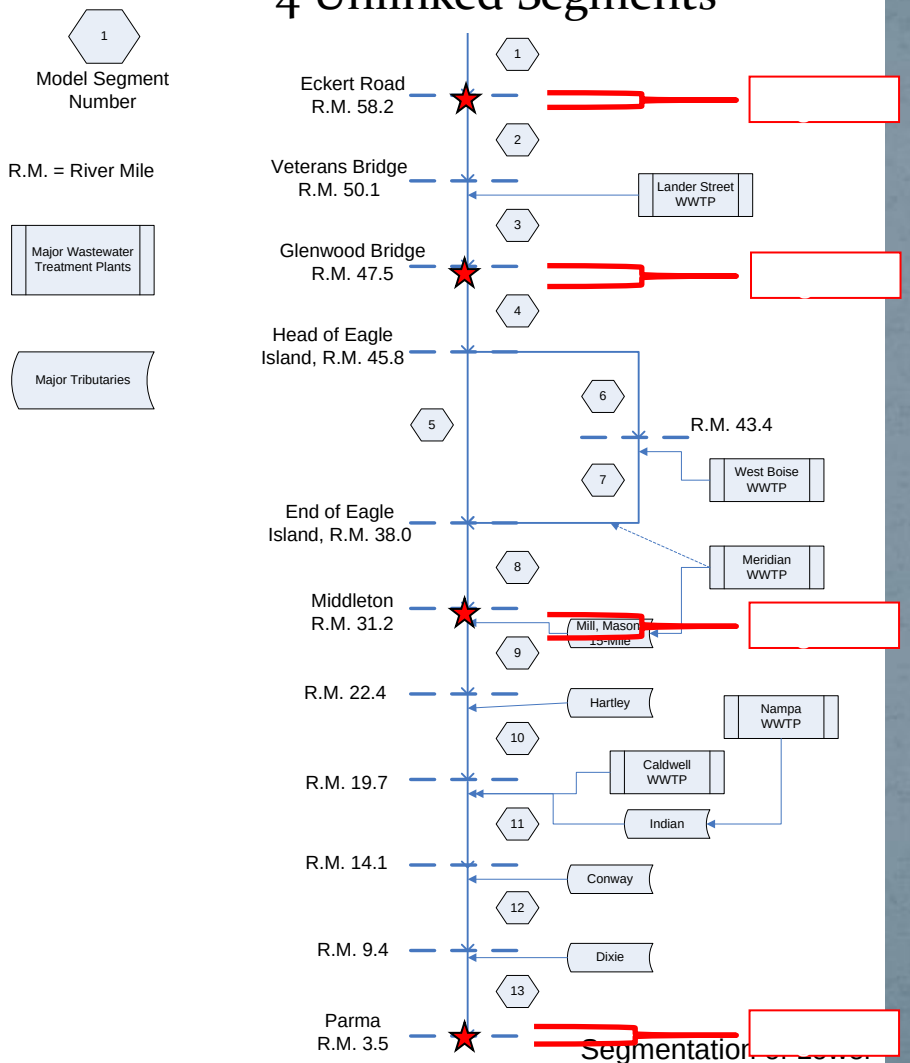
- Discussed approach for AQUATOX model setup
  - Segmentation (river reaches)
  - Linking (upstream conditions connected to downstream)
  - Time Period (period of simulation)
  - Flow
  - Parameterization (water quality inputs and coefficients)
- AQUATOX use includes translating the instream periphyton Chla target (150 g/m2) to a TP concentration
- DEQ will "own" the model but is looking for help building it from the stakeholders
- DEQ will start developing model report/documentation

Modeling Work Sessions: April 9, 2013

- Segmentation
  - Discussed segmentation: 4, 13, or other options
  - ★ Selected 13 segments rather than spend effort modifying (April 30th)
- Linking
  - Discussed unlinked vs. linked model
  - ★ Selected linked model
- Time Period
  - ★ Selected January 1, 2012 through April 30, 2013
  - "For initial model calibration and runs, we plan to implement a January 1, 2012 through April 30, 2013 time period. This will enable us to capture the entire year and USGS's synoptic events"

