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November 13, 2007

Dave Knight
Washington State Department of Ecology
Water Quality Program
4601 N. Monroe Street
Spokane, WA 99205

RE: Comments on the Draft Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load, Water Quality Improvement Report, Washington State Department of Ecology (September 2007)

Dear Mr. Knight,

These comments are submitted on behalf of our clients, Sierra Club, Upper Columbia River Group, and the Center for Environmental Law and Policy (CELP), on Ecology's 2007 Draft Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load, Water Quality Improvement Report. The Sierra Club Upper Columbia River Group is a membership organization dedicated to protection of natural resources. The Upper Columbia River Group works on multiple issues related to restoring water quality and quantity in the Spokane River and aquifer. There are approximately 1600 Upper Columbia River members in the Spokane watershed many of whom fish, swim, boat, paddle, hike and otherwise enjoy the Spokane River and Lake Spokane.

The Center for Law and Environmental Policy is a non-profit membership organization that works to defend and develop ecologically and socially responsible water laws and policies. CELP speaks for the overall public interest in the public's water; its mission is to leave a legacy of clean, flowing water for rivers and aquifers of the Pacific Northwest. CELP's members live, work, recreate, and use waters in and along Washington's lakes, rivers, and streams, including the Spokane River. CELP and its members are knowledgeable, interested, and significant stakeholders in the outcome of this TMDL process and other water management actions on the Spokane River.

Although we appreciate the time and effort Ecology has dedicated to the Dissolved Oxygen TMDL process since 1998, and the many opportunities for the Sierra Club and other members of the public to participate in that process, we are unable to support the final document as drafted.
As set forth in detail in the attached comments, the DO TMDL falls short of meeting the legal requirements of the Clean Water Act in a number of ways and does not provide adequate assurance that the water quality standards for dissolved oxygen will be met. First and foremost among these shortcomings is the political decision to utilize a degraded boundary condition at the border between Washington and Idaho which essentially permits Washington to double the allowable amount of pollution in Lake Spokane in violation of state law. Second, the TMDL contains no required interim pollution reduction limits and delays enforcement of final limits for twenty years. Third, although the TMDL outlines numerous important strategies necessary to restore water quality, it provides very few enforcement mechanisms and relies instead on "voluntary control actions" to achieve clean water.

The Sierra Club and CELP appreciate the opportunity to comment on this TMDL and hope that Ecology will reexamine its approach and redraft the plan to conform to the requirements of the Clean Water Act and state law.

Sincerely,

CENTER FOR JUSTICE

BCR

Bonne Beavers
On behalf of the Sierra Club, Upper Columbia Group, and CELP

cc: Mike Gearheard, U.S. Environmental Protection Agency

CERTIFICATE OF SERVICE

I hereby certify that on November 13, 2007, I caused to be delivered to the following persons a true and correct copy of the *Comments on the Draft Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load, Water Quality Improvement Report, Washington State Department of Ecology (September 2007)* on behalf of the Sierra Club, Upper Columbia Group, and the Center for Environmental Law and Policy (CELP):

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Comments on the Draft Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load, Water Quality Improvement Report, Washington State Department of Ecology (September 2007)

Submitted on behalf of the Sierra Club, Upper Columbia River Group
And the Center for Law and Environmental Policy

In addition to the comments below, the Sierra Club and CELP adopt by reference herein the comments tendered by the former Dissolved Oxygen TMDL lead, Drea Traeumer, which are attached hereto, and any attachments supporting Ms. Traeumer's comments tendered to Ecology.

INTRODUCTION

The Spokane River flows 111 miles from Lake Coeur d'Alene in Idaho to its confluence with the Columbia River in Washington State. It is the defining feature of the region and of great economic and aesthetic value to the people of Spokane and the surrounding area. Unfortunately, during the low-flow summer months, the river, including segments in the Spokane Tribe Reservation and Lake Spokane (Long Lake), are afflicted with low dissolved oxygen (DO), a condition that is harmful to fish and other aquatic organisms.

Seven wastewater treatment plants (WWTP), three in Idaho and four in Washington, discharge pollution effluent to the main stem of the Spokane River.[1] In addition, the Hangman Creek Watershed, a major tributary of the Spokane River, contains ten permitted facilities, six of which discharge to surface waters.[2] Combined, the seven mainstem Spokane River wastewater treatment plants discharge up to 75 million gallons a day in the summer to the river. These discharges, in combination with nonpoint source pollution from urban and rural runoff, impair water quality and cause violations of state water quality standards for dissolved oxygen (DO) in several segments of the Spokane River and Lake Spokane.[3] As can be seen from the pictures below, this impairment leads to unsightly and toxic algae blooms in the lake during critical periods of warm weather and low flow, blooms which not only contribute to lower dissolved oxygen, but also adversely affect recreational uses and aesthetics. As a result, these segments are listed on the State's § 303(d) list as critically impaired water bodies for dissolved oxygen.

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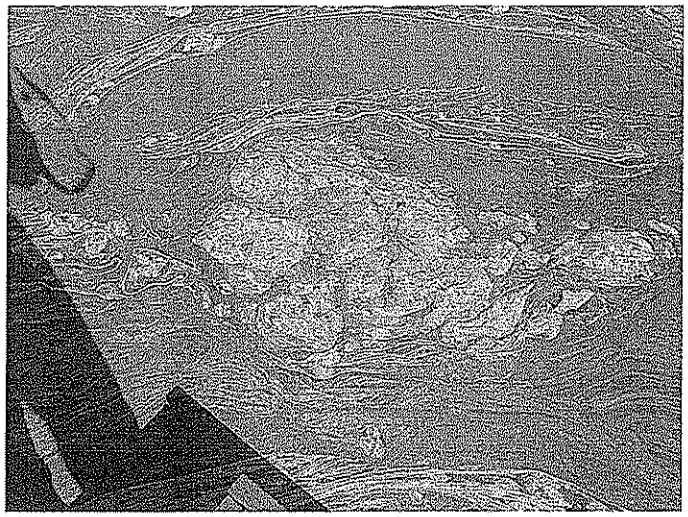
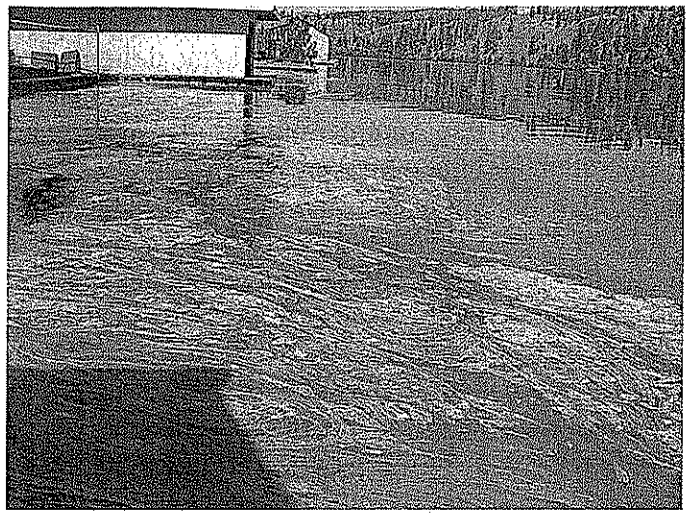
[1] These WWTPs are the City of Coeur d'Alene, the City of Post Falls, Hayden Sewer District, Liberty Lake Sewer & Water District, Kaiser Aluminum, Inland Empire Paper Co., and the City/County of Spokane.
[2] *See* Hangman TMDL Submittal Draft Report at 22 (Oct. 13, 2005).
[3] *See* Appendix A: (1) *TMDL To Restore and Maintain Dissolved Oxygen In the Spokane River and Long Lake(Long Lake),* Submittal Report, Public Comment Draft at 8 (Merrill and Cusimano Revised October 15, 2004) (hereinafter "2004 Draft TMDL").





Source: Washington Dept. of Ecology

A § 303(d) listing means that current wastewater technologies and other pollution control activities, such as Best Management Practices (BMPs) for nonpoint sources, are insufficient to protect the health of the river and that more stringent measures must be applied to meet water quality standards.[4] As a result, Ecology must devise a clean-up plan or Total Maximum Daily Load (TMDL) that identifies the pollutants contributing to oxygen depletion, assigns pollutant waste load and load allocations to point sources and nonpoint sources, respectively, and incorporates strategies to control pollutant release.

As applied to this TMDL, the water quality standard for dissolved oxygen in Lake Spokane provides that all human actions considered cumulatively may not decrease the dissolved oxygen concentration in Lake Spokane more than 0.2 mg/L below natural conditions.[5] To determine the pollutant sources causing and contributing to low dissolved oxygen levels in Lake Spokane, conducted a technical assessment of the pollutant loading in the watershed and drafted a clean-up plan based on that assessment. The assessment began in 1998 when a "draft study plan was presented to the Spokane River Phosphorus Technical Advisory Committee."[6] Five years later, Ecology published the *Spokane River and Lake Spokane (Long Lake) Pollutant Loading Assessment for Protecting Dissolved Oxygen*, a pollutant loading assessment of the Spokane River which formed the technical basis for the TMDL.[7] In its assessment, Ecology utilized the 2-D dynamic CE-QUAL-W2 model developed by the Army Corp of Engineers, upgraded in 2000, to simulate river and lake conditions and assess pollutant loading by point and nonpoint sources and their impacts on the river system.[8] EPA subsequently utilized this model in determining permit conditions and load allocations for the Idaho wastewater treatment plants.[9] Similarly, the model was used to complete the 2007 Draft TMDL and determine permit conditions for the Washington plants.[10]

The assessment identified the sources of pollutant loading to include all seven Spokane River WWTPs, both in Idaho and Washington, and the three main tributaries, Latah Creek (Hangman), Coulee Creek, and the Little Spokane, as contributors to violations of water quality standards for

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[4] 33 U.S.C. §§ 1313(d), 1329; 40 C.F.R. § 130.7.
[5] WAC 173-201A-200(1)(d)(ii); WAC 173-201A -020. *See* Comment 3 below.
[6] Appendix A: (1) 2004 Draft TMDL at 3.
[7] *See Spokane River and Lake Spokane (Long Lake) Pollutant Loading Assessment for Protecting Dissolved Oxygen* (Cusimano 2004), available at http://www.ecy.wa.gov/biblio/0403006.html: Data Summary, Spokane River and Lake Spokane (Long Lake), Pollutant Loading Assessment for Protecting Dissolved Oxygen (Cusimano, 2003), available at http://www.ecy.wa.gov/biblio/0303023.html. The data for this report are located at http://www.ecy.wa.gov/biblio/0303023data.html.
[8] Ecology created the state-of-the-art CE-QUAL-W2 model for the Spokane River with the assistance of top modeling experts in the United States (Scott Wells, Portland State University, and Tom Cole, Army Corp of Engineers). EPA provided assistance on the Idaho portion of the river. *See* Appendix G: (11) (EPA emails discussing the Spokane River DO TMDL).
[9] Appendix A: (1) 2004 Draft TMDL; Appendix B: (4) Review of Model Scenarios and Results related to the Proposed Reissuance of NPDES Permits for Idaho Wastewater Treatment Plants at Post Falls, Coeur d'Alene, and Hayden (Massman, May 9, 2007); (5) Comments Regarding the need for considering additional calibration for the Washington Spokane River Model (Massman, May 23, 2007); (8) Preliminary thoughts and comments on the August 17, 2007 Portland State report describing the revised CE-QUAL-W2 model for the Washington reach of the Spokane River (Massman, August 22, 2007); 7) Joel Massman, Ph.D. P.D. Resume (2007). *See also Upper Spokane River Model in Idaho: Boundary Conditions and Model Setup for 2001 and 2004, Technical Report* , EWR-02-05 (Annear Jr. , Wells and Berger 2005).
[10] *Id.*

dissolved oxygen. Based on this assessment, in 2004 Ecology drafted a clean up plan, or Dissolved Oxygen TMDL (DO TMDL) which outlined strategies to reduce these loadings.[11] The strategies included reducing point source discharges to background concentrations within ten years with interim limits of 50 ug/L within five, reuse and conservation, and implementation of controls to reduce tributary, nonpoint source loading by up to 80%.

This was not the first attempt to restore Lake Spokane to health. Indeed, "nutrient enrichment and eutrophication of Lake Spokane has [sic] been one of the major water quality concerns for the area for over the last [33] years."[12] As a result, in 1987 Ecology and EPA proposed the establishment of individual waste load allocations (aka a TMDL) for all seven Spokane River dischargers.[13] The TMDL was never implemented. Rather, the dischargers, Ecology and EPA entered into a Memorandum of Agreement (MOA) which "postpone[d] the need for allocation of maximum daily phosphorus loadings to individual dischargers until a management plan approach is unable to meet the Long Lake TMDL."[14] Despite this plan, lake conditions worsened and Ecology moved forward with this TMDL ten years later.

To help in developing an implementation plan for the TMDL, in May 2003 Ecology convened a wide group of stakeholders to serve on a DO TMDL Advisory Committee. These stakeholders, including representatives from all seven dischargers, the Spokane Tribe, EPA, Ecology, Avista, the Sierra Club Upper Columbia River Group, the Lands Council, and others, were asked to work together to map out a watershed-based dissolved oxygen clean up plan that would reduce nutrient loading from all sources in an equitable fashion.

At the same time, the dischargers sponsored a parallel scientific study conducted by CH2MHill aimed at lowering water quality standards in order to obviate the need for stringent reduction strategies. This study, entitled a Use Attainability Analysis (UAA), allows a lowering of water quality standards where credible science shows that attaining a designated use is not attainable.[15]

In October 2004, Ecology released its 2004 Draft TMDL for public comment. Although the public response was largely supportive, including the Sierra Club's, the dischargers requested Ecology to delay the TMDL until the UAA was finalized.[16] Concluding that the UAA was not sufficient to support a change in standards, Ecology moved forward with the TMDL.[17] The dischargers responded by filing a Petition for Rule-making forcing Ecology to either move

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[11] Appendix A: (1) Draft 2004 TMDL.
[12] Appendix A: (1) at 1citing (Cunningham, 1969; Soltero et al., 1973-86; Singleton, 1981; Wagstaff and Soltero, 1982).
[13] Appendix C: (1) Memorandum of Agreement For the Spokane River Phosphorus Management Plan (March 1989).
[14] *Id.* at 3.
[15] 40 C.F.R. §§ 131.3(g); 131.10(g). The sponsors of the UAA were the City of Coeur d'Alene, City of Spokane Valley, City of Spokane, City of Post Falls, Hayden Area Regional Sewer Board, Liberty Lake Sewer and Water District, Kaiser Aluminum, and Inland Empire. Spokane River and Long Lake Reservoir Use Attainability Analysis (December 2004) Transmittal Letter at 3. An Advisory Committee was also convened for this process with largely the same members as those on the TMDL Advisory Committee.
[16] Appendix A: (2), (3), (4), (5), (6) Various comments on Draft 2004 TMDL and Ecology Draft responses.
[17] Appendix D, Correspondence/Petition for Rulemaking - Regarding the Draft UAA.

forward with the TMDL and risk suit by the dischargers or to delay the TMDL and initiate rule-making to change the standards.[18]

Instead, Ecology withdrew the TMDL and the dischargers withdrew their petition pending the outcome of a negotiation process, the TMDL Collaboration ("Collaboration").[19] Although the intent was for short term negotiations, the process lasted two years, from February 2005 to March 2007. Collaboration participants largely mirrored those on the Advisory Committees.[20] In addition to serving on various work groups, Collaboration participants were encouraged to submit their own proposed implementation plans (MIPs) and both the Sierra Club and the dischargers submitted plans.[21]

From these, Ecology developed another reasonably strong, detailed plan, released in January 2006. At 126 pages long, the MIP assumed interim effluent limits of 50 ug/L and required achievement of final limits of 10 ug/L within 10 years.[22] It was silent as to a UAA. The Sierra Club had some reservations about this plan, but was largely supportive. Once again, the dischargers were not.[23]

By July 12, 2006, Ecology's MIP had undergone numerous revisions and contracted into a 16 page document (which itself underwent 21 versions) entitled, "Foundational Concepts for the Spokane River TMDL Managed Implementation Plan."[24] On March 7, 2007, Ecology, the four Washington Spokane River dischargers, and Spokane County, a proposed new discharger, signed a Memorandum of Agreement regarding the Foundational Concepts. None of the other Collaboration members signed this document. The agreement states that the "parties reached an agreement *in principle* with regard to the Spokane River Dissolved Oxygen TMDL, as set forth in the document entitled, 'Foundational Concepts for the Spokane River TMDL Managed Implementation Plan.'"[25] Therein, the signatories agreed that the document would "guide" the TMDL Implementation.

Conspicuously missing from the MOA are the three Idaho wastewater dischargers and EPA, all of whom had participated on the original Phosphorus Management Plan, the TMDL Advisory Committee, the UAA Advisory Committee, and the TMDL Collaboration. The reason for their participation in these processes was obvious – the dissolved oxygen problems in the Spokane River

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[18] Appendix D: (10).
[19] Appendix D: (15), (19), (20).
[20] 2007 Draft TMDL at 74.
[21] *See* Sierra Club Spokane Restoration Scenario for the Dissolved Oxygen TMDL Collaborative at Spokane River TMDL Collaboration, Resources, http://client-ross.com/spokane-river/docs/final%20scenario.pdf; Table of Contents at http://client-ross.com/spokane-river/docs/Sierra%20Club%20Scenario_Table%20of%20Contents.pdf: and attachments at http://client-ross.com/spokane-river/docs/Sierra%20Club%20Scenario_Attachments.pdf. Dischargers' Scenario at http://client-ross.com/spokane-river/docs/SEADOCS.pdf.
[22] *See* Spokane River TMDL Collaboration, Resources, Ecology Spokane River Implementation Plan and Comments thereto at: http://client-ross.com/spokane-river/resources.htm. The Sierra Club's Comments on Ecology's MIP (2006) are attached in Appendix E: (2).
[23] *Id.*
[24] Foundation Comments and Transmittal Memo at http://client-ross.com/spokane-river/resources.htm. See also emails on the iterations if you need them.
[25] Draft 2007 DO TMDL at 56.

and Lake Spokane do not begin at the Washington border. They are watershed-based problems which require watershed-based solutions.

EPA's participation was particularly important. Not only does it have regulatory authority to issue the Idaho NPDES permits, it also has the regulatory duty to approve this TMDL and the Washington NPDES permits which must be issued in conformity therewith. As stated by the Supreme Court, "The Clean Water Act anticipates a partnership between the States and the Federal Government animated by a shared objective: 'to restore and maintain the chemical, physical, and biological integrity of the nation's waters.'"[26] Where, as here, a state line separates a discharge from its impacts, EPA has the authority and duty to ensure that downstream waters are protected.[27] To that end, EPA has adopted a watershed-based permitting policy and issued a guidance document[28] which states, "Watershed-based NPDES permitting is an approach to developing NPDES permits for multiple point sources located within a defined geographic area (watershed boundaries) to meet water quality standards."[29] Watershed boundaries can transcend local, state and even national boundaries.[30]

Although the Idaho dischargers contribute only 5% of the pollutant loading in Lake Spokane, they are a significant source of phosphorus, ammonia, and $CBOD_5$ loading in Lake Spokane and alone have the potential to cause a 1.1 mg/L decrease below natural conditions in Lake Spokane.[31] For that reason, the 2004 Draft TMDL included the Idaho dischargers in its calculations and proposed effluent limits that the assessments showed were necessary to meet downstream standards for these as well as the Washington dischargers.[32] Although Washington cannot impose load allocations on the Idaho dischargers, EPA is under a legal duty to condition the Idaho NPDES permits such that they will not cause or contribute to violations of Washington's water quality standards and to ensure that this TMDL is crafted to restore water quality.[33] Thus, just as in the 1989 Spokane River

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[26] *Arkansas v. Oklahoma*, 503 U.S. 91, 101 (1992).
[27] *See* 40 C.F.R. 122.4 (No NPDES permit shall be issues when the imposition of conditions cannot ensure compliance with all affected States); 40 C.F.R. 122.44(d).
[28] *Watershed-Based National Pollutant Discharge Elimination System (NPDES) Permitting Technical* Guidance at http://cfpub1.epa.gov/npdes/whatsnew.cfm?program_id=0; *Watershed-Based NPDES Permitting Implementation* at http://www.epa.gov/npdes/pubs/watershedpermitting_finalguidance.pdf. *Id.* at 1-1 (EPA 2003). See also USEPA *Watershed-Based National Pollutant Discharge Elimination System (NPDES) Permitting Policy Statement, Guidance, supra*, Appendix A. (Jan. 2003) (Watershed-based permitting will foster more effective implementation of watershed plans, including TMDLs).
[29] *Guidance*, supra at 2-1 (A watershed is a geographic area in which water, sediments, and dissolved materials drain to a common outlet such as a larger stream, lake, an underlying aquifer, an estuary or an ocean. These can transcend local, state and national political boundaries).
[30] *Id.*
[31] Proposed Reissuance of an NPDES Permit to the City of Coeur d'Alene Fact Sheet p. C-3, 4 at http://yosemite.epa.gov/r10/water.nsf/NPDES+Public+Notices/Idaho-Wastewater-extPN. The Sierra Club tendered comments on EPA's proposed permits and IDEQ's 401 Certification for the three Idaho Wastewater Treatment Plants which are attached hereto as Appendix N: (1) and (2) and incorporated herein by reference.
[32] Cusimano (2004) at 65 (Boundary conditions at WA/ID border included Idaho dischargers). *See also* Massman Review (2007), Appendix B: (4) at 3 ¶ 9 (2004 study showed that additional loading above identified loading would cause water quality violations even if the loads occurred upstream of WA/ID border).
[33] 40 C.F.R. 122.4; 122.44(d).

Management Plan, it was understood by all participants that the solution must include Idaho and EPA.

Unfortunately, EPA abandoned the watershed approach in permitting the three Idaho plants.[34] Instead of viewing the watershed as a whole, EPA ran new modeling scenarios which evaluated the impacts of the Idaho plants on Lake Spokane in isolation. As a result, EPA considered only the impact of the Idaho dischargers on Lake Spokane and conditioned the permits such that the Idaho discharges alone will cause just under 0.2 mg/L decrease below natural conditions in Lake Spokane.[35] This is problematic in that Idaho's discharges, in combination with just a fraction of Washington loading, will violate the water quality standards in Lake Spokane. In fact, the Idaho discharges at the proposed final limits, enforceable in ten years from permit issuance, together with the allowable nonpoint source loading from Washington as calculated by the revised modeling, will cause a 0.4 mg/L decrease below natural conditions, twice the allowable limit.[36]

Instead of objecting to EPA's strategy, Ecology revised the TMDL in conformity therewith.[37] Under the Draft 2004 TMDL, the boundary conditions at the state line were calculated as natural background and did not include the Idaho point source discharges.[38] Consistent with Washington law which requires a cumulative analysis of all human sources, these discharges, in addition to Washington sources, were considered in determining how much more loading could be added beyond natural background to avoid causing more than a 0.2 mg/L decrease below natural conditions in Lake Spokane. In its revision, Ecology adopted a degraded background condition which includes the Idaho discharges. This is the baseline from which the TMDL allows another 0.2 mg/L decrease.[39]

Although the proposed TMDL includes many important pollutant reduction strategies, such as conservation, reuse and technology upgrades, it is fundamentally flawed by the use of a degraded background. The CWA requires TMDLs to be established at levels sufficient to attain water quality standards.[40] This TMDL does not do so based on the revised boundary conditions and the other concerns noted below.

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[34] Our comments on EPA's permitting strategy and its implications for this TMDL are adapted from our comments on the proposed Idaho NPDES permits. For full comments on these issues see Appendix: N (1) and (2).

[35] *See* fn. 31, CDA Fact Sheet at C-5. *See also* Comments on NPDES Permits, Appendix N(1),Ex. 5, 4.14.06 EPA email; Massman (2007) at 5 ¶ 9 (The limits proposed by EPA for the Idaho NPDES permits do not consider the effects of existing wastewater treatment plants and existing nonpoint pollutant sources in the State of Washington. These additional sources will cause further reductions in dissolved oxygen in Long Lake. The cumulative impact of the Idaho and Washington sources will exceed the water quality criteria of 0.2 mg/L reduction in dissolved oxygen.).

[36] Appendix N: (1) Ex. 32 at C.4. See also Appendix B: (4), Massman (2007) at 6 ¶ 4 (A reasonable estimate of impact from Idaho point source loading at proposed limits and Washington nonpoint source loading will be approximately 0.4 mg/L, twice the allowable level.)

[37] See Appendix G: (11) Ronald Lavigne, AAG which demonstrates Ecology will object to Idaho permits which are not protective of Washington water quality standards ("EPA should not be proposing permits mods that allow increases in pollutant loads to discharges that contribute to 303(d) listed waters at the state border.").

[38] Appendix N (1) Ex. 1 at 14; Ex. 32 at A.6.

[39] Appendix N (1) Ex. 17.

[40] 33 U.S.C. § 303(d)(1)(C); 40 C.F.R. 130.7(c)(1)(i).

COMMENTS

TMDL

1. There is no scientific or other evidence in the TMDL that reducing phosphorus will also reduce CBOD and ammonia, all of which must be reduced in order to attain water quality standards for dissolved oxygen in Lake Spokane.

p. v: "The TMDL focuses on strategies to reduce phosphorus because the strategies will likely result in reductions to ammonia and carbonaceous biochemical oxygen demand."

Under the CWA and its implementing regulations, TMDLs must be established for all pollutants preventing or expected to prevent attainment of applicable water quality standards.[41] TMDLs may, however, be established on a pollutant-by-pollutant basis or biomonitoring approach.[42] TMDLS should include a description of any important assumptions relied upon in their development.[43]

This TMDL identifies three pollutants which contribute to nonattainment of the dissolved oxygen standard in Lake Spokane - ammonia (NH3-N), total phosphorus (TP), and carbonaceous biochemical oxygen demand (CBOD). "Management of these pollutants," according to this TMDL, "will result in restoration and protection of existing and designated uses stipulated in Washington's water quality standards."[44] Yet, the only technologically based implementation action required is to install equipment to reduce phosphorus concentrations. No explanation is presented which supports the assumption that this technology will concurrently reduce CBOD and ammonia, especially for processes lacking biological nutrient removal.[45] Nor are there any other strategies described or required targeting any parameter but phosphorus. Moreover, mere chemical addition with filtration for phosphorus removal may or may not impact CBOD, but added to existing processes is unlikely to achieve waste load allocations for ammonia. The TMDL must explain the linkage between phosphorus reducing efforts and reductions of the other two pollutants and require the requisite reduction actions necessary to reduce CBOD and ammonia as well as phosphorus.[46]

2. The expression utilized for CBOD needs to be consistent throughout the TMDL.

The TMDL calls for reductions in CBOD as necessary to meet water quality standards in Lake Spokane. However, CBOD is described variously throughout the report as BOD, BOD5, CBOD,

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[41] 33 U.S.C. § 1313(d)(C); 40 C.F.R. 130.7(1)(ii).
[42] 40 C.F.R. 130.7(1)(i).
[43] *EPA Guidance*, fn. 28.
[44] 2007 Draft TMDL at 10.
[45] *See* Appendix G: (13) Email from Ecology staff noting questions about assumption that "cutting edge" phosphorus treatment would also result in corresponding reduction in ammonia and CBOD.
[46] *See* Appendix I: (2) December 22, 2006 letter from IEP to Ecology stating "IEP was of the understanding that we had an agreement with DOE that limits for CBOD and ammonia would be established based on performance of the significant capital equipment to be installed for achieving the phosphorus goals. IEP remains concerned that the DOE may impose regulatory constraints for CBOD and ammonia that may result in significant additional financial investments in an attempt to meet limits that may be unachievable."

ultimate CBOD ($CBOD_{utl}$), and $CBOD_5$. For example, the waste load allocations in Table ES 2, p. ix, are expressed as CBOD but the instream concentrations in Table 5, p. 23, are expressed as $CBOD_{ult}$. Because BOD and phosphorus loads are stochiometrically linked due to phosphorus tied into organic material (algae and detritus), one can't raise the parameters separately unless the stochiometry of algae changes. The TMDL should explain these differences and utilize a consistent expression throughout the report and in calculating loadings.

3. The TMDL misrepresents the applicable water quality standard for dissolved oxygen in Lake Spokane.

p. 9, Table 2: "Dissolved Oxygen Criteria – No measurable decrease (0.2 mg/L) from natural conditions." ¶ 3: "TMDLs under development will use the unrevised (1997) water quality standards. However Ecology will use the revised standards for compliance tracking…"

Federal law requires that TMDLs be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards (WQS).[47] Washington's water quality standard for dissolved oxygen in lakes is an applicable water quality standard.

Washington's revised water quality standard for dissolved oxygen in lakes became effective on December 21, 2006. This standard provides: For lakes, human actions considered cumulatively may not decrease the dissolved oxygen concentration more than 0.2 mg/L below natural conditions.[48] Although EPA has the duty to approve state water quality standards within ninety days of submission and additionally indicated its intent to approve this standard as early as September 1, 2005, it has yet to finalize its approval.[49] Consequently, the TMDL states that it must utilize the old standard in developing the TMDL, but will use the revised standard for "compliance tracking."[50] This is contrary to earlier statements by Ecology that the new standards "represent the most current science and are therefore the most appropriate to apply" to new permits and other activities.[51] Nor is it consistent with Ecology's current interpretation of the unrevised standard as it has been applied to dissolved oxygen TMDLs.

