

# Spokane River TMDL Collaboration

## Full Group Meeting

June 23, 2005, 9:00a.m.-2:00 p.m.

City of Spokane Fire Training Center, N. 1618 Rebecca Street

### Full Group Attendees:

Todd Mielke, Spokane County Commissioner

Dave Peeler, Department of Ecology

Bruce Howard, Avista

Tom Agnew, Liberty Lake Sewer and Water District

Dale Arnold, City of Spokane

Chris Butler, Spokane Tribe of Indians

Dick Denenny, City of Spokane Valley

Tom Eaton, US EPA

Wayne Frost, Inland Empire Paper Co.

Rene-Marc Mangin, Department of Ecology

Mike Petersen, Lands Council

Bill Ross, Ross & Associates, Facilitator

Ryan Orth, Ross & Associates

Mike Sharar, Mike Sharar Consulting

John Spencer, CH2M Hill

### Collaboration Update and Meeting Agenda Review

Full Group Co-Chairs Dave Peeler and Todd Mielke opened the meeting by thanking everyone for their hard work to date. Mr. Peeler recognized that the Collaboration process is making good progress through the useful contributions of its participants. Mr. Mielke added that the group is still building a structure to achieve phosphorus reductions in the Spokane River. He described two objectives of the Collaboration process as being (a) to review technical data to inform sound decision-making, and (b) to then figure out a plan to resolve TMDL implementation issues. The four technical workgroups are now making progress in answering their Fundamental Questions, which focus on a search for pounds of phosphorus that can be removed from the River.

Bill Ross, the Full Group Facilitator, commented that the process continues to build a broader picture of the state of the River and inform what can be done to improve its health. The Steering Workgroup is helping to sharpen the focus of the technical workgroups as they answer their assigned Fundamental Questions.

### Status Reports and Discussion of the Workgroups' Progress in Answering Fundamental Questions

Each of the Co-Chairs of the four technical workgroups then provided status reports on their approach and findings on Fundamental Questions assigned to each workgroup.

### Wastewater Flows & Loadings Workgroup

Co-Chairs Bruce Rawls and Richard Koch provided an update of the Wastewater Flows & Loadings Workgroup activities. The Workgroup is developing a table that describes current and future wastewater flows and phosphorus loadings to the Spokane River. The Co-Chairs presented an example chart that displayed discharger loadings and considered factors such as increasing phosphorus loads to the treatment plants as well as industrial and non-point source controls.

The Co-Chairs described the Workgroup's greatest challenge as predicting future influent loadings, which their table will describe in five-year increments. They noted that data from Hayden was not yet included, and they described various assumptions affecting different dischargers.

Discussion:

Dave Peeler asked if the City of Spokane's numbers accounted for both City and County flows or if Spokane County flows were to be dealt with in a separate, additive manner when the County's proposed treatment plant comes on-line in the years ahead. Discussion indicated the County and City flows have not yet been presented in a manner that clearly recognizes the phase-in of a new County treatment plant.

Mike Petersen questioned whether conservation taken into account for the City's flows? The Co-Chairs responded that there were four adjustments of flow volume and concentration taken into account, so far. Bruce Rawls noted that the County is assuming 80 gallons per capita per day for future connections.

Wayne Frost mentioned that the Inland Empire Paper Company is conducting a pilot program and will help the Workgroup focus its numbers for effluent concentration.

Bruce Howard suggested that as the tables are developed it would be helpful to include relevant assumptions made by each discharger in estimating future flows and loadings.

***Technology Workgroup***

Co-Chairs Lars Hendron and Len Bramble summarized the activities and progress of the Technology Workgroup. Mr. Bramble described the Workgroup's primary focus as being on data collection for selected treatment technologies, to develop preliminary information on performance in removing phosphorus.

Mr. Hendron explained that the Workgroup is also preparing a matrix that describes the scale of operation and performance for each of the treatment technologies under consideration. Workgroup members will be using a uniform questionnaire. The Workgroup will also be monitoring the results of the current technology pilot at Inland Empire Paper, as well as the later pilot planned at the City of Spokane's treatment facility.