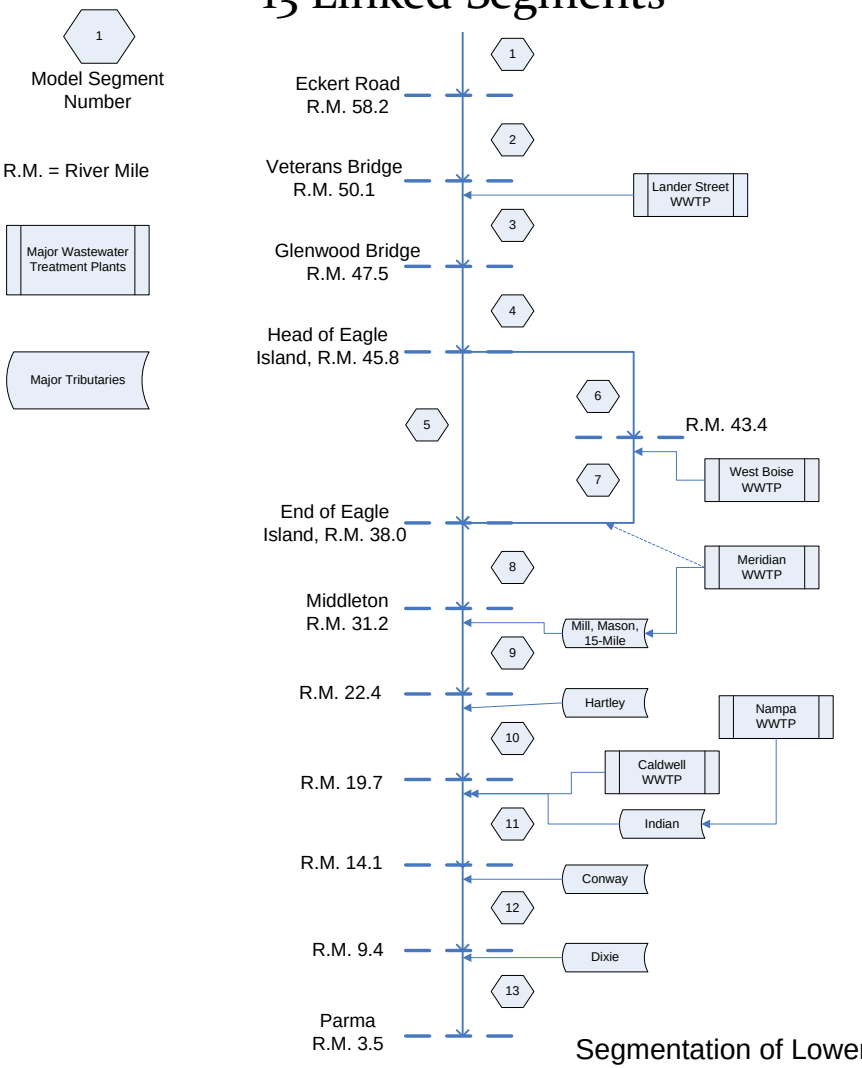
Segmentation and Linking

4 Unlinked Segments



Segmentation of Lower Boise River for Aquatox Model