The current or unrevised standard for dissolved oxygen in fresh water lakes such as Lake Spokane provides for "no measurable decrease from natural conditions."[52] The standard does not have a 0.2 mg/L allowance for human sources in lakes and as such is misrepresented in the TMDL.[53] However, as explained by EPA in the Fact Sheets for its proposed Idaho permits, Ecology has allowed a 0.2 mg/L sag in some TMDLs. Specifically, "Ecology has generally allowed a 0.2 mg/L decrease in dissolved oxygen concentrations in TMDLs for oxygen-demanding substances, pursuant to its dissolved oxygen criterion of 'no measurable decrease from natural conditions.' … In other words, Ecology has interpreted its narrative criterion of 'no measurable decrease from natural conditions to mean 'less than a 0.2 mg/L decrease from natural conditions.'"[54]

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[47] 40 C.F.R. 130.7(c)(1).
[48] WAC 173-201A-200(1)(d)(ii).
[49] 33 U.S.C. 1313 (a)(3); 40 C.F.R. 130.10(3); Ex. 3, Ecology 3.7.07 email.
[50] 2007 Draft TMDL at 9.
[51] Appendix N: (1) Ex. 3.
[52] WAC 173-201A-030(5)(c)(ii).
[53] 2007 Draft TMDL at 9.
[54] CDA Fact Sheet, supra fn. 31 at C-4,5.

EPA attributes Ecology's "interpretation" of Washington's lake class water quality standard for dissolved oxygen to Bob Cusimano's 2004 *Loading Assessment for the Spokane River and Lake Spokane*.[55] In applying the standard to the Spokane River and Lake Spokane DO TMDL, Mr. Cusimano explained:

> The dissolved oxygen criterion for Lake Spokane is "no measurable change from natural conditions...." However, in other TMDLs for oxygen-consuming substances, Ecology has allowed a 0.2mg/L degradation in dissolved oxygen concentration due to human impacts when the dissolved oxygen concentration is below (or near) the criteria. We are proposing to apply this allowable change in dissolved oxygen for the Spokane River and Lake Spokane TMDL study as discussed in the following paragraphs. Any additional decrease in dissolved oxygen would require formally changing the water quality criteria for the river and lake (i.e. developing site-specific criteria) or conducting a Use Attainability Analysis (UAA) to reduce the level of beneficial use protection....
>
> We are proposing to apply the Lake Class dissolved oxygen criteria to Lake Spokane as follows: Under critical year conditions, allow no more than a 0.2 mg/L deficit in dissolved oxygen from "natural conditions" (i.e. reference conditions) at any point in the water column due to identified point and nonpoint pollutants. Reference conditions for Lake Spokane will be defined as the water quality conditions estimated by the calibrated CE-QUAL-W2 model that would occur with no point source discharges and tributary pollutant (nonpoint source) concentrations set to estimated background conditions.

Cusimano at 61, 62 [56]

As is clear from this excerpt, Ecology's intent in applying the lake criteria to Lake Spokane was to allow no more than a cumulative 0.2 mg/L decrease considering identified sources cumulatively. Ecology's former water quality standards senior analyst, Mark Hicks, concurs:

> The 1997 criteria do not have a 0.2 mg/L allowance for freshwaters. However, based on discussion with our TMDL modelers it is my understanding that we have been applying a 0.2 mg/L cumulative allowance in fresh waters as part of our dissolved oxygen TMDL targets. This has been argued as appropriate because of reasons such as: marine waters have a 0.2 allowance, lakes have a measurable degradation allowance, the 0.2 is within measurement error, the 0.2 would avoid setting an unreasonable zero allocation, and because Ecology wanted to include a 0.2 freshwater allowance during the ongoing rulemaking.[57]

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[55] CDA Fact Sheet, supra fn. 31 at C-2, fn 3.
[56] Appendix N: (1) Ex. 8.
[57] *Id.*, Ex. 9 at 11 ¶ 1.

Thus, the current standard as applied here allows a 0.2 mg/L decrease and requires a cumulative analysis of all identified, human sources. The TMDL should clarify its application of the unrevised standard.[58]

4. <u>The TMDL inappropriately applied Washington's water quality standard for dissolved oxygen to Lake Spokane by ignoring the loading coming into Washington from Idaho.</u>

p. 15: "The upstream boundary natural background conditions have been modified and are now represented by the output of EPA's calibrated CE-QUAL-W2 model for the Idaho section of the Spokane River, and include point source loads corresponding to the proposed Idaho permit limits."
p. 16: "Background nutrients for the Spokane River under the "NO SOURCE" modeling scenario have been modified to represent the boundary condition of the river at the Idaho/Washington border using EPA's calibrated model, which includes point source loads corresponding to the proposed Idaho permit limits."

Washington's water quality standard for dissolved oxygen in Lake Spokane as applied in this TMDL provides that all human actions cumulatively cannot cause more than a 0.2 mg/L decrease below natural conditions in Lake Spokane. The water quality standards for dissolved oxygen in lakes relies on a determination of natural conditions. " 'Natural conditions' or 'natural background levels' means surface water quality that was present before any human-caused pollution. When estimating natural conditions in the headwaters of a disturbed watershed it may be necessary to use the less disturbed conditions of a neighboring or similar watershed as a reference condition."[59]

In calculating the loading from identified sources, the 2004 Draft TMDL first estimated the natural background conditions as the boundary condition at the Washington/Idaho (WA/ID) state line.[60] For the natural background condition at state line, Ecology utilized data from the outlet of Lake Coeur d'Alene which has very low phosphorus concentrations.[61] This then became the boundary condition from which allowable loading was calculated. It did not include loading from Idaho dischargers.[62]

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[58] EPA indicated its intent to approve Washington's dissolved oxygen water quality standard for lakes as early as September 2005. It appears that Ecology is using EPA's failure to approve the revised standard to excuse its failure to consider **all** human actions cumulatively in developing this TMDL. As this approach was adopted from EPA, which likewise failed to consider all human actions in conditioning the Idaho permits, one must question whether EPA's failure to approve the revised standard will be further "delayed" until the TMDL and Idaho permits are approved. *See* 2007 Draft TMDL at 16, § Natural and Background Conditions ("The following language was developed in consultation with EPA Region 10").
[59] WAC 173-201A-020.
[60] Appendix A: (1) at 4, 14 (citing to Cusimano (2004)); Appendix G: (6) Email from Cusimano describing low levels of phosphorus from Lake CDA.)
[61] *Id.* at 14. "While the lake is not pristine from a nutrient standpoint (it receives anthropogenic nutrients from communities along two large tributaries), available monitoring indicates that nutrient concentrations are low in the lake." (Cope 2006). *See also* Appendix G: (19) Cusimano email stating that "natural condition" values are reasonable and defensible.
[62] Appendix N: (1) Ex. 1 at 14; Ex. 32 at A.6.

By contrast, the 2007 Draft TMDL does not use natural background conditions. The boundary conditions were calculated with Idaho point sources included. This is not a "natural background condition," but instead a degraded condition which includes human-caused impacts from which the revised TMDL allows additional nonpoint source loading in Washington up to the 0.2 mg/L limit.[63] According to EPA, the "human-caused impacts" from the Idaho plants at current levels alone have the potential to cause a 1.1 mg/L decrease in dissolved oxygen in Lake Spokane.[64] This is more than 5 times the allowable loading. And, at the proposed permit limits (enforceable in ten years), EPA's own modeling demonstrates the Idaho discharges alone will cause just a shade under a 0.2 mg/L sag below natural conditions in Lake Spokane.[65] The combined point source loading from Idaho with the proposed nonpoint source loading in Washington will violate the water quality standards in Lake Spokane.[66]

Clearly the Idaho dischargers contribute to water quality violations in Lake Spokane and Ecology violates Washington water quality standards by failing to consider their loading in devising the waste load and load allocations in this TMDL.

5. <u>There is no rational basis for utilizing a degraded baseline as the upstream boundary condition.</u>

p. 16: "In order to provide the most *realistic baseline condition* for the source analysis in Washington, Ecology has elected to use the predicted water quality outcome at the state line under the revised Idaho permit requirements as the upstream boundary condition for the source analysis in Washington." (emphasis added).

Implementation actions in TMDLs must be based on articulable explanations. In other words, "[t]here must be a rational connection between the facts found and the choices made." EPA Region10 Guidelines, quoting *Dioxin/Organochlorine Center v. Clarke*, 57 f.ed 1517, 1525 (9th Cir. 1995). The 2007 Draft TMDL does not provide a sufficient explanation for choosing the degraded boundary condition. Instead, it explains simply that upstream boundary conditions for

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[63] *Id. See also* Massman Review (2007) at 6 ¶ 2 ("The 'natural conditions' that are used in the recent simulations in fact represent a degraded system relative to the natural conditions that were used in the 2004 TMDL study and relative to the natural conditions used in the 2006 EPA study. The recent simulations essentially redefine 'natural conditions' to mean conditions that result after pollutant loadings have been discharged from the three Idaho wastewater treatment facilities.")

[64] CDA Fact Sheet, *supra* fn. 29 at C-3, 4.

[65] Appendix N: (1) Ex. 7 (EPA email from Brian Nickel, EPA permit writer, stating "It appears that Ben (Cope) and I have found limits for the Idaho dischargers which limit them to just a shade less than 0.2 mg/L impact in Lake Spokane on the worst day...."); Ex. 7.1 (The "modeling team" for the EPA runs and the revised TMDL runs included Bob Cusimano (Ecology), Karol Erickson (Ecology) and Ben Cope (EPA)). *See also* Ex. 32 at C.2 ("The expected impact from these point sources is approximately equal to the allowable limit of 0.2 mg/L decrease in dissolved oxygen concentrations in Long Lake...."). *See also* Appendix B: (4).

[66] *See* Appendix B: (4) Massman (May 9, 2007) at 6 ¶ 4 (Massman, May 9, 2007)(Although simulations have not been completed to evaluate the combined effects of both the proposed Idaho point loads described in Cope (2006) and the proposed Washington nonpoint loads described in Berger and Wells (2007), it is clear that these impacts will be significantly greater than 0.2 mg/L. A reasonable estimate would be that the combined impact will be approximately 0.4 mg/L, or twice the level allowed under the water quality criteria....).

TMDLs can vary depending on information available and that the revised boundary condition is the "*most realistic baseline condition.*"[67]

If reality is that which exists objectively and in fact, this baseline condition is not based on objective facts. The fact is that the baseline includes degradation by point sources from Idaho which currently cause more than a 1.1 mg/L sag below natural conditions in Lake Spokane, and after ten years or more, will still cause just a shade under the allowable 0.2 mg/L sag. Unless Ecology's definition of reality does not consider the Idaho dischargers as "human," their discharges are "human" actions that contribute to water quality violations in Lake Spokane. Ecology's interpretation is disconnected from the facts, the science and the law. The available information does not support Ecology's approach. To the contrary, it demonstrates that the Idaho discharges are human sources/actions that cumulatively contribute to more than a 0.2 mg/L decrease below natural conditions in Lake Spokane.

It is equally as absurd to claim that "[w]ithin Washington, the baseline condition consists of the Spokane River without any anthropogenic sources." [68] Surely anthropogenic sources include Idaho point sources which discharge just a few miles upstream of the border.

6. <u>The Idaho permits were not derived from or consistent with Washington water quality standards.</u>

p. 16: "The NPDES permits for the Idaho municipalities are derived from Washington water quality standards. EPA, in consultation with Ecology and the State of Idaho, has developed permit requirements for phosphorus, ammonia and CBOD that ensure that Idaho sources achieve the Washington dissolved oxygen standard for Lake Spokane. The permit conditions ensure that these sources will have no measurable impact on dissolved oxygen levels in Washington, both at the state line and in Lake Spokane."

We disagree. The proposed NPDES permits for the three Idaho municipalities are not derived from Washington water quality standards, do not ensure attainment of the dissolved oxygen standard in Lake Spokane and currently do have and will have at full implementation a measurable impact on dissolved oxygen in Lake Spokane.

a. EPA's permits are not derived from or consistent with Washington's dissolved oxygen standard for lakes as applied by Ecology in TMDLs.

Federal law requires that the effluent limits in the Idaho permits be derived from and comply with all applicable water quality standards in the affected states.[69] Washington's water quality standard for dissolved oxygen in lakes is an applicable water quality standard and as applied by Ecology to dissolved oxygen TMDLs requires that all human actions cumulatively may not cause more than a 0.2 mg/L decrease below natural conditions in Lake Spokane.[70]

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[67] Draft 2007 TMDL at 16.
[68] 2007 Draft TMDL at 17.
[69] 40 C.F.R. § 122.44(d).
[70] *See* Comments 3 and 4 above.

EPA calculated the loading allocations for each Idaho plant by determining how much pollutant loading from all three Idaho plants would cause less than a .02 mg/L sag. Hence, EPA does acknowledge that the standard requires a cumulative analysis. And it agrees that Lake Spokane is a "reasonable point of compliance" for the Idaho dischargers.[71] Yet it arbitrarily limits its analysis for purposes of these permits to the impacts of the Idaho dischargers and ignores all other sources between the border and the lake. There is no basis in law for this distinction. Federal regulations clearly and unambiguously require EPA to include in these permits any conditions necessary to achieve Washington's water quality standards, including limitations on all pollutants which EPA determines will cause or have the potential to cause or contribute to an excursion above Washington's water quality standards.[72] Thus, EPA is charged by federal law to consider Idaho's *contribution* to Washington water quality violations. And EPA is charged by federal law to apply Washington's water quality standards. The Idaho dischargers are identified sources of loading to Lake Spokane which both EPA and Ecology have shown contribute to violations of its water quality standard for dissolved oxygen.[73]

EPA has misinterpreted this standard and federal regulations. Federal regulations require not only that the Idaho discharges not *cause* violations, but also that they not *contribute* to such violations. A "contribution" analysis is a "cumulative" analysis and requires consideration of all identified sources. Similarly, as applied by Ecology to Lake Spokane, the state standard requires a consideration of all identified sources. Thus, EPA's application of this standard in all three permits is neither derived from nor consistent with Washington's lake standards, is arbitrary and capricious and is thus in violation of 40 CFR 122.44(d).

b. <u>Utilizing the best science available, the Idaho discharges have a significant and measurable impact on Lake Spokane.</u>

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[71] Appendix N: (1) Ex. 2 at ¶ 5.

[72] 40 C.F.R. 122.44(d)

[73] This situation varies from that in *Arkansas v. Oklahoma* where the U.S. Supreme Court found no violation by an Arkansas discharge of Oklahoma's antidegradation policy where there was no evidence in the record of any detectable change in the water quality in the downstream state. *Arkansas v. Oklahoma,* 503 U.S. 91 (1992). There, the Court determined that the evidence supported a finding that, with regard to dissolved oxygen, "in the 39 miles between discharge and the border the effluent would experience "complete oxygen recovery." *Id.* at 112. By contrast, here extensive modeling provides ample evidence that after traveling the distance from the state line to the lake, the effluent has adverse impacts on dissolved oxygen in Lake Spokane. Moreover, in *Arkansas*, the point of impact was at the state line itself. Thus, the Court was not asked to consider questions of contribution. Indeed, the Court could not have been asked to consider contribution under 40 C.F.R. 122.44. Section 122.44, as it existed at the time the permit was drafted, did not contain the requirement for NPDES permits to specifically assess whether a discharge will "cause or contribute" to a water quality standard violation. *See* 48 Fed. Reg. 14,146 (April 1, 1983). After the permit for the City of Fayetteville was issued and after review by an EPA Administrative Law Judge, Section 122.44 was amended in 1989 to include the "cause or contribute" language. 54 Fed. Reg. 23,868 (June 2, 1989); *see also Oklahoma. v. E.P.A.,* 908 F.2d 595 (10th Cir, 1990)(for procedural history of the case). Accordingly, the interpretation of this regulation was an issue that was neither considered by nor properly before the Supreme Court. Further, the permits at issue in Arkansas were proposed in 1983. Clearly, advances have been made in qualitative and quantitative measuring methodologies in the past twenty-four years. According to Ben Cope, the CE-QUAL-W2 model can assess discharge impacts less than 0.2 mg/L with some degree of confidence. Appendix N: (1) Ex. 2 at 4 ¶ 5.

EPA's modeling undisputedly shows that at the proposed final limits, the Idaho discharges alone will cause just a shade under the allowable limit.[74] This modeling demonstrates more than theoretical impacts downstream and both EPA and Ecology rightly relied on this modeling, and not instream measurement, as the best available science to determine waste load and load allocations for the Spokane River sources. [75]

While water quality criteria are developed solely on science, water quality standards are developed taking into consideration technology, (i.e., the ability to detect and measure specific levels of pollutants), and the economic and social impacts of imposing a regulatory level at a criteria recommendation. According to Ecology water quality staff, modeling is the accepted method for determining cumulative impacts to water segments:

> Historically, Ecology has not required ambient monitoring of dischargers, and since the criteria are based on compliance during critical conditions the monitoring necessary to statistically demonstrate compliance would be logistically and financially prohibitive. We always, or almost always, use simulations or models of some kind, whether static or dynamic to determine what effluent limits and controls on nonpoint sources will be needed to achieve compliance with the state standards.[76]

For the past several years, Ecology has been working with EPA for approval of its new standards. Apparently, EPA was unhappy about Ecology's allowing even a 0.2 mg/L decline below natural conditions in lakes in part because EPA considered 0.1 mg/L measurable.[77] Although EPA's Kathleen Collins indicated that "it is EPA's intention to approve the allowance for a 0.2 mg/L D.O. depression in the WA WQS package," she also asked Ecology to provide justification for this allowance.[78]

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[74] *See infra* Comment 4. See also Appendix B: (4) Massman Review (May 2007) at 6 ¶ 9 ("The limits proposed by EPA for the Idaho permits do not consider the effects of existing wastewater treatment plants and existing nonpoint pollutant sources in the State of Washington. These additional sources will cause further reductions in dissolved oxygen in Long Lake [Lake Spokane]. The cumulative impact of the Idaho and Washington sources will exceed the water quality criteria of 0.2 mg/L reduction in dissolved oxygen.")

[75] Appendix N: (1) Ex. 12.1 at 3 (EPA email discussing approved testing methodology and analytical procedures from EPA laboratory staff that can achieve quantification levels of less than 0.0005 mg/L and discussing peer review process model development); Ex. 2 (EPA believes model reasonably incorporates the known features and available information for the Spokane River system; available data sufficient to develop a useful and reasonably accurate water quality model of the system; level of uncertainty is acceptable; runs sufficient to determine limitations of achieving water quality goals; model is well-suited to long, narrow reservoirs such as Long Lake); Ex. 2.1; Ex. 13 (EPA letter stating "Ecology's technical evaluation of the river from the Idaho border to the Long Lake Dam (Cusimano 2003) represents the best available information about Spokane River water quality conditions. The evaluation determined that during the critical period there is no loading capacity for pollutants that exert an effect on dissolved oxygen concentrations without degrading water quality."). *See also American Trucking Ass'n v. Atchison, T & S.F. Ry. Co.*, 387 U.S. 397, 416 (1967) (administrative agencies are not required to, nor should they, regulate the present and future within the inflexible limits of yesterday); *Postema v. PCHB*, 11 P.3d 726, 740 (2000) (citing to numerous PCHB decisions upholding conceptual modeling).

[76] Appendix N: (1) Ex. 9 at 11, Email from Mark Hicks, former Water Quality Standards Senior Analyst, Washington Department of Ecology.

[77] Appendix N: (1) Ex. 11 (Email from Mark Hicks discussing EPA's decision to grant 0.2 mg/L allowance to Idaho dischargers.).

[78] Appendix N: (1) Ex. 9 at 2.

In response, Ecology water quality staff Melissa Guildersleeve replied that Ecology allowed a 0.2 mg/L reduction below natural conditions for the cumulative impact of all human sources of degradation to dissolved oxygen throughout the watershed for the following reasons:

1) the increment represents the measurement quality objective (MQO)1 for dissolved oxygen for our agency (See http://www.ecy.wa.gov/pubs0303200.pdf);

2) the increment is the reported accuracy range for hydrolab sensors (See http://www.hachennvironmental.com/products/d_oxygen.asp);

3) It is nearly no-change from natural conditions criteria, yet in rivers where there is reasonable dilution and active flows it also allows for permit limits to be set that can be achieved by permittees. (It would be meaningless to give an allowance for human effects so small that it typically results in zero discharge requirement);

4) The biological research studies used to establish water quality criteria are characterized by having oxygen concentrations which commonly fluctuated by more than 1.0 mg/L and thus cannot be used to infer precision greater than 0.2 mg/L is necessary or appropriate for applying the criteria; and

5) this cumulative impact criteria is not applied using field monitoring.[79]

In sum, then, Ecology's position was that a cumulative 0.2 mg/L decline was measurable and necessary as economic mitigation to avoid requiring zero discharge. It was a reasoned trade-off that would still prevent undue impacts. The standard did not, however, allow for individual point sources or groups of point sources to individually cause the sag. It was applied to all identified sources discharging into the water body of concern.

In November of 2005, EPA permit writer Brian Nickel and EPA modeler Ben Cope presented a power point on the "Permit Limits for Idaho Dischargers to the Spokane River."[80] In the presentation, EPA stated that the Idaho discharges were a "small, but significant, part of the problem" for dissolved oxygen in Lake Spokane.[81] The presentation included several slides showing the impact of the Idaho dischargers on dissolved oxygen in Lake Spokane under varying scenarios. In these, the model calculated D.O impacts from the Idaho dischargers at 0.81 mg/L, 0.24 mg/L , 0.28 mg/L, 0.15 mg/L, and 0.16 mg/L, two of which were under 0.2 mg/L.[82] This modeling provides ample evidence of measured impacts on Lake Spokane.

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[79] Appendix N: (1) Ex. 9 at 5,6.
[80] Appendix N: (1) Ex. 12.
[81] *Id.*
[82] Appendix N: (1) Ex. 12.1 at 3 (EPA email discussing approved testing methodology and analytical procedures from EPA laboratory staff that can achieve quantification levels of less than 0.0005 mg/L); (describing peer review process model development); Ex. 2 (EPA believes model reasonably incorporates the known features and available information for the Spokane River system; available data sufficient to develop a useful and reasonably accurate water quality model of the system; level of uncertainty is

EPA should thus have conditioned the Idaho permits consistent with the best science and Ecology's interpretation of its own standards such that the permits will not contribute to water quality standard violations in downstream. Instead, EPA essentially granted all the allowable loading to Idaho thereby ensuring that any addition from Washington would violate the standard. Ecology then adopted this strategy by allowing another 0.2 mg/L decrease in addition to that caused by Idaho.

Ecology's own staff concur with this analysis. Upon learning that EPA intended to grant the entire allowable loading to Idaho, Ecology's former Senior Water Quality Standards Analyst, Mark Hicks, sent an email to Ecology and EPA stating:

> I am a little bewildered about how EPA is dealing with dissolved oxygen issues right now. For the Spokane River, EPA appears poised to grant a 0.2 mg/L depression from naturally low dissolved oxygen levels to the point source dischargers in Idaho, and then grant another 0.2 mg/L depression for the Washington dischargers. However, our standards allow only a cumulative 0.2 mg/L depression below naturally low oxygen levels for all human sources combined (point and nonpoint), not 0.4 mg/L. Further the 0.2 is for our state's dischargers, not Idaho's.
>
> - How can EPA interpret our standards as permitting the 0.2 mg/L human allowance to go to Idaho's dischargers?
> - Shouldn't EPA be accounting for nonpoint source contributions?
> - How can EPA ignore that our standards set a cumulative 0.2 depression by granting a cumulative 0.4 mg/L.?
> - What is the mechanism for overriding our state standards in writing permits?
> - EPA standard's staff involved in the ongoing review of our standards have formally questioned whether or not we should even be giving 0.2 mg/L?
> - Why did EPA, who has told us they believe 0.1 is measurable and more appropriate, not divide the 0.2 mg/L allowance between the two state's dischargers?
> - Won't this result in other dischargers in our state questioning why they are being held to 0.2 since EPA finds 0.4 sufficient to meet our standards and the CWA?
> - EPA has told us that the existing oxygen criteria are probably not protective enough to pass ESA, yet they appear ok with allowing a 0.4 further depression from natural levels that are below those questionable criteria. How can they

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acceptable; runs sufficient to determine limitations of achieving water quality goals; model is well-suited to long, narrow reservoirs such as Long Lake); Ex. 2.1; Ex. 13 (EPA letter stating "Ecology's technical evaluation of the river from the Idaho border to the Long Lake Dam (Cusimano 2003) represents the best available information about Spokane River water quality conditions. The evaluation determined that during the critical period there is no loading capacity for pollutants that exert an effect on dissolved oxygen concentrations without degrading water quality."). *See also American Trucking Ass'n v. Atchison, T & S.F. Ry. Co.*, 387 U.S. 397, 416 (1967) (administrative agencies are not required to, nor should they, regulate the present and future within the inflexible limits of yesterday); *Postema v. PCHB*, 11 P.3d 726, 740 (2000) (citing to numerous PCHB decisions upholding conceptual modeling).

> be knowingly allowing an even greater depression from levels below what they question as protective?
>
> The current EPA dialogue on dissolved oxygen does not appear defensible or logical. The current approach of treating each issue (CWA review, ESA review, NPDES permitting, TMDL) independently and inconsistently is almost certainly going to lead to greater problems for the state in the long run.
>
> We should be encouraging EPA Region 10 to develop a more coherent policy surrounding the review and application of our state's dissolved oxygen criteria.[83]

Ken Merrill, former Ecology DO TMDL lead, stated:

> EPA should not be making unilateral modifications to the model and permitting the ID dischargers using their own new and contorted definitions of WA standards and legal obligations of upstream States' responsibilities.
>
> WA standards and federal WQ regs require that dischargers not "cause or contribute" to WQ violations. It is erroneous to use the 0.2 "no measurable change" from 2001 conditions in Lake Spokane as the definition of "no measurable contribution" from ID dischargers. The change is to be related to the natural condition and the total pollutant load (all sources) can only cause 0.2 mg/L decrease from the natural value.
>
> EPA cannot ignore the draft TMDL, LAs and WLAs previously developed collaboratively to be legally defensible using good science consistent with EPA written guidance, regulation and ongoing review.[84]

Similarly, Hydrologist Drea Traeumer, who served as the second DO TMDL lead, sent an email to Ecology urging a change of course:

> Considering we are at a critical point and recommendations are being asked of me on how to proceed, I suggest we revert back to using natural conditions as stated in our water quality criteria and defined per our WAC. I realize it's a recent policy decision to include the Idaho point source dischargers in our estimate of natural conditions, and that this will result in lower nonpoint source load allocations for the tributaries (resulting in increased potential for pollutant trading).[85] However, continuing with this approach can only be problematic to Ecology because: it is inconsistent with our water quality criteria and our definition of natural conditions per our WAC; is not likely to be scientifically defensible; it will not change the reality of

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[83] Appendix N" (1) Ex. 11; Ex. 11.3 (Email from Gwen Franson of Idaho DEQ to Don Martin, EAP, stating that EPA's role is to integrate the permitting and TMDL processes and to ensure that both state's permits comply with Washington water quality standards). *See also* Appendix H: (10).

[84] Appendix G:21.

[85] Interestingly, in April 2006, EPA came to the same conclusion. See Appendix G: (11) (Email exchange between EPA headquarters and EPA staff reporting that while "trading was theoretically possible, it was not really viable due to the dramatic reductions (89%) needed in nonpoint sources. This conclusion could change if new modeling runs call for significantly lower levels of nonpoint source reduction.)

> the amount of nonpoint source reduction that is necessary to meet the target in the lake; and it will damage Ecology's credibility.[86]

And, according to an email from Ms. Traeumer to Ecology staff, at least two members of the Spokane modeling team agreed as well, Karol Erickson and Bob Cusimano. "I spoke with Karol (Erickson) and Bob (Cusimano) and both agree it would not be reasonable to apply Idaho's approach to Washington as there is no capacity during the shoulder months, due to NPS impacts...."[87]

Ecology did not heed its staff. Consequently, rather than author a document that Ms. Traeumer deemed fatally flawed, she resigned.[88]

Thus, EPA did not condition the Idaho permits in conformity with Washington water quality standards and this TMDL suffers from the same flaw.

For more comments and argument on these issues, see Sierra Club's Comments on the Environmental Protection Agency's (EPA) proposed NPDES permits for the City of Coeur d'Alene, Idaho, City of Post Falls, and the Hayden Area Regional Sewer Board, Idaho and Comments on the Proposed 401 Certification for these same permits which are attached hereto as Appendix N and incorporated herein by reference in their entirety.[89] In particular, see the Introduction and comments 1-9, and 25, Appendix N: (1).[90] See also related comments above.

7. <u>The available information from the watershed conclusively supports a baseline that does not include the Idaho pollution.</u>

p. 16: "As a starting point for the TMDL analysis, a baseline condition is established that is consistent with the scope of this TMDL and the available information in the watershed."

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[86] Appendix H: (1) – (6). See also Ms. Traeumer's Comments on Draft Spokane River and Lake Spokane TMDL (Traeumer 2007), tendered by Ms. Traeumer and thus a part of this administrative record.

