

Potential AQUATOX Applications for Lower Boise TP TMDL Modeling

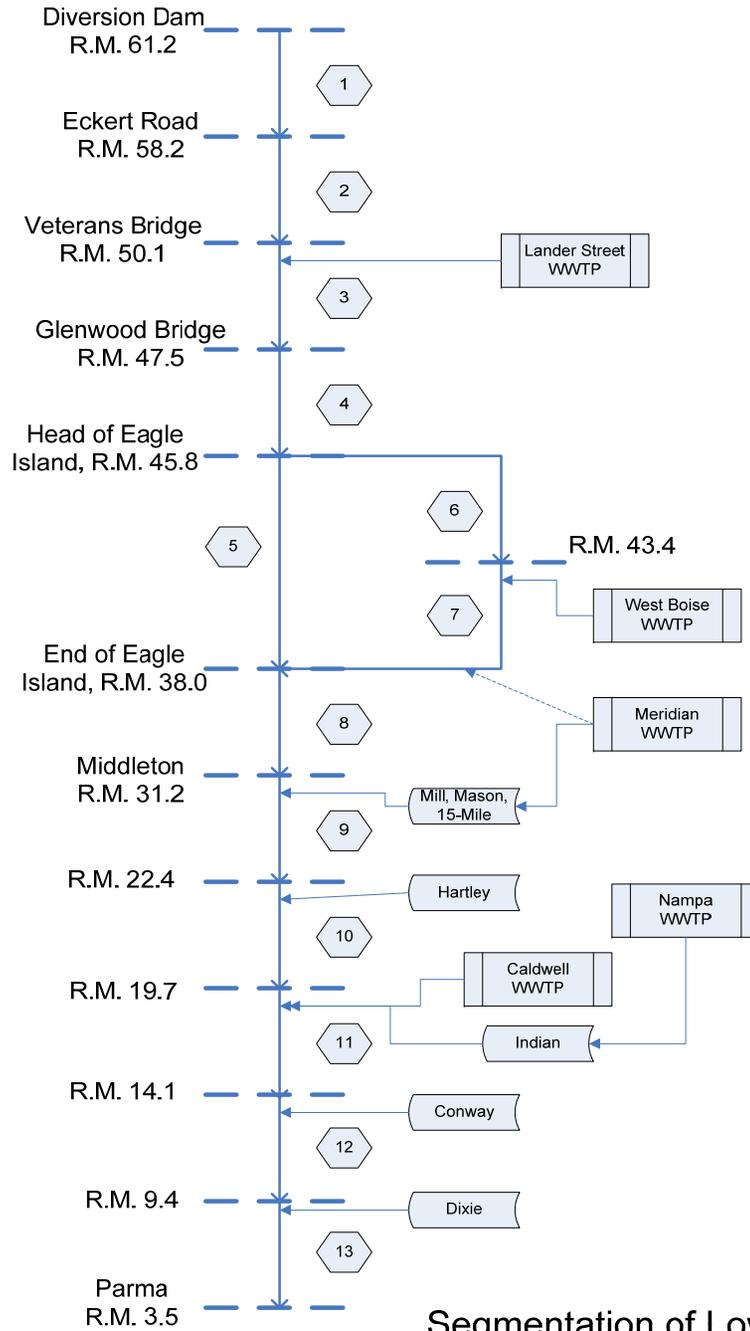
Tom Dupuis

February 21, 2013

Modeling Group Meeting

Available Segmentation for Lower Boise River

- Single Segments:
 - Set boundary conditions for each
 - Diversion Dam/Eckert Road
 - Glenwood
 - Middleton
 - Parma
- 4 Segment Version (not linked, share same parameter set)
- 13 Segment Linked Version