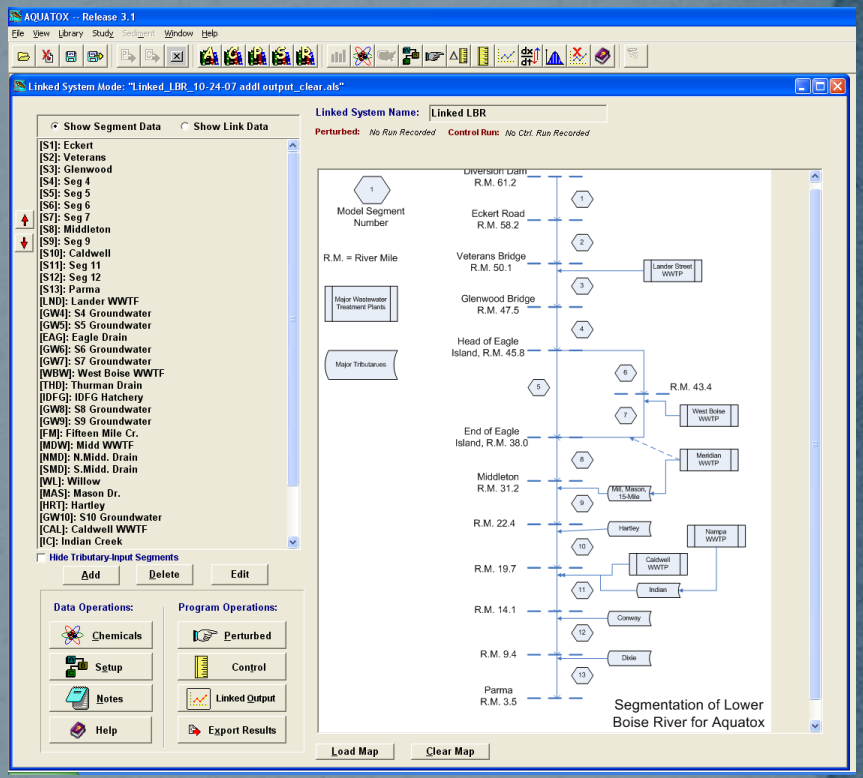
13 Linked Segments



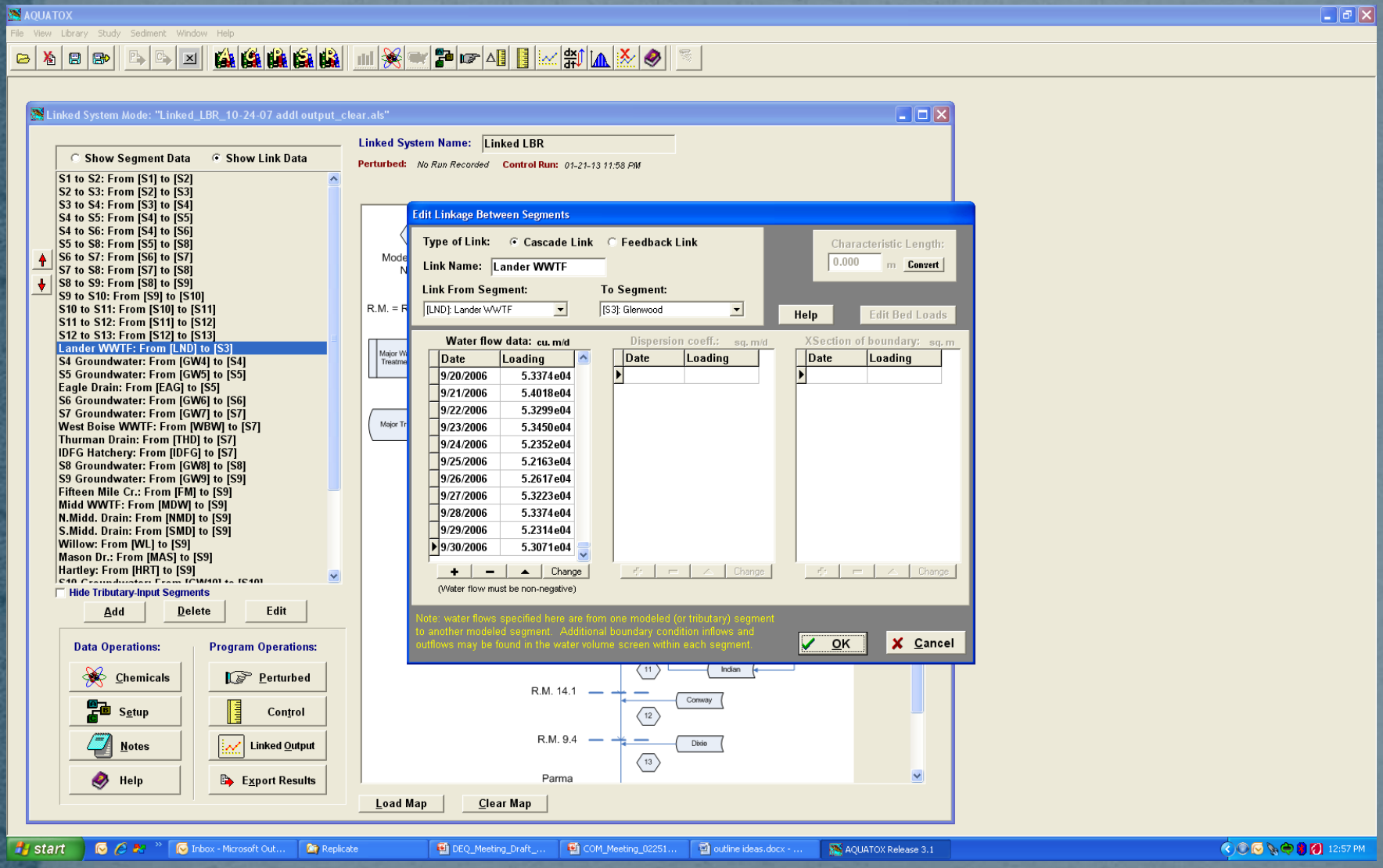
Segmentation of Lower Boise River for Aquatox Model