[87] *Id.* at (4). See also Appendix H: (7) (Email from Ken Merrill, former DO TMDL lead, to Dave Ragsdale, former EPA lead for the DO TMDL (EPA allowing Idaho to use all of the allowable assimilative capacity in Lake Spokane for oxygen depletion is inconsistent with the federal regulations....)); (8) Email from Bob Cusimano to Ken Merrill (Stateline conditions have a significant role in determining hypolimetic oxygen concentrations in Lake Spokane); (9) Email from David Knight, Ecology, to Karol Erickson (My concerns are EPA pushing so hard for us to implement the TMDL, then taking what appears to be the easy road with the Idaho dischargers. I thought EPA's role was to assure consistency between Idaho and Washington).

[88] Appendix H: (11) (Email from Traeumer to Dave Knight ("The goal of a TMDL is to ensure that water quality standards are attained. As the water quality standard (i.e. natural condition) is not being applied to this TMDL, it does not appear to be a legally or scientifically defensible TMDL. This has resulted in a professional conflict that prevents me from authoring the TMDL."). *See also* Appendix H: (2) Spokesman Review Editorial by Ms. Traeumer and other newspaper articles on Ms. Traeumer's departure. Unfortunately, Ms. Traeumer was not the only agency staff member negatively impacted by this revision. David Ragsdale, EPA, and Ken Merrill, Ecology, both DO TMDL leads for their respective agencies, were also removed from this project due in part to professional disagreements with the revisions to the plan. Interestingly, the original 2004 Draft TMDL was authored by Ken Merrill and Bob Cusimano. No one was apparently willing to author the 2007 Draft TMDL.

[89] In particular, see Appendix N: (1), Introduction and comments 1-9, and 25. *See also* Appendix B (4) Massman Review (2007).

[90] See also Appendix B: (4) Massman Review (2007).

Ecology and EPA's technical analyses utilized in this TMDL provide ample information from the watershed, a watershed that does not stop at the boundary, to justify inclusion of the Idaho dischargers as contributors to dissolved oxygen problems in Lake Spokane.

See comments 2-6; Sierra Club Comments on Idaho NPDES permits in Appendix N; Appendix B: (1), (2), (4), (5), (8), (9), (10), (16), (21), and the other technical documents utilized by Ecology and EPA in assessing the river for the 2004 Draft TMDL, the Idaho permits and all assessments and data utilized in the 2007 Draft TMDL as well as those referenced in the 2007 Draft TMDL at 45-48.

8. By adopting EPA's permitting strategy, Ecology has unlawfully created a *de facto* new water quality criteria for Lake Spokane – one which allows a 0.4 ug/L sag below natural conditions.[91]

EPA, as the permitting authority upstream of Washington, has the duty under federal law to condition the Idaho permits such that they do not cause or contribute to downstream water quality violations, whether in Idaho or Washington.[92] Ecology should have objected to the proposed Idaho permits because EPA's strategy not only violates Washington's water quality standards for dissolved oxygen by ignoring the cumulative effect of Idaho and Washington loading, but it essentially leaves Washington with no allowable loading. Ecology declined to do so and instead incorporated EPA's selective view of the words "cumulative" and "contribute" into its TMDL.[93]

The combined effect of the EPA proposed permit limitations for the Idaho dischargers as incorporated into the Washington TMDL is to authorize degrading dissolved oxygen by 0.2 mg/L and to allow an additional 0.2 mg/L degradation. This approach sets a *de facto* new criteria – 0.4 mg/L - one that is inconsistent with Washington water quality standards and developed without formally changing the water quality criteria for the lake.[94] Moreover, this "new standard" is not stringent enough to restore Lake Spokane.

9. As a result of the decision to ignore the loading coming across the state line, the nonpoint source reductions necessary to meet water quality standards have been grossly underestimated.

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[91] Appendix B: Massman Technical Memos (2), (4), (7), (8). Joel Massman, PhD., P.D., conducted analyses of the 2004 Draft TMDL, the 2007 Draft TMDL, and the Model Scenarios and Results related to the Proposed Re-Issuance of the Idaho NPDES Permits.

[92] 33 U.S.C. § 1441(a)(2); 40 C.F.R. § 124.4, 124.44(d).

[93] Appendix N: (3), (4) (Correspondence between Sierra Club and Ecology requesting action to protect Washington interests).

[94] Appendix B: (4) Massman (2007) at 6 ¶ 4 ("Although simulations have not been completed to evaluate the combined effects of both the proposed Idaho point loads described in Cope (2006) and the proposed Washington nonpoint loads described in Berger and Wells (2007), it is clear that these impacts will be significantly greater than 0.2 mg/L. A reasonable estimate would be that the combined impact will be approximately 04 mg/L, or twice the level allowed under the water quality criteria....)

p. 20: "The maximum loading capacity for the upper Spokane River and Lake Spokane was determined by the amount of allowable increase in the nutrient load (phosphorus, carbonaceous biochemical oxygen demand, and ammonia) above the estimated natural and background conditions without causing a violation of the dissolved oxygen criteria."

p. 21: "Load allocations are assigned to the mouths of the tributaries: Hangman Creek; Coulee Creek; and the Little Spokane River. These load allocations are comprised of the estimated natural loads and the allowable increase in nonpoint pollution that would not cause an oxygen depletion to exceed 0.2 mg/L from the natural condition."

The CWA and its TMDL implementing regulations require a calculation of the total loading capacity of the impaired water body. A calculation of the total loading capacity, the greatest amount of pollutant a water body can assimilate without violating water quality standards, is necessary in order to determine the total maximum daily load and allocations based thereon.[95]

Table 2, p. 23 in the 2004 Draft TMDL (Appendix A) and Table 4, p. 22, in the 2007 Draft TMDL, show the tributary loading and proposed reductions necessary to meet load allocations. Both tables include loadings from the tributaries, Hangman Creek, Coulee Creek and the Little Spokane.[96]

All modeling scenarios utilized to calculate loadings for the Draft 2004 TMDL utilized a natural background condition at the state line as the baseline that did not include loading from Idaho. It was this baseline from which allowable loading was calculated. By contrast, the revised 2007 Draft TMDL utilized a degraded background condition as the baseline which included the Idaho discharges.

The difference between these two approaches can be seen by comparing Table 4 in the 2007 Draft TMDL with Table 2 in the 2004 Draft TMDL.[97] These tables contain the seasonal tributary load allocations under current conditions, the allowable loads and the reductions necessary to meet the load allocations. As can be seen from these tables, allowable nonpoint source loading has increased significantly under the 2007 revision.

The significance of this increase is readily apparent by comparing the average tributary nonpoint loading targets for phosphorus in the tables below:

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[95] 33 U.S.C. § 1313(d)(1)(C); 40 C.F.R. 130.2

[96] The 2004 Draft TMDL also includes loadings from the state line. These are omitted from Table 4 as well as the Table on p. 76 entitled Spokane River Tributary and Stateline Load Analysis, Appendix C. Ignoring these loadings underestimates the total loading to Lake Spokane. For an explanation of how Cusimano derived allocations, see Appendix G: (2).

[97] Id. at 22; Appendix A: (1) 2004 Draft TMDL at 23.

Allowable Pounds of Phos.

Tributary	Hangman Creek	Coulee Creek	Little Spokane
Apr- May **2004**	13.87	3.62	88.62
Ju-Oct	1.49	0.39	43.89
Total	15.36	4.01	132.51
Apr- May **2007**	50.6	8.5	114.6
Ju-Oct	3.3	0.8	55.8
Total	53.9	9.3	170.4

Percentage Reductions Required to Meet Target Allocations

Tributary	Hangman Creek	Coulee Creek	Little Spokane
Apr- May **2004**	76%	76%	32%
Ju-Oct	65%	65%	24%
Apr- May **2007**	39%	40%	13%
Ju-Oct	15%	15%	4%

As can be seen from the table above, the allowable loading under the revised scenario was granted to the nonpoint sources and resulted in considerably more nonpoint source loading. This has important ramifications for the ultimate success of the TMDL.

Under both the 2004 and 2007 Draft TMDLs, the point sources must reduce phosphorus concentrations to background conditions. The 2007 Draft TMDL, however, allows dischargers to achieve these reductions through a combination of end-of-the-pipe technologies and offsets from phosphorus reductions through other strategies such as nonpoint source reductions. Washington law limits credits or offsets to the proportion of the nonpoint source (or other source) reductions which occur beyond existing requirements.[98] Similarly, EPA's Water Quality Trading Policy provides credits only for pollutant reductions greater than those required by regulatory requirement or established under a TMDL.[99]

The 2004 Draft TMDL estimated phosphorus reductions of 65 – 75% in loading from Hangman Creek and Coulee Creek, and 24 to 32% in the Little Spokane, would be necessary to meet water

[98] WAC 173-201A-450.
[99] Final Water Quality Trading Policy, III D. (EPA 2003) at http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html .

quality standards in Lake Spokane.[100] (Brian Nickel, Office of Water NPDES Permit Unit (EPA), determined that up to 96% reductions in human-caused nonpoint source loading would be required.)[101] According to Joel Massman, Ph.D., P.E., who reviewed the 2004 and 2007 TMDLs on behalf of the Sierra Club, "The allowable loads for Hangman and Coulee Creeks have been increased by more than 1200% (i.e. 12 times larger than the original values) and the allowable load for the Little Spokane River has been increased by more than 350% (i.e. 3.5 times larger than the original values)."[102] By contrast, under the revised scenario, only reductions from 15% to 20 % will be required to meet instream targets.[103]

This is problematic because it unrealistically lowers the bar for offsets for nonpoint source reductions which might be used to meet target concentrations by the dischargers. According to the 2004 Draft TMDL, "the total nutrient loading capacity of Lake Spokane is consumed by just a portion of the existing nonpoint pollutant source load combined with the natural condition load. There is no reasonable assurance that NPS can or will be reduced to achieve the load allocation. Therefore, no assimilative capacity is left for point source pollutant loading that would cause or contribute to an increase in river concentrations of pollutants during the critical period (April 1 – October 31.)"[104]

By contrast, the proposed Draft 2007 TMDL states, "The total nutrient loading capacity of Lake Spokane is consumed by just a portion of the existing nonpoint pollutant load. Therefore, without reducing the nonpoint source load, no assimilative capacity is left for point source pollutant loading that would increase river concentrations of pollutants during the critical period (April 1 – October 31)."[105]

The salient difference between these versions is that the 2007 Draft not only increases the allowable loading thereby lower the reduction percentages, it ignores the difficulty of achieving nonpoint source reductions and implies that room can be created in the river if any nonpoint source reductions occur. This is a misrepresentation for two reasons. First, as is clear from the modeling, because the river is over-assimilated for phosphorus, no "room" can be created until nonpoint sources are over-controlled and all point sources at background. Simply reducing some unspecified amount of nonpoint source pollution will not create room in the river. Second, nonpoint source reductions have been historically difficult to achieve. Indeed, unlike point source reductions, "There is inherent uncertainty in the problem definition and in the effectiveness of corrective actions" regarding nonpoint source reduction strategies and "true indicators of success may not be assessed or evident until well after designed programs are in place."[106]

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[100] Appendix N: (1) Ex. 1 at 23; Appendix G: (9) (The TMDL relies on 90-70% nonpoint pollution loading reductions in spring through fall from WA tributaries (optimistic goal) along with elimination of point source loading during the period April – October. Nonpoint pollution from Lk CDA is not the problem, but should be capped.)
[101] Appendix N: (1) Ex. 19. *See also* Appendix B:14 Memoranda from Berger, Scott and Wells showing increases of 300% in CBOD and TP in the tributaries.
[102] Appendix N: (1) Ex. 32 at C.3. But see Appendix B: (14) (By using an allocated tributary CBOD concentration of 2.5 mg/L rather than 1.64 mg/L, the allocated tributary loadings were increased by over 300%).
[103] See also 2007 Draft TMDL at 80.
[104] Appendix A: (1) 2004 Draft TMDL at 24. See also Appendix D: (22).
[105] Draft 2007 TMDL at 23.
[106] Appendix C: (2) Memorandum of Agreement Between Ecology and EPA at 13.

One of the nonpoint phosphorous reduction "success stories" from the Inland Northwest is the Cascade Reservoir near McCall, Idaho. The Cascade Reservoir captures runoff from a 357,000 acre watershed in the Payette River basin (a slightly smaller watershed than the Hangman watershed). As illustrated below, EPA reports the phosphorous loadings to the reservoir declined by 21% (57% of the reduction goal) after 8 years and the investment of $20 million. Nonpoint source load was reduced only 12% (41% of the total goal of 31% reduction sought). Agricultural nonpoint source (like that in the Hangman watershed) achieved a 6% reduction (21% of the goal) -- well short of what had been originally projected.

Summary of Estimated Phosphorus Loads and Reductions for Point and Nonpoint Sources in the Cascade Reservoir Watershed, 1994 through 2002

	Total Load (kg/yr)	Projected Reduction (kg/yr)[a]	Reduction Achieved to Date (kg)	Percent of Reduction Achieved to Date
Point Sources				
McCall Wastewater Treatment Plant[b]	3,947	3,947	3,947	100%
Idaho Fish and Game fish hatchery	726	508	508	100%
Point source totals	4,673	4,455	4,455	100%
Nonpoint Sources				
Forestry	8,840	2,652	2,675	101%
Agriculture	11,740	3,485	745	21%
Urban and suburban	4,423	1,359	255	19%
Septic systems	2,205	1,544	838[c]	38%
Unidentified and natural sources	8,508	2,134	80	4%
Nonpoint source totals	35,716	11,174	4,593	41%
Grand Total	**39,881**	**15,121**	**8,540**	**57%**

[a] Contains management, natural, and background loading.

[b] Construction of winter storage pond is not yet complete. Storage and delivery systems will be completed and tested. Additional options for effluent use are being investigated to ensure that the system will operate with no discharge to North Fork Payette River in extreme water years.

[c] The 838 kg figure used assumes that all septic-to-sewer hookups completed included proper decommissioning of the septic tanks. This assumption has yet to be validated. Septic decommissioning is being evaluated.

Source: EPA, Section 319: Nonpoint Source Success Story: Idaho, available at http://www.epa.gov/nps/success/state/pdf/id_cascade.pdf.

"The complexities of nonpoint source regulation present overwhelming scientific and political obstacles" and render success illusive.[107] Successful reductions require tight coordination among different agencies and organizations in varying jurisdictions. Effective strategies also hinge on integrating control strategies with local land use and smart growth issues yet there is no one agency with regulatory control. Given the inherent difficulties in these programs, a viable trading program

[107] *An Evaluation of Nonpoint Source Pollution Regulation in the Chesapeake Bay*, 13 U. Balt. J. Envtl. L. 221 (2006). Provides a detailed analysis of the difficulties related to NPS clean up plans and the recurring problems in the Chesapeake Bay despite years of clean up efforts. As the author states, "Non-point source pollution is the primary reason the Chesapeake Bay is perpetually present on the EPA's 'impaired waters' list exemplifying the general failure of NPS pollution regulation in the United States." *Id.* at 221.

or offsets posited on the reductions under the 2004 Draft TMDL would be highly unlikely.[108] Although success may be similarly illusive under the revised 2007 Draft TMDL, the "goal" is much closer.

Because the revised TMDL essentially ignores loading that is contributing to water quality violations, it provides an opportunity for credit from nonpoint source reductions before these sources have been over-controlled. In addition, the TMDL appears to envision double counting nonpoint source reductions by subtracting the reduction from the nonpoint source account as well as granting dischargers credit for the same reduction. A viable trading program or offsets based on these manipulated numbers is illusory. If dischargers are given credits based on such a scheme, the lake will remain impaired.[109]

10. The rationale for rounding the total phosphorus target concentrations up to 10 ug/L is flawed in two ways: 1) rounding up when translated into pounds will result in discharges that are not protective of the water quality and 2) 10 ug/L is not below analytical detection limits.

p. v and 23: "In-stream concentrations for various reaches must be approximately 10 ug/L total phosphorus during the critical period (April 1- October 31). These concentrations were translated into wasteload allocations, expressed as pounds per day, for the four point sources that discharge to the Spokane River."

The target instream concentrations for total phosphorus are .008 mg/L upstream of Liberty Lake, Kaiser, and Inland Empire, and .007 mg/L upstream of the Spokane plant.[110] According to the 2007 Draft TMDL, these were rounded up to 0.10 mg/L (10 ug/L) for two reasons. First, "the difference between the instream concentrations listed in Table 5 and 10 ug/L of phosphorus has less than a 1 ug/L change in dissolved oxygen in the river. Thus, implementing a 10 ug/L wasteload allocation is essentially the same as the limits in Table 5 because discharges at this concentration will not measurably change the instream concentration." Second, the Draft claims that "10 ug/L is very close to laboratory detection limits for phosphorus. Therefore the wasteload allocation for point source dischargers is 10 ug/L total phosphorus." [111]

The identified instream concentrations for total phosphorus at the applicable river reaches are .008 mg/L and .007 mg/L.[112] Rounding up to 0.010 mg/L amounts to a 20 to 30 percent increase in concentration. When translated into pounds, this will result in discharges that are not protective of water quality.

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[108] Appendix N: (1) Ex. 20.1 (2004 email between Ecology staff discussing fact that trading is unlikely because "currently all sources need to be reduced far beyond current loadings with no room for a safety factor).

[109] EPA issued a trading paper developed with information supplied by the TMDL Collaboration NPS Workgroup. According to EPA and Ecology staff, the data utilized is seriously flawed. Hence, to the extent that the dischargers attempt to devise a trading program based on this paper, Ecology should conduct further review. See Appendix G: (8);

[110] 2007 Draft TMDL at 23.

[111] *Id.*

[112] *Id.* at 23, Table 5.

As to detection levels, *EPA Guidance on Water Quality Based Effluent Limits Set Below Analytical Detection/Quantitation Limits* provides: "NPDES permit limits must include the water quality based effluent limit regardless of the proximity of the limit to the analytical detection level."[113] The Guidance document provides recommendations for permit conditions where the effluent limit concentration is below the analytical detection level for the pollutant of concern.

Here, however, the phosphorus limits are not below analytical detection limits. Analytical procedures (ICP-MS) for low level total phosphorus measurement routinely achieve a reportable level of less than 3 to 5 ug/L at Ecology's Manchester laboratory. Thus, 10 ug/L is not the laboratory detection limit for phosphorus. Rather, it is simply the limit for using the modified colorimetric method which many wastewater treatment plants currently use.

11. Expressing the wasteload allocations for phosphorus, CBOD and ammonia in pounds rather than concentration allows for an increase in loading which is not protective of water quality unless the mass-based limits float with discharge volume.

p. 23: "During the Spokane TMDL Collaboration the instream phosphorus concentrations were translated into pounds per day wasteload allocations based no discharge volumes."

Because the total nutrient loading capacity of Lake Spokane is consumed by just a portion of the existing nonpoint pollution load, there is no assimilative capacity for point sources. Therefore, these must be at or near natural condition concentrations to avoid causing or contributing to water quality violations. For phosphorus, 10 ug/L was determined to represent the "natural condition" of the river.[114] Hence, waste load allocations must meet the seasonal target of 10 ug/L for phosphorus.

Table 6 shows the waste load allocations translated from concentrations to pounds based on flow projections provided by a Collaboration work group.[115] Unfortunately, the table misrepresents the formula for converting phosphorus concentration into pounds in a manner that is inconsistent with the TMDL. The TMDL states that the "pounds per day wasteload allocations [are] based on discharge volume estimates."[116] Thus the formula for converting concentration to pounds per/day should be expressed as follows: lbs/day = *effluent* MGD x 0.010 mg/L x 8.3454.

Instead, the TMDL's conversion formula uses influent.[117] At times when discharge is less than inflow (i.e. where a plant reuses water rather than discharging), the pounds discharged will be the

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[113] Appendix I: (1).
[114] But see comment 10 above.
[115] *See* Appendix I: (4) Email exchange between Mike Sharar, consultant for Ecology, and Dave Peeler. Ecology's Water Quality Program Head, raising questions about the validity of the flow projections utilized in the TMDL and risks of Ecology abdicating its regulatory authority to the dischargers. *See also* Appendix I: (8) Email exchanges between Ecology staff and Spokane County re: flows further raising questions regarding the flows chosen for the TMDL; Appendix G: (18) Ecology email exchange discussing, in part, fact that work group members had very little scientific understanding of the model and loading capacity issues.
[116] 2007 Draft TMDL at 23.
[117] 2007 Draft TMDL at 24, Table 6 fn a: lbs/day for point source = *Influent* MGD x 0.010 mg/L P x 8.3424.

same but the concentration higher than that required by the TMDL.[118] This is not protective of water quality and will contribute to further violations of the dissolved oxygen standard. Such a scheme allows water quality based effluent limits that are not representative of the concentration-based target in the TMDL and are therefore inconsistent with the TMDL unless the mass-based limits "float" with discharge volume.

The TMDL provides no explanation for the decision to translate concentration-based limits to pounds, other than that this was negotiated during the Collaboration. Concentration is how the proposed TMDL is expressed and is a better means to directly compare phosphorus removal efficiency.[119]

As to the projected flows themselves, Ecology should review these once more rather than relying on numbers provided by the Collaboration NPS Work Group in light of concerns about their accuracy raised by Ecology staff.[120] Additionally, no allocations should be given to Kaiser for cooling water and, until instream target concentrations are met, discharge should be capped at performance levels for all dischargers, not design flow, and no increases allowed unless at background concentrations to avoid further degradation.

12. <u>The Spokane River instream concentrations as predicted by the model should be the basis for waste load allocations and translated into NPDES water quality based effluent limits for the existing Spokane River dischargers.</u>

p. 23, Table 5: "Spokane River instream concentrations as predicted by the CE-QUAL-W2 model scenario Natural Condition plus allowable nonpoint pollution to meet dissolved oxygen in Lake Spokane (April – October)."

Under the state and federal regulations governing NPDES permits and applicable to state programs, no permit may issue when the imposition of conditions cannot ensure compliance with applicable water quality standards.[121] These regulations clearly and unambiguously require the permitting authority to include any limitations necessary to achieve water quality standards, including limitations on all pollutants which are determined have the reasonable potential to cause or contribute to an excursion above water quality standards.[122] These conditions must be sufficient to attain and maintain applicable water quality standards, and be derived from and comply with all applicable water quality standards and/or any waste load allocations under § 303.[123] Such limitations shall include any legally applicable requirements necessary to

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[118] *See also* Washington State Department of Ecology, Permit Writer's Manual, Ch. 4 § 1.4 (2004) at http://www.ecy.wa.gov/biblio/92109.html ("Effluent limits expressed as mass (pounds or kilograms per day) create an opportunity for inefficient operation of a treatment process so a permit writer should consider using concentration limits (milligrams per liter) in addition to the mass limits.").
[119] Appendix I: (6).
[120] See fn. 117.
[121] 33 U.S.C. 1342(a), 1312(a); 40 C.F.R. 122.4; WAC 173-220-130(b).
[122] 40 C.F.R. § 122.44(d); WAC 173-220-130.
[123] *Id.*; 40 C.F.R § 130.7.

implement total maximum daily loads established pursuant to section 303(d), any regulations and guidelines issued pursuant thereto, and any other requirements deemed appropriate.[124]

Thus, the CWA and its implementing regulations require the inclusion of water quality based effluent limits in NPDES permits when technology based effluent limits are insufficient to meet water quality standards. Section 303(d) waters are, by their very definition, waters for which technology based limits are insufficient to meet standards.[125] Because it has been established that the oxygen-depleting pollutants have the reasonable potential to cause or contribute to water quality violations for dissolved oxygen in Lake Spokane, any permits issued to the Spokane River dischargers must include more stringent, water quality based effluent limits for these pollutants.

Section 301 of the CWA requires that NPDES meet state water quality standards.[126] The meaning of section 301 is plain and straightforward. "It requires unequivocal compliance with applicable water quality standards, and does not make any exceptions for cost or technological feasibility."[127] Because there is no assimilative capacity for point source loading that would increase river concentrations of oxygen-depleting pollutants during the critical period, the point sources must meet the identified instream concentrations to avoid causing or contributing to water quality violations in Lake Spokane. These concentrations should form the basis for final water quality based effluent limits (WQBELs) in the NPDES permits of the Spokane River dischargers.[128] Regardless of how the dischargers plan to meet the final effluent limits, or whether Ecology exercises its discretion to allow compliance schedules to the dischargers, final WQBELs based on these in-stream concentrations must be in the dischargers' NPDES permits. To the extent target pursuit actions such as nonpoint source reductions or reuse are relied upon to meet the final water quality based effluent limits, these limitations must be enforceable and included in the permits.[129]

The instream concentrations for all three oxygen-depleting pollutants are listed in Table 5, p. 23 in the 2007 Draft TMDL. These differ significantly from the concentrations identified in the 2004 Draft TMDL at 24. The revised concentrations were apparently derived from EPA's calibrated CE-QUAL-W2 model for the Idaho reach of the Spokane River. Apparently, Ecology's model for the Washington reach has not been re-calibrated using the revised boundary conditions.[130] According to Ecology staff, failure to recalibrate the Washington stretch of the river with EPA's output for the upstream boundary conditions was unreasonable.[131] The revised

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[124] 33 U.S.C. 1313(d), 1342(a)(2); WAC 173-220-130(b).
[125] 33 U.S.C. 303(d).
[126] 33 U.S.C. § 1311(b)(1)(C); 33 U.S.C. § 1341(a)(2); 40 C.F.R. § 122.44(d)(4).
[127] *In re City of Fayetteville, Ark.*, 2 E.A.D. 594, 600-601 (CJO 1988), *aff'd sub. Arkansas v. Oklahoma*, 503 U.S. 91 (1992).
[128] 2007 Draft TMDL, Table 5 at 23.
[129] 33 U.S.C. 1342(a)(2); WAC 173-220-130(b) (Permits must include all conditions necessary to meet water quality standards, waste load allocations, and any other conditions deemed appropriate). See also Appendix I: (3).
[130] Appendix H: (1), (2), (3), (4), (5), (6), (12) (Emails between Ecology staff discussing lack of new modeling and consequences of failure to recalibrate Washington model with EPA's output included.)
[131] Appendix H: (1) ("I think we may need to consider reverting back to the 2004 TMDL, with an option to re-open pending the outcome of the issues surrounding the Idaho NPDES permits, and the results of these unanticipated model runs. This will also delay issuance of the Washington NPDES Permits even though

instream targets are significantly less as to CBOD and phosphorus but more than the original targets for ammonia. Thus, if Ecology intends to rely on EPA's data, the model should be re-calibrated using the newer estimates for in-stream concentrations at state line. This could result in further changes to model parameters that are sensitive to boundary concentrations and may affect predictions relied upon here.[132]

Using the calculations spreadsheet in Ecology's Permit Writer's Guidance and the concentration targets identified in the 2004 and 2007 Draft TMDL, these waste load allocations translate into the following limitations:

2004 Draft TMDL:

PARAMETER	Average Monthly Limit (AML) ug/L	Maximum Daily Limit (MDL) ug/L	Comments
Phosphorus	**14.3**	**28.7**	**Liberty Lake**
Phosphorus	**13.5**	**27.1**	**Kaiser**
Phosphorus	**13.4**	**26.8**	**IEP**
Phosphorus	**12.7**	**25.5**	**City of Spokane**
CBOD	**3089.3**	**6197.8**	**Liberty Lake**
CBOD	**2732.3**	**5481.4**	**Kaiser**
CBOD	**2126.8**	**4266.8**	**IEP**
CBOD	**1831.9**	**3675.1**	**City of Spokane**
NH3-N	**21.7**	**43.6**	**Liberty Lake**
NH3-N	**31.0**	**62.3**	**Kaiser**
NH3-N	**26.4**	**52.9**	**IEP**
NH3-N	**46.6**	**93.4**	**City of Spokane**

the waste load allocations have not and will not change.....CK"); (4) Email from Traeumer to Ecology staff ("I spoke with Karol (Erickson) and Bob (Cusimano), and both agree that it would not be reasonable to apply Idaho's approach to Washington as there is no capacity during the shoulder months, due to NPS impacts, from which to "step down."); (6) (Traeumer wonders "if our modeling is appropriate considering we're now using EPA's output for our upstream boundary conditions; however the model has not yet been recalibrated with EPA's output. It seems we're mixing applies with oranges and we need to recalibrate with EPA's output included).

[132] Appendix B: (5) Massman Comments regarding the need for considering additional calibration for the Washington Spokane River model (2007); (16) Berger memo discussing the differences between the Idaho and Washington Spokane River models and concluding "Since the fraction of P, N, or C in organic matter differs between the 2 models, the organic matter concentrations predicted at the downstream end of the Idaho model cannot be input into the Washington model's corresponding organic matter compartments without violating the conservation of mass.").

2007 Draft TMDL:

PARAMETER	Average Monthly Limit (AML) ug/L	Maximum Daily Limit (MDL) ug/L	Comments
Phosphorus	**12.4**	**24.9**	**Liberty Lake**
Phosphorus	**12.4**	**24.9**	**Kaiser**
Phosphorus	**12.4**	**24.9**	**IEP**
Phosphorus	**10.9**	**21.8**	**City of Spokane**
CBOD	**2018.2**	**4048.8**	**Liberty Lake**
CBOD	**1603.7**	**3217.2**	**Kaiser**
CBOD	**1707.7**	**3425.9**	**IEP**
CBOD	**1707.7**	**3675.1**	**City of Spokane**
NH3-N	**80.7**	**162.0**	**Liberty Lake**
NH3-N	**60.5**	**121.5**	**Kaiser**
NH3-N	**40.4**	**81.0**	**IEP**
NH3-N	**43.5**	**87.2**	**City of Spokane**

A comparison of these values shows that under the revised TMDL, concentrations of total phosphorus and CBOD are lower than the 2004 values but much higher for ammonia. As noted above, the TMDL should explain the difference in these values.

