UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
IDAHO OPERATIONS OFFICE
1435 N. Orchard St.
Boise, Idaho 83706

May 4, 2007

Mr. Craig Shepard
Watershed Manager
Boise Regional Office
1445 N. Orchard
Boise, Idaho 83706-2239

Dear Mr. Shepard:

Thank you for the opportunity to review the pre-public comment draft of the *Lower Boise River, Total Maximum Daily Load, Total Phosphorus,* March 2007. The hard work by the Lower Boise Watershed Council, the Idaho Department of Environmental Quality, and CH2MHill is recognized and appreciated by the Environmental Protection Agency.

While recognizing that this TMDL effort has been difficult and time consuming for all concerned, we are taking this opportunity to clarify our position on the importance of the water quality in the Lower Boise River and the downstream receiving waters. We believe that the Lower Boise River is one of the most intensively used rivers by one of the most diverse group of users in EPA Region 10. The Lower Boise is an extremely important resource to irrigators, commerce and industry, communities and recreationalists to name a few of the user groups. The Lower Boise is also home to a diverse biological community including salmonid fish. For these reasons, EPA believes that it is a high priority to protect the water quality of the Lower Boise to ensure it remains the high quality, multi-use resource that it is today. The impact of elevated phosphorus levels on the Snake River and the Hells Canyon Reservoirs is well known and documented. As the receiving waters, the Snake River and Hells Canyon are also very high priority water bodies for the people of Idaho and EPA and merit a high level of protection.

Attached to this letter, you will find our comments on the draft Lower Boise TMDL from three programs within the EPA Office of Water. Because of the importance of this TMDL, comments are provided by the Watershed Program (TMDL), the NPDES Permit Program, and the Office of Environmental Assessment. We believe the comments are consistent with the comment letter dated January 12, 2006 which EPA sent to IDEQ concerning the *Draft Technical Memorandum Phosphorus Allocations* document by CH2MHill dated December 2005.

Again, thank you for the opportunity to review this TMDL. I would be happy to discuss these comments with you at your convenience. I can be reached at 208-378-5753 or you may call David Croxton in Seattle at 206-553-6694.

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Sincerely,

/signed/

William C. Stewart
Environmental Protection Specialist

cc: Marti Bridges
Mike McIntyre
Sherrill Doran

bcc: Dave Croxton
Christine Psyk
Ben Cope
Mike Lidgard
Brian Nickel
Leigh Woodruff

May 3, 2007

MEMORANDUM

Subject: Comments on the Draft Lower Boise River, Total Maximum Daily Load, Total Phosphorus, March 2007.

From: William C. Stewart, TMDL Project Manager
Watershed Unit
EPA Region 10, Idaho Operations Office

To: Craig Shepard, Watershed Manager
Boise Regional Office
Idaho DEQ

The following are my comments on a review of the Draft Lower Boise River TP TMDL. My comments are general in nature and are accompanied by more specific technical comments from Dr. Ben Cope with the EPA Office of Environmental Assessment and Mr. Brian Nickel with the EPA NPDES program.

1. There is no accounting for low flow conditions in this TMDL draft. It appears that the modeling was conducted using mean or median flows in the Lower Boise River. The target is a concentration of 0.070 mg/l or less at the mouth of the river from May 1 through September 30. We need to see an explanation of how the target will be met at low flows. If a mean or median flow is used in the calculations, the target won't be met approximately half of the time. The TMDL must show how the load allocations and wasteload allocations will meet the target in all flow conditions, including periods of critical low flows. The convention has been to use 7Q10 flows or comparable values to evaluate low flow scenarios.

2. The use of the flow duration methodology may hold the answer to the low flow question. What appears to have been done is to plot existing concentration against the various flows. This needs to be taken a step further and identify what allocations need to be met to meet the 0.070 mg/l target at all flow levels. These allocations can be stepped up or down based on flows in the river.

3. With the improved performance demonstrated by WWTFs across the country using newer technologies, WLAs will need to be lower than 0.200 mg/l of TP for future sources which haven't been constructed at this time. Setting future WLAs at 0.200 mg/l would not assure compliance with the 0.070 mg/l target at the mouth, unless it can be demonstrated otherwise.