Modeling Work Sessions: April 16, 2013

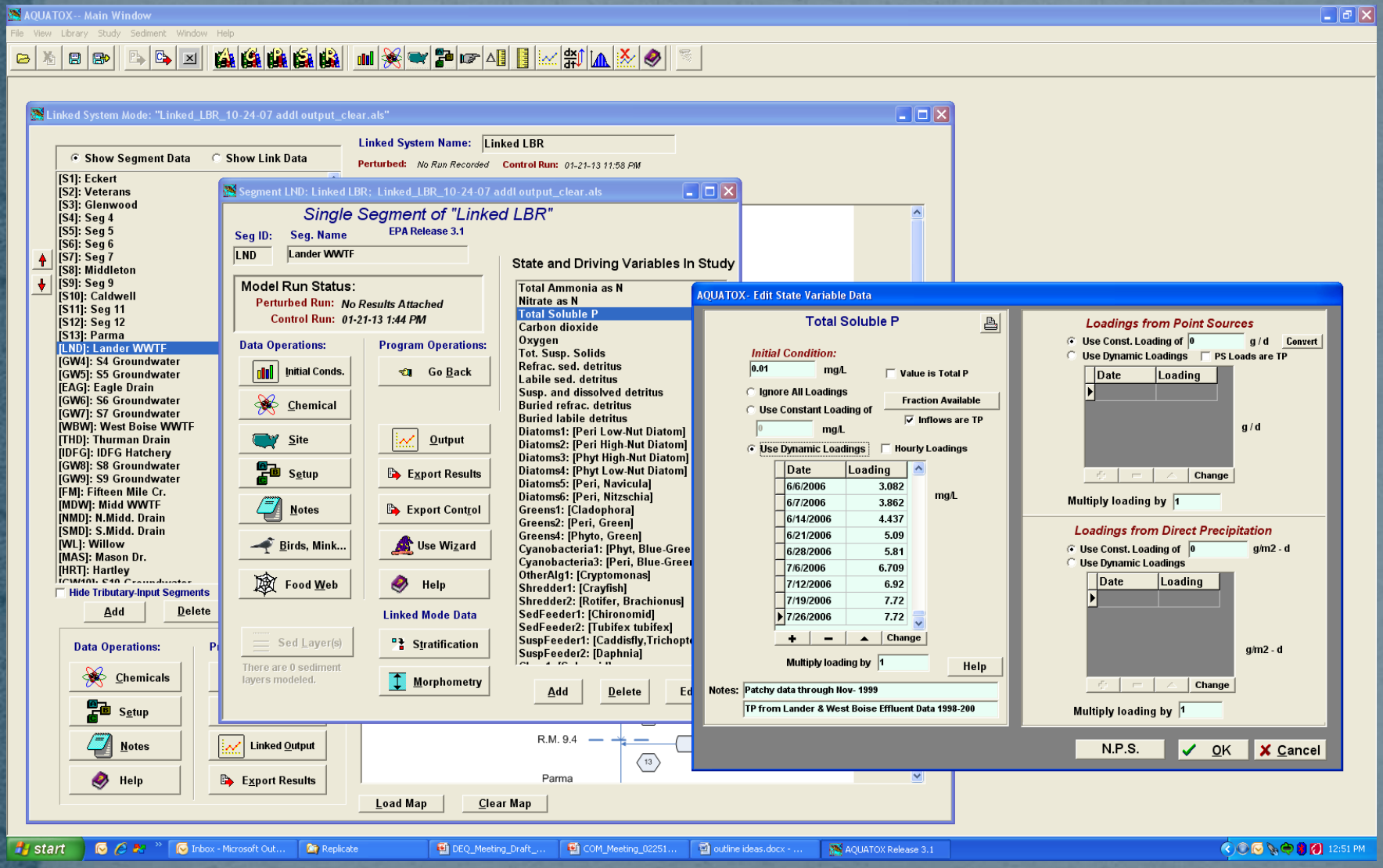
- Continue discussion of model setup, inputs, and calibration
- Parameterization
  - Selected for increased model simplicity and defensibility, animals (grazers) will not be included in the model simulations.
    - Tests with previous model revealed minor differences in results.
  - Use the same periphyton categories as in the previous model and continue to discuss