The Co-Chairs explained that until this technology assessment matrix has been completed, additional Fundamental Questions assigned to the Workgroup will remain on-hold. In addition, to answer some of these questions the Workgroup will eventually need to look at potential ways to measure compliance. A first review of the matrix is planned for the July 23 Full Group meeting.

Discussion:

Mike Petersen asked how the Workgroup settled on the specific technologies they are evaluating. The Co-Chairs responded that through discussion, the Workgroup made a preliminary evaluation of each technology based on performance, cost, and the technology being operational.

Workgroup member Bruce Rawls noted that the concept of an expert panel to help with the technology assessment has not yet been decided, and will require further discussion by the Workgroup.

Dave Peeler asked if the Workgroup's meeting summaries were posted to the Collaboration website and commented that it would be helpful to have these summaries made available in a timely manner. Mr. Hendron responded that the first meeting summary is posted and that there have been some

discussions about the language for the May 26 notes and that these and other summaries will be available soon.

Bill Ross summarized that the Technology workgroup is attempting to describe the range of potential phosphorus reductions for each technology. As information becomes available for these technologies, two or three scenarios may emerge. The Workgroup will discern the pounds of removal for each of these scenarios, but is not tasked with choosing a technology. The Full Group will not discuss compliance-related items until the Technology Workgroup has helped describe the range of performance of the various technologies.

### ***Non-Point Source Workgroup***

Non-Point Source Workgroup Co-chair Dave Knight and alternate Co-Chair Lars Hendron reported to the Full Group. The Workgroup is making progress, but will need to conduct additional meetings before there are significant findings to present to the Full Group. The Workgroup has larger questions to address, including those surrounding attenuation and sediment oxygen demand (SOD). The Workgroup is developing a matrix to identify sources and amounts of non-point source phosphorus. Mr. Hendron described the basic design of the table, which summarizes the two Fundamental Questions assigned to the Workgroup: Where are the sources of Non-Point Source loadings to the River? What are the methods of Non-Point Source removal? What percentage of each of these sources can be reduced by these methods? What are the means for each of these reductions: compliance, physical, educational? How quickly can we implement these? What is the likelihood of success for each of these?

The Workgroup's next steps are to fill-in the non-point source matrix and brainstorm the potential phosphorus reductions resulting from non-point source controls. The Workgroup will have rough numbers to report for the July 23 Full Group meeting. Dave Knight explained that putting numbers to some of these sources is difficult due to the challenge of knowing how quickly sources are moving, where they are depositing, etc. To describe some of these non-point source contributions, there are known sources of data that can be quantified, literature sources that can be applied, and studies that could be commissioned. However, some non-point sources will remain difficult to quantify.

### Discussion:

Todd Mielke commented that septic tanks appear to be a substantial source of non-point source phosphorus loadings. Mr. Mielke asked: Is the group attempting to put a number on those septic tanks over the aquifer for counties in both Washington and Idaho? Are you looking at the Clark Fork, MT septic study? Are you looking at septic contributions of phosphorus to Long Lake? The Co-Chairs responded that the Workgroup does know the number of tanks over the aquifer in Spokane and Kootenai Counties but needs to reach out to Stevens County to get septic data and determine jurisdictional issues. Once the Workgroup is able to determine the total number of septic tanks, they can determine how much available phosphorus is making it through the substrate to the aquifer, and subsequently into the River. This is a difficult calculation to make as the improvements attributable to non-point source measures may not be realized for 15-50 years.

Bruce Rawls commented that the County's engineering consultant, HDR, has done substantial work on septic tank loading, including participation in the Clark Fork, MT TMDL, where they developed a protocol and methodology to calculate septic tank loadings to ground water. HDR has asked if the County wants them to perform a similar analysis for the Spokane River. The County is interested in

having HDR perform this study, but while they have good GIS data on septic tanks in Washington, they do not have this same information for Idaho.

Tom Eaton asked the Co-Chairs what range of methods they are looking at to remove phosphorus from septic tank sources. Dave Knight responded that the Workgroup is still focused on identifying the range of non-point sources, including the Little Spokane and Headman Creek tributaries. A methodology for non-point source controls will be developed after the range of sources has been identified.