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4. In Exhibit 24 and Exhibit 25, wasteload allocations (WLAs) are projected to be 0.200 mg/l for all WWTF, both new and future. In light of existing technology to reach much lower concentrations and considering the far reaching assumptions in this TMDL, we do not believe these WLAs are stringent enough. In considering reasonable assurance (a required element of a TMDL) we think more stringent WLAs are called for with existing sources. In addition, it would be safer to set the WLA concentration for new sources to be 0.070 mg/l of TP to ensure that exceedences to the TMDL target are prevented. The concept of reuse is certainly a viable option if appropriate conditions are present for the source.

5. The footnotes on page 12 are centered on the argument concerning the "not to exceed" target of 0.070 mg/l in the Snake River Hells Canyon TMDL. This is not an "average" or "mean" concentration target in the approved SRHC TMDL, yet the arguments persist. Inclusion of these arguments in the TMDL document is not conducive to the development of the TMDL.

6. The discussion on the expression of nutrient targets in an acute form on pages 12-13 is interesting but does not tell the whole story. There is no discussion present on nutrient cycling in the reservoir and the effect of trapping nutrients in the sediments of Brownlee Reservoir over time. Phosphorus is trapped by reservoirs and does not simply flow through the system. Frequently, phosphorus is released from the sediments to the water column under anoxic conditions, such as those present in Brownlee during late summer months, and cycles in the reservoir resulting in an internal load which accelerates eutrophication.

7. No one from EPA is disagreeing that the critical time period in the TMDL or that the target from the Snake River Hells Canyon TMDL is in effect from May through September. That is what was approved in the SRHC TMDL.

8. In Exhibit 10 on page 16, is a table that gives "relative contribution" of total phosphorus from sources and explains how much reaches the Lower Boise mouth at Parma based on "calculations." It is difficult to understand how the West Boise WWTF which has a mean discharge of 20 cfs at a mean concentration of 4.9 mg/l TP can have a relative contribution of 0.18 while the Boise MS4 which has a mean discharge of 9.8 cfs and a mean concentration of 0.24 mg/l, discharging in the same general area, has a relative contribution of 0.40. This is not intuitive.

9. On page 48, Section 3.7 and also in the appendices are estimates of costs of implementation of this TMDL. We have never seen these types of estimates in any other TMDL from IDEQ and we question the utility of the information. The purpose of a TMDL is to demonstrate pollution reductions necessary to protect the water quality of the waters of the US. The discussion of how to go about it and how much it costs belongs in the implementation phase of the TMDL.

10. A considerable portion of this document seems to be dedicated to criticizing the target from the Snake River Hells Canyon TMDL. Another considerable portion is dedicated to cost projections. Reference to 20 year compliance periods for point sources and 70 year implementation schedules for nonpoint sources are continually made in the TMDL draft. None of this is appropriate for a TMDL. These discussions will occur, if they haven't already, at an appropriate time. The most important factor here is to determine what reductions are necessary to meet the target and what the allocations will be. That is the role of a TMDL.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

May 3, 2007

Reply To
Attn Of: OEA-095

TECHNICAL MEMORANDUM

Subject: Comments on a Phosphorus Mass Balance Model and Draft TMDL for the Boise River, Idaho

From: Ben Cope, Environmental Engineer
Office of Environmental Assessment
EPA Region 10

To: Bill Stewart, TMDL Project Manager
Office of Water and Watersheds
EPA Region 10

This is a review of the draft document entitled "Lower Boise River, Total Maximum Daily Load, Total Phosphorus", by the Lower Boise Watershed Council, in cooperation with the Idaho Department of Environmental Quality (March 2007). My primary focus is the technical work, including the modeling work that underlies the TMDL allocations.

This review is organized into the following topics:

TMDL Complexity
Boise River Model – Capabilities, Limitations, and Uncertainty
Comments on TMDL Elements
Recommendations for a Simple TMDL Analysis
Conclusions

I have reviewed previous versions of the CH2M Hill spreadsheet model of the Boise River. My comments on an early version of the model (April 19, 2006), and CH2M Hill's responses, have been included verbatim in the draft TMDL document. It should be noted that the model has been revised substantially since that time. In particular, the previous variable-flow version was changed to restrict the analysis to mean flow conditions (see below for comments on that topic). In addition, this review encompasses

not only the "current condition" model but also the manner in which this model was modified to extrapolate future conditions for the TMDL.