Nevertheless, because both draft TMDLs concur that the river has no room for point source loading, the instream concentrations are the appropriate values to be used in determining water quality based effluent limits in the permits. Moreover, in the event Ecology allows a compliance schedule, current flows should be capped at performance and not design flow and any expanded increase must meet instream flow concentrations in order to avoid further degradation and backsliding.

13. The TMDL does not contain either a WLA for the NPDES-permitted stormwater systems (City of Spokane, Spokane County, Liberty Lake, and Millwood) and lacks a LA for the unpermitted systems.

pp. 23, 24: "There are many small direct and indirect discharges to the Spokane River that may result from rainfall and snowmelt events. Some of these stormwater discharges are regulated by NPDES permits for runoff from construction sites greater than one acre, runoff from industrial activities and discharges from the municipal storm sewer system. Typically, significant discharges from these facilities will not occur during the critical period and none did during

TMDL monitoring in 2001. However, discharges from these facilities may occur during the critical period in some future year. Ecology's municipal, industrial and construction stormwater permits establish the primary activities needed to control pollution from stormwater. This TMDL assumes that compliance with the permit constitutes compliance with this TMDL."

The Clean Water Act specifically requires Ecology to address stormwater by means of a WLA or LA in the TMDL. In a November 22, 2002 memorandum from EPA, EPA specifically provided that "NPDES-regulated storm water discharges must be addressed by the wasteload allocation component of a TMDL. See 40 C.F.R. § 130.2(h)." [133] Moreover, EPA states:

> EPA expects TMDL authorities will make separate aggregate allocations to NPDES-regulated storm water discharges (in the form of WLAs) and unregulated storm water (in the form of LAs). It may be reasonable to quantify the allocations through estimates or extrapolations, based either on knowledge of land use patterns and associated literature values for pollutant loadings or on actual, albeit limited, loading information.

This simply did not occur for in this TMDL. The TMDL does not contain a WLA for the NPDES-permitted stormwater systems (City of Spokane, Spokane County, Liberty Lake, and Millwood) and lacks a LA for the unpermitted systems.

The TMDL provides no evidence to support the assumption that compliance with the Phase II permit would result in compliance with the TMDL. To the contrary, a review of the Eastern Washington Phase II Stormwater General NPDES Permit indicates that the permit intends to defer to specific TMDLs to meet specific water quality concerns -- Section S7.C of the Permit states:[134]

> For TMDLs that are approved by EPA after this permit is issued, Ecology may establish TMDL-related permit requirements through future permit modification if Ecology determines implementation of actions, monitoring or reporting necessary to demonstrate reasonable further progress toward achieving TMDL wasteload allocations, and other targets, are not occurring and shall be implemented during the term of this permit or when this permit is reissued. Permittees are encouraged to participate in development of TMDLs within their jurisdiction and to begin implementation.

The TMDL fails to provide specific waste load allocations for these point sources and, instead, simply "punts" to the Phase II permit, which lacks any specific requirements to address phosphorus removal needed to meet water quality standards in the Spokane River.

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[133] Available at: http://www.epa.gov/npdes/pubs/final-wwtmdl.pdf.
[134] Available at: http://www.ecy.wa.gov/programs/wq/stormwater/municipal/phase_ii_e_wa/phase_ii_ewa-0107/ewa_ph_ii_permit-final.pdf.

14. The TMDL lacks an adequately conservative margin of safety as required by law.

p. 24: For this TMDL, Ecology used an implicit margin of safety by using a critical, low flow year as the design flow and unaccounted for reductions of SOD over time.

Under the CWA and its implementing regulations, TMDLs must include a margin of safety (MOS) that accounts for uncertainty about the relationship between the pollutant loads in the water body and the quality of the receiving water body.[135] For some water pollution problems, there are well validated models that can predict effects with a known level of certainty.[136] These "implicit" MOSs are incorporated as "conservative assumptions" into the model or calculations used to assess the pollutant loading for the water body. Where the degree of certainty cannot be well quantified due to lack of data, margins of safety must be increased. To account for these unknowns, additional or explicit MOSs must be added as a separate component of the TMDL. EPA shows this quantitatively in the following equation: the TMDL = LC (Loading Capacity) = WLA (Waste Load Allocation) +LA (Load Allocation) + MOS.[137]

This TMDL relies on implicit margin of safety by using the critical low flow year, 2001. It additionally claims an implicit margin of safety based on the assumption that dissolved oxygen will improve over time due to lower sediment oxygen demand.[138] "This potential reduction of the sediment oxygen demand was not included in the modeling and therefore can be considered an additional margin of safety."[139]

According to Dr. Joel Massman, just the opposite is true. "If the proposed implicit approach for incorporating a margin of safety is to have validity, it would require that the DO concentrations under natural conditions be calculated with an SOD that is lower than the SOD used to estimate DO concentrations under future, "maximum load" conditions. This will result in a lower allowable load from nonpoint sources." Under-estimating the oxygen depletion is a "non-conservative assumption" and hence does not provide any margin of safety.[140] Massman also identifies other non-conservative assumptions made by Ecology in estimating allowable loadings and which too lend uncertainty to the TMDL.[141]

Similarly, it would appear that the critical year 2001may not represent the worst case scenario given the apparent decreasing trend in low flows (i.e. low 7Q10 flows) which indicate the river may not provide as much dilution in the future.[142] As can be seen from the chart below, flows have been decreasing historically for over 100 years.

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[135] 33 U.S.C. § 1313(d)(1)(C). *See also EPA Guidance for Water Quality Based Decisions: The TMDL Process*, p. 14 (1991).
[136] *Id.* at 30.
[137] *Id.* at 14.
[138] 2007 Draft TMDL at 24.
[139] *Id.*
[140] For a complete discussion of Margin of Safety issues see Appendix B(4) Massman Review at 21-24 (2004) at 21-24.
[141] *Id.* at 20 ¶ F. See also Appendix B: (8) Identifying even more uncertainties related to revised calculations.
[142] *Id.* at 66.

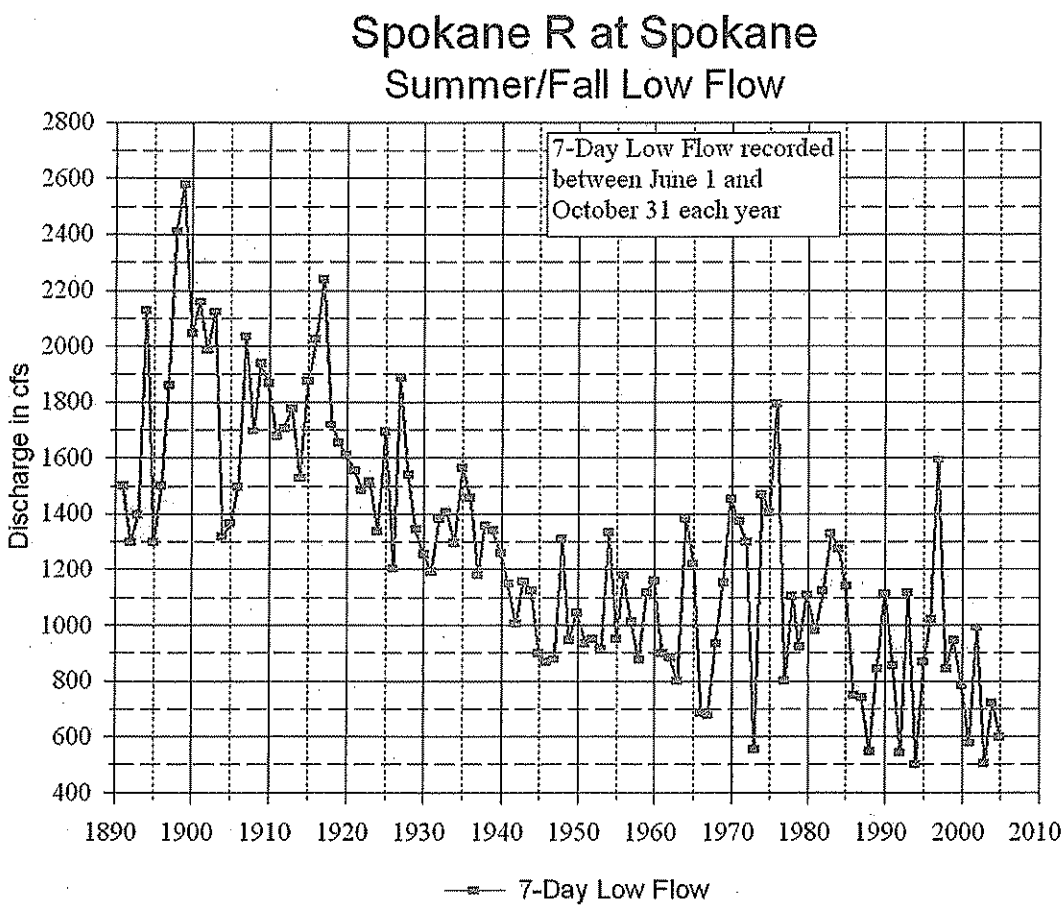

Chart prepared by John Covert, WA Dep't of Ecology Water Resource Program (2005).

The past several years have been no different. 2003 was an even lower year than 2001 with the lowest flow 493 cfs and 14 days below 550 cfs and 2007 was just barely lower with the lowest flow 539 cfs and 5 days below 550 cfs.[143] Given these trends, the assumption is likely obsolete.

This was anticipated by Cusimano as early as June 18, 2002 in a Memorandum he circulated on the Spokane River CEQUALW-2 Model Results. "For the Spokane TMDL study, an explicit margin-of-safety will need to be identified because the model uses ambient conditions for 2001 that may or may not be exceeded during other low years."[144]

Given that there is no implicit MOS built into the model and no explicit MOS added into the TMDL, combined with the uncertainties regarding nonpoint source reductions relied upon to meet target concentrations, the non-conservative rounding up of concentrations, the degraded background conditions, and the other non-conservative assumptions identified by Massman in

[143] Appendix G: (1).
[144] Appendix B: (9) Cusimano Memo at 4 (June 18, 2002). *See also* Appendix B (10)Cusimano Loading Assessment at 24 (2004) (7-day low flows at Post Falls and Spokane decreased from 1968 – 2001 and the trend suggests that groundwater inflows to the surface water system in the watershed continue to decrease).

his review of the CE-QUAL-W2 and the revised modeling,[145] the TMDL lacks an adequate margin of safety as required by Section 303(d)(1)(C) of the CWA.

MANAGED IMPLEMENTATION PLAN

15. The "Collaboration" did not agree that the Managed Implementation Plan (MIP) would be consistent with the Foundational Concepts or that the Foundational Concepts would guide the implementation of this TMDL.

p. 25: "The Spokane River Collaboration consisted of representatives from local governments, the State of Idaho, the Spokane Tribe of Indians, environmental groups, power companies, and organizations that discharge wastewater treatment plant effluent to the Spokane River (the Dischargers).[146] The group developed the Foundational Concepts for the Spokane River TMDL Managed Implementation Plan (Foundational Concepts). The Collaboration agreed that this Managed Implementation Plan will be consistent with the principles described in the Foundational Concepts."

This statement is misleading. The *only* members to sign on to the *Memorandum of Agreement Regarding the Foundational Concepts, Managed Implementation Plan, and Dissolved Oxygen TMDL for the Spokane River* were Ecology, Spokane County, Liberty Lake Sewer &Water District, the City of Spokane, Kaiser Aluminum and Inland Empire Paper – all dischargers (or proposed dischargers) and the agency. Though a Collaboration member, the Sierra Club expressly objected to the Foundational Concepts in a letter dated April 5, 2006.[147] Moreover, to the best of our knowledge, no other members were asked or allowed to sign the agreement, including the Spokane Tribe. It was understood the dischargers objected to third-party signatories.[148]

The most that can truthfully be said is that the final Foundational Concepts were largely negotiated by the dischargers, through their consultant John Spencer of CH2MHill, with Ecology, through its consultant Mike Sharar and the facilitator, Ross and Associates,[149] and was

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[145] *See* Appendix B: (2) Massman (2004) at 20 (Model under predicts algae production under current conditions and over predicts dissolved oxygen in the river).
[146] See 2007 Draft TMDL at Appendix B (List of Collaboration Members).
[147] Appendix E: (4).
[148] Appendix G: (2) (Email from Spokane County Commissioner Todd Mielke, "This is a deal between Ecology and the Petitioners." " Huge legal issue for us.... 'The petitioners and Ecology mutually agree that completion of these target pursuit actions, as described and scheduled in each NPDES permit holder's Delta elimination plan, is required and will be incorporated into NPDES permits or other enforceable agreements with Ecology.' Per our discussion with Mary Sue, we are not interested in including within NPDES permits items that are not regulated under such permits, and thereby create third-party enforceable action. This was agreed to previously. This language is a departure from that agreement." This email indicates the extent to with the Dischargers (Petitioners) dictated elements in the TMDL. In addition to the above language, this email shows how the Dischargers dictated terms that ultimately ended up in the agreement (e.g. performance-based effluent limits, application of credits/offsets, assumption that phosphorus controls would also control CBOD and ammonia with no added requirements to control these pollutants).
[149] *See* Appendix E: (7) (Emails between Mike Sharar to Ecology staff detailing negotiations with Dischargers').

discussed with other Collaboration members during private and group meetings over the course of two years. This document was NOT a consensus document. It was an agreement between the regulators and the regulated. Whether or to what extent each of the non-signing members agreed with the Foundational Concepts document is unclear.

16. Considerable reductions in CBOD and ammonia in addition to phosphorus are needed to improve dissolved oxygen.

p. 26: "Considerable reductions in phosphorus are needed to improve dissolved oxygen levels in the Spokane River and Lake Spokane."

This is not a phosphorus TMDL. It is a dissolved oxygen TMDL. Unless appropriate reductions are made in all three pollutants, dissolved oxygen WQS will not be meet.

17. The dischargers must be required to meet the final waste load allocations/WQBELs within ten years as is required by law.

p. 34: "The phosphorus targets are goals during the first ten years. The phosphorus targets will not be binding during the first ten years after initiation of technology improvements and phosphorus reduction actions.... By the end of the 20th year, NPDES permit holders are required to be in compliance with the phosphorus waste load allocations."

NPDES permits are the primary means of implementing TMDLs. Under Washington law, Ecology may exercise its discretion to grant compliance schedules to existing dischargers to achieve compliance with water quality standards through their NPDES permits. "Such schedules of compliance shall be developed to ensure final compliance with all water quality-based effluent limits in the shortest practicable time." [150] "Schedules of compliance may in no case exceed ten years, and shall generally not exceed the term of any permit."[151]

The Draft 2004 TMDL required compliance with final waste load allocations within ten years, as did Ecology's earlier MIP.[152] In each case, Ecology did not consider it impractical for the dischargers to upgrade their existing plants and maximize operations within that timeframe. This MIP violates state law by granting the dischargers twenty years to comply with the WQBELs necessary to meet water quality standards.[153]

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[150] WAC 183-201A-510(4). *See also* Appendix N: (1) Comments 9 – 13.
[151] *Id.* See also Appendix E: (8) Email from Dave Peeler, Ecology Water Quality Program Manager (Ten year schedule to meet point source waste load allocations is the "maximum time allowed under state regulations").
[152] Appendix A: (1) at 27; Appendix A: (G) (1) 2006 MIP required pilot studies within 6 months, upgrade designs within 12 to 18 months depending on facility size, construction 12 to 36 months, and compliance with 10 ug/L concentration within ten years. The MIP did not provide a waste load allocation for the proposed County plant.
[153] *See* Appendix G: (11) (Email exchange between EPA Headquarters and EPA staff stating that any TMDL proposal that does not include water quality based effluent limits in NPDES permits and delays achievement of permit limitations for 20 years render the proposal "vulnerable to third party suits.")

18. The existing dischargers should be required to meet the waste load allocations as water quality based effluent limits in the shortest time possible not to exceed ten years.

p. 27: "The largest phosphorus reductions are due to point source phosphorus removal technology improvements (for this illustration the graph [Figure 5] assumes discharges at 50 ug/L). Later point source reductions result from the assumption that highly treated wastewater will be re-used instead of discharged to the river."

p. 27: "After the Dischargers meet the 50 ug/L of phosphorus interim limit, they will need to reduce an additional 26.6 pounds per day (26.6 lbs/day) to meet the equivalent TMDL target in [another] ten years."

p. 27: "NPDES permit holders will prepare, and submit to Ecology for approval, a comprehensive technology selection protocol for choosing the most effective technology for seasonally removing phosphorus from their effluent with an objective of achieving a discharge with seasonal average 50 ug/L phosphorus or lower. If pilot testing is a part of the protocol, there will be appropriate provisions for quality assurance control."

The MIP does not set an interim limit of 50 ug/L. In fact it sets no ceiling at all for phosphorus removing technology. Instead, it sets an "objective" of meeting at least 50 ug/L through technology. Rather than setting a 50 ug/L interim limit or even objective, the existing dischargers must be required to meet their waste load allocations as WQBELs in the shortest time possible, not to exceed ten years. Currently, there are technologies in place achieving phosphorus reductions of 50 ug/L and some even reaching at or near 10 ug/L.[154] Moreover,

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[154] Appendix N: (1) Ex. 5, *Advanced Wastewater Treatment to Achieve Low Concentration of* Phosphorus (U.S. EPA 2007) http://yosemite.epa.gov/r10/water.nsf/Water+Quality+Standards/AWT-Phosphorus/$FILE/AWT+Report.pdf. This report lists several WWTPs achieving phosphorus concentrations near or below 10 ug/L and others achieving near 50 ug/L. See also Appendix N: Ex. 22 (EPA email to TMDL Collaboration Technology Workgroup on plants achieving low phosphorus concentrations; Ex. 5 at 62-65 (describing Blue Water Technologies' full scale wastewater treatment research facility at the Hayden plant. "Based on the results of long term testing, Blue Water representatives state their phosphorus removal system can consistently achieve an effluent quality of less than 0.030 mg/L total phosphorus."); Ex. 22.1 (EPA email citing independent study certifying that Blue Water's Blue Pro process can achieve total phosphorus concentrations of less than 10 ug/L); Ex. 22.2 (Ecology email discussing two stage filtration system capabilities and costs); Ex. 22.3 (EPA email discussing feasibility of achieving low levels of phosphorus through current technologies). Ex. 22.4 (Ecology emails discussing local alternatives to river discharge such as Hayden's land application, Chehalis, WA DO TMDL requiring zero discharge during critical conditions; Post Falls intent to land apply); Ex. 22.5 (Ecology email recommending short term compliance schedule for tertiary treatment upgrades (2-3 years), long-term (10 years) for implementation of seasonal reuse or upgrades to 10 ug/L, no new or expanded discharges to impaired water bodies); Ex. 22.6 (Ecology emails discussing lack of technical support for interim limits over 50 ug/L where technologies exist today achieving under 50 ug/L); Ex. 22.7 (Modeler Erickson states that at phosphorus loading of 50 to 60 ug/L, it is reasonable to expect a more than 0.2 mg/L decline in DO as the model predicts); Ex. 22.8 at 3, 5 (EPA email stating that there is no reason that the technology could not be designed, constructed and fully operational in the fourth year from initiation; no need for six year compliance schedule for City of Spokane – one year for design and two for construction of filters); Ex. 22.9 (Ecology transmitting information about Blue Water stating that the process "is apparently achieving a mean phosphorus concentration of 9 ug/L); Ex. 22.91(Ecology email relaying information about the DualSand system from Delaware Engineering showing full-scale operation in 4 WWTPs in NY); Ex. 22.92 (Email from EPA, Dave Ragsdale, to CDA's Sid Frederickson dated April 2005 expressing disappointment that Mr. Fredrickson failed to attend a presentation on D2 filtration technology); Ex. 22.93 (Ecology email of 2004 discussing Blue Water capabilities); Ex. 22.94 (Response to Ecology from Colorado agency that lowest phosphorus limit in Colorado is 50 ug/L). *See also* Appendix B: (19), (20), (22).

extensive pilot testing of some of these technologies has already been done by several dischargers including the Inland Empire Paper Co., the Cities of Spokane and Coeur d'Alene, and Hayden Area Regional Sewer and Water Board.[155]

Ecology admits that the largest and quickest phosphorus reductions will be gained through technological upgrades. Therefore, before allowing the dischargers ten years to pilot test and implement plant upgrades, upgrades for which there are no specific requirements, Ecology should require the following at the least:

1) documentation of source control efforts currently underway or completed, including compliance with any pollution prevention programs that have been established:

2) a proposed schedule for additional source control measures or waste treatment (such as biological nutrient removal);[156]

3) documentation of the results of pilot testing already conducted by the regional dischargers and an explanation of why more pilot testing is necessary and the costs of such testing;

4) information regarding plants achieving exemplary phosphorus removal and why these would or would not work here;

5) documentation supporting the highest discharge quality that can be reasonably achieved until final compliance is achieved;

6) documentation that the design, build, and operational maximization periods are the shortest possible;

7) reasonable alternatives to river discharge, and

8) a demonstration that the proposed compliance schedule is as short as possible, taking into account economic, technical and other relevant factors.[157]

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[155] See Appendix B: (19) Final Pilot Test Report by Parkson for pilot testing at Spokane WWTP.

[156] *See* Appendix B: (22) Presentations by Carollo Engineers demonstrating significant phosphorus reductions through biological processes for plants up to 100 mgd.

[157] The 2007 Draft TMDL proposes 10 years to install upgrades to existing plants. A recent review of similar expansions and upgrades in plants from 1 mgd to 100 mgd, concludes that 56 to 58 months is reasonable for plants such these to pilot test, design, construct and optimize treatment. *See* Appendix N: (1) Ex. 5.1. Carpenter Environmental Associates, Inc., Report detailing findings and recommendations pertaining to schedules for Wastewater Treatment Upgrades and Pilot Testing (Pape, 2007); Appendix N:(1) Ex. 5 USEPA Region 10, Advanced Wastewater Treatment to Achieve Low Concentrations of Phosphorus (Ragsdale, 2007). Also at http://yosemite.epa.gov/r10/water.nsf/Water+Quality+Standards/AWT-Phosphorus. *See also* Appendix N: (1) Ex. 5.2, Phosphorus Removal in a Membrane Reactor System: A Full Scale Wastewater Demonstration Study (Lorenz) (Testing conducted over three to four months). *See also* Appendix B: (19), (20) Parkson D-

The Technology selection protocol requires dischargers to submit a protocol for choosing the most "effective" technology. The Foundational Concepts requires a protocol for the most "effective feasible" technology. These terms are not defined and ambiguous. For all proposed processes, whether as upgrades to wastewater treatment plants or for nonpoint source management practices, Washington law requires a showing that that these meet AKART - all known, available, and reasonable methods of treatment.[158] The use of the word "all" in this context has been construed to mean "state of the art" or "best available." *Weyerhauser v. Southwest Air Pollution Control Authority*, 91 Wn. 2d (1978). AKART can, in some circumstances, include zero discharge.[159]

For phosphorus removing technology, a more apt description might be "state of the art technology that removes the most phosphorus while economically achievable." The TMDL should clearly state the standard applicable under the Technology Selection Protocol.

Somewhat confusingly, the MIP requires only a technology selection protocol and not a technology selection. The MIP should require the dischargers to select a technology that is demonstrably "state of the art" for reducing phosphorus, CBOD and ammonia.

19. <u>The MIP should require firm commitments regarding reuse</u>.

p. 27: "Later point source reductions result from the assumption that highly treated wastewater will be re-used instead of discharged to the river."

Under the state and federal regulations governing NPDES permits and applicable to state programs, no permit may issue when the imposition of conditions cannot ensure compliance with applicable water quality standards.[160] These regulations clearly and unambiguously require the permitting authority to include any limitations necessary to achieve water quality standards, including limitations on all pollutants which are determined have the reasonable potential to cause or contribute to an excursion above water quality standards.[161] These conditions must be sufficient to attain and maintain applicable water quality standards, and be derived from and comply with all applicable water quality standards and/or any waste load allocations under § 303.[162] Such limitations shall include any legally applicable requirements necessary to implement total maximum daily loads established pursuant to section 303(d), any regulations and guidelines issued pursuant thereto, and any other requirements deemed appropriate.[163]

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2 Final Pilot Testing Report for City of Spokane WWTP and Ecology Preliminary Assessment of two-stage filtration; Appendix G: (17) Ecology emails re: exemplary

[158] Chs. 90.48; 90.52; 90.54 RCW; Chs. 173-200; 173-201A; 173-216; 173-220; Water Quality Permit Writer's Manual, Ch. 4, § 3 (2004).

[159] See Appendix G: (12) Email from Ecology staff requiring zero discharge to Stillaguamish River during critical period ('...no load capacity remaining in the river for nutrients during the critical period' was essentially equivalent to '...the nutrient wasteload for Arlington is zero during the critical period.')

[160] 33 U.S.C. 1342(a), 1312(a); 40 C.F.R. 122.4; WAC 173-220-130(b).

[161] 40 C.F.R. § 122.44(d); WAC 173-220-130.

[162] *Id.*; 40 C.F.R § 130.7.

[163] 33 U.S.C. 1313(d), 1342(a)(2); WAC 173-220-130(b).

There is nothing in the MIP or TMDL requiring reuse and nothing to support the assumption that point source reductions beyond those achieved through end-of-the-pipe upgrades will be achieved through reuse. Rather it is merely presented as an optional target pursuit action. If achievement of final limits and compliance with standards is predicated in part on reuse, then the TMDL must require zero discharge seasonal limits for that portion of the discharge that cannot be achieved through plant upgrades and is instead being met through reuse and incorporate these or other reuse requirements into the permits as part of the WQBELs.

20. Delta Elimination Plans on which final achievement of water quality based effluent limits are predicated must be incorporated into the discharger's permits or other administrative orders.

p. 27: "The [Delta Elimination] Plan, in combination with the phosphorus reduction from technology, will provide reasonable assurance of meeting the permit holder's target in ten years."

To the extent a Delta Elimination Plan is relied upon to meet final water quality based effluent limits, it must be enforceable by inclusion in the applicable NPDES permits. (See comment 19, above.) Otherwise, there is no reasonable assurance that water quality standards will be met.

21. Final limits must be water quality based effluent limits.

p. 29 – "Final limits will be set based on the actual performance of technology installed and operated at optimum reliable efficiency."

The CWA and its implementing regulations require the inclusion of water quality based effluent limits in NPDES permits when technology based effluent limits are insufficient to meet water quality standards. Section 303(d) waters are by their very definition, waters for which technology based limits are insufficient to meet standards.[164] Because it has been established that the oxygen-depleting pollutants have the reasonable potential to cause or contribute to water quality violations for dissolved oxygen in Lake Spokane, any permit issued to the Spokane River dischargers must include more stringent, water quality based effluent limits for these pollutants.

Yet, inexplicably, this TMDL calls for performance-based final limits. Performance-based limits *are* technology based limits. Thus, unless the actual technological performance meets the waste load allocations in the TMDL (i.e. the instream concentrations in Table 5), final limits ***must be water quality based***. This requirement of the CWA and its implementing regulations is not optional. The NPDES permits which implement this TMDL must include final water quality based effluent limits.[165]

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[164] 33 U.S.C. 303(d).

[165] See Appendix I: (7) (Draft letter to IEP vetted by AAG Ron Lavigne stating that IEP has known since 1993 that water quality based effluent limitations would be necessary in permit).

22. Ecology may not abdicate its regulatory authority by agreeing to a moratorium on enforcement for 20 years.

p. 29: "The investment in phosphorus removal technology is recognized by Ecology as having a 20-year life, and no significant modifications or replacements of phosphorus removal facilities will be required during the 20 year timeframe of this TMDL, except in cases in which best available data indicate that modifications to installed technology would enhance phosphorus removal performance and are efficient and cost-effective."

The dischargers want a twenty year guarantee before they will comply with the law. While it is recognized that upgrading these plants will involve substantial sums, Ecology cannot be precluded from requiring treatment or other measures that may be determined necessary in the future. The Spokane River is currently § 303(d) listed for PCBs and dioxin, among other pollutants, and a TMDL is underway for the former.[166] According to the Draft PCB TMDL, the average 2003-2004 PCB loading at Stateline was 477 mg/d.[167] The target loading under the Draft PCB TMDL is 23.96 mg/d, a 95% reduction.[168] Thus, the loading at Stateline represents about 25% of the total loading to the system.[169] Not only will reductions in these toxins be required, it is highly likely that further reductions over 20 years will be necessary in other parameters.

The dischargers should not present to Ecology, and Ecology should not approve, any engineering plans for upgrades that do not achieve the highest level of pollutant reductions and that cannot be adapted in the future as necessary to meet the PCB TMDL requirements or any other requirements deemed necessary under the law. To the extent this requirement can be read to preclude Ecology from exercising its regulatory authority to enforce water quality standards, it is illegal.