Jani Gilbert commented that Ecology is working to develop a program on non-point sources and groundwater contamination. Ms. Gilbert asked how the Workgroup plans to get data on the effect of education on behavior that will reduce phosphorus loadings. Ms. Gilbert suggested that this data does exist from other states and municipalities that have conducted similar education programs. Mr. Hendron responded that the workgroup is estimating the effectiveness of education from examples across the nation to apply to the Spokane River scenarios.

Tom Agnew commented that near and on-shore land-use measures at Lake Spokane could yield immediate improvements in the next few years. Also, wind migration may affect loadings to the River from agriculture sources, such as fertilizer plants. Mr. Agnew asked: How will the Workgroup evaluate near-shore land uses at Lake Spokane? To what degree has the group looked at the adequacy or accuracy of the non-point sources data and loadings to the river? Mr. Hendron responded that the Workgroup will portray the loadings to Long Lake using information from the Draft TMDL. They will then reconcile the pounds of phosphorus attributable to septic tanks and calculate this contribution of phosphorus to the River via the aquifer. The Workgroup will consider attenuation in their calculations. In response to the second question, as the Workgroup evaluates the listing of sources, they will ground truth each source's contributions and work with partners to drill down on specifics to ensure the adequacy and accuracy of their data.

Tom Agnew announced that Liberty Lake held a seminar on phosphate free detergents. The dish detergent industry showed examples in Western Europe and Phoenix, AZ that unless phosphorus is banned by the community, there is difficulty in implementing non-phosphorus detergent alternatives. Bruce Rawls responded that the Workgroup is gathering data on the distribution of the following products that contain phosphorus:

- » Laundry detergents (while they have been banned, the group is surveying their retail availability)
- » Dish detergents
- » Residential lawn and garden fertilizers

In addition, data is being gathered on:

- » Effects and conveyance of phosphorus in turf fertilizer
- » Survey of dish soap bans

Dave Peeler commented that the Washington State Legislature is considering a law banning phosphorus in dishwashing detergent. Research contracts are funded to investigate alternative control systems and create pilots. These studies could be helpful.

Jani Gilbert commented that the Spokane Regional Health District is heading a cross agency/program aquifer protection council that meets on a monthly basis. Their efforts are focused on identifying contamination sources over the aquifer and mechanisms that are in-place to protect the aquifer.

### ***Re-Use & Conservation Workgroup***

Co-Chairs Lloyd Brewer and Kathy Cupps reported on the activities of the Re-Use & Conservation Workgroup. The Workgroup is asking many questions about the costs and drivers of re-use and conservation opportunities. At the Workgroup's request, the Steering Workgroup has clarified and given direction on several of their assigned Fundamental Questions. The primary focus of the Workgroup's efforts is on identifying potential opportunities for re-use, especially those opportunities that have the greatest likelihood for application during the April-October timeframe. However, their survey is not exclusive of year-round opportunities.

The Workgroup has also begun to draw its concentric rings and identify potential opportunities for re-use within these rings, including treatment plants, schools, cemeteries, and golf courses. They are now busy coding each geographic location with a category and available data. Data elements being collected for each source within a ring include: the current source of water; average, peak, and seasonal uses; the most likely water treatment sources for each and their distance from treatment; and water class needed. Re-use treatment and land treatment options will be reflected in response to the Fundamental Questions.

The Workgroup has also begun to gather examples of water conservation activities. The water conservation plans from the City of Carnation and City of Seattle call for very aggressive programs that could reduce their wastewater flows by 45-50%. These examples do not seem as applicable for the Spokane River, where 20% reductions appear more realistic. The group is also looking at a City of Spokane study on costs of the local water supply to get a picture of the economics of water conservation

### Discussion:

Dave Peeler commented that many studies look at treatment alternatives. He asked if there was an opportunity to look at arid parts of the country to describe achievements in re-use. Ms. Cupps responded that the Workgroup has looked at these re-use examples in committee, but this information has not been summarized for presentation. A lot of work been done around the country, including an EPA guidebook on re-use and conservation. Ecology has also put together case studies in reclaimed water use that is now on their website.

Chris Holm asked how the Workgroup will focus on pollutant reductions to the River. Mr. Brewer responded that the Workgroup is looking at flows reduction. Flows reduction may off-set withdraw, which could increase in-stream flows. The known flows and technologies will be considered to determine the calculation of pounds that is not going to River, but rather to land application.