TMDL Complexity

Traditionally, a TMDL establishes the allowable load for the pollutant at a compliance location, and distributes that load to known upstream sources of that pollutant. It is apparent that the stakeholders and technical staff analyzing the Boise River have decided to incorporate a great deal of the complexity of the Boise River watershed into this TMDL, and the result is that the basic elements of this TMDL are obscured and erroneous. I believe the problems start with some unnecessary and unrealistic demands on the technical analysis, including:

- Estimation of 70-year conditions
- Specific assignment of irrigation canal loads/allocations to contributing sources

In this review, I will describe problems arising from the technical approach taken in this TMDL and offer an alternative analysis that would return to a more basic, coherent TMDL.

Boise River Model – Capabilities, Limitations, and Uncertainty

A wide variety of water quality models are employed in the development of TMDLs. Before using a mathematical model in decisions, it is critically important to understand the purpose, capabilities, and limitations of the model. The Boise River model developed by CH2M Hill is a mass balance model of phosphorus in the mainstem river and tributaries. The Boise is a managed river with a complex network of irrigation canals. At various points in the mainstem, water is diverted for agricultural use. The model includes some phosphorus source tracking within the diversion system. Eventually, the water returns to the river via downgradient return drains.

There are two model "setups" or configurations in the current version of the model files. The current condition setup for the model offers measurement-based estimates of the mainstem water quality and flow, and incoming flow and quality from point sources and drains. The model provides a reasonable picture of the current conditions and the flow routing of the system. We can make diagrams of the longitudinal change in phosphorus seen in the main stem from Lucky Peak Dam to Parma. We can see that the cities are a major contributor to those increases, as well as some of the drains (see Figure 1; note that this figure was created using an earlier version of the model, which has been under continuous revision to date).

Problems arise, however, when we attempt to use the model in the second setup mode, which provides a hypothetical future condition (70-year projection). This mode is used to evaluate TMDL allocations. The TMDL "allocation model" is hampered by the complexity of the system, because the model cannot tell us what sources (cities, farms, etc) are responsible for the phosphorus loadings entering the Boise River from the

irrigation return canals. In addition, the model is based on the mean flow condition, whereas the TMDL application must address the full range of flow conditions.

To summarize, the following are important capabilities and limitations of the current version of the Boise River mass balance model:

Capabilities

1. The model can provide reasonable estimates of the current, mean river conditions for phosphorus, including point source loadings and irrigation canal loadings.

2. The model can be used in a limited TMDL evaluation of the effect of allocations on phosphorus loadings at Parma (subject to the limitations below).

Limitations

1. The current version of the model only includes mean flow conditions (previous versions included range of conditions). In its present form, it cannot provide information on low flow conditions.

2. The model cannot provide meaningful information regarding the origin of phosphorus measured in irrigation return canals.

Both of these limitations are problematic for the TMDL. Fortunately, a more simple analytical approach can resolve these problems.

Model Uncertainty

The document includes information about the model features in Appendix B. The documentation of model uncertainty is inadequate in a number of areas, as follows:

Transparency of Sub-Watershed Estimation

Overall, the documentation of the calculations of source contributions in sub-watersheds is not sufficient to allow for a community of technical experts to evaluate the validity of the estimates. I suspect that, at present, only CH2M Hill consultants fully understand the sub-watershed allocation estimates. As noted below, I also believe that the current information base for the sub-watersheds will not be sufficient to provide confidence in those estimates.

Model Error and Uncertainty

Information is provided on how the current condition model predicts the concentration at Parma. The current condition model does not rely on sub-watershed (irrigation canal) estimates. The current condition model works reasonably well for the current condition,

because it is a simple mainstem "trunk line" calculation. This model relies primarily on measurement-based estimates of current mean flow and total phosphorus concentrations in point source discharges, irrigation canals at mouths, and groundwater. It does not rely on ballpark estimates of the relative source contributions to irrigation canals. This is where the problematic uncertainty lies for the TMDL.

Yet this uncertainty is not discussed in any detail. Only general statements are provided, or rhetorical questions such as these statements in Appendix D regarding runoff estimates and the origin of phosphorus in irrigation canals:

It is important to note that this estimation relies on a variety of data sources and numerous assumptions in the absence of relevant data. This component of the model will require additional analysis during the implementation period.