23. Recalculations based on bio-available phosphorus must be applied uniformly to all sources in the TMDL.

p. 30: "NPDES permit holders may seek to prove to Ecology that a certain stable fraction of their phosphorus discharge is not bio-available in the River...and if Ecology agrees, the pounds of phosphorus that are not bio-available will be recognized as contributing toward achieving the total phosphorus wasteload allocations."

The concept of bio-available phosphorus was first raised in the collaboration by Inland Empire Paper when it became clear the company felt it would be very difficult, if not impossible, to reach phosphorus concentrations of even 50 ug/L. No science has been tendered so far to support the contention that they, or anyone, should be allowed to discharge more phosphorus because it's the kind that doesn't "matter." It may very well be a viable argument, but so far

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[166] Spokane River PCBs Total Maximum Daily Load Study (Draft Report) at http://www.ecy.wa.gov/pubs/0603024.pdf.
[167] *Id* at 78.
[168] *Id.* at 81.
[169] *Id.* at 99. *See also* Ex. 28 at 5 (EPA Daily Environmental Report states, "About one-fourth of the PCB load in the Spokane River is from Idaho, the department said.").

there is no scientifically tested, viable data to support this theory. However, a query on this subject suggests that all phosphorus is eventually bioavailable.

Additionally, it appears that soluble reactive phosphorus concentrations were used as the bio-available phosphorus concentrations in the model, including in describing the water quality of the upstream boundary conditions, and as used in the model, these may actually under-predict dissolved phosphorus available from nonpoint sources.[170] Hence, if recalculations of bio-available phosphorus are necessary, these should be uniformly applied to all sources in the TMDL.

24. Offsets for nonpoint source reductions must be determined by Ecology only in accordance with state and federal law.

p. 30: "Successful phosphorus-reducing actions funded by the NPDES permit holders through this nonpoint source reduction program will be recognized as contributing toward achieving dischargers' phosphorus wasteload allocations."

2007 Draft TMDL, Appendix E, p. 109: "Oversight Committee has authority to allocate credit to dischargers for nonpoint source reductions."

Washington's offset regulation provides:

> (1) A water quality offset occurs where a project proponent implements or finances the implementation of controls for point or nonpoint sources to reduce the levels of pollution for the purpose of creating sufficient assimilative capacity to allow new or expanded discharges. The purpose of water quality offsets is to sufficiently reduce the pollution levels of a water body so that a proponent's actions do not cause or contribute to a violation of the requirements of this chapter and so that they result in a net environmental benefit. Water quality offsets may be used to assist an entity in meeting load allocations targeted under a pollution reduction analysis (such as a total maximum daily load) as established by the department. Water quality offsets may be used to reduce the water quality effect of a discharge to levels that are unmeasurable and in compliance with the water quality antidegradation Tier II analysis (WAC 173-201A-320).
>
> (2) Water quality offsets may be allowed by the department when all of the following conditions are met:
>
> (a) Water quality offsets must target specific water quality parameters.
>
> (b) The improvements in water quality associated with creating water quality offsets for any proposed new or expanded actions must be demonstrated to have occurred in advance of the proposed action.
>
> (c) The technical basis and methodology for the water quality offsets is documented through a technical analysis of pollutant loading, and that analysis is

[170] Upper Spokane River Model: Boundary Conditions and Model Setup (1991 and 2000) at 69; Upper Spokane River Model in Idaho: Boundary conditions and Model setup (2001) at 22. See also Appendix B: (3) Bioavailability of Phosphorus (Massman, June 2006).

> made available for review by the department. The methodology must incorporate the uncertainties associated with any proposed point or nonpoint source controls as well as variability in effluent quality for sources, and must demonstrate that an appropriate margin of safety is included. The approach must clearly account for the attenuation of the benefits of pollution controls as the water moves to the location where the offset is needed.
>
> (d) Point or nonpoint source pollution controls must be secured using binding legal instruments between any involved parties for the life of the project that is being offset. The proponent remains solely responsible for ensuring the success of offsetting activities for both compliance and enforcement purposes.
>
> (e) Only the proportion of the pollution controls which occurs beyond existing requirements for those sources can be included in the offset allowance.
>
> (f) Water quality offsets must meet antidegradation requirements in WAC 173-201A-300 through 173-201A-330 and federal antibacksliding requirements in CFR 122.44(l).

The purpose of this regulation is to create assimilative capacity for proposed new or expanded discharges. The improvements in water quality must be demonstrated to have occurred in advance of the proposed action and credits are available only for the proportion of the pollution controls which occur beyond existing requirements.

As applied here, offsets for nonpoint source reductions would not be available until nonpoint sources have been controlled beyond the required reductions identified in the TMDL.[171] In other words, there will be no assimilative capacity above target concentrations until the load capacity to Lake Spokane is met.

Too, offsets appear limited to circumstances in which an existing discharger wishes to expand and not to meet limits at current discharge levels. Indeed, because there is no assimilative capacity for discharges at current levels, there is no capacity for expanded discharge beyond unless at background levels, in the absence of over-controlled nonpoint sources. Moreover, a recent Ninth Circuit decision calls into question the legality of allowing offsets for new dischargers.

In *Friends of Pinto Creek v. United States Environmental Protection Agency* (Hereinafter "*Carlotta Copper*"), the court was asked to decide whether an NPDES permit should issue to a new discharger where the proposed discharge was to a § 303(d) listed water body.[172] Although it was clear that the discharge would cause or contribute to a violation of the water quality standards, the proposed discharger, Carlotta Copper, argued that it planned to offset the discharge through remediation actions upstream.[173]

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[171] *See* Comment 9, above. Clearly, available offsets become even more unlikely if Ecology changes course and reverts to the natural boundary conditions used in the 2004 Draft TMDL.
[172] *Carlotta Copper v. U.S.E.P.A.*, No. 05-70785 (9th Cir. 2007). A copy of this decision is included at Appendix G: (3).
[173] Id. at 13511.

As a new discharger, Carlotta was subject to federal regulation 40 C.F.R. 122.4(i) which provides:

> No permit may be issued: .....(i) To a new source or a new discharger if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or new discharger proposing to discharge into a water segment which does not meet applicable water quality standards or is not expected to meet those standards...and for which the State or interstate agency has performed a pollutants load allocation for the pollutant to be discharged, must demonstrate, before the close of the public comment period, that:
>
> (1) There are sufficient remaining pollutant load allocations to allow for the discharge; and
>
> (2) The existing dischargers into that segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards.

40 C.F.R. § 122.4 (2000).

In construing this regulation, the court found "there is nothing in the Clean Water Act or the regulation that provides an exception for an offset when the waters remain impaired and the new source is discharging pollution into that impaired water."[174] The court also found that Carlotta had not met subsection (2) above and hence denied the permit. Because the court found that both subsections must be met in order to get a permit, the court did not reach the issue of whether there were sufficient pollutant load allocations to allow for the discharge. However, the court indicated that subsection (1) in the regulation refers to sufficient remaining pollutant load allocations under "existing circumstances."[175]

Although this decision interprets a federal regulation, that regulation also applies to state regulations implementing the CWA.[176] In light of this decision, reading Washington's regulation to allow offsets for new dischargers meeting the CWA's definition of a "new discharger" would render the regulation in conflict with the court's interpretation of the CWA and subject to challenge.

Of concern as well is the fact that the *Spokane River TMDL Oversight Committee Organization, Draft Discussion Paper* (2007 Draft TMDL Appendix E., p. 109) provides authority to the Oversight Committee to "allocate credit to Dischargers from Nonpoint source phosphorus reduction." The Oversight Committee has six members, four dischargers, one member at large and one seat for Ecology.[177] Although not shown in this Draft Paper, documents submitted to the Collaboration Members show that, although

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[174] *Id.* at 13515.
[175] *Id.* at 13516.
[176] 40 C.F.R. 123.25. This regulation requires states to establish regulations as stringent or more stringent than the enumurated regulations therein.
[177] 2007 Draft TMDL at 112.

Ecology sits on the Oversight Committee, it does not have voting rights.[178] Ecology cannot abdicate its regulatory authority to enforce its offset regulation by allowing this committee to determine whether the regulation has or has not been met.[179]

25. All target pursuit actions relied upon to meet final water quality based effluent limits must be included as enforceable conditions in NPDES permits.

pp. 27 -31: Listing required and optional target pursuit actions designed to meet a discharger's "delta," the amount of pollutant reductions between that removed end-of-pipe and the final effluent limits.

See comments 19 – 21, above.

26. Because Lake Spokane is overassimilated for dissolved oxygen, Spokane County as a new discharger cannot receive an NPDES permit to discharge into the Spokane River.

p. 26: "Spokane County is planning on constructing a new wastewater treatment plant near the eastern city limits of Spokane, upstream of the City of Spokane's existing plant. Compliance with 10 ug/L phosphorus TMDL target for this new facility will be met through a combination of advanced treatment and target pursuit actions. At the time the plant begins normal, routine operations, it is expected to meet the TMDL targets."

p. 31: "The County may, if Ecology approves, use the pounds of phosphorus prevented from reaching the River and Lake Spokane through septic tank elimination as part of any needed offsets for the County's new treatment plant."

p. 33: "Spokane County's new wastewater treatment plan will be constructed within six years after this TMDL is approved."

Pursuant to 40 C.F.R. § 122.4(i), no permit may issue to a new source or a new discharger if the discharge will cause or contribute to water quality violations. In addition, where the proposed discharge is to a water segment on the § 303(d) list, no permit may issue unless the discharger can show there are sufficient remaining load allocations for the discharge and the existing dischargers are subject to compliance schedules designed to bring the segment into compliance. *Id.* Schedules of compliance may not be issued to new discharges.[180] WAC 173-20A-510(4).

Although the 2007 Draft TMDL and the Foundational Concepts are completely silent on this fact, Spokane County's proposed plant is a new discharger under the CWA for which prohibitions apply that are not applicable to existing dischargers. Under the CWA, a new discharger "means any building, structure, facility, or installation:

(a) From which there is or may be a "discharge of pollutants;"

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[178] Appendix E: (3) Draft Oversight Committee, 3/6/07.
[179] *See Environmental Defense Center, Inc. v. U.S.E.P.A.*, 344 F. 3d 832, 856 (9th Cir. 2003) (Ecology cannot abdicate its regulatory authority by approving a stormwater general permitting program designed by regulated parties which provided no meaningful agency oversight).
[180] WAC 173-20A-510(4).

(b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;
(c) Which is not a "new source;" and
(d) Which has never received a finally effective NDPES permit for discharges at that "site."

40 C.F.R. 122.4(i).

First and foremost among these distinctions is that new dischargers do not qualify for compliance schedules to meet waste load allocations under a TMDL. The CWA definitions of new and existing dischargers are linked to particular facilities at particular sites. The policy behind the regulations governing new dischargers accommodates the costs and equities associated with forcing existing facilities to upgrade versus requiring new facilities to incorporate the latest technologies. "This distinction is based on the concept that new facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies."[181] "The legislative history of the CWA indicates that the new source requirements were intended to apply where new construction allows flexibility to incorporate new pollution control technology."[182]

In furtherance of this policy, there are numerous regulations, both federal and state, providing for compliance schedules to existing dischargers. In fact, the federal regulations also give the EPA the discretion to grant compliance schedules to new facilities under some circumstances. Washington State, however, adopted a more stringent regulation and expressly forbids compliance schedules to new dischargers.

In accord with these federal and state laws, as a new discharger, [183] the proposed County plant may not receive an NPDES permit for discharge into the Spokane River unless it can show that, upon commencement of discharge, its effluent will not will not cause or contribute to water quality violations and that it has meet all the requirements of 40 C.F.R.122.4, including subsection (i).[184]

As to the first requirement of § 122.4(i), the four Washington dischargers will be given compliance schedules consistent with the TMDL once it is approved. (Arguably, unless the Idaho permits and this TMDL are revised, none of the Spokane River dischargers have been given waste load allocations and compliance schedules designed to meet the dissolved oxygen standard in Lake Spokane.) As to the second requirement, the modeling demonstrably shows there is no existing assimilative capacity for point sources. Consequently there can be no waste load allocation in the TMDL for the proposed County plant.

Nevertheless, the TMDL holds out the possibility of an NPDES permit through offsets from septic tank elimination. This is unavailing given the Ninth Circuit's decision in *Carlotta Copper*.

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[181] Rules and Regulations, EPA, 40 C.F.R. Parts 122, 134, and 125, National Pollutant Discharge Elimination System Permit Regulations, 49 Fed. Reg. 37998 (September 26, 1984).
[182] *Id.* at 38043, 44. This section also applies the same policy rationale to new dischargers.
[183] See Appendix F: (6) Correspondence between Sierra Club and Ron Lavigne, AAG, regarding Spokane County's proposed plant.
[184] *Carlotta Copper, supra* at 13516,17(Requirements of 40 C.F.R. 122.4 *See also* Appendix F: (4) EPA letter to Ecology discussing limits to discharge for Spokane County as a new discharger.

"There is nothing in the Clean Water Act or the regulation that provides an exception for an offset when waters remain impaired and the new source is discharging pollution into that impaired water."[185]

Without offsets, the County's proposed plant as designed will contribute to water quality violations. The County's proposed plant is designed for 8 mgd annual average flow and the chosen technology, Membrane Bioreactor (MBR) with biological nutrient removal and chemical polishing, is expected to achieve at least 50 ug/L for phosphorus.[186] This is greater than the required instream target concentrations for phosphorus. And, as has been demonstrated from the modeling, even with nonpoint sources set to natural conditions, the standard in Lake Spokane will still be exceeded with all point sources at 50 ug/L.[187] Thus, the County has chosen a technology that will have the potential to cause or contribute to water quality violations and will not meet the instream concentrations as required by the TMDL but instead will discharge a known amount of pollution to the river.

However, even if the *Carlotta Copper* decision were construed to allow offsets to a new discharger (which it clearly does not), it is doubtful that the County can demonstrate phosphorus reductions from its elimination program in a scientifically defensible manner.

In general, TMDL submittals must include load allocations that, where possible, distinguish natural and nonpoint source load.[188] However, because of the complexity of the hydraulic interconnection between the aquifer and the river, Ecology was not able to collect source-specific data sufficient to differentiate between human-caused loading, such as that from septics, and natural background in groundwater loading.[189] Consequently, groundwater loading was deemed to be natural background in the TMDL. [190] Indeed, Table 3, p. 13 in the 2007 Draft TMDL, indicates that the groundwater characteristics are naturally low in phosphorus, essentially background, and in fact appears to treat them as such. Additionally, Cusimano noted that groundwater comprised only a small fraction of the water budget to Lake Spokane with surface water contributing approximately 98.5% and that concentrations were naturally low in phosphorus.[191] In order to provide offsets for septic loading reductions, Ecology must first determine an instream load allocation (as opposed to groundwater) associated with septic loading and recalibrate the model to show that portion of background which is actually nonpoint source and not background. This would, no doubt, result in the natural background conditions being even better than originally assumed and will in all probability require further load reductions.

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[185] *Id.* at 13515. *See also* Comment # 26. See also
[186] Spokane County 2006 Wastewater Facilities Plan Amendment at http://www.spokanecounty.org/utilities/wwfp/.
[187] Appendix B: (17).
[188] 40 C.F.R. 130.2(g).
[189] 2007 Draft TMDL at 12, 13 "The Spokane River and aquifer interactions are a very complex system. If monitoring indicates that the groundwater characteristics have changed significantly from what was used in the original model scenarios, Ecology will use the CE-QUAL-W2 model to analyze the river with current groundwater conditions. If necessary, load and wasteload allocations will be adjusted according to the model predictions (see adaptive management in the Managed Implementation Plan)."
[190] 2007 Draft TMDL at 12, 13 "Groundwater does not contribute CBOD or ammonia in the model."
[191] Loading Assessment at 16 (Cusimano 2004). If, as it appears, the 2007 Draft TMDL assumes groundwater to be background, it should provide an explanation for this assumption and other expected impacts of groundwater on Lake Spokane.

Spokane County's challenge then is to characterize septic pollutant loading such that it could show over-control. In an attempt to distinguish septic loading from background, Spokane County tendered a technical memorandum on loading from septic systems to Ecology with its amended 2006 facilities plan[192] Unfortunately, this memorandum is not scientifically defensible and likewise fails to meet the criteria of WAC 173-201A-450.

Prior to the finalization of the Foundation Concepts document, Sierra Club provided Ecology with a review of the County's initial Phosphorus Loading Estimate Technical Document conducted by Gary Andres, a hydrogeologist with expertise in the Spokane Valley –Rathdrum Prairie Aquifer.[193] That initial estimate warned that the proposal to provide phosphorus offsets through the septic elimination program was not scientifically defensible and failed to meet the vigorous standards of Ecology's offset regulation (WAC 173-201A-450). Mr. Andres conducted an additional review of a later version of the HDR assessment and concluded that little additional information had been provided to demonstrate that the offset proposal was either scientifically or legally defensible.[194]

Specifically, this assessment finds that the HDR report fails to include a sensitivity analysis, adequately address seasonal variations, verify conclusions with field data, or adequately consider a soil/aquifer retention factor. In considering whether the HDR satisfies the requirements of Ecology's offset regulation, the assessment concludes:

"The study does not quantify uncertainty in both P loading and migration to the river, address variability in the effluent quality, provide an appropriate margin of safety (no sensitivity analysis), or account for attenuation as P migrates in the SVRP. These shortcomings make it impossible to determine the existence of benefits. Yet, if the County is allowed to discharge at 50 ug/L, the impact of that discharge will be clear."

Dr. Joel Massman also conducted a review of the HDR memo for Sierra Club and concluded the analysis over-estimated phosphorus loadings and offsets, failed to acknowledge the loading which would continue years after elimination due to desorption, and utilized an approach that is not conservative and does not provide an adequate margin of safety.[195]

Ecology, too, expressed concerns regarding the sufficiency of the HDR analysis in its comments on the proposed facilities plan noting continued "uncertainty regarding the quantity and timing of the offsets."[196]

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[192] Id.
[193] Appendix B: (11).
[194] Id. at (12).
[195] Appendix B: (6). See also Appendix G: (5) (Email from Bob Cusimano with analysis of groundwater concentrations ("It is hard to measure how much aquifer TP gets into the river because aquifer chemistry and river interactions…are very complicated, i.e., a well, spring or seepage grab sample of total P does not represent the actual amount that gets incorporated into the water column" and concluding that if such concentrations were 2 to 3 times what was in the model, the model would be overestimating river concentrations by the same factor); Appendix G: (6).
[196] Appendix F: (1) Ecology letter re: Draft Final County of Spokane's Wastewater Facilities Plan (March 14, 2007). See also

The proposal to offset phosphorus discharges from the new plant is also problematic from legal and policy perspectives. WAC 173-201A-450(2)(e) requires that pollution offsets may be utilized only to the extent the offset allocation derives from new (i.e. not pre-existing) requirements. The Septic Tank Elimination Program, which the County proposes to use as an offset for phosphorus loading to the River, is a longstanding obligation of the County and does not qualify as pollution offset.[197]

The STEP program commenced in 1985 when County voters approved a resolution to create an Aquifer Protection Area and to allow the County to impose a $15 fee on property tax statements. A primary purpose of the fee was (and is) to construct sewer mains to eliminate septic systems and connect households to the City's sewage plant. The County has collected and spent tens of millions of property taxpayer dollars from this fund. In addition the County has received substantial funding from the State's Centennial Clean Water Fund, again on the order of tens of millions of dollars.

The obligation to utilize these funds to eliminate on-site sewage systems derives both from the County's own program as well as contracts with the State of Washington. This obligation pre-dates the TMDL and the discharge permit the County now wishes to obtain to allow discharge to the Spokane River. Removal of septic tanks from the Spokane Aquifer will not create a phosphorus "credit" over and above what will occur regardless of the new treatment plant.

The proposal to use septic elimination as an offset is a bad idea from a policy standpoint. Rewarding the County with a pollution offset credit for the septic elimination program creates an incentive for the County to promote the use of on-site septic systems for new home construction. Indeed, this is exactly what has occurred since the County conceived the idea of using STEP as an offset. In 2005, the County loosened the requirements for connecting to sewer mains. There has also been significant growth in septic systems in the last several years in Spokane County. There has been little effort by the County to limit or control growth in a manner that would reduce demand for septic permits.

In sum, the proposal to trade an undetermined reduction of phosphorus from septics for a known phosphorus load is supported neither in science, law or policy. The County facilities plan should be revised to meet final water quality based effluent limits through technology or seasonal reuse upon commencement of discharge and the TMDL revised to reflect these requirements.[198]

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[197] *See Addressing The Land Use, Environmental Quality, And Transportation Connection In Chittenden County, Vermont: Using Nepa To Arrive At An Affordable, Effective, And Environmentally Responsible Solution For Vermont's Transportation Future*, 31 Vt. L. Rev. 783, *856 (2007) at 824 fn. 264 *citing* CCCH Stormwater Discharge Permits, Nos. WQ-02-11, WQ-03-05, WQ-03-06, WQ-03-07 Consolidated, Findings of Fact, Conclusions of Law, and Order, at 43 (Vt. Water Res. Bd. Oct. 4, 2004), available at http:// www.nrb.state.vt.us/wrp/decisions/wrbdecisions/2004wq-02-11etseq-fco.pdf (No offset for proposed reduction of winter sanding where such reductions were a preexisting requirement under federal law regulating stormwater).

[198] Appendix F:(2) (Letter granting County $8.5 million SRF loan to amend facilities plan to reflect the requirements of the Spokane River DO TMDL); (4).

27. A UAA is inappropriate until and unless all implementation actions have been in place for a period of time necessary to determine their effects.

p. 33: "After ten years of implementation of this TMDL, a thorough assessment will be conducted.... The assessment will determine, what, if any additional phosphorus reduction actions are necessary, what actions should be continued or discontinued, and whether any changes to the phosphorus reduction goal in the TMDL or the water quality standards for dissolved oxygen in the Spokane River and Lake Spokane are warranted."

p.38: "This 10 year assessment may be delayed if the advanced treatment technology has not been in operation for a long enough time to produce sufficient data.... If this occurs, the 10 year assessment would not be completed until there has been at least three years of operation of all treatment technology upgrades by all Dischargers.... The Spokane River TMDL Oversight Committee will use a collaborative process to make decisions about the relevant actions appropriate for the second 10 year period."

The MIP provides for an assessment after ten years of implementation of this TMDL. While ongoing and periodic assessments are necessary, unless the TMDL is revised to comply with Washington law and compliance is required in ten years, there will necessarily be inadequate information to assess progress by ten years. The Idaho dischargers are not required to meet final effluent limits of 50 ug/L until ten years after issuance of their permits. Hence no improvement from Idaho loading will occur within that timeframe. Moreover, under the permits, these facilities will be allowed to expand during that timeframe. Even worse, the Washington dischargers have no requirement to meet even 50 ug/L within ten years. And nonpoint source reductions are unlikely to be in place or their effects apparent within ten years.[199] The only chance of seeing real gains in ten years is if the dischargers install and optimize phosphorus removing technologies which achieve less than 50 ug/L well within the first ten years. This is especially true of the City of Spokane whose "current discharge represents about half of the TP loading to Lake Spokane at a location in the river that has by far the most significant impacts on Lake Spokane."[200]

The MIP does state that the assessment will be delayed until there have been three years of operations by the upgraded plants. Even then, improvements will depend on the technologies chosen. Ecology's own modeling shows a dramatic increase if all existing dischargers meet an

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[199] It's actually unclear when this ten-year period begins. According to correspondence between the County and Ecology, the dischargers wanted the MIP to take effect upon the signing of the MOA. *See* Appendix G: (2).

[200] Appendix G: (14) Estimate of Summer Loading to Lake Spokane (2003). See also G: (16) Email between EPA staff ("The City's current discharge represents about half of the TP loading to Lake Spokane at a location in the river that has by far the most significant impacts on Lake Spokane"); G:(15) Ecology email discussing relative contributions of point source to nonpoint source loading ("We must not allow folks to divert attention away from the fact that over half of the growing season total phosphorus load to Lake Spokane comes from wastewater that contributes to less than 10% of the total water inflow to the lake during a dry year like 2001 and 2003, and now looking soon to be 2004"); G: (22) Phosphorus attenuation model for 2000 shows that River TP phosphorus attenuation from Spokane WWTP as 3.23% compared to CDA WWTP at 47.44%.

interim phosphorus limit of 50 ug/L.[201] But the modeling also shows that at this level, with all nonpoint sources removed, exceedences will still occur.[202]

Measurable success under this TMDL relies in part on nonpoint source reductions. As stated in the MOA signed by Ecology and EPA regarding TMDLS, "NPS TMDLS often reflect the assumption that designed management approaches (e.g. BMPs and/or restoration activities) will produce desired water quality goals. There is inherent uncertainty in the problem definition and in the effectiveness of corrective actions, therefore a margin of safety must be included and progress checked against specific, measurable interim targets. True indicators of effectiveness may not be assessed until well after designed programs are in place."[203]

"If initial implementation measures fail, then progressively more aggressive efforts will be employed to meet water quality goals. This allows locally-driven programs a chance to be successful before more restrictive measures are applied. Ecology will specify in the implementation plan other more restrictive measures which will be applied should initial measures not be implemented or successful. The process relies heavily on the development of interim and final targets to identify the desired future condition of a water body. These final targets must meet water quality standards at the end of the planned period."[204]

And, under EPA Region 10's Reasonable Assurance Policy, "*If progress towards achieving these nonpoint source reductions does not occur, EPA expects NPDES permit limits for these facilities will be revised to reflect no credit for nonpoint source reductions.*"[205]

This TMDL proposes just the opposite. There are no interim targets. Yet, if enough progress is not being made, the TMDL allows a reduction in efforts or standard changes in lieu of more aggressive measures. Holding out the promise of a UAA – lowering standards - under these circumstances does not provide incentive for success. There is no basis to revert to a UAA, especially in light of Ecology's conclusions regarding the dischargers' UAA, until all identified actions have been aggressively pursued to completion and "doing anything more would result in severe economic hardship."[206] Under the law, the dischargers may attempt to upgrade their UAA at any time. It is counterproductive for Ecology to promise to do it for them..

Clearly, a collaborative approach is necessary in a mixed TMDL. To that end, the MOA between Ecology and EPA regarding TMDLs allows Ecology to tailor its watershed process by utilizing a locally driven implementation process as is being done here.[207] No matter the level of public involvement, however, Ecology cannot abdicate its regulatory authority to the TMDL

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[201] 2007 Draft TMDL at 28, Figure 5.
[202] 2007 Draft TMDL, Appendix C. at 81("With constituent concentrations in Hangman Creek, Coulee Creek, and the Little Spokane River being set to background condition values, the simulation with Washington point sources having total phosphorus concentrations of 50 micrograms/liter slightly exceeded the standard of 0.2 mg/L on several occasions."
[203] Appendix C: (2) at 13 § X.
[204] *Id.*
[205] Appendix G: (4).
[206] Appendix D: (21) (Ragsdale email outlining TMDL strategy if Ecology denied discharger's UAA petition). See also Appendix D: (1) Ecology comments on UAA.
[207] Appendix C: (2) at 15.

Collaboration Oversight Committee in determining what constitutes sufficient, credible data for assessment and adaptive management decisions.

28. There is no reasonable assurance that nonpoint loads will be reduced to their allocated amount.

p. 35: TMDLS must show "reasonable assurance" that [point and nonpoint sources] will be reduced to their allocated amount.

Under the CWA, the only federally enforceable controls are those for point sources through NPDES permitting. For those TMDLs in which waste load allocations to point sources are based on the assumption that loads from nonpoint sources will be reduced, TMDLs submitted by Ecology to EPA must provide documentation of specific actions demonstrating reasonable assurance that the nonpoint source load allocations will occur.[208] "Where there are not reasonable assurances, under the CWA, the entire load reduction must be assigned to point sources."[209] "When establishing permits for point sources in the watershed, the record should show that in the case for any credit for future nonpoint source reductions, there is reasonable assurance that nonpoint source controls will be implemented and maintained, and that nonpoint source reductions are demonstrated through an effective monitoring program...."[210] "If progress towards achieving these nonpoint source reductions does not occur, EPA expects NPDES permit limits for these facilities will be revised to reflect no credit for nonpoint source reductions."[211]

"Reasonable assurance is provided when all of the following elements are fulfilled:

- Existing implementation commitments within the watershed are documented, such as currently funded BMPs and other restoration projects, letters of commitment from landowners, local ordinances, etc., and

- Commitment is provided to:
  - develop an implementation plan within a specified period of time, and
  - include a monitoring program in the implementation plan which evaluates both 1) implementation of BMPs and other needed control actions, and 2) trends in relevant water quality parameters, and
  - seek funding for the implementation plan, and

- The process for revising the TMDL is explained."[212]

The TMDL assigns waste load allocations to the point sources based on the background concentrations of phosphorus, ammonia and CBOD. The Managed Implementation Plan, however, allows the dischargers to meet their waste load allocations through a combination of

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[208] *Id*; Appendix G: (4).
[209] Appendix G: (4) (EPA Interim Reasonable Assurance Policy and email exchanges between EPA and Ecology regarding reasonable assurance citing 1991 Guidance for Water Quality-based Decisions at http://www.epa.gov/OWOW/tmdl/decisions/.)
[210] *Id.*
[211] Id. Interim Reasonable Assurance Policy.
[212] *Id.*.

end-of-pipe technology upgrades and other actions such as nonpoint source reductions. Hence the doctrine of "reasonable assurance applies."