Mike Petersen asked how much it would cost to develop conservation programs, and the relative costs of indoor vs. outdoor programs. Mr. Brewer responded that there is a lot of work being done around the country to develop conservation programs. The greater cost is generally associated with conservation measures for outdoor water uses. Reducing flows to wastewater treatment is one "conservation" measure that has not been considered that utilities are now considering. Ms. Cupps added that indoor water goes to treatment plants, and these conservation efficiencies are needed to

reduce flows. Outdoor conservation measures may be a place where we can offset other water supplies by using reclaimed water. Indoor and outdoor measures, in conjunction, may reduce overall flows of phosphorus to the River.

Dave Peeler asked how conservation translates to phosphorus loading. Mr. Brewer responded that some new indoor technologies use less water and less detergent. However, there is a treatment efficiency to consider, where higher concentrations in the waste stream allow for the removal of more phosphorus. Tom Eaton added that banning phosphorus detergent may not have any impact on loadings as some of the available treatment technologies are not dependent upon the concentration of the influent.

Tom Agnew commented that a significant stream of state, county, and municipal income is derived from water use revenues. Conservation measures could reduce general fund revenue, especially for cities.

Bruce Rawls commented that as the Workgroup attempts to quantify phosphorus reductions associated with re-use actions, they should consider the possibility of different sensitivities of dissolved oxygen throughout the growing season.

#### Aeration Workshop Update

Richard Koch gave an update on the results of the June 13 Aeration Workshop. The Wastewater Flows & Loadings Workgroup hosted a panel of six recognized experts on oxygenation and aeration (Dr. Marc Beutel [WSU], Dave Clark [HDR Engineering], Dr. Larry Esvelt [Esvelt Engineering], Dr. Barry Moore [WSU], Dr. Eugene Welch [UW Emeritus], and Laurens Van der Tak [CH2M HILL]) to explore the dissolved oxygen and algae issues in Lake Spokane and to evaluate the options for aeration and feasibility of implementing an aeration project to mitigate dissolved oxygen and/or algae issues.

The Workshop discussion concluded that neither aeration nor oxygenation would likely affect algae blooms in Lake Spokane. The primary benefit of aeration or oxygenation would be for dissolved oxygen levels. The panel did not believe there is an appreciable release of phosphorus from sediments at the end of the Lake that has the algae problem. There was no consensus on how phosphorus levels would decrease over time.

The Workshop also came to the preliminary conclusion that aeration at Lake Spokane would not be as efficient as oxygenation. It may be most efficient and cost effective to transport liquid oxygen or generate oxygen on-site. However, efficiency and cost are not the only factors to consider in this scenario as the lake is long and narrow, with many homeowners and resorts along the two lane highway. The panel gave a range of costs for oxygenation at \$12M-\$21M in capital costs. Both aeration and oxygenation, if developed, should start at the beginning of lake turnover and continue through the fall. The Workshop participants had considerable discussion of whether it made sense to pilot an oxygenation project, but came to no conclusions.

The case studies, Workshop summary, and list of conclusions from the Aeration Evaluation Workshop will be posted to the Collaboration website.

#### Discussion:

Bruce Rawls asked if the Full Group wanted information on aeration/oxygenation now, as the lake is stable, or would rather an assessment or demonstration take place after the lake has undergone changes due to phosphorus removal. In addition, Mr. Rawls commented that the goals for aeration/oxygenation have not been defined, and reiterated that the Workshop has already determined that algae blooms will not be affected by oxygenation/aeration. Mr. Rawls raised the following questions about aeration/oxygenation, noting that answers to some of these may help the Workgroup refine the 25-150 year improvement horizon referenced by the panel: Is there going to be a dissolved oxygen limit in the reservoir? Will aeration/oxygenation help us to make up the difference in pounds of phosphorus? Is the model appropriately balanced for sediment oxygen demand versus loadings coming into the water? If we reduce loadings to the river, how much change will we see in sediment oxygen demand? Richard Koch added the questions: in designing an aeration/oxygenation project, how will we distinguish a reasonable safety factor from an excessive safety factor? How will we know enough to be able to convince people to make any investment in oxygenation?

