December 3, 2008

Note to reviewers: This table is a draft list of modeling scenarios for assessment of Lake Spokane dissolved oxygen impacts developed by EPA, Ecology, IDEQ, and the Spokane Tribe. These scenarios are designed to provide quantitative "building block" information to inform the TMDL and NPDES permitting process. Depending on the information gained from this first round of modeling scenarios, additional scenarios may be developed with your input.

DRAFT Lake Spokane Dissolved Oxygen Scenarios

#	Name	State Split ? Y/N	State Split (mg/l DO impact)	Point Sources		Tributaries		Comments
				Flow	TP NH3 CBOD	Flow	TP NH3 CBOD	
Baseline (required scenarios)								
0	Calibration	NA	NA	2001	2001	2001	2001	Comments: PSU will check the calibration of the combined Idaho and Washington models and incorporate new information from USGS/IDWR on groundwater inflow and quality.
1	No Source	NA	NA	Zero	NA	2001	Estimated Natural	Comments: This is the baseline model run for the TMDL. All scenario run results are compared to the baseline DO conditions in Long Lake from this baseline. The previous No Source run may be re-run with new FERC minimum flows. 2001 flows would be altered to insure flow does not fall below FERC minimum flows for Post Falls Dam (600 or 500 cfs depending on CdA Lake elevation).
TMDL Allocation Scenario Options (in order of priority)								
2	No Point	NA	NA	Zero	NA	2001	2001 or X % reduction from 2001 levels (estimated achievable reduction)	Comments: This is similar to the NO SOURCE scenario but includes nutrients from nonpoint sources. It may be up to three model runs, with tributary levels set to 2001, natural background, and/or estimated achievable reduction levels. This scenario provides information on existing and "best case" future impacts from nonpoint sources.
3	50/50 State Split	Yes	ID 0.1 mg/l WA 0.1 mg/l	Design	Informed by: Trial and error, scenarios, and other allocation methods	2001	X % reduction from 2001 levels (estimated achievable reduction)	Comments: This is not a model simulation but rather a first step allocation of 0.1 mg/l impact to each state. This would allow more state autonomy in meeting the WQS. Other scenarios might be used to inform allocations within each state.

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#	Name	State Split ? Y/N	State Split (mg/l DO impact)	Point Sources		Tributaries		Comments
				Flow	TP NH3 CBOD	Flow	TP NH3 CBOD	
4	Flat 50	No	NA ID impact likely less than 0.1 mg/l based on preliminary analysis	Design	All sources set to TP=50 ug/l CBOD, NH3 at estimated achievable levels	2001	X % reduction from 2001 levels (estimated achievable reduction)	<u>Comments:</u> This scenario sets all point source TP to 50 ug/l as proposed by dischargers. This scenario expands the 50 ug/l to the shoulder season in Idaho. Potential exceptions to uniform limits : (1) new county permit set to natural background, (2) industrial permits with facility-specific limits
5	Flat XYZ	No	NA	Design	All sources set to TP=X, Y, and Z ug/l CBOD, NH3 at estimated achievable levels	2001	X % reduction from 2001 levels (estimated achievable reduction)	<u>Comments:</u> This is a set of up to 3 scenarios with all point source TP set to fixed values less than 50 ug/l. Potential exceptions to uniform limits: industrials and county.
6	Best Treatment Performance	No	NA	Design	Best performance to be assessed by engineering group using objective criteria	2001	X % reduction from 2001 levels (estimated achievable reduction)	<u>Comments:</u> This scenario has point and nonpoint sources set to reasonably achievable nutrient levels allocations using state-of-the-art pollution control. Previously 50 ug/l was proposed by municipal dischargers as the level of achievability by the available technology. Agencies would develop an analytical approach to reviewing available info and make a determination on achievable limits.

Source Assessment and Implementation Scenario Options (in order of priority)

DRAFT Lake Spokane Dissolved Oxygen Scenarios

#	Name	State Split ? Y/N	State Split (mg/l DO impact)	Point Sources		Tributaries		Comments
				Flow	TP NH3 CBOD	Flow	TP NH3 CBOD	
7	Avista Oxygenation/ Aeration Feasibility	NA	NA	TBD	TBD	2001	TBD	Comments: Placeholder for separate model run to evaluate the effect and feasibility of oxygenation of the hypolimnion. "TBD" means "to be determined". Initially, this can be a screening analysis to determine the scale of a system to deliver oxygen to the metalimnion and hypolimnion.
8A	Avista Dam Responsibility No Dams	NA	NA	Zero	NA	2001	Estimated Natural	Comments: This is an assessment of D.O. in the absence of dams. This can first be evaluated with available information (empirical and model estimates). If needed, a "no dams" model run could be conducted to estimate DO in a free-flowing Spokane River. Comparison to Natural Condition scenario is one way to identify Avista's responsibility for DO impact.
8B	Avista Dam Responsibility Spokane Arm Approach No Dams	NA	NA	Design	Determined by complex trial and error tests with TP, NH3 and CBOD concentrations	2001	Included in trial and error in manner chosen by WA	Comments: This approach, outlined in a memo from Bob Steed, identifies Avista responsibility by using a "no dams" setup and determining point and nonpoint concentrations necessary to achieve 0.2 mg/l in Spokane Arm. Difference compared to Natural Condition scenario is one estimate of Avista impact. This approach is very complex and would require extension of the modeling boundary to the Spokane Arm.
9	Avista Selective Withdrawal	NA	NA	TBD	TBD	2001	TBD	Comments: Placeholder for separate model run to evaluate the effect and feasibility of changing the outlet structure of Long Lake Dam. "TBD" means "to be determined". Initially, this can be a screening analysis to determine whether a selective withdrawal structure would significantly alter oxygen in the metalimnion and hypolimnion.