Unlike the 2004 Draft TMDL which set interim effluent limits of 50 ug/L end-of-pipe for phosphorus, there is no enforceable requirement to achieve a certain level of pollutant removal through technology. Thus, the TMDL relies heavily on Delta Elimination Plans in which the dischargers may meet these concentrations through offsets from "target pursuit actions" such as nonpoint source reductions.

As detailed in the comments above, there is no reasonable assurance of overcontrolling nonpoint source loading to the level necessary to provide assimilative capacity for point sources, especially where the TMDL calls for reductions below that shown to be necessary by modeling. In addition, there is no timeframe set by which certain reductions must be made. The MIP includes a three phase nonpoint source work plan.[213] Although Phase 1, data collection and assessment, is anticipated to take 12 to 18 months, there is no timeframe given for completion of phase two -NPS characterization and evaluation of BMPs - or three, implementation.

Without setting outcome-based benchmarks for nonpoint source reductions, there is no assurance that requisite nonpoint source reductions will occur.

29. Reasonable assurance based on "commitments" is meaningless without regulatory enforcement.

p. 35: "Ecology believes that the following activities already support this TMDL and add to the assurance that dissolved oxygen in the Spokane River and Lake Spokane will meet conditions provided by Washington State water quality standards." "This assumes that the activities described below are continued and maintained."

p. 37: "While Ecology is authorized under Chapter 90.48 RCW to impose strict requirements or issue enforcement actions to achieve compliance with state water quality standards, it is the goal of all participants in the Spokane River and Lake Spokane TMDL process to achieve clean water through voluntary control actions. *Ecology will consider and issue notices of noncompliance, in accordance with the Regulatory Reform Act, in situations where the cause or contribution to the cause of noncompliance with load allocations can be established.* (emphasis added)."

The Foundational Concepts provides, "Enforceable terms of each NPDES permit will include the obligation to meet the interim or final effluent limit and the obligation to start, continue, and/or complete the target pursuit actions."[214] By contrast, the MIP does not include this statement and neither document requires interim or final water quality based effluent limits for twenty years. Unless these requirements, and other actions relied upon to meet effluent limits, are specifically included in the respective NPDES permits or other documents enforceable by Ecology and third parties as allowed under the CWA, there can be no assurance that the required reductions will be achieved.

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[213] 2007 Draft TMDL at Appendix D.
[214] 2007 Draft TMDL, Foundational Concepts at 70.

Ecology's original 2004 Draft TMDL included the stringent requirements necessary to meet water quality standards within 10 years. By contrast, the 2007 Draft, as a result of hard bargaining by the dischargers, relies on yet another MOA with no out-come based limitations for another twenty years. In light of the ongoing problems in this watershed related to dissolved oxygen over the past twenty years despite agreements between Ecology and the dischargers, there is no reasonable assurance that this plan will work by virtue of yet another MOA.

The CWA allows third-party suits to enforce effluent standards and limitations. NPDES permits are the primary means of implementing such limitations pursuant to a TMDL. The public must be given, not only the opportunity to participate in this TMDL, but to hold the agencies and dischargers accountable for their actions relating to its implementation. The dischargers' commitments which are necessary to meet waste load allocations, i.e. Delta Elimination Plans, must be enforceable terms as allowed under 33 U.S.C. § 1365(a). By the above statements, Ecology essentially abdicates its regulatory authority by agreeing NOT to enforce the conditions of the TMDL unless it can prove violations of load allocations – allocations that are not enforceable in this TMDL for 20 years.

It is interesting that the TMDL states it will only enforce noncompliance with "load allocations." "Load allocations" are by definition allocations for nonpoint sources, reductions of which are notoriously hard to track. Ecology should clarify that it intends to enforce both waste load and load allocations as required by law.

30. <u>The TMDL fails to assess the Avista dams as a contributing factor to the dissolved oxygen problem and to allocate responsibility for water quality violations as deemed appropriate.</u>

The TMDL fails to discuss the impacts of Avista's Spokane River dams to dissolved impacts in the Spokane River. While dams have not been specifically recognized as point sources, EPA has consistently asserted that dams are *nonpoint* sources.[215] The construction and operation of the Long Lake dam causes many changes in water quality within the Reservoir and below the dam, flowing into the Spokane Reservation. Avista does not control delivery of phosphorus, suspended particulates, and other nutrients and contaminants to the Long Lake Reservoir via the Spokane River and tributaries from above the dam. However, but for the dam, certain water quality problems impacting dissolved oxygen, including extended retention times for nutrients and increased aquatic macrophytes, would not exist. Consequently, Avista has an obligation to share in the responsibility for meeting the water quality standard for dissolved oxygen in Long Lake Reservoir.

The Department of Ecology has long been aware of the water quality impacts associated with Avista's dams. In a 1972 Report, Ecology reported that the "main influence on water quality in the lower Spokane River" was Avista's (then Washington Water Power) dams. Robert A. Bishop, *et al.*, <u>Spokane River Cooperative Water Quality Study</u>, Report No. 72-001, (1972) at 3. The report specifically identifies impacts such as "thermal stratification, low dissolved oxygen in the lower strata, accumulation of nutrients, and algal blooms." *Id.* The 1972 Report recommended, "Further study should be made to define feasible projects to modify operations

[215] See *National Wildlife Federation v. Gorsuch*, 693 F.2d, 156 (D.C. Cir. 1982) (dams are nonpoint sources subject to state control)..

and/or structures of Washington Water Power Company's hydropower developments" specifically to examine "achieving artificial destratification of Long Lake during the summer months" so that "water quality in the deeper portions of the reservoir would not deteriorate to the degree that occurs during thermal stratification." *Id.* at 4. This recommendation is just as valid today as it was 35 years ago.

The construction of the dam and the filling of the reservoir and its operations create a nutrient sink thus reducing transport of organic materials and nutrients originating from above and within Long Lake Reservoir to below the dam.[216] In other words, nutrients in various forms are being retained and metabolized in Long Lake Reservoir due to Long Lake dam. Long Lake dam also creates a reservoir where riverine habitat, habitat that assimilates nutrients with different results, once existed. The reservoir is long and deep and thermally stratifies each summer. These temperature-verses-depth gradients exist each summer in the reservoir. Because of the rich supply and biological processing of nutrients received from above the dam, the hypolimnion of the reservoir becomes depleted of dissolved oxygen once the reservoir has stratified. Avista's own studies describe the oxygen impact associated with dam operations:

> Lake Spokane thermally stratifies from June through September, and stagnation of deep water results in low DO concentrations near the bottom of the lower portion of the reservoir in the summer and early fall. The primary effects of current Project operations on DO concentrations are that concentrations are increased in the upper end of the lake during most of the spring and summer and decreased in the hypolimnion of the lower portion of the lake in comparison to free-flowing conditions. *The model indicates that 8.0-mg/L concentrations would be met under unimpounded conditions, whereas the current impoundment of water behind Long Lake Dam and current Project operations, collectively, contribute to not satisfying the 8.0-mg/L criterion between 3 to 5 months per year in the interflow and hypolimnion of the lower portion of the lake under current conditions.* (Avista PDEA at 5-125 (emphasis added)).[217]
>
> Moreover, Avista's studies find dissolved oxygen problems associated with dam operations upstream of Long Lake:
>
> For most of the reach between the Upriver forebay and Nine Mile tailrace, model results suggest that the impoundments contribute to DO concentrations falling below the 8.0-mg/L criterion during about 2 to 3 months of the summer. (PDEA at 5-124).

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[216] Ecology has long recognized that Long Lake Reservoir acts as a nutrient "sink" and the DO problems that result. *See e.g.,* Raymond A. Soltero, *et al.,* Further Investigation as to the Cause and Effect of Eutrophication in Long Lake, Washington (1974); Raymond A. Soltero, *et al.,* The Effect of Continuous Advanced Wastewater Treatment by the City of Spokane on the Trophic Status of Long Lake, WA. during 1980 (1981) ("Comparing mean daily influent and effluent nitrogen and phosphate loads shows that the reservoir has been a nutrient sink for all years of study except for total nitrogen in 1972." *Id.* at 25).

[217] Available at: http://www.avistautilities.com/resources/relicensing/spokane/documents.asp?DocID=2005-0067.

> Avista has admitted that the operation of its dam will continue to contribute to dissolved oxygen problems in the reservoir:
>
> [T]he Proposed Action would be expected to continue to result in Long Lake HED discharges that frequently have DO concentrations of less than the 8.0-mg/L criterion during the summer and fall. (PDEA at 5-131).

Addressing this impact in the TMDL only makes sense and is consistent with Ecology's own guidance. As described in Ecology's §401 Guidance Manual:

> If total daily maximum load (TMDL) allocation of pollutants to a hydropower facility can provide information that helps make these water quality certification decisions, Ecology will use them. Total maximum daily loads are not separate enforceable requirements, but are used as a tool to make regulatory decisions. ... A TMDL may be useful to the applicants. It allocates the portion of the pollution that is the responsibility of applicants where there is more than one source. ... [W]e will expect applicants to determine their contribution to the pollution.

Guidance Manual at 26.

Further, the States of Oregon and Idaho address a mix of point, nonpoint, and dam-related impacts when preparing TMDLs . In the development of a TMDL for the Hells Canyon Reach of the Snake River, both states assessed the impacts of three dams on the ability of the Snake River to assimilate nutrients.[218] In so doing, each dam was assigned a specific allocation of oxygen to put back into the river:

> In addition to the total phosphorus load allocations for the Upstream Snake River segment (RM 409 to 335) and the tributaries, a dissolved oxygen load allocation has been established for Brownlee Reservoir (RM 335 to 285) (IPCo) to offset the calculated reduction in assimilative capacity due to the Hells Canyon Complex reservoirs.
>
> The dissolved oxygen allocation requires the addition of 1,125 tons of oxygen (1.02 x106 kg) into the metalimnion and transition zone of Brownlee Reservoir (approximately 17.3 tons/day (15,727 kg/day)). The total dissolved oxygen mass required to address the loss of assimilative capacity in the metalimnion over this time frame is 1,053 tons (957,272 kg). This is equivalent to an even distribution of 16.2 tons/day (14,727 kg/day) over 65 days. The total dissolved oxygen mass required to address the loss of assimilative capacity in the transition zone over this time frame is 72 tons (65,454 kg). This is equivalent to an even distribution of 3.0 tons/day (2,727 kg/day) over 24 days. The calculated time period when exceedences occurred in the metalimnion of Brownlee Reservoir is between Julian days 182 and 247 (the first of July through the first week of September)

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[218] *See* http://www.deq.state.id.us/water/data_reports/surface_water/tmdls/snake_river_hells_canyon/snake_river_hells_canyon.cfm.

when dissolved oxygen sags are observed to occur to a greater degree than those identified as the result of poor water quality inflowing from the upstream sources. However, this time frame should not be interpreted as an absolute requirement. This approach recognizes that the actual mass of dissolved oxygen necessary per day is not static. It is variable depending on system dynamics and may vary from a few tons to as many as 30 tons per day. Timing of oxygen addition or other equivalent implementation measures should be such that it coincides with those periods where dissolved oxygen sags occur and where it will be the most effective in improving aquatic life habitat and support of designated beneficial uses. Water column dissolved oxygen monitoring is expected to be undertaken as part of this scheduling effort.

This load allocation does not require direct oxygenation of the metalimnetic and transition zone waters. It can be accomplished through equivalent reductions in total phosphorus or organic matter upstream, or other appropriate mechanism that can be shown to result in the required improvement of dissolved oxygen in the metalimnion and transition zones to the extent required. A reduction of 1.7 million kg of organic matter/algal biomass would equate to the identified dissolved oxygen mass. This translates to approximately 11,000 kg/day over the critical period (May through September) or 26,000 kg/day over the 65-day load period identified in the calculations for reduced assimilative capacity. Direct oxygenation can be used, but should not be interpreted as the only mechanism available. Cost effectiveness of both reservoir and upstream BMP implementation should be considered in all implementation projects.

Because there are both total phosphorus and dissolved oxygen load allocations assigned within different segments of the SR-HC TMDL reach, it must be clearly understood that Upstream Snake River segment (RM 409 to 335) pollutant sources are responsible for those water quality problems occurring in the Upstream Snake River segment. They are not responsible for those water quality problems that would occur if the waters flowing into Brownlee Reservoir met water quality standards and are exclusive to the reservoir. Similarly, IPCo (as operator of the Hells Canyon Complex) is responsible for those water quality problems related exclusively to impoundment effects that would occur if inflowing water met water quality standards.[219]

Ecology should follow the lead of its neighboring state agencies and properly assess Avista's contribution to the DO problem in the TMDL. This approach fairly allocates the responsibility of the dissolved oxygen problem between all sources, point, nonpoint, and otherwise.

31. Washington NPDES permits derived from this TMDL will violate federal law by allowing continued violations of the Spokane Tribe's water quality standards for dissolved oxygen.

p. 7: "The Spokane River downstream of Lake Spokane Dam (Long Lake Dam) also violates State and Spokane Tribe water quality standards with dissolved oxygen reported below 3.0 mg/L near the

[219] Snake River - Hells Canyon Subbasin Assessment and Total Maximum Daily Loads at 449-450.

mouth of the Spokane River attributed to decomposition of summer algal biomass (Lee et al., 2003). Continuous monitoring of the river below Lake Spokane Dam by the Spokane Tribe shows depressed oxygen levels with recurring minimums below 4.0 mg/L (Butler, 2004)."

p. 60: "Ecology will continue to work on a government-to-government basis with the Spokane Tribe of Indians to ensure compliance with downstream Tribal water quality standards."

The authority to issue NPDES permits was granted by Congress to EPA under the Clean Water Act (CWA).[220] In Washington, this authority was delegated to Ecology pursuit to Section 402 of the CWA.[221] All such permits must comply with the applicable requirements of the CWA and its implementing regulations.[222] Under the CWA, Ecology may not issue NPDES permits "when the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected states."[223] With regard to these permits, both Washington, where the effluent discharges take place, and the Spokane Tribe, where the receiving waters flow after leaving Lake Spokane, are affected "states," or more aptly, jurisdictions. Thus Ecology must consider the water quality standards of both "states" in making permit decisions.

In addition, federal regulations clearly and unambiguously require Ecology to include in these permits any conditions necessary to achieve the Spokane Tribe's water quality standards, including limitations on all pollutants which Ecology determines will cause or have the reasonable potential to cause or contribute to an excursion above Washington's water quality standards.[224] When determining whether a discharge causes or has a reasonable potential to cause or contribute to water quality standard violations, Ecology must use procedures that account for existing controls on point and nonpoint sources of pollution.[225] When Ecology determines that the discharge has the reasonable potential to cause water quality violations, Ecology must place effluent limits in the permit that are sufficient to attain and maintain applicable water quality standards.[226] Finally, these effluent limits must be derived from and comply with all applicable water quality standards and must be consistent with the assumptions and requirements of any available wasteload allocation pursuant to 40 C.F.R. 130.7.[227]

The Spokane Tribal waters are in this watershed and are affected by pollution from Washington. Spokane Tribe Surface Water Quality Standards require that dissolved oxygen shall not be less than 8.0 mg/L in Class A waters and there shall be no measurable decrease below natural conditions in lakes.[228] The TMDL admits that these standards are currently being violated, yet the TMDL provides no discussion or analysis of how this TMDL will ensure compliance with the Spokane Tribe's water quality standards. Under federal law, Ecology must ensure that the waste load allocations

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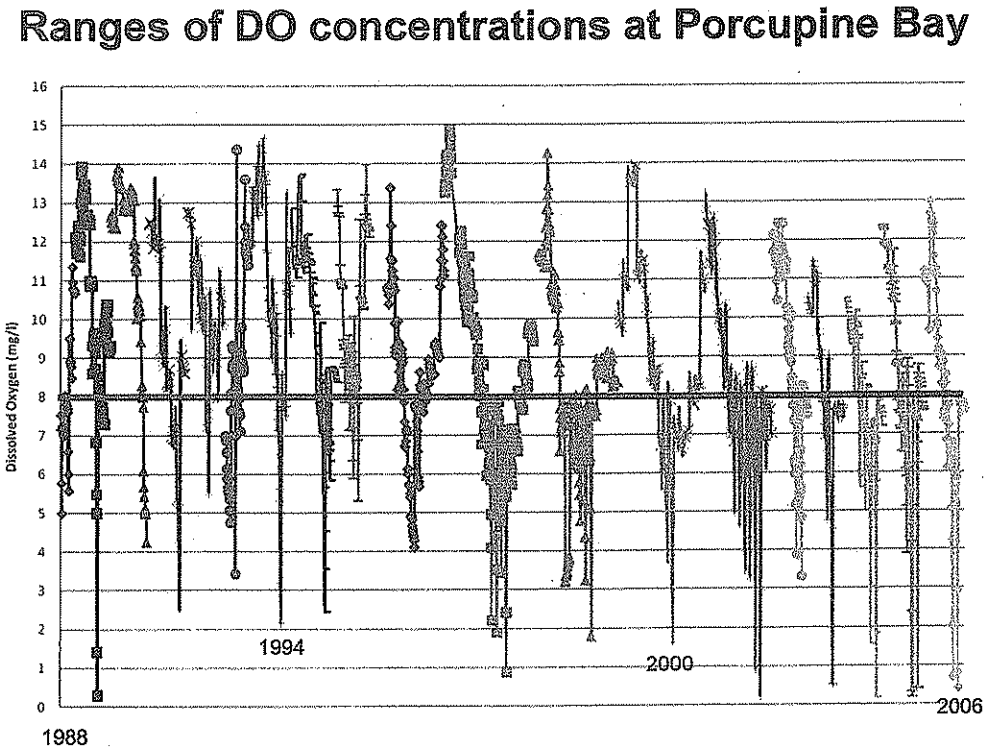
[220] 33 U.S.C. § 1342.
[221] 33 U.S.C. § 1342(b); RCW 90.48.260.
[222] 33 U.S.C. §1311(b)(1)(c); 40 C.F.R. § 122.4 (a).
[223] 40 C.F.R.§ 122.4 (d).
[224] 40 C.F.R. § 122.44(d).
[225] *Id.*
[226] *Id.*
[227] *Id.*
[228] Spokane Tribe, Surface Water Quality Standards (2003), Ch. 9 at http://www.epa.gov/waterscience/standards/wqslibrary/tribes/spokane.pdf.

translated into NPPDES permits will meet Spokane Tribe standards. As set forth by the Supreme Court, any NPDES permit issued to a discharger in an upstream jurisdiction must include limitations necessary to comply with the water quality standards of a downstream jurisdiction. *Arkansas v. Oklahoma*, 503 U.S. 91, 107 (1992); *see also Montana v. U.S. Environmental Protection Agency*, 941 F. Supp. 945 (D. Mont. 1996); *City of Albuquerque v. Browner*, 97 F.3d 415 (10th Cir. 1996).

The Tribe's water quality standards are not being met. As illustrated below, data from the Tribe indicates alarmingly low levels of dissolved oxygen at Porcupine Bay on the lower Spokane River. These levels have dipped as low as 0.2 mg/L, significantly below the tribal standard of 8.0 mg/L.[229]



Source: Chris Butler, Spokane Tribe

Just as this TMDL and any permits issued in conformity therewith cannot assure attainment of the Washington water quality standards for dissolved oxygen in Lake Spokane, they likewise cannot assure attainment of the Spokane Tribe's water quality for dissolved oxygen.

[229] Tribal standards are available at http://www.epa.gov/waterscience/standards/wqslibrary/tribes/spokane.pdf.

CONCLUSION

As explained above, this TMDL is not designed to attain water quality standards for dissolved oxygen in Lake Spokane for the following reasons:

1. The TMDL is fatally flawed by relying on a degraded boundary condition which allocates all the allowable loading to Idaho point sources and leaves none for Washington.

2. By allowing Washington to add loading to that coming over the border, the TMDL allows twice the loading in Lake Spokane than is allowed under Washington law.

3. By utilizing a degraded boundary condition, the TMDL requires fewer nonpoint source reductions than are necessary to meet standards.

4. The TMDL allows point sources to meet waste load allocations through a combination of end-of-pipe technology and credits from nonpoint source reductions. Credits or offsets are not available until nonpoint sources have been overcontrolled. Credits based on the degraded boundary conditions and revised modeling will be illusory because the modeling shows more nonpoint source reductions are necessary to meet standards.

5. The TMDL requires no enforceable interim benchmarks or final water quality based effluent limits.

6. The TMDL does not require compliance with the waste load allocations for 20 years. Washington law expressly limits compliance schedules for point source dischargers to 10 years.

7. Ecology has abdicated its enforcement authority by granting the regulated community the right to determine when and to whom credits or offsets should be granted and whether there is sufficient credible data to continue with implementation actions.

8. Ecology has essentially abdicated is enforcement authority for 20 years by stating that it will rely on voluntary implementation of the TMDL and will issue non-compliance notices only where noncompliance with *load allocations* can be determined. Load allocations are defined as allocations for non point sources. There are no enforceable nonpoint source load allocations in this TMDL. Moreover, there are no enforceable waste load or load allocations for 20 years.

9. The ten year assessment allows for a lowering in standards without first requiring compliance with any interim or final waste load or load allocations and other aggressive reduction measures.

10. There is no adequate margin of safety.

11. Washington State must condition its NPDES permits such that they do not cause or contribute to water quality violations in Spokane Tribe waters. As drafted, the TMDL and any permits issued in conformity therewith will continue to cause and contribute to water quality violations in the Spokane Tribe waters in violation of federal law.

Dissolved oxygen problems have persisted and worsened in this watershed for almost twenty years due in part to the dischargers' success in delaying the imposition of waste load allocations. This TMDL not only delays imposition of the dischargers' waste load allocations for yet another twenty years, it relies on illusory numbers that ensure standards will not be met. Having failed to object to EPA's permitting strategy, Ecology's only legally and scientifically defensible option now is to revert to a natural boundary condition which will leave no allowable loading for Washington.[230] This approach will not impact the dischargers' loading allocations which must meet background concentrations under either scenario. It will, however, impact the tributary loading and reduce the likelihood of delta elimination based on nonpoint source reductions. Nevertheless, this is the only realistic, legal path forward. If, after aggressive implementation using all the tools in the TMDL toolbox the lake remains impaired, it may be appropriate to undergo an economic hardship analysis under a UAA. But reliance on illusory numbers is a recipe for failure.

Furthermore, adopting a degraded baseline sets a dangerous precedent. As noted above in comment 22, the Spokane River is § 303(d) listed for PCBs of which 25% originate in Idaho. Assuming that pollutant loading coming from upstate is background, whether it's PCBs, dioxin, or heavy metals, creates an incentive for upstream states to simply pass their problems downstream and compromises federal and state clean up plans.

Despite these concerns, a fix is not difficult. There are many positive and important strategies in this clean up plan, strategies that will undoubtedly make a difference. To cure the defects in this TMDL, Ecology should, at a minimum, do the following:

1. Revert to the natural boundary conditions.
2. Require hard targets/benchmarks and enforceable water quality based effluent limits as soon as possible and in no event later than ten years.
3. Require a reassessment only after appropriate upgrades have been made and other actions in place long enough to see changes.
4. Prohibit increased or new discharges except where these meet background concentrations.

The Sierra Club has invested an enormous amount of time and financial resources to this TMDL process and, like Ecology, wishes to reach a solution that works for everyone in our community while meeting the requirements of the Clean Water Act. While we appreciate the opportunity to meet with Ecology over the past two years in an effort to craft a strong TMDL and to comment on the many versions of the TMDL, we are not able to support this draft in its current form for the reasons outlined above. Nevertheless, the Sierra Club and CELP look forward to working with Ecology and other stakeholders

[230] In the event the Idaho permits are successfully challenged, Ecology could then revise its TMDL accordingly.

to ensure the plan is not only appropriately designed to restore and maintain the quality of the Spokane River and Lake Spokane, but also enforceable.

Sincerely,

Bonne W. Beavers
On behalf of the Sierra Club, Upper Columbia River Group and CELP

APPENDICES: SIERRA CLUB/CELP COMMENTS DO TMDL

Appendix A – 2004 Draft TMDL

1. TMDL To Restore and Maintain Dissolved Oxygen In the Spokane River and Long Lake(Long Lake), Submittal Report, Public Comment Draft at 8 (Merrill and Cusimano Revised October 15, 2004) (hereinafter "2004 Draft TMDL").

2. Public Hearing Summary for the draft dissolved oxygen TMDL for the Spokane River (Dec. 28, 2004).

3. Sierra Club Comments, Spokane River Dissolved Oxygen TMDL (December 2004).

4. Addendum to Sierra Club Comments on Spokane River Dissolved Oxygen TMDL (December 31, 2004).

5. Spokane Tribe Natural Resources Comments on Spokane River Dissolved Oxygen TMDL (December 30, 2004).

6. Ecology Draft Responses to comments received from formal comment period ending 11-3-2004.

Appendix B – Technical Reports/Memoranda

1. Assessment of the Water Quality Impact of Idaho Wastewater Treatment Plants on the Spokane River and Lake Spokane, EPA Region 10 (Cope 2006)).

2. Spokane River Lake/Long Lake Total Maximum Daily Load (TMDL); A Review and Assessment of Materials Related to the Model for Estimating Dissolved Oxygen (Massman, November 1, 2004).

3. Bioavailability of Phosphorus (Massman June 26,2006).

4. Review of Model Scenarios and Results related to the Proposed Reissuance of NPDES Permits for Idaho Wastewater Treatment Plants at Post Falls, Coeur d'Alene, and Hayden (Massman, May 9, 2007).

5. Comments Regarding the need for considering additional calibration for the Washington Spokane River Model (Massman, May 23, 2007).

6. HDR, Onsite Sewage Disposal Systems Phosphorus Loading Estimate, Technical Memorandum prepared for Spokane County Division of Utilities (Massman, October 8, 2007).

7. Joel Massman, Ph.D. P.D. Resume (2007).

8. Preliminary thoughts and comments on the August 17, 2007 Portland State report describing the revised CE-QUAL-W2 model for the Washington reach of the Spokane River (Massman, August 22, 2007).

9. Spokane River Preliminary CEQUALW2 Model Results (Cusimano, June 18, 2002).

10. Spokane River and Lake Spokane (Long Lake) Pollutant Loading Assessment for Protecting Dissolved Oxygen (Cusimano, 2004) at http://www.ecy.wa.gov/biblio/0403006.html.

11. Review of HDR Phosphate Study Report (Andres June 2006).

12. Review of HDR Phosphorus Loading Estimate Technical Memorandum (Andres January 2007).

13. Gary Andres, Senior Hydro geologist, resume.

14. Revised Model runs with increased BOD loading from Spokane River Tributaries – includes total phosphorus averages (Berger, Wells and Annear, April 4, 2006).

15. Email: Exchange between Bob Cusimano and John Spencer re: Modeling (September 8, 2004).

16. Linking Idaho and Washington sections of CE-QUAL-W2 Spokane River (Berger, 2007).

17. Simulation with Washington Point Sources having total phosphorus concentrations of 50 micrograms/liter (Berger, Wells, PSU, 2007).

18. Ecology Response to review comments on Spokane River and Long Lake TMDL development (December 5, 2003).

19. Parkson Corporation, Dynasand D2 Advanced Filtration System Pilot Test Final Report, City of Spokane WWTP (June 3, 2006).

20. Preliminary assessment of two-stage sand filtration for phosphorus removal (Ecology 2005).

21. Email: Tom Cole, Research Hydrologist, USACE Engineer Research and Development Center, response comments to dischargers on latest calibration report (July 21, 2003).

22. Presentations on low phosphorus removal through biological processes (Carollo Engineers).

Appendix C: Memoranda of Agreements

1. Memorandum of Agreement for the Spokane River Phosphorus Management Plan (March 1989).

2. Memorandum of Agreement Between the United States Environmental Protection Agency and the Washington State Department of Ecology Regarding the Implementation of Section 303(d) of the Federal Clean Water Act (October 29, 2007).

Appendix D: UAA Correspondence/Petition for Rule Making

1. Ecology Comments on UAA (October 1, 2004).

2. Sierra Club Comments on the Proposed UAA (September 4, 2004).

3. Spokane Tribe of Indians Comments on the Proposed UAA (September 30, 2004).

4. Dave Ragsdale, Former EPA Lead for the Spokane River DO TMDL to John Spencer, CH2M Hill re: EPA Comments on Long Lake Use Attainability Analyses (October 1, 2004).

5. Email: Mark Hicks, Senior Water Quality Analyst, Ecology, to Ecology Staff (August 22, 2003) re: Concerns over course of Spokane UAA.

6. Email: Ken Merrill, Senior Water Pollution Biologist, Ecology, former Ecology Lead for the Spokane River DO TMDL, to James Bellaty, et. al., re: Economic Assessment with UAA. (October 3, 2003).

7. Email: Dave Ragsdale, EPA, to Ken Merrill, Ecology, re: Spokane River dischargers' response to comments on UAA (October 31, 2003).

8. Email: Bob Cusimano to Ecology staff, re: UAA Meeting (March 21, 2004).

9. Email: Darren Brandt, Idaho Department of Environmental Quality, to Ken Merrill, Ecology, re: Draft UAA (June 9, 2004).

10. Petition for Adoption, Amendment, or Repeal of a State Administrative Rule (Petition for Change in Standards re: UAA) (December 27, 2004).