Mike Petersen commented that if one of the conclusions of the Workshop was that oxygenation would improve DO in the lake, than this seems to be a good goal. Bruce Rawls replied that we're not certain of the goal or target for aeration/oxygenation, because the goal is based on the standard. Mike asked if using the model could help create a worst case scenario, as some on the panel thought. Richard Koch responded that the model could help to give a worst-case scenario, but with some uncertainties; there is no conclusion yet that adding oxygen would achieve the dissolved oxygen target.

Tom Eaton commented that full scale implementation of aeration/oxygenation may be appropriate, but that the Full Group should determine overall pounds reduced before proceeding and that modeling may help to estimate aeration/oxygenation benefits. Richard Koch replied that the Workgroup will need to refine the sources of inputs before running the model, including groundwater and sediment air deposition. Bruce Rawls suggested that before considering a pilot the Workgroup estimate reduced pounds of phosphorus going to reservoir, then estimate the effect on BOD, and then start gathering data that is specific to aeration.

Tom Eaton asked if the workgroup could determine how much phosphorus reduction is necessary to eliminate the algae blooms. Bruce Rawls replied that Bob Cusimano is investigating whether the amount of phosphorus in the water was equal to the amount of chlorophyll present. However, there are differences in interpretation of how much algae is due to phosphorus. Todd Mielke commented that a good portion of the Aeration Workshop discussion was focused on lake characteristics. The discussion led by Dr. Welsch suggested that something else, not consistent with the model, is affecting algae blooms in the lake. The panel did not all agree with the modelers' assumption that wind was carrying the surface concentration of phosphorus across the lake.

Bruce Rawls commented that experts at the workshop suggested that the Workgroup identify their goals for aeration: downstream dissolved oxygen, reservoir dissolved oxygen, or sediment oxygen demand reduction. Sediment oxygen demand measures are very difficult to obtain and any technology assessment is dependent upon this data. As the Full Group looks at an implementation strategy and timing, they should consider the 5-10 year period for advanced aeration strategies. Mr. Rawls speculated if collecting data and doing an aeration/oxygenation pilot now to isolate and get some sediment oxygen demand numbers relative to the performance of aeration was a good idea.

Rick Eichsteadt asked if there was any discussion within the Workgroup of whether aeration could affect the sediment oxygen demand issue. Richard Koch replied that there is information out there about this relationship, but the literature is not conclusive since these measures take so long to realize results. Dr. Welch gave his professional opinion that aeration would help heal the lake, but that it will take time.

Dave Peeler asked if Bob Cusimano addressed the sediment oxygen demand data-gathering question. Bruce Rawls replied that he has heard an estimate of \$100K for a one year study. Todd Mielke suggested that since part of this April-Oct season is now past, that as a next step the Flows & Loadings Workgroup scope such a data-gathering study.

Bill Ross added that this negotiating process will not necessarily be resolve all identified issues in a certain timeframe and emphasized the importance of the Workgroups bringing tough questions and potential next steps to the Full Group to consider. An adaptive management model, that continues to work on these issues over time as actions are implemented and the River responds, can be built in to the implementation plan.

The Flows & Loadings Workgroup will consider the goals of aeration in light of what the experts have said and outline how to implement an aeration/oxygenation strategy dependent upon which goal is being addressed.

### **Water Quality Trading Analysis Overview**

Rob Greenwood of Ross & Associates Environmental Consulting, Ltd. is now on contract with EPA Region 10 to conduct analysis and outline the opportunities for water quality trading within the Spokane River watershed. Mr. Greenwood helped to develop a EPA's Water Quality Trading Assessment Handbook and has worked with many communities around the country to conduct such analyses. He gave an introduction to the concept of water quality trading, an overview of the analytic framework for his study, and then addressed how his study might best coordinate with existing efforts of the Collaboration.

Mr. Greenwood reviewed different trading approaches as well as the fundamental concepts of the trading assessment. Water quality trading is defined as an environmental equivalent, mutually beneficial exchange of discharge obligations between water pollutant sources. Water quality trading suitability analysis considers pollutant type/form, water quality equivalence, compliance and discharge timing, and pollutant reduction supply/demand quantities. The watershed loadings profile, a chart that helps to identify the relationships between pollutant discharge, compliance, and costs of control for each discharger, is created to help determine the characteristics of potential trading relationships. Ideal trading conditions create cost-effective benefits and exist when one or more dischargers has the technical capacity to "over control" their loadings, while other dischargers find themselves willing to pay to avoid expensive incremental control costs.