Stated another way, TP that is discharged from point sources in the mainstem is diverted, in part, to the tributary network. Not all of this mainstem point source TP will return to the river via the tributary network because a fraction will become diffuse in the environment through application to and reuse on agricultural land, and unknown rates of groundwater exchange within the canal system. For example, how much TP load observed at the mouth of Indian Creek is composed of point source TP loads from West Boise WWTF, the discharges of which are diverted partially into the Phyllis Canal that occasionally may discharge into Fivemile Creek?

Assignment of the phosphorus loadings in irrigation canals in a system like the Boise River watershed is an extremely uncertain task, and it may not be achievable in any meaningful way. A major undertaking of monitoring and assessment would be needed to develop a convincing mass balance for the entire Boise River tributary network that addressed the myriad conditions of baseline flow, irrigation flow, seepage to groundwater, farm discharge, carriage water, and stormwater discharge. Unless that kind of effort is undertaken, this TMDL should be based on estimates that carry a reasonable degree of confidence. At this point, I would reject the use of sub-watershed estimates to assign responsibility in this TMDL. For the point sources, this means that the TMDL should start from the presumption that all discharged phosphorus reaches Parma one way or another, via transport in the main stem, irrigation canals, and groundwater.

Comments on TMDL Elements

Design Flow

The management goal of the TMDL is to achieve a target concentration of 70 ug/l at Parma in the algal growing season between May and September. The critical period, in terms of the lowest allowable mass in the river, occurs in the month of August. In particular, August presents the critical condition for allocations for continuous point source discharges. It may be useful and important to evaluate higher flow regimes in addition to the low flow condition, but the TMDL should address the low flow condition from the outset.

Figure 2 shows the mean August flows in the Boise River for the measurement record at the USGS gauge at Parma (1971 to 2002). Figure 3 shows the May through September mean flow, monthly mean flows, and 10th percentile mean August flows, as well as the flow used in the draft TMDL.

The baseline flow at Parma used in the draft TMDL is 1,981 cfs. Flows are substantially lower than 1,981 cfs in the summer, particularly in August. Based on the record of monthly average flows, the 10th percentile mean monthly flow at Parma is 399 cfs. At 400 cfs, the loading capacity of the Boise River at Parma is approximately 150 lbs/day. The draft TMDL allocates approximately 484 lbs/day (220 kg/day) to wastewater treatment facilities alone, and 1,256 lbs/day (571 kg/day) to all sources (see Exhibit 30). The selection of a mean baseline flow renders the TMDL unprotective and eliminates any margin of safety (see also some discussion of margin of safety below).

A previous version of the model spreadsheet included a variable flow capability, meaning that different baseline flow conditions could be simulated. The current version includes a note in the Read Me tab that states: "Earlier model version allowed the user to select variable flows. This version cannot do so because of critical data gaps in the more complex water balance." It is unclear what critical data gaps have emerged, but CH2M Hill has indicated that the uncertainties of a 70-year flow projection for the TMDL led to the decision to employ only a mean flow condition in the model. For this and many other reasons, the 70-year timeframe cannot be used in the calculation of the loading capacity and allocations for this TMDL.

In the draft TMDL, the load-duration curve and percent reduction figures (Exhibits 8 and 9) are cited as evidence that the TMDL need not consider low flow conditions and the reduced loading capacity that accompanies them. In fact, the load duration curves for this river indicate exceedance problems across the entire flow spectrum. This means that the TMDL should consider pollutant loading conditions across the full range of flows, including conditions at low flow. One cannot reasonably draw the conclusion that a calculation assuming a mean flow baseline will be protective of low flow conditions from the load duration information presented in the draft TMDL document.

Summation of Allocations

Load and wasteload allocations are apparently based on a future estimated mean flow rate at Parma of 1,981 cfs (Page 74). At the flow of 1,981 cfs at Parma, the loading capacity is approximately 340 kg/day. But the draft TMDL allocates approximately 570 kg/day to all sources (see Exhibit 30, Page 42). The linkage between baseline conditions (i.e., flow, background concentrations), allocations and total loading capacity must be clear in the TMDL. The allocations should sum to a number smaller than the loading capacity, or, if a loss in the system is assumed, the basis for assuming that loss must be provided.