11. Email: Dave Ragsdale to James Bellaty and Ecology staff, re: Idaho Chamber of Commerce asking Idaho Gov. to contact Locke about Spokane TMDL (January 5, 2005).

12. Sierra Club letter to Dave Peeler, Ecology re: Spokane UAA Public Participation Process (January 10, 2005).

13. Email: Dave Ragsdale, EPA, to Ken Merrill, Ecology, re: Spokane River Strategy (February 3, 2005).

14. Email: Dave Ragsdale, EPA, to Mike Peterson, the Lands Council, and others re: UAA Process (February 23, 2005).

15. Dischargers Letter to Ecology re: Petition (February 22, 2005).

16. Sierra Club Letter To Gov. Gregoire re: Spokane River Dissolved Oxygen (February 14, 2005).

17. Sierra Club Letter to Dave Peeler, Ecology, Thomas Eaton, EPA re: Proposal of Spokane River Dischargers (February 17, 2005).

18. Sierra Club Letter to Dave Peeler, Ecology re: Final Proposal of Spokane River Dischargers (February 23, 2005).

19. Ecology Letter to Dischargers re: Withdrawal of Petition/UAA (February 23, 2005).

20. Sierra Club Letter to Dave Peeler re: Spokane River UAA Public Participation Process (January 23, 2005).

21. Email: Dave Ragsdale to Ken Merrill re: Spokane River TMDL strategy (February 3, 2005).

22. Email: Dave Ragsdale to Ken Merrill re: Spokane TMDL counter proposal 2 (June 2, 2004).

23. Ecology correspondence regarding UAA and attendant problems (January 2003 – August 2004).

24. Email: Ken Merrill to Sid Frederickson re: Phosphorus Attenuation Model (December 14, 2000).

Appendix E: Managed Implementation Plans/Foundational Concepts

1. Ecology Spokane River Managed Implementation Plan (Version 2) at Spokane TMDL Collaboration website, Resources at http://client-ross.com/spokane-river/resources.htm. Attached are pages 9 – 17 of the MIP Outline.

2. Sierra Club's Comments on MIP (March 7, 2006).

3. Spokane River TMDL Oversight Committee, Draft 3/6/07

4. Sierra Club Letter to Ecology and EPA re: Spokane River Dissolved Oxygen TMDL (April 5, 2006).

5. Sierra Club Letter to Dave Peeler, Ecology re: Spokane River MIP Implementation (January 17, 2007).

6. Sierra Club Letter to Dave Peeler re: Spokane River MIP Implementation (January 23, 2007).

7. Email: Mike Sharar to Dave Peeler: re Talking with John Spencer, Dischargers' consultant in TMDL Collaboration (June 23, 2006).

8. Email: Dave Peeler to John Spencer, CH2MHILL re: Spokane TMDL Implementation Plan (March 1, 2005).

9. Dischargers' Proposed Scenario with Comments by Ken Merrill (November 2005).

10. Email: Merrill, Ecology, to Ragsdale, EPA re: Comments on MIP (February 1, 2006).

Appendix F: Spokane County Proposed Wastewater Treatment Plant

1. Ecology letters re: Draft Final County of Spokane's Wastewater Facilities Plan (February 8, 2007, March 14, 2007).

2. Ecology letter to Spokane County re: SRF Loan Offer (August 2, 2004).

3. Ecology letter to Rachael Osborn (Sierra Club representative) re: status of Spokane County Plant (August 18, 2004).

4. USEPA letter to Ecology re: Discharges to Spokane River (June 16, 2004.

5. Email: Ecology staff re: HDR Septic Tank elimination memo (may 26, 2007).

6. Email: Sierra Club to Ron Lavigne, AAG re: Spokane County as new discharger (March 10, 2006).

Appendix G: Miscellaneous

1. Spokane River Flow Charts.

2. Email from Todd Mielke, Spokane County Commissioner, to Dave Peeler, Ecology re: DOE Negotiations (June 26, 2006).

3. *Carlotta Copper v. U.S.E.P.A.*, No. 05-70785 (9th Cir. 2007).

4. EPA Region 10, Interim Reasonable Assurance Policy (1999); EPA emails discussing the same (August 2007).

5. Email: Bob Cusimano to David Knight re: NPS Sub Group Questions (July 8, 2005).

6. Email: Bob Cusimano to Will Kendra, Karol Erickson re NPS package (September 16, 2005).

7. Email: Bob Cusimano to Dave Ragsdale re: Phosphorus in CDA Basin (April 15, 2005).

8. Emails discussing proposed NPS trading and other concerns with the TMDL Collaboration NPS Work Group data.

9. Email: Ken Merrill to Jay Manning re: Phosphorus in CDA Basin (April 20, 2005).

10. Email: Ecology staff exchanges re: 2004 proposed modifications to Idaho permits (March 9, 2004).

11. Email: Exchange between EPA headquarters and EPA staff re: Spokane River Briefing Points (April 26, 2006).

12. Email: Ecology staff re: Arlington expansion (June 11, 2006).

13. Email: Ecology staff, dischargers re: urgent question (June 29, 2006).

14. Estimate of Effective Summer Phosphorus Load to Lake Spokane (2003).

15. Email: Ken Merrill to Ecology staff re: Spokane Watershed (April 30, 2004).

16. Email: Dave Ragsdale to Tom Eaton re: Potential proposal from Spokane dischargers (May 6, 2004).

17. Email: Ecology exchanges re: state of the art phosphorus removal technologies.

18. Email/correspondence re: Collaboration Work Group product (June 3, 2005).

19. Email: Cusimano to Ecology staff re: Spokane FAQS (August 23, 2004).

20. Email: Cusimano to Ecology staff re: Load Allocations for Spokane River and Lake Spokane (2004).

21. Email: Merrill to Ecology re: Cope's presentation materials (November 7, 2005).

22. Email: Merrill to Sid Fredrickson re: Phosphorus Attenuation Model (December 14, 2004).

Appendix H: 2007 Draft TMDL Revisions

1. Email: Drea Traeumer to Ecology staff re: Request for EPA model runs (June 7, 2007).

2. Letter to the editor, Spokesman Review, Drea Traeumer (Sept. 27, 2007); Scientist's departure taints river cleanup plan, James Hagengruber, Spokesman Review (Sept.9, 2007); State Line, Dirty Water, The Pacific Northwest Inlander ONLINE, Kevin Taylor (Nov. 2, 2007).

3. Email: Drea Traeumer to Bob Cusimano, et all re: Final EPA ID model (September 7, 2006).

4. Email: Drea Traeumer to Ecology re: Potential for step-down approach for shoulder months (September 6, 2006).

5. Email: Drea Treaumer to Karol Erickson, Ecology modeling team re: Spokane River final modeling runs (September 6, 2007).

6. Email: Drea Treaumer to Karol Erickson re: Calibration questions (May 22, 2007).

7. Email: Ken Merrill to Dave Ragsdale re: ID Permits Modeling Results, Spokane R (April 17, 2006).

8. Email: Bob Cusimano to Ken Merrill re: No_Point_Idaho model scenario (April 25, 2003).

9. Email: Between Ken Merrill, David Knight, Karol Erickson, Bob Cusimano, et al. re: Cope's presentation materials (November 7, 2005).

10. Email: Mark Hicks to Dave Peeler, Melissa Guildersleeve, et al re: EPA decisions on dissolved oxygen (September 1, 2005).

11. Email: Drea Traeumer to David Knight re: Documentation of SR DO TMDL issue (August 9, 2007).

12. Email: Exchange between Ecology staff re: Spokane Model update (July, August 2006).

Appendix I: Waste Load Allocations/Permitting Issues

1. Guidance on Water Quality Based Effluent Limits Set Below Analytical Detection/Quantitation Limits (USEPA, 2005).

2. Inland Empire Paper Co. Permit File, Correspondence.

3. Email: Dave Ragsdale to Drea Traeumer, re: WQBELs for Ecology's Spokane River Dischargers (March 14, 2007).

4. Email: Mike Sharar to Dave Peeler, et al. re: WLAs and NPS, Fundamental Concepts v15d.

5. Email: Ken Merrill to TMDL Collaboration Facilitator re: revised figures since draft 2004 TMDL went to public notice (June 21, 2005).

6. Email: Dave Ragsdale to TMDL Collaboration Technology Workgroup (August 3, 2005).

7. Email: Ronald Lavigne to Carl Nuechterlein, Ken Merrill re: Draft Responses to IEP (March 20, 2001).

8. Email: Exchanges between Ecology staff and Spokane County re: TMDL Flows (June 5, 2006).

Appendix N: Proposed Idaho NPDES Permits and 401 Certification and Comments/Correspondence

1. Sierra Club Comments on Proposed Reissuance of Idaho NPDES Permits # ID-002285-3, ID-002585-2, ID_002659-0 with exhibits.

2. Sierra Club Comments on Proposed 401 Certification for Idaho NPDES Permits # ID-002285-3, ID-002585-2, ID_002659-0 with exhibits.

3. Sierra Club letter to Jay Manning re: Request for Action to Protect Washington Interests (April 26, 2007).

4. Ecology Response to Sierra Club letter requesting Action to Protect Washington Interests (June 22, 2007).

5. Sierra Club Letter to EPA re: Spokane River NPDES Permits/TMDL (September 11, 2007.

Em Consulting
2930 W. Ontario St · Sandpoint, ID · 83864 837 Walker Ave · Reno, NV · 89509

November 11, 2007

Mr. Dave Knight
WA State Dept. of Ecology
Water Quality Program
4601 N. Monroe St.
Spokane, WA 99205

Re: Comments on Draft Spokane River and Lake Spokane TMDL

Dear Mr. Knight:

Please accept the following comments on the Draft Spokane River and Lake Spokane TMDL. As the former TMDL Lead for this project, comments presented are based on in-depth technical knowledge and understanding of this TMDL.

This does not appear to be a reasonable or approvable TMDL Water Quality Improvement Plan because the "natural" water quality standard is not applied and the reasonable assurance requirement is not been met. Given that this TMDL is necessary because an earlier clean up plan implemented by Ecology since 1989 has proved to be inadequate (due to a non-conservative approach), it is even more important that this second attempt almost 20-years later address the problem head-on to ensure the water quality standard is finally attained. To address a problem head-on, however, requires that the situation be perceived for what it is. Unfortunately, this TMDL (v.2007) has undergone significant changes since its original release (v.2004), to be discussed below, that have served to distort the reality of the issue being assessed for purposes that will also be discussed. Without a realistic assessment, it does not seem possible that this Draft TMDL provides reasonable assurance, as required for approval, that it attain its goal to meet the water quality standard.

The policy decision by Ecology to incorporate ID Dischargers at their permit limits into the "natural" condition of the river is not adequately justified and appears to serve a win-win situation for the ID and WA Dischargers at the expense of a reasonable TMDL. The ID permit limits are based on EPA modeling that was performed to determine the permit loadings that *just cause* the allowable .20 mg/L DO degradation from the "natural" condition in Lake Spokane. However, this loading from ID that just causes the allowable degradation has now been incorporated into the "natural" condition and in effect removed from consideration, which has three significant effects.

First, it allows the WA Dischargers to also take the allowable .20 mg/L DO degradation below the "natural" condition now that ID discharges have been incorporated into the "natural" condition. Second, it lowers the water quality goal of the TMDL (to attain the "natural" condition) because the "natural" condition is now degraded by the incorporation of the ID Discharger loadings. Third, and most significantly, the increased loading to the "natural" condition completely shifts the results of the TMDL analyses in favor of the WA Dischargers, as presented in Attachment 1. Specifically, the results for the percentage NPS Load Reductions necessary to create capacity in the river for the WA Dischargers are now shifted downwards by 31 – 85 %, with an average downward shift of 60%. The significance of this shift is that it creates opportunities, albeit not

based on the reality of the situation, for WA Dischargers to create capacity in the river that were not previously present with the Draft TMDL v.2004. The reality of the situation that is not being presented or addressed is that ID Dischargers are taking the allowable 0.20 degradation, this leaves no assimilative capacity for the WA dischargers as a result, and the necessary NPS Reductions are actually higher.

As you will recognize, Attachment 1 is a summary table comparing the results of TMDL v.2004 to v.2007 that I developed while serving as the TMDL Lead for this project, and have recently updated with the most current results from PSU that were used to develop this Draft TMDL . Attachment 1 is being presented solely for comparative purposes and to show the effects of Ecology's policy decision to incorporate the contributions of the ID dischargers into the "natural" condition. This can be seen in the changes to both the "natural" condition and resulting NPS reductions. There are also changes to the "current" conditions, but these are the effects of updating the model with corrected flows for Hangman Creek and concentrations for the Little Spokane River and are not an issue.

While the above reveal my opinion that this Draft TMDL essentially is not reasonable because it fails to realistically assess the problem, it follows that my comments and technical analyses provided in the form of tables should not be construed as my condoning the results of the Draft TMDL in its current form.

As I have recommended in the past, the technical approach for the Draft TMDL v.2004 should not be abandoned. It was a realistic approach that provided reasonable results because it applied the "natural" water quality standard throughout its analysis, specifically through representation of more natural conditions at stateline that did not include the ID Dischargers. For this reason, the Draft TMDL v.2004 assessed the situation as it is, which is critical to the development of a clean up plan that provides reasonable assurance it will attain the water quality standard. By deviating from the Draft TMDL v.2004 specifically by incorporating the ID Dischargers at their permit limits into the "natural" condition, the new results have significantly shifted in a way that presents opportunities for the WA Dischargers that were not available before, as evidenced by the fact that it required a two-year collaborative effort to develop an alternative to the Draft TMDL v.2004 that the Dischargers could agree on.

While I'm fully aware that the train has left the station and this TMDL will be approved, it is my sincere hope that my efforts will somehow affect the changes that are needed now to develop a reasonable TMDL that approaches the problem realistically and provides reasonable assurance it can attain the water quality standard. The unfortunate alternatives are an appeal process or a second attempt by Ecology that is slated to take yet another 20 years and will likely also prove to be inadequate.

Thank you for your consideration.

Respectfully,

s/DreaTraeumer

Drea Traeumer, Hydrologist
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Please incorporate the following into the Executive Summary

Modify Table ES1 with the revisions presented below, which are based on the most current PSU information and include corrections and additions. If modifications will not be presented as suggested, please discuss why.

Revised Table ES1 with underlined corrections and additions for Apr - Oct averages and % NPS Reductions

Tributary and Season	Current Condition (lbs/day)	Load Allocation (lbs/day)	Allocation Concentration (mg/L)	Reduction[a] (%)	NPS Reduction[b] (%)
Hangman Creek					
Apr - May Avg	82.6	50.6	0.086	39	50.3
Jun - Oct Avg	4.3	3.3	0.0529	22	31.8
Apr - Oct Avg[c]	26.6	16.8	0.0624	37	48.4
Coulee Creek					
Apr - May Avg	14	8.5	0.086	40	50.6
Jun - Oct Avg	1.1	0.8	0.0529	20	29.6
Apr - Oct Avg	4.8	3	0.0624	36	47.8
Little Spokane River					
Apr - May Avg	131.5	114.6	0.0429	13	23.3
Jun - Oct Avg	58.2	55.8	0.027	4	47.8
Apr - Oct Avg	79.1	72.6		8	18

[a] % Reduction NPS needed to meet Load Allocation is not evident, as Current Condition used to calculate % Reduction is Natural + NPS

[b] % Reduction NPS needed to meet Load Allocation had been added to make evident

[c] Apr - Oct averages have been added to provide information for critical period (modified in TMDL from original Jun - Oct to Apr - Oct)

Please incorporate the following into the TMDL Analysis section

- Subsection "Additional Analyses Since 2004 Draft TMDL" (p. 15):

  Include more detail in this section about how Natural Background conditions were estimated for both the original and current Draft TMDLs (e.g. v.2004 and v.2007). Specifically, include discussion of how measured water quality data from outlet of Lake Coeur d'Alene were used in the original PSU model to estimate the "natural" condition of the river, and if/how these data were used in the current EPA model estimations.

- Subsection "Natural Background Conditions" (p. 16)

  "Natural" conditions at stateline were originally represented in the modeling for the Draft TMDL v. 2004 using measured water quality data from the outlet of Lake Coeur d'Alene, located upstream of the ID Dischargers. For this TMDL, the "natural" condition been modified to include the ID Dischargers at their permit limits. Please justify why Ecology elected to make this change given the availability of measured water quality data that were reasonable and appropriate for use in estimating the "natural" condition of the river as it crosses the stateline.

  Please discuss in more detail how the ID Discharger permit limits were determined. Specifically, discuss the EPA modeling methodology that was used to determine the ID permit limits, which relied on iterative simulations to determine the amount of loading that was found to cause the allowable 0.20 mg/L DO degradation in Long Lake. Perhaps clarify by way of comment that this iterative process is essentially the same method used by Ecology to determine Nonpoint Source Load Allocations for this TMDL.

- Subsection "Results of 2007 Analyses" (p. 17)

  Please provide more detail in this section for the % NPS Reductions that are needed. Specifically, include the range of % NPS Reductions needed (e.g. 8 – 37%); and explain that the 16% value reported in this section is the average value for Hangman, Coulee, and Little Spokane tributaries. Please also provide the ranges and averages for the remaining periods of analyses (e.g. Apr – May and Jun – Oct), which currently are only presented in Appendix C of the Draft TMDL.

  Please have both sets of Tables 2 - 4 in Appendix C corrected where average values are erroneously presented as totals.

Please incorporate the following into the Results and Discussion section

- Loading Capacity subsection (p. 20)

This section currently does not present the Loading Capacity in a clear fashion, as was done for the original TMDL v.2004. Please add the following table for ease of comparison and transparency, which has been updated using the most current information from PSU.

Lake Spokane Total Loading Capacity by Month

(Total Loading Capacity = 9Mi +LSR based on model estimates)

	avg TP	avg CBOD	avg NH3	TP lbs/day	CBOD lbs/day	NH3 lbs/day
APR	0.011	1.004	0.019	374	33266	645
MAY	0.008	0.828	0.026	629	61329	1892
JUN	0.009	0.752	0.027	237	19866	722
JUL	0.008	0.437	0.021	106	5440	260
AUG	0.010	0.408	0.018	79	3341	150
SEP	0.010	0.525	0.019	89	4593	163
OCT	0.012	0.774	0.022	156	10102	287
Apr-May avg	0.009	0.882	0.024	501.33	47297.21	1268.24
Jun-Oct avg	0.010	0.630	0.023	133.57	8668.61	316.60
Apr - Oct avg	0.009	0.783	0.023	238.64	19705.35	588.50

Allowable Nonpoint Source Pollution Loading (9Mi + LSR)

	TP lbs/day	CBOD lbs/day	NH3 lbs/day
APR	104	6579	-12
MAY	81	5462	11
JUN	45	2984	6
JUL	15	466	1
AUG	16	675	1
SEP	16	689	1
OCT	19	698	1
Apr-May avg	92.34	6020.74	-0.56
Jun-Oct avg	22.27	1102.51	1.66
Apr - Oct avg	42.29	2507.72	1.03

% Nonpoint source reduction needed to get from CURRENT to TMDL

	TP	CBOD	NH3
APR	39%	42%	18%
MAY	27%	42%	1%
JUN	42%	48%	-15%
JUL	60%	63%	6%
AUG	64%	64%	32%
SEP	67%	67%	40%
OCT	62%	57%	35%
Apr-May avg	32%	42%	6%
Jun-Oct avg	57%	56%	14%
Apr - Oct avg	45%	48%	9%

CURRENT 2001 CONDITIONS (based on model estimates)

	avg Flow	(9Mi+LSR) avg TP	avg CBOD	avg NH3	TP lbs/day	CBOD lbs/day	NH3 lbs/day
APR	6149.93	0.018	1.725	0.024	611	57187	788
MAY	13748.05	0.012	1.438	0.026	861	106549	1908
JUN	4900.14	0.016	1.437	0.024	412	37941	626
JUL	2308.90	0.021	1.180	0.022	265	14682	276
AUG	1519.29	0.027	1.137	0.027	218	9309	221
SEP	1622.94	0.031	1.597	0.031	267	13970	272
OCT	2421.54	0.031	1.815	0.034	408	23693	445
Apr-May avg	9948.99	0.015	1.582	0.025	735.70	81868	1348
Jun-Oct avg	2554.56	0.025	1.433	0.028	314.17	19919	368
Apr - Oct avg	4667.26	0.022	1.475	0.027	434.61	37619	648

"Natural" Conditions = NOSOURCE (9Mi + LSR)

	avg TP	avg CBOD	avg NH3	TP lbs/day	CBOD lbs/day	NH3 lbs/day
APR	0.008	0.805	0.020	270	26686	656
MAY	0.007	0.754	0.025	548	55867	1881
JUN	0.007	0.639	0.027	193	16883	716
JUL	0.007	0.400	0.021	91	4974	260
AUG	0.008	0.326	0.018	63	2666	150
SEP	0.008	0.446	0.019	73	3904	163
OCT	0.010	0.720	0.022	137	9404	287
Apr-May avg	0.008	0.78	0.023	409	41276	1269
Jun-Oct avg	0.008	0.51	0.021	111	7566	315
Apr - Oct avg	0.008	0.58	0.022	196	17198	587

Lake Spokane Total Loading Capacity by month with comparison to estimates of "Current" and "Natural" Condition loadings. Total Lake load was derived as the sum of "Natural" conditions and allowable nonpoint source (NPS) pollution loads for Spokane River near 9 Mile Dam (9Mi) combined with Little Spokane River near the mouth (LSR). Revised Nov. 2007 by Drea Traeumer.

- Subsection Load and Wasteload Allocations (p. 21)

  Modify Paragraph 1, sentence 2 in Wasteload Allocations subsections (p. 23) as underlined below to clearly show that overcontrol beyond the NPS Load Allocations is necessary to create assimilative capacity for Dischargers when effluent is greater than10 µg/L:

  > *"Therefore, without reducing the nonpoint source loads <u>beyond their Load Allocations</u>, no assimilative capacity is left for point source pollutant loading that would increase river concentrations of pollutants during the critical period (April 1 – October 31)."*

Modify Table 4 with the revisions presented below, which are based on the most current PSU information and include corrections and additions. If modifications will not be presented as suggested, please discuss why.

Revised Table 4 with underlined corrections and addition of Apr - Oct averages and % NPS Reductions

Tributary and Season	Current Condition (lbs/day)	Load Allocation (lbs/day)	Allocation Concentration (mg/L)	Reduction[a] (%)	NPS Reduction[b] (%)
Hangman Creek					
Apr - May Avg	82.6	50.6	<u>0.086</u>	39	50.3
Jun - Oct Avg	4.3	3.3	<u>0.0529</u>	<u>22</u>	31.8
Apr - Oct Avg[c]	26.6	16.8	0.0624	37	48.4
Coulee Creek					
Apr - May Avg	14	8.5	<u>0.086</u>	40	50.6
Jun - Oct Avg	1.1	0.8	<u>0.0529</u>	<u>20</u>	29.6
Apr - Oct Avg	4.8	3	0.0624	36	47.8
Little Spokane River					
Apr - May Avg	131.5	114.6	<u>0.0429</u>	13	23.3
Jun - Oct Avg	58.2	55.8	0.027	4	47.8
Apr - Oct Avg	79.1	72.6		8	18

[a] % Reduction NPS needed to meet Load Allocation is not evident, as Current Condition used to calculate % Reduction is Natural + NPS

[b] % Reduction NPS needed to meet Load Allocation had been added to make evident

[c] Apr - Oct averages have been added to provide information for critical period (modified in TMDL from original Jun - Oct to Apr - Oct)

Please incorporate the following into the Managed Implementation Plan section

The % NPS Reduction that must first be attained and then overcontrolled in order to create assimilative capacity for the Dischargers when effluent is greater than 10 µg/L is not explicit in this section. Please provide detail on the % Reduction that must be attained and overcontrolled, and where this reduction will be required. For example, is it the 16% presented in the TMDL Analysis subsection "Results of 2007 Analyses" (p. 17), which is an average value for the tributaries for Apr – Oct? Or is it the % NPS Reduction value specific to each tributary that must be attained and overcontrolled? It would seem that the % NPS Reductions should be based on individual tributary values, and not average values.

Explain how the additional 26.6 lbs/day phosphorus reduction (needed with Dischargers at 50 µg/L to meet the equivalent TMDL target of 10 µg/L in ten years) was determined, as stated in paragraph 3, p. 25 of the MIP section.

Reconcile the above statement with the simulation presented in Appendix C, PSU Tech Memo dated May 2007, which shows that with WA Dischargers at their interim limits of 50 µg/L and the tributaries set to "natural background" conditions (i.e. 100% NPS Reductions or zero NPS loading), the standard of 0.20 mg/L DO degradation is exceeded on several occasions.

Incorporate the following excerpt from The Foundational Concepts into the Reasonable Assurance subsection (p. 35):

> *"The MIP provides reasonable assurance that the Water Quality Standards can be achieved during the first ten years of the MIP effort..."*

Given the PSU simulation discussed above, the reasonable assurance presented in the Foundational Concepts and excerpted above does not appear to be supported. Please discuss and present evidence that will show with reasonable assurance that the water quality standard will be attained in the first ten years of the MIP. If is proposed that the Dischargers might possibly treat effluent to below the interim limit of 50 µg/L, please present simulations that will provide reasonable assurance by demonstrating the % NPS Reduction associated with possibly lower effluent concentrations that will meet the water quality standard (i.e. with treatment at 30µg/L, X % NPS Reduction will be needed to meet the water quality standard).

Incorporate into the Reasonable Assurances section examples and documentation of successful % NPS Reductions comparable to those needed for this TMDL, which are on average 34%, that have been attained elsewhere. These are needed to provide assurance that the % NPS Reductions that must be overcontrolled to create assimilative capacity for the Dischargers are, in fact, reasonable.

Spokane County's Septic Tank Elimination System is listed in the Reasonable Assurances subsection. Please determine an instream (as opposed to groundwater) Load Allocation for septic tanks, as this information is necessary to determine by what amount the Dischargers must overcontrol septic tank loadings to the river in order to create assimilative capacity when effluent is greater than 10 µg/L.

Please explain the cause and discuss the significance of the % changes between TMDLs v.2004 and v.2007 for the "natural" condition and % NPS Reductions that are presented in Appendix 1.

Attachment 1: Comparison of Results for Draft TMDLs v. 2004 and v. 2007

Apr - May	Current Condition (v. 2004)	Current Condition (v. 2007)	% Change Current	Natural Condition (v. 2004)	Natural Condition (v. 2007)	% Change Natural	% Reduction (v.2004)	% Reduction (v.2007)	% Change Reduction	% Reduction NPS (v.2004)	% Reduction NPS (v.2007)	% Change NPS Reduction
Stateline	386.1	360.8	-7	297.1	337.9	14	16.5	6.3	-62	71.5	99.9	40
Hangman Creek	56.7	82.6	46	12.2	19.0	55	75.6	38.7	-49	96.3	50.3	-48
Coulee Creek	14.8	14.0	-5	3.2	3.2	0	75.6	39.1	-48	96.4	50.6	-47
Little Spokane River	129.8	131.5	1	80.6	59.3	-26	31.7	12.8	-60	83.6	23.3	-72

Jun - Oct	Current Condition (v. 2004)	Current Condition (v. 2007)	% Change Current	Natural Condition (v. 2004)	Natural Condition (v. 2007)	% Change Natural	% Reduction (v.2004)	% Reduction (v.2007)	% Change Reduction	% Reduction NPS (v.2004)	% Reduction NPS (v.2007)	% Change NPS Reduction
Stateline	67.1	65.8	-2	48.0	59.4	24	21.8	9.8	-55	76.5	100.0	31
Hangman Creek	4.3	4.3	-2	1.3	1.3	-2	65.6	22.1	-66	94.0	31.8	-66
Coulee Creek	1.1	1.1	-7	0.3	0.3	0	65.5	20.0	-69	93.7	29.6	-68
Little Spokane River	57.9	58.2	0	38.9	36.0	-7	24.2	4.2	-83	73.6	11.1	-85

Apr - Oct	Current Condition (v. 2004)	Current Condition (v. 2007)	% Change Current	Natural Condition (v. 2004)	Natural Condition (v. 2007)	% Change Natural	% Reduction (v.2004)	% Reduction (v.2007)	% Change Reduction	% Reduction NPS (v.2004)	% Reduction NPS (v.2007)	% Change NPS Reduction
Stateline	158.2	150.1	-5	119.1	139.0	17	18.1	7.4	-59	73.2	100.0	37
Hangman Creek	19.3	26.6	38	4.4	6.4	44	73.9	36.8	-50	96.0	48.4	-50
Coulee Creek	5.0	4.8	-6	1.2	1.2	0	74.0	36.1	-51	96.1	47.8	-50
Little Spokane River	78.5	79.1	1	50.8	42.7	-16	27.8	8.3	-70	78.7	18.0	-77

August 2007 Spokane River Model Simulations

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Prepared for Washington Department of Ecology

August 2007

Spokane River Total Maximum Daily Load (TMDL) scenarios were simulated using the CE-QUAL-W2 model developed for the Washington Department of Ecology by Portland State University (Berger et al., 2003).