Model Input: Flow



Model Input: Concentration



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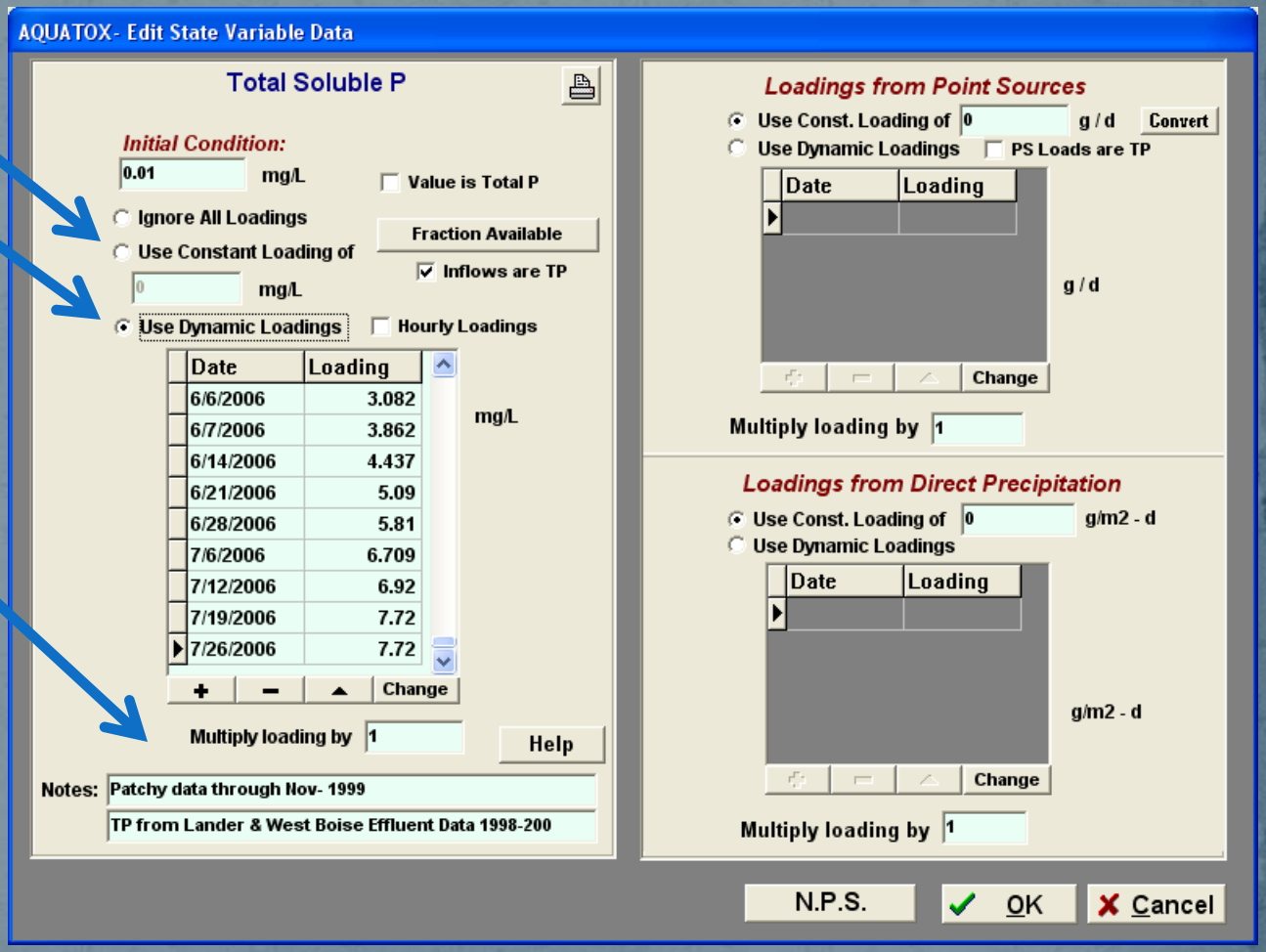
Model Input: Concentration Options