In discussions about the model with CH2M Hill, it appears the primary reason for the difference between the allocated load and the loading capacity at Parma is that some

source loadings are double-counted. This problem appears to arise due to the efforts to differentiate the loadings to and from the irrigation canals. A more simple TMDL analysis would resolve this problem.

Wasteload Allocations and Reasonable Assurance

The document provides no basis to conclude that there is reasonable assurance that nonpoint source control will be achieved in a reasonable time frame (e.g., 15 years). A brief section in the document entitled "Reasonable Assurance" alludes to 70-year land use conversion projections; the document includes no demonstration that nonpoint allocations can or will be achieved. This is particularly important in a TMDL such as this one, where point sources are a significant fraction of the source load.

The approach of establishing wasteload allocations for major discharges at the instream target concentration (70 ug/l) is an appropriate way to resolve the problem of a lack of reasonable assurance. At this level, point source discharges will not cause or contribute to excursions of the TMDL target. If a serious attempt is to made to achieve 70 ug/l at Parma, then the major point sources could be allocated concentrations less than 70 ug/l. The proposed NPDES permits for cities along the Spokane River in Idaho include a permit limit of 50 ug/l for total phosphorus, and EPA believes this limit is achievable. EPA recently issued a report regarding treatability of phosphorus in municipal wastewater that includes extensive data from across the country. This information should be considered in the Boise River TMDL.

The document includes a telling estimate: using an equal concentration allocation, all sources would need to achieve 82 ug/l in order to achieve the 70 ug/l target at Parma. It appears from the spreadsheet model that this estimate is based on a simple mainstem calculation similar to the "current condition" model.

This estimate further highlights the need to reduce point source loadings to the maximum extent feasible using current treatment technology (i.e., lower than 70 ug/l). Yet, the proposed wasteload allocations are 200 ug/l. This over-allocation to point sources then necessarily requires that some irrigation drains be controlled to levels below the 70 ug/l target to reach the goal at Parma. Thus, the proposed point and non-point allocations are impractical on both ends. The point sources can achieve lower loads than allocated to them with certainty, while the non-point sources cannot achieve the allocated loads with any certainty.

Margin of Safety

The draft TMDL offers two element of a margin of safety. One element is that the instream target from the SR-HC TMDL carries an implicit margin of safety, because it was purposely established at a slightly lower concentration than necessary based on the analysis of the Snake River. This is a valid consideration. The second element is related

to the load duration curve, which is interpreted to indicate a margin of safety. As noted earlier, the untenable interpretation that the load duration curve supports the use of a mean flow baseline has the effect of undermining any margin of safety.

Irrigation Return Canal Allocations

The draft TMDL reflects an attempt to assign specific responsibility for current and future irrigation return canal loadings (see Exhibits ES-1 and 30). Loadings in the return canals are likely comprised of a mixture of agricultural discharges, point source discharges upstream of the diversions, urban stormwater, and groundwater impacted by all-of-the-above. As noted above, I do not believe the available information is sufficient to distinguish the origin of phosphorus in the irrigation return canals.

Recommendations for a Simple TMDL Analysis

The complexity of the Boise River diversion network is a challenge for TMDL development, and this complexity has probably contributed to some of the problems in the draft TMDL. As noted earlier, I believe a more simple analytical approach can resolve several basic problems with the draft TMDL. In order to help move the TMDL process along, I offer the following recommendations for an alternative TMDL allocation approach to calculate the basic TMDL elements:

a. Establish the critical loading for point sources (low flow) at Parma. As noted above, a conservative flow for a low flow tier is 400 cfs. At this flow, and a target concentration of 70 ug/l, the total maximum daily load at Parma is approximately 150 lbs/day. If natural background is 20 ug/l, there is approximately 108 lbs/day available for allocation to point and nonpoint sources.

b. Establish wasteload allocations for point sources that will meet the critical load and allow for some nonpoint source loads. One option for a wasteload allocation is 70 ug/l, the target concentration at Parma. This is an achievable level that meets the target at end-of-pipe (which addresses the "reasonable assurance" policy), and it allows for additional nonpoint loads. Using this allocation and 2025 build-out flows, the gross allocation to point sources is approximately 57 lbs/day. The remainder of the load available to nonpoint sources is 51 lbs/day at the low flow condition.