The scenarios were run with varying dissolved phosphorus inputs for Washington tributaries to determine the amount of additional phosphorus that would reduce Long Lake dissolved oxygen by 0.2 mg/l with respect to background conditions. Phosphorus rather than ammonia was varied because it has more of a significant impact on algal production. Background conditions are defined as the water quality without human caused pollution sources. The adjusted Washington tributaries were Hangman Creek, Coulee Creek, and the Little Spokane River. Input files at the upstream boundary condition, located at the Washington-Idaho state line, were provided by EPA and used for all the simulations except for the calibration simulation. These input files were the output of the upstream model that was developed for the Idaho section of the Spokane River. The Idaho simulation included point source loads corresponding to the proposed Idaho discharge limits, and this simulation is referred to as the "LIMIT" scenario.

The Washington scenarios were listed in Table 1. The scenarios had Washington point source nutrient and CBOD loadings set to groundwater conditions. Scenario A had tributary inputs at background levels. Scenario B had CBOD concentrations at 2001 levels and dissolved phosphorus at background levels. For Scenario C the CBOD concentrations remained at 2001 levels, but dissolved phosphorus was increased 2.5 times from background levels. Scenario D was the 2001 calibration run.

Table 1. Descriptions of model scenarios and their tributary loads.

Scenario	Description of tributary loads	Dissolved P	CBOD	Upstream Boundary Condition
A	Background inputs	Background	Background	EPA "limit" run for Idaho
B	CBOD at 2001 levels, dissolved P at background levels	Background	2001 levels	EPA "limit" run for Idaho
C	CBOD at 2001 levels, dissolved P at 2.5 times background levels	2.5X background concentrations	2001 levels	EPA "limit" run for Idaho
D	2001 Calibration Run	2001 levels	2001 levels	Data

For each scenario, the model cell weighted average dissolved oxygen concentration for the model segment adjacent to the Lake Spokane dam (segment 188) was calculated, selecting only cells that had values below 8.0 mg/l. At a time step of 0.02 days, the algorithm would scan the model cells adjacent to Lake Spokane dam for concentrations less than 8.0 mg/l. For each time step, the concentrations of cells satisfying the "less than 8.0 mg/l concentration" criterion would be averaged. To permit comparisons between simulations having slightly different hydrodynamics, the model predictions were smoothed for each scenario by calculating the running average of the concentrations using a window of one-fifth of a day. The difference in the "smoothed" cell weighted

concentrations of the scenarios relative to the background conditions scenario were calculated and plotted in Figure 1. Increasing the dissolved phosphorus 2.5 times in tributaries reduces the cell weighted average of the dissolved oxygen concentrations at the dam by approximately 0.2 mg/l, compared to background conditions.

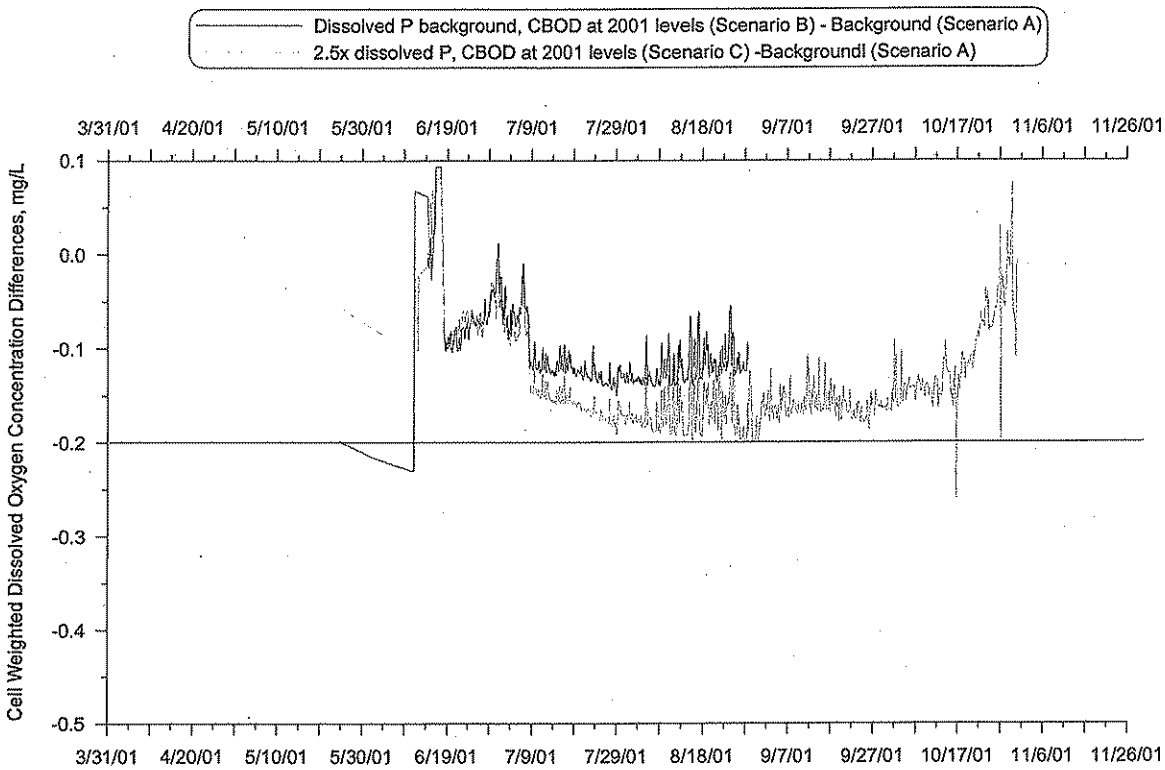

Figure 1. Plot of cell weighted dissolved oxygen differences for model segment adjacent to dam (segment 188) and considering only cell concentrations less than 8.0 mg/l. The linear nature of the plots prior to June 19 is due to lack of variation and the low number of model cells being used in the calculation. The dissolved oxygen differences were not plotted before May 20 because there were not any model cells predicting concentrations less than 8.0 mg/l. The dynamic fluctuation occurring after October 15th were caused by differences in the hydrodynamics in the model runs. The different nutrient loadings in the scenarios caused differing amounts algae growth, which slightly affected temperature predictions by changing the water transparency. The different temperature predictions affected the timing of turnover events during Fall, leading to the fluctuations in the predicted dissolved oxygen differences.

The April/May tributary phosphorus loadings for the current conditions scenario, the background conditions scenario, and 2.5X background P concentration in tributaries scenario were shown in Table 2. The June through October and the April through October tributary phosphorus loadings for these scenarios were shown in Table 3 and Table 4, respectively. For the May/April period, the 2.5X background P in tributaries scenario corresponds to a 24% reduction of phosphorus loadings from 2001 levels. The reduction in phosphorus loadings for the June through October period was 6% and for the April through October period was 16%.

Table 2. April/May phosphorus loadings of tributaries for current conditions (2001) scenario, background conditions scenario, and 2.5X background P concentration scenario. Loadings from the current conditions scenario have to be reduced 24% to be equivalent to the P loadings of the 2.5X background P concentration scenario.

Average pounds/day of TP				
	Current 2001 Scenario D	Background Scenario A	TMDL, or 2.5x P concentration Scenario C	Percent Reduction from 2001 levels
Hangman	82.58	18.96	50.61	39%
Coulee	14.02	3.20	8.54	39%
Little Spokane	131.47	59.30	114.62	13%
Total	228.07	81.46	173.77	24%

Table 3. June through October phosphorus loadings of tributaries for current conditions (2001) scenario, background conditions scenario, and 2.5X background P concentration scenario. Loadings from the current conditions scenario have to be reduced 6% to be equivalent to the P loadings of the 2.5X background P concentration scenario.

Average pounds/day of TP				
	Current 2001 Scenario D	Background Scenario A	TMDL, or 2.5x P concentration Scenario C	Percent Reduction from 2001 levels
Hangman	4.25	1.32	3.31	22%
Coulee	1.05	0.34	0.84	20%
Little Spokane	58.21	36.04	55.75	4%
Total	63.51	37.7	59.9	6%

Table 4. April through October phosphorus loadings of tributaries for current conditions (2001) scenario, background conditions scenario, and 2.5X background P concentration scenario. Loadings from the current conditions scenario have to be reduced 16% to be equivalent to the P loadings of the 2.5X background P concentration scenario.

Average pounds/day of TP				
	Current 2001 Scenario D	Background Scenario A	TMDL, or 2.5x P concentration Scenario C	Percent Reduction from 2001 levels
Hangman	26.63	6.36	16.82	37%
Coulee	4.76	1.16	3.04	36%
Little Spokane	79.14	42.69	72.57	8%
Total	110.53	50.21	92.43	16%

References:

Berger, C.J., R.L. Annear, S.A. Wells, and T. Cole, 2003. "Upper Spokane River Model: Model Calibration 2001." Technical Report EWR-01-03. Department of Civil Engineering, Portland State University, Portland, OR.

Merrill, K. and B. Cusimano (2004). " Total maximum daily load to restore and maintain dissolved oxygen in the Spokane River and Lake Spokane (Long Lake), DRAFT." Water Quality Program, Washington State Department of Ecology, Olympia, Washington.

Appendix A – Adjustment of Washington Model Calibration

The flow input file for Hangman Creek was updated from a file that used estimated flows to a file using data. The new flow file, which had greater flows, resulted in the need to update the model calibration. Changes to modeling coefficients are summarized in Table 5.

Table 5. Modeling coefficients adjusted.

Coefficient	Description	Change
SEDK	first order sediment decay rate	0.10 d^{-1} to 0.08 d^{-1}
LDOMDK	labile dissolved organic matter decay rate	0.10 d^{-1} to 0.08 d^{-1}
SOD	Zero order sediment oxygen demand (SOD)	Segments 130-153 (Nine Mile Rersevoir): 0.5 to 0.3 g O_2 m^{-2} d^{-1} Segments 154-162 (upstream Long Lake): 0.6 to 0.1 g O_2 m^{-2} d^{-1} Segments 163-177 (middle Long Lake): 0.6 to 0.3 g O_2 m^{-2} d^{-1}

The new model error statistics for dissolved oxygen predictions are listed in Table 6. Figure 2 through Figure 7 show model-data comparison of dissolved oxygen profiles in Long Lake.

Table 6. Dissolved oxygen profile error statistics, 2001

Site	n, # of data profile comparisons	DO model –data error statistics	
		AME, mg/L	RMS error, mg/L
LL0	2	1.04	1.26
LL1	2	1.52	1.67
LL2	2	1.17	1.38
LL3	2	0.69	0.86
LL4	2	1.10	1.29
LL5	2	1.11	1.24
Avg.		1.11	1.28

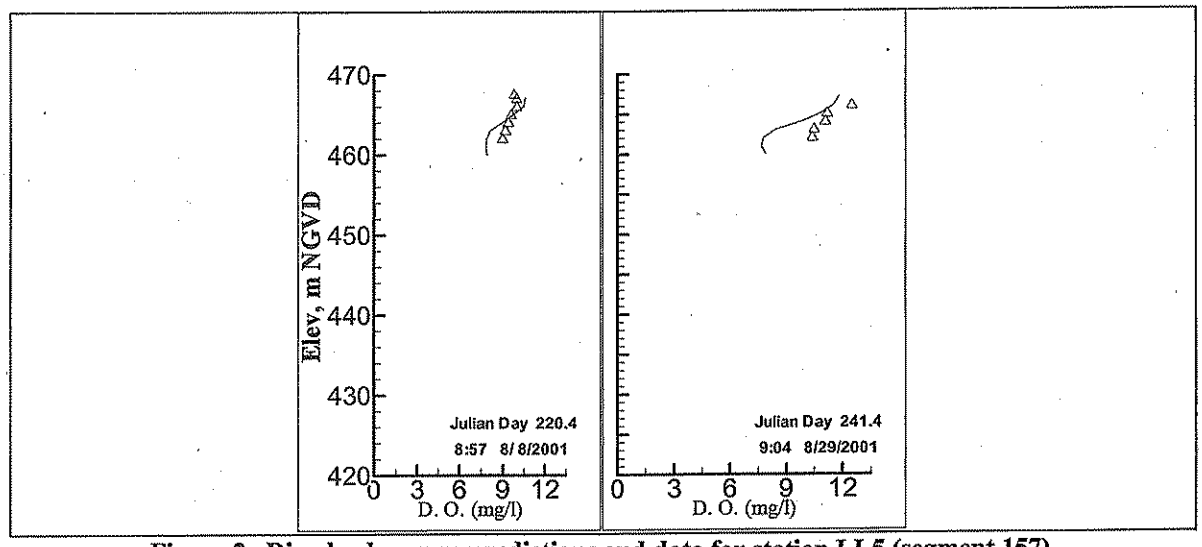

Figure 2. Dissolved oxygen predictions and data for station LL5 (segment 157).

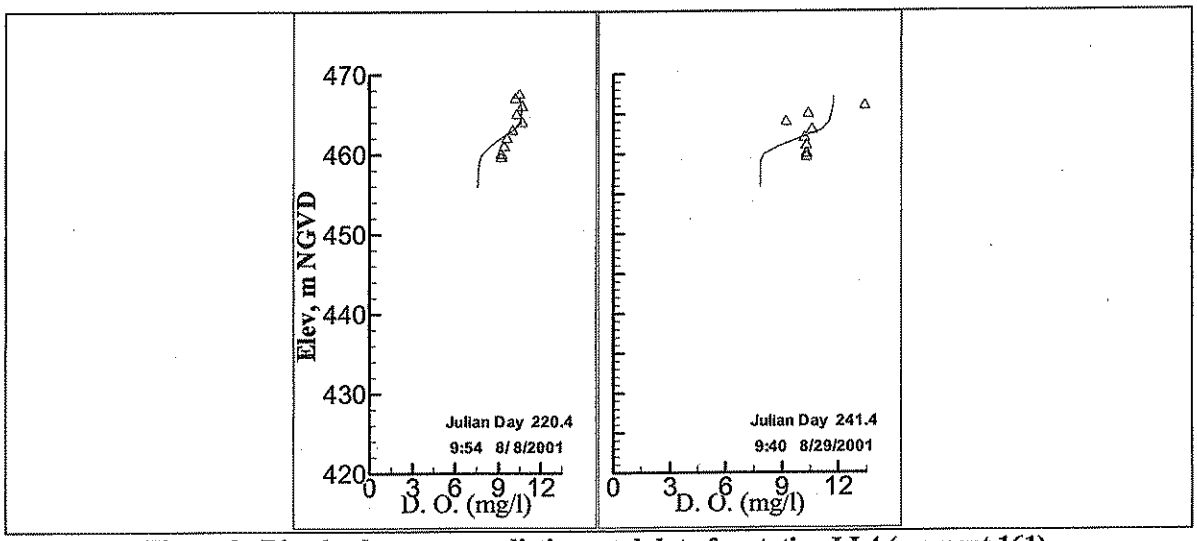

Figure 3. Dissolved oxygen predictions and data for station LL4 (segment 161).

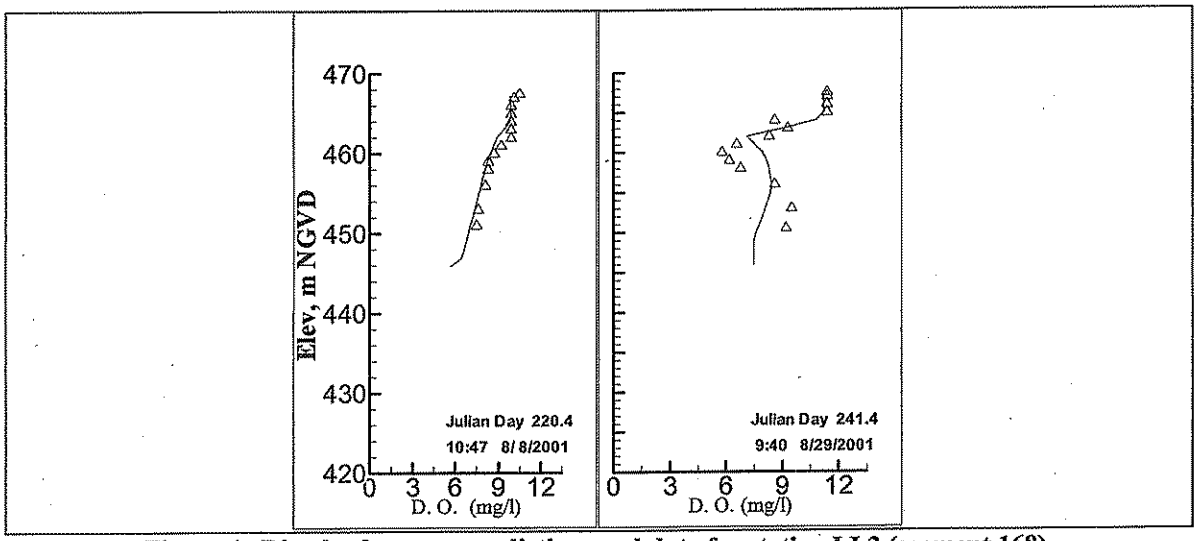

Figure 4. Dissolved oxygen predictions and data for station LL3 (segment 168).

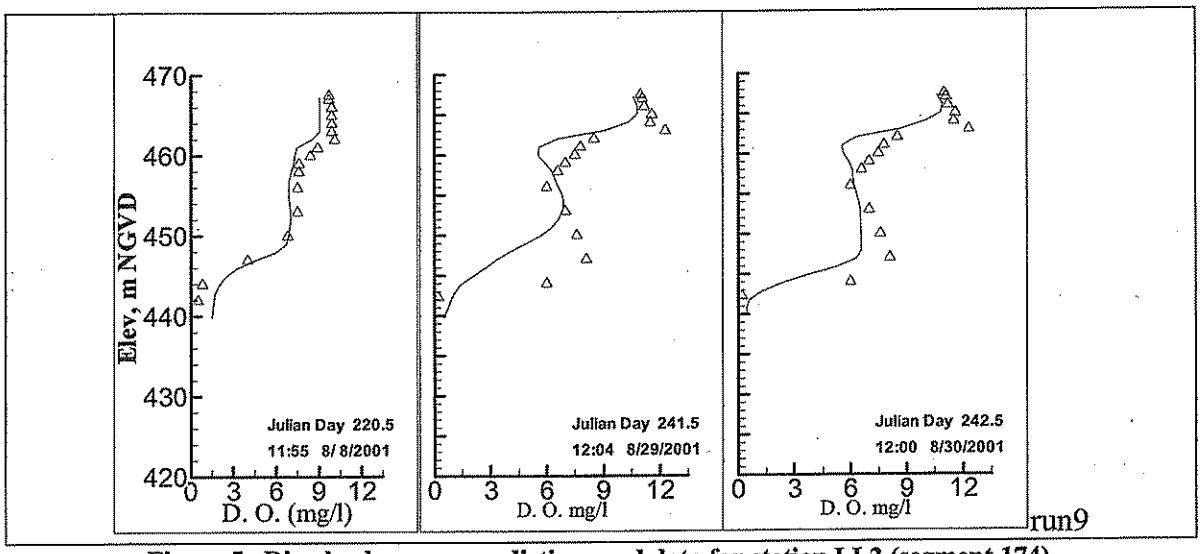

Figure 5. Dissolved oxygen predictions and data for station LL2 (segment 174).

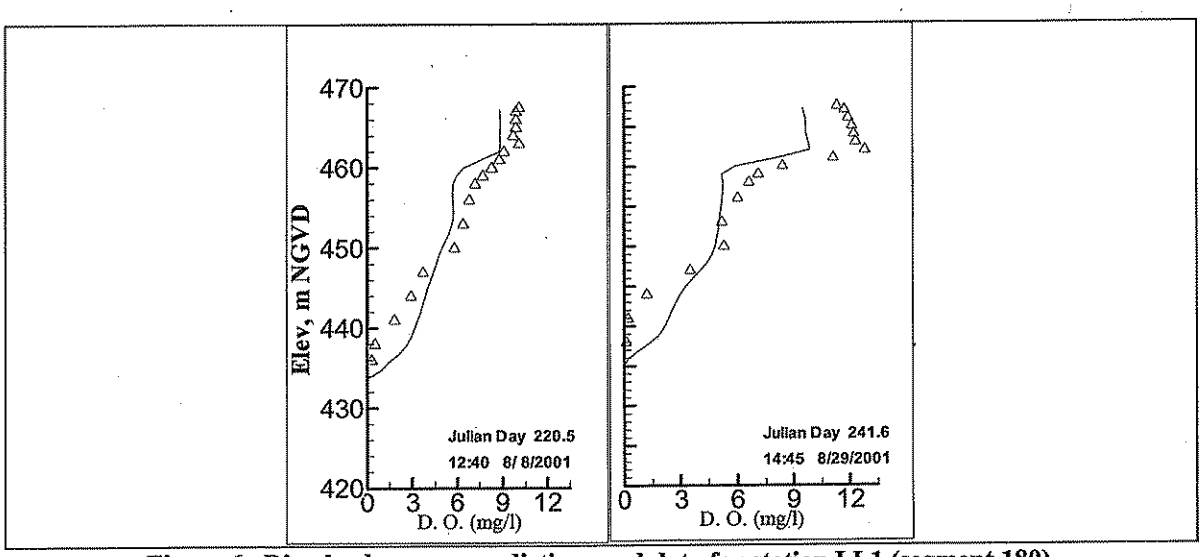

Figure 6. Dissolved oxygen predictions and data for station LL1 (segment 180).

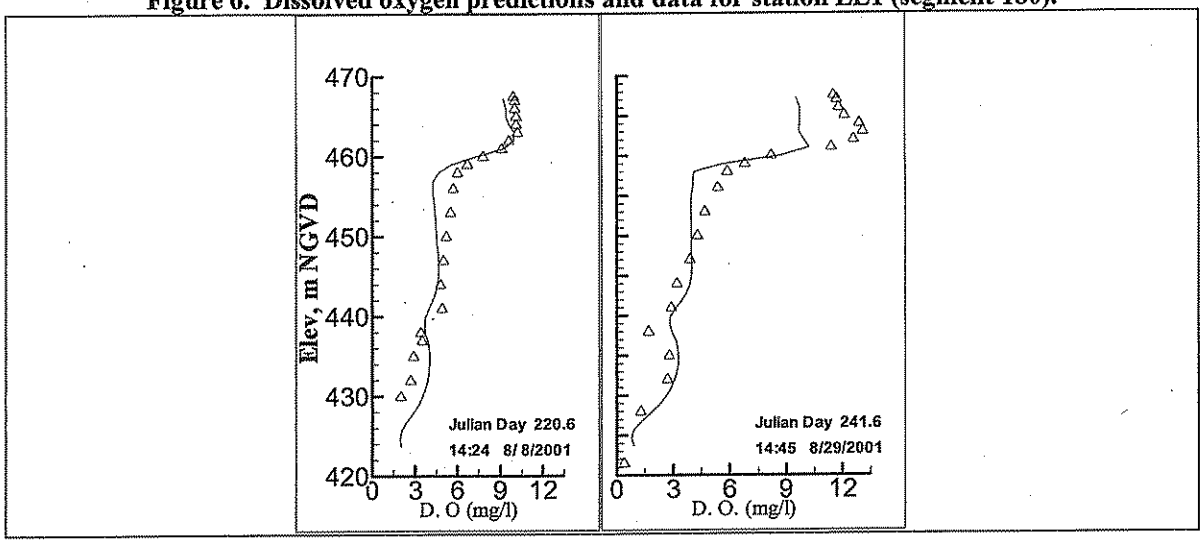

Figure 7. Dissolved oxygen predictions and data for station LL0 (segment 187).

Appendix B – Calculation of Concentrations and Loads

The monthly concentrations used in the TMDL worksheets calculated by PSU were determined by totaling the constituent mass flowing out of a tributary or passing a specific segment and dividing by the corresponding monthly total volume of water. Model input files (for the tributaries and state line) or output files (Nine mile Dam) were read at a arbitrary time interval of 0.05 days ($\Delta t = 0.05$) and the constituent concentration C was multiplied by the instantaneous flow rate Q_i to determine the total mass for that time interval. Thus the total mass M_i for time step i was calculated using $M_i = Q_i * C * \Delta t$

The monthly total mass M was then determined by

$$M = \sum_{i=1}^{n} M_i = \sum_{i=1}^{n} Q_i * C * \Delta t$$

where n was the total number of times steps in a month.

Likewise, the total water volume V was calculated with

$$V = \sum_{i=1}^{n} V_i = \sum_{i=1}^{n} Q_i * \Delta t$$

Using the monthly total mass and the total monthly water volume, the monthly average concentration was then calculated with

$$C = \frac{M}{V}$$

Appendix C – Linking Idaho and Washington Models

The phosphorus (P) stoichiometry (the ratio of P mass to total mass), nitrogen (N) stoichiometry, and carbon stoichiometry (C) of the organic matter compartments of the Idaho and Washington Spokane River models are different. For example, the Idaho model uses a P stoichiometry coefficient for organic matter of 0.001 and the Washington model has a value of 0.005. In CE-QUAL-W2 organic matter is divided into labile dissolved organic matter (LDOM), labile particulate organic matter (LPOM), refractory dissolved organic matter (RDOM), and refractory particulate organic matter (RPOM) compartments. Since the fraction of P, N, or C in organic matter differs between the 2 models, the organic matter concentrations predicted at the downstream end of the Idaho model cannot be input into the Washington model's corresponding organic matter compartments without violating the conservation of mass. Table 7 lists the stoichiometry coefficient values of the two models for all 4 of organic matter compartments simulated in CE-QUAL-W2.

Table 7. Phosphorus, nitrogen, and carbon stoichiometric values for the organic matter compartments in the Idaho and Washington Spokane River models. In the CE-QUAL-W2 control file the phosphorus stoichiometric variable is ORGP, the nitrogen stoichiometry variable is ORGN, and the carbon stoichiometry variable is ORGC.

Organic Matter	Phosphorus Stoichiometry (ORGP)		Nitrogen Stoichiometry (ORGN)		Carbon Stoichiometry (ORGC)	
Compartment	Idaho	Washington	Idaho	Washington	Idaho	Washington
Labile Dissolved Organic Matter (LDOM)	0.001	0.005	0.010	0.08	0.60	0.45
Refractory Dissolved Organic Matter (RDOM)	0.001	0.005	0.010	0.08	0.60	0.45
Labile Particulate Organic Matter (LPOM)	0.001	0.005	0.010	0.08	0.60	0.45
Refactory Particulate Organic Matter (LPOM)	0.001	0.005	0.010	0.08	0.60	0.45

As a work around, four new CBOD compartments are being created in the Washington model, which brings the total number of CBOD compartments in the model to 14. These four additional compartments will simulate the organic matter originating from the Idaho models organic matter compartments (LDOM, RDOM, LPOM and RPOM). To do this, the organic matter concentrations have to be converted to carbonaceous biochemical oxygen demand concentration. In the Spokane model it is assumed that the stoichiometric requirements for organic matter decay are 1.4 g O_2 per 1 g organic matter. To convert organic matter concentrations into CBOD concentrations the following expression is used:

$$CBOD\ concentration = OM\ concentration \times 1.4$$

Also, in order to conserve P, N, and C mass in the conversion the stoichiometric ratios of the new CBOD compartments must be calculated using:

$$(P, N\ or\ C\ stoichiometry\ for\ CBOD\ decay) = (stoichiometric\ equivalent\ btw.\ OM\ and\ P, N, or\ C)/1.4$$

The CBOD compartments in the Washington model and their sources are listed in Table 8. CBOD compartments #11 through #14 correspond to the four Idaho organic matter compartments.

Table 8. The CBOD compartments in the Washington model. Compartments #11 through #14 correspond to the Idaho models organic matter compartments. The stoichiometric ratios for each compartment are also listed.

CBOD compartment # in Washington model	Corresponding Source	P stoichiometry for CBOD decay (BODP)	N stoichiometry for CBOD decay (BODN)	C stoichiometry for CBOD decay (BODC)
1	Liberty Lake	0.020	0.08	0.45
2	Kaiser Aluminum	0.002	0.08	0.45
3	Inland Empire Paper	0.002	0.08	0.45
4	Spokane WWTP	0.016	0.08	0.45
5	Organic matter from Washington Tributaries	0.011	0.08	0.45
6	Coeur D'Alene WWTP	0.00047	0.08	0.45
7	Hayden POTW	0.00496	0.08	0.45
8	Post Falls STP	0.00041	0.08	0.45
9	Lake Coeur D'Alene CBOD	0.003	0.08	0.45
10	Hayden POTW summer discharge	0.0001	0.08	0.45
11	Idaho Labile Dissolved Organic Matter (LDOM)	0.000714	0.00714	0.429
12	Idaho Refractory Dissolved Organic Matter (RDOM)	0.000714	0.00714	0.429
13	Idaho Labile Particulate Organic Matter (LPOM)	0.000714	0.00714	0.429
14	Idaho Refractory Particulate Organic Matter (LPOM)	0.000714	0.00714	0.429

Some additional comments:

- To adequately simulate the settling of particulate organic matter in the CBOD compartments a settling term for CBOD was added into version 3.1 CE-QUAL-W2.
- Organic matter originating from Lake Coeur D'Alene has a faster decaying component simulated as CBOD compartment #9 (in both Idaho and Washington models), and a slower decaying component (simulated as refractory DOM in the Idaho model, and as CBOD compartment #12 in the Washington model).
- The organic matter compartments in the Washington model only simulate organic matter originating from algae mortality. Organic matter from dischargers and tributaries are accounted for with corresponding CBOD compartments.