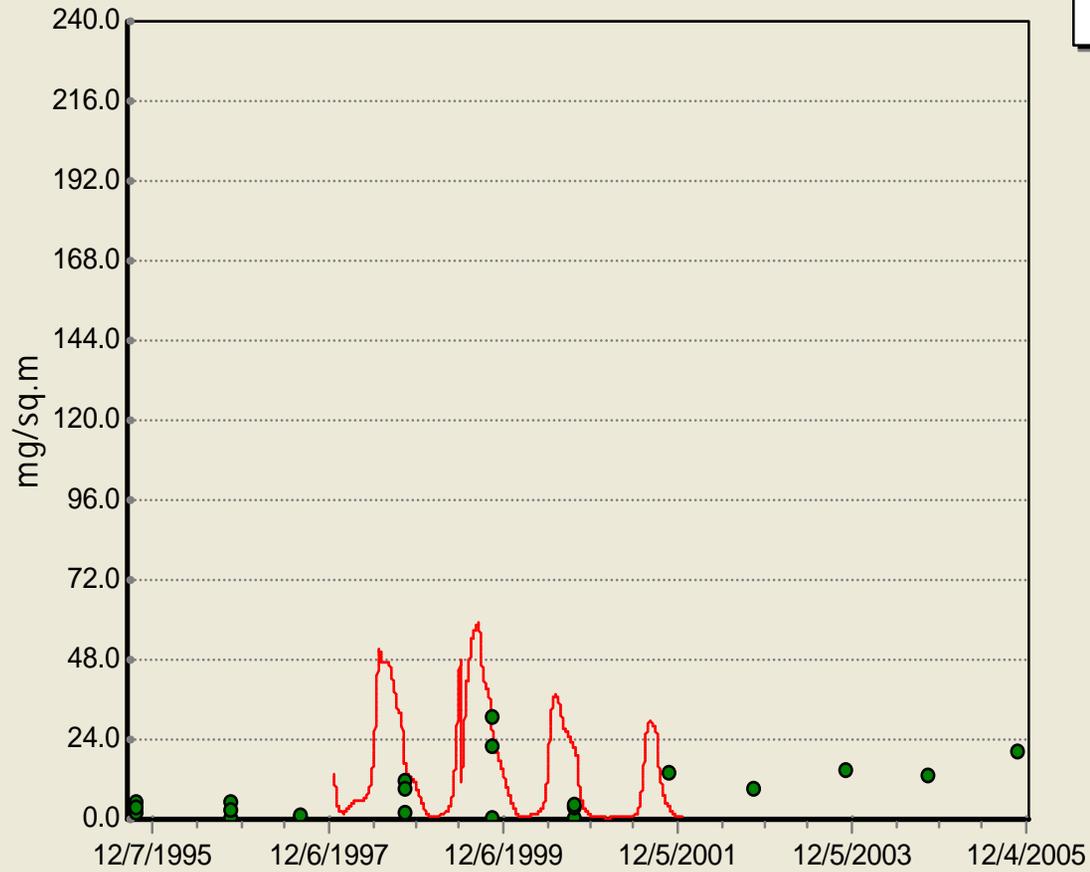
Segmentation of Lower
Boise River for Aquatox
Model

Calibration Process

- For Lower Boise Application, set up and calibrated by Dick Park and Jon Clough, model developers
- Initial calibration done with single