In an initial review of the draft TMDL, Mr. Greenwood did not observe any obvious traditional point-source to point-source water quality trading relationships in the Spokane River watershed. However, there are other, unique examples of water quality trading projects to look to that have used pooled resources and "certified" pollution credits to facilitate a water quality trading marketplace. In the Spokane River watershed, non-point sources will figure largely into the analysis to determine if their contribution of pounds of phosphorus will be equivalent to the difference needed to reach the overall

goals for the River. He suggested that a water quality trading approach might provide a valuable lexicon or vocabulary for the kinds of decisions ahead.

Mr. Greenwood noted that many of the Fundamental Questions the workgroups are trying to answer, especially within the Non-Point Source and Technology Workgroups, are addressed in the Water Quality Trading Assessment Handbook. Furthermore, the Handbook provides a lexicon for this analysis that can aid in communicating concepts and findings, as well as an analytical framework, complete with spreadsheet templates. Mr. Greenwood suggested that instead of duplicating the workgroups' efforts, he amend his work plan to follow the workgroup's data gathering, assist in evaluating the matrices the workgroups will populate, and conduct his trading analysis based on their findings.

A copy of Mr. Greenwood's presentation will be available on the Collaboration website.

#### Discussion:

Tom Eaton remarked that Mr. Greenwood's proposal to change the trading work plan made good sense and suggested that Mr. Greenwood provide this analytical framework to each of the workgroups. Mr. Greenwood will evaluate the workgroup's Fundamental Questions and provide suggestions of an analytical framework to follow, which may be adapted to best suit the workgroup's specific goals.

Lars Hendron commented that the Collaboration product will contain some element of uncertainty regarding reductions and their effect on the River. In trading, these are called "uncertainty discounts." Mr. Hendron asked how this uncertainty would be addressed without having formal trade. Mr. Greenwood responded that risk management will discount for uncertainty and in some cases discount heavily. There are many policy tools that can be used and the solution set for this situation will have a variety of tools to manage uncertainty, one of which may be a trading-related tool.

Lloyd Brewer asked if the trading analysis made provisions for seasonal variability, specifically if current and future loadings could be applied to the analysis of the aquifer. Mr. Greenwood answered that building-in seasonal variability is a market design consideration that could be asked. He was unsure if this could trigger an anti-backsliding clause within the Clean Water Act, which may explain why it is not found in other water quality trading examples.

Dave Peeler asked how difficult it has been for stakeholders in other communities to come to agreement and how trading tools are represented in the TMDL. Mr. Greenwood replied that agreements are not simple, but there are permit and permit model language examples available for reference. Furthermore, many of these models have passed EPA and General Council review, setting a successful precedent.

Dick Denenny asked if Mr. Greenwood generally helps to develop the discount factors in the trading model and if this was considered as part of mediation. Mr. Greenwood responded that water quality trading decisions are based on technical information and sometimes these decisions are straightforward enough that the trading model will suffice. In other situations, there is literature that can help to provide that confidence. In some cases these agreements are negotiated.

Mike Petersen asked about the timeframe in the sample watershed loadings profile and whether this could be adjusted. Mr. Greenwood responded that the projections in the analysis can be pushed-out to 30 years or longer.

Dave Knight, Len Bramble, and Lars Hendron will coordinate with Mike Sharar and John Spencer to deliver the Non-Point Source and Technology Workgroup matrices to Mr. Greenwood for his review. Mr. Greenwood will ensure that the Workgroups' methods are gathering all of the information he will require to complete the water quality trading analysis.

#### **Next Steps and Directions for July 22<sup>nd</sup> Full Group Meeting**

Bill Ross summarized the day's discussion and offered a vision for project trajectory through the July 22 Full Group Meeting. The group made significant progress in identifying several tough questions that will need further consideration by the workgroups. In the next month, the primary activity of all workgroups will be the gathering of data. This information is not expected to be completely refined by the July Full Group meeting, but will help to create a sharper focus. Additional technical policy interface questions will come into play once data has been refined and the Full Group begins to see how each of the workgroups' analyses fit together.

**Adjourn**