- Constant
- Time variable
- Reduction factor



Modeling Work Sessions: April 23, 2013

- Discuss plant (periphyton) categories
- Dr. Park performed test simulations
  - Recommended using at least four categories
- Discuss pebble counts and translation of periphyton data
  - Concluded should use 1997 data as basis to represent conditions
- DEQ to start compiling point source data

Modeling Work Sessions: April 30, 2013

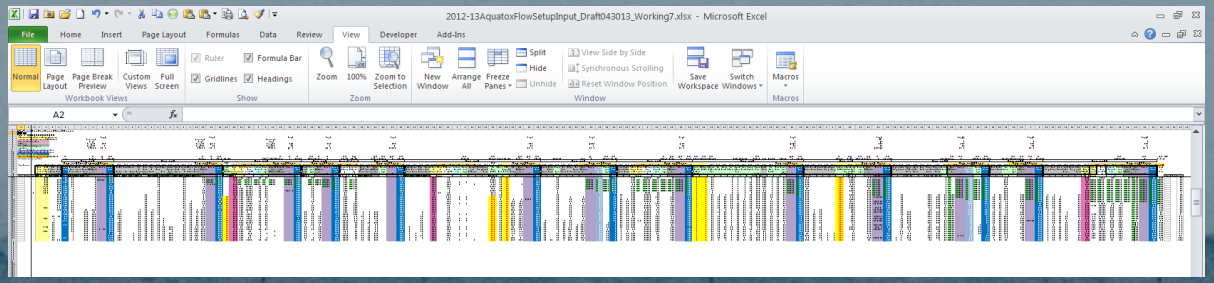
- Continue discussion of periphtyon data
  - May need a translator between field data and model results
    - Field data are from specific riffle locations
    - AQUATOX periphyton results are for a model segment
  - Ben Cope and Dick Park provided presentations
- Data compilation
  - Representatives for point sources compile data
  - Kate Harris compile flow and water quality for 2012-13
  - Michael Kasch use data to update AQUATOX model

Modeling Work Sessions: May 14, 2013

- Continue discussions
  - Compiling point source data
  - Periphyton representation and translation
  - Review of physical parameters

Flows:
Water Balance

- AQUATOX does not route flows
  - Water balance must be developed external to the model and flows input
- Acquired and reviewed water balance spreadsheets from previous modeling work
  - Used as a template with modifications for 2012-13
- Flow data sources
  - USGS, Reclamation, Water Resources, Point Sources
- Spreadsheet
  - 153 columns, 56 withdrawals, 21 inflows, 6 observation points and 70 calculations



AQUATOX Import Spreadsheet

- AQUATOX has a feature to import data from a spreadsheet
- Acquired and reviewed import spreadsheet from previous modeling work
  - Updated spreadsheet with 2012-13 flows and water quality data
  - Imported the spreadsheet into the AQUATOX model
  - Reset the simulation period
  - Simulated the model
- Model status
  - Functional model with majority of 2012-13 data
  - Spreadsheet may be updated and readily re-imported

Modeling Coordination

- Met with DEQ
- Discussed and provided files
  - Water balance spreadsheet
  - Import spreadsheet
  - AQUATOX model file
- Emailed files to Modeling Work Session attendees list

Next Steps

- Continue updating the model
  - Point source data
  - Fifteenmile and Indian Creek
  - Confirm water quality data
  - Review physical and mean depth data
  - Compare unaccounted (groundwater) flows between water balance spreadsheet and USGS mass balance model
- Develop plan for continuing to update the model and sharing of updated files
- DEQ review model support efforts and continue to lead model development
- DEQ develop modeling workplan and determine needs for additional assistance