segments and Minnesota rivers parameter set
- Very good calibration for periphyton chlorophyll
- Dick and/or Jon available to assist on limited basis via EPA HQ contract

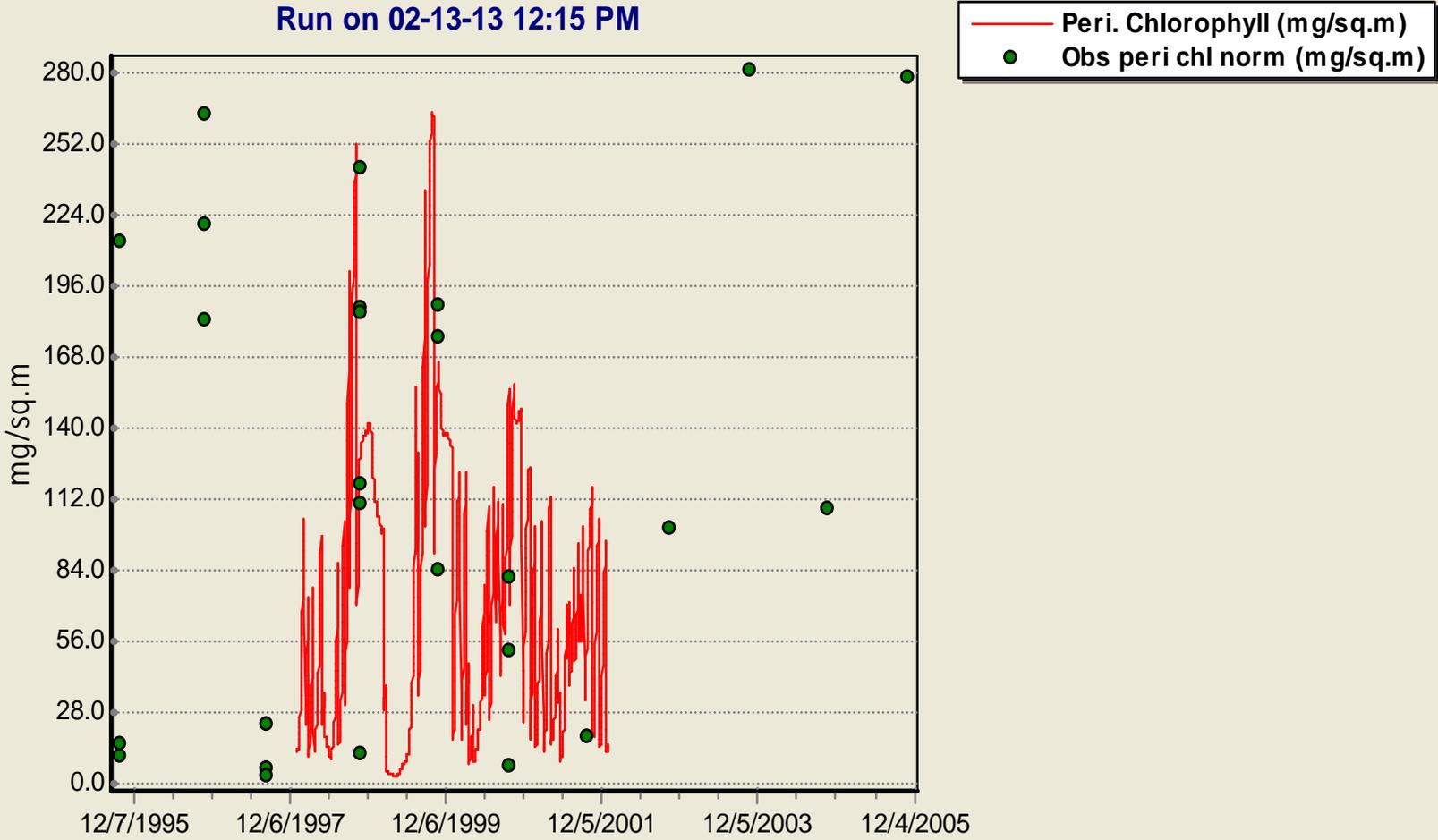
Diversion-Eckert Road, LBR ID (PERTURBED)

Run on 02-13-13 2:23 PM

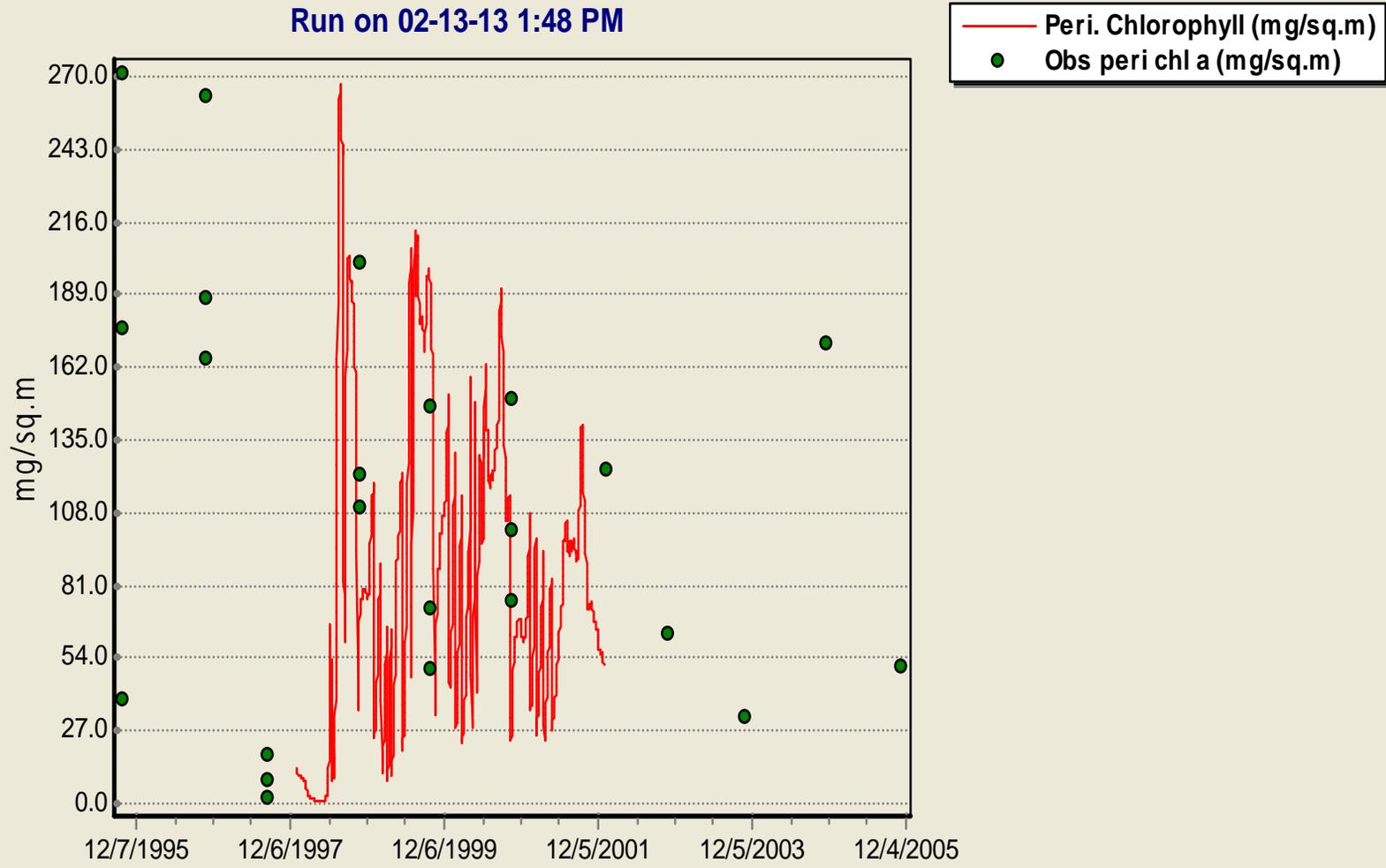


Glenwood Br, LBR ID (PERTURBED)

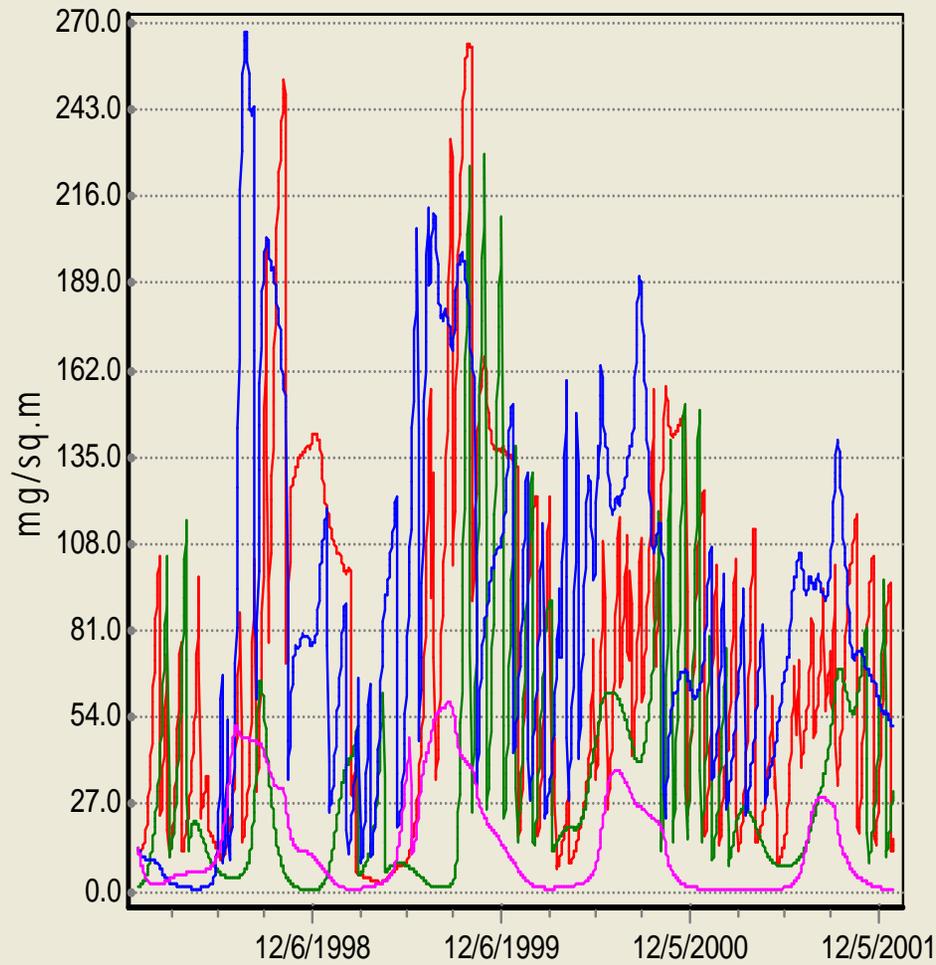
Run on 02-13-13 12:15 PM



Middleton, LBR ID (PERTURBED)
Run on 02-13-13 1:48 PM



Lower Boise River ID (PERTURBED)
Run on 02-13-13 2:23 PM



- Glen: Peri. Chlorophyll (mg/sq.m)
- Parm: Peri. Chlorophyll (mg/sq.m)
- Midd: Peri. Chlorophyll (mg/sq.m)
- Eck: Peri. Chlorophyll (mg/sq.m)

Ways in Which AQUATOX Can Be Used for Lower Boise TP TMDL

1. Use existing version to understand relative importance of key factors such as scour
2. Use existing version to evaluate limited number of scenarios
3. Update model to newer datasets encompassing USGS synoptics
4. Use either existing or updated model for curve-fitting process

Ways in Which AQUATOX Can Be Used (1)

- Use model as currently set up and calibrated to understand importance of key factors:
 - Scour
 - Movement of biomass downstream
 - Time-variable and seasonal components
 - Etc
- Will help decide if Qual2k or AQUATOX is most appropriate for periphyton in LBR

Ways in Which AQUATOX Can Be Used (2)

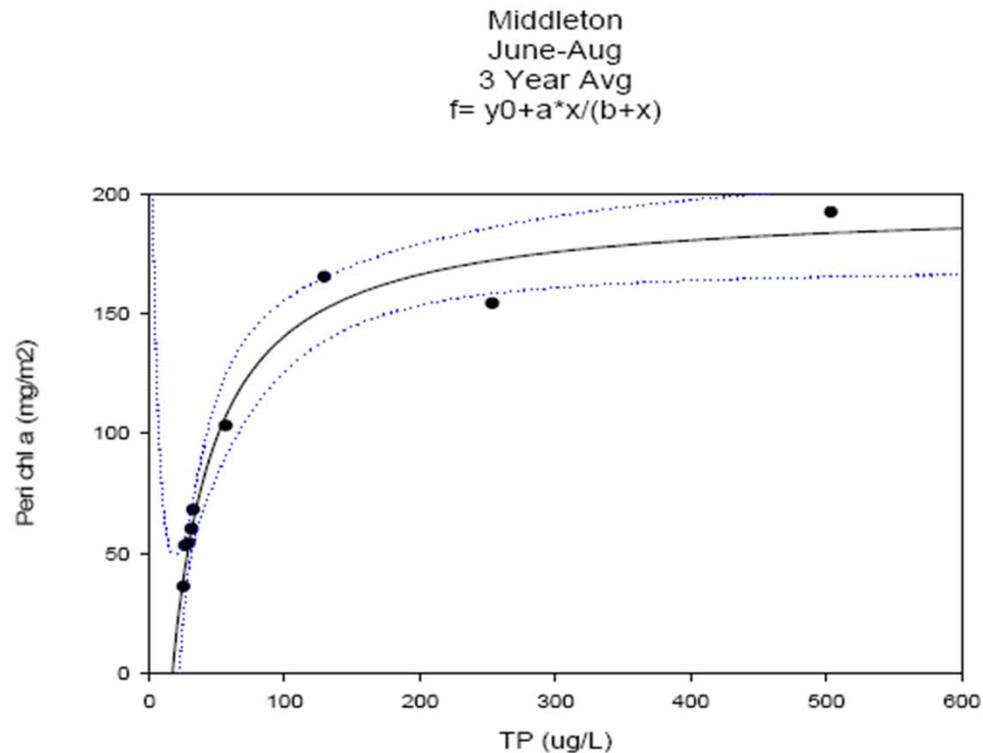
- With current set-up and calibration:
 - If results of synoptic monitoring by USGS indicate that the model predicts reasonably well for similar seasonal and flow conditions
 - Develop/screen scenarios with mass balance, run limited number of scenarios with AQUATOX to confirm outcome that accounts for all factors affecting periphyton growth and TP uptake
 - Could be done with various segmentation options

Ways in Which AQUATOX Can Be Used (3)

- Update with newer data from USGS synoptic monitoring program
- Check/modify calibration if needed (Dick and Jon are available to help)
- Could use single segment or linked version
- Again, mass balance used to screen scenarios, AQUATOX used to confirm outcome that accounts for all factors affecting periphyton

Ways in Which AQUATOX Can Be Used (4)

- Curve-fitting process, with current model or new



Ways in Which AQUATOX Can Be Used (4)

Table 6-1. Aquatox Predicted TP concentration ($\mu\text{g/L}$) to Achieve Periphyton Chlorophyll a Level of 150 mg/m^2				
Water Year and Location	Season			
	May-Sep.	May-Nov.	Oct.-Nov.	Jun.-Aug.
Three-Year (1999 to 2001) Average				
Middleton	160	361	N/A	124
Parma	351	297	208	315