   Another option is to set the allocations for the major cities (e.g., City of Boise) at 50 ug/l to free additional loading capacity for stormwater and nonpoint sources.

c. Create additional flow tiers representing higher flows in the system. Typically, 4 to 5 flow tiers can be used to craft a TMDL that addresses the range of instream flows

d. With the point source allocation fixed at 57 lbs/day, allocate available loading capacity at higher instream flows to agricultural non-point sources and stormwater. See Figure 4 for pie charts showing four hypothetical flow tiers from 400-3200 cfs for the Boise River and the breakdown of allocations using the approach outlined here.

e. To evaluate higher target concentrations (>70 ug/l) at the drain mouths, re-visit earlier versions of the model and use variable flow balances to distribute available load to the tributaries and back-calculate concentration targets.

Conclusions

The following summarizes my conclusions about the draft TMDL:

- The baseline (or design) flow used in the TMDL is flawed, because critical low flow conditions are not addressed. A flow-tiered TMDL would be appropriate for this TMDL to address seasonal variability.

- The sum of wasteload and load allocations and background loads exceeds the loading capacity at Parma. Part of the problem appears to be "double-counting" of some source loads.

- The TMDL does not provide reasonable assurance that non-point sources will be controlled to achieve the load allocations, and, as a result, the wasteload allocations are unreasonably high.

- The use of a 70-year target date for achieving the target undermines the technical analysis, adds complexity, adds uncertainty, and is inconsistent with NPDES permitting time frames.

- While the current condition version of the mass balance model is well-grounded in measurements of flow and water quality, there is insufficient information to use the mass balance model to estimate the relative source contributions in tributaries, as attempted in the TMDL.

- A simple, straightforward TMDL is possible for the Boise River, and a roadmap for such a TMDL is provided in this memo.

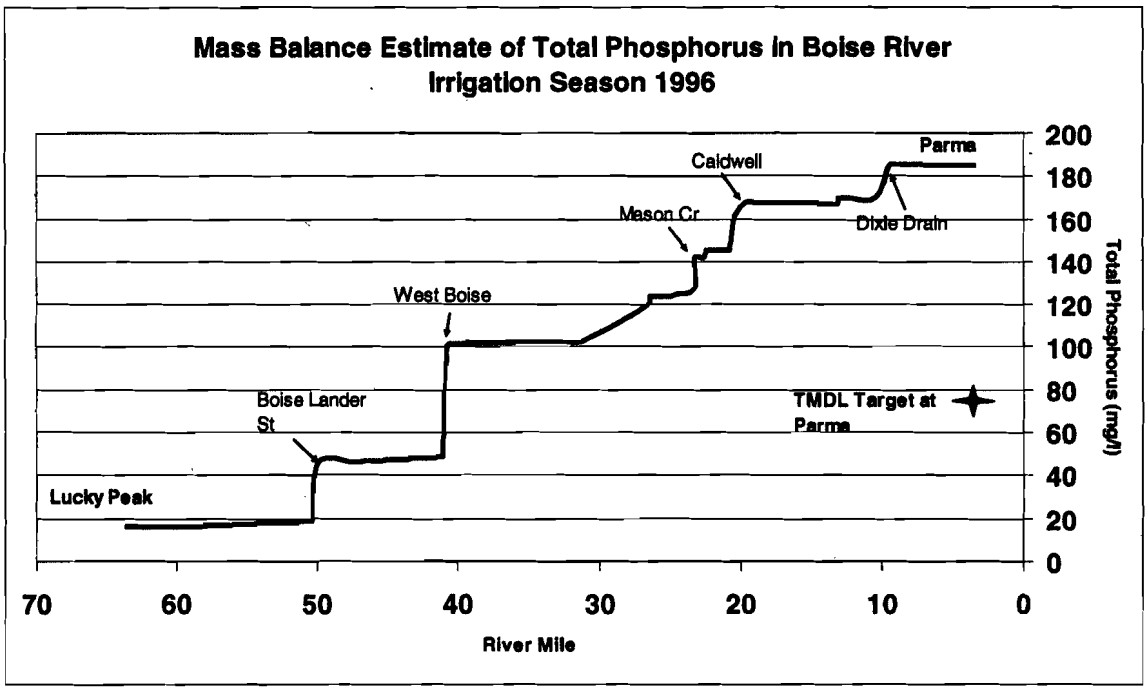

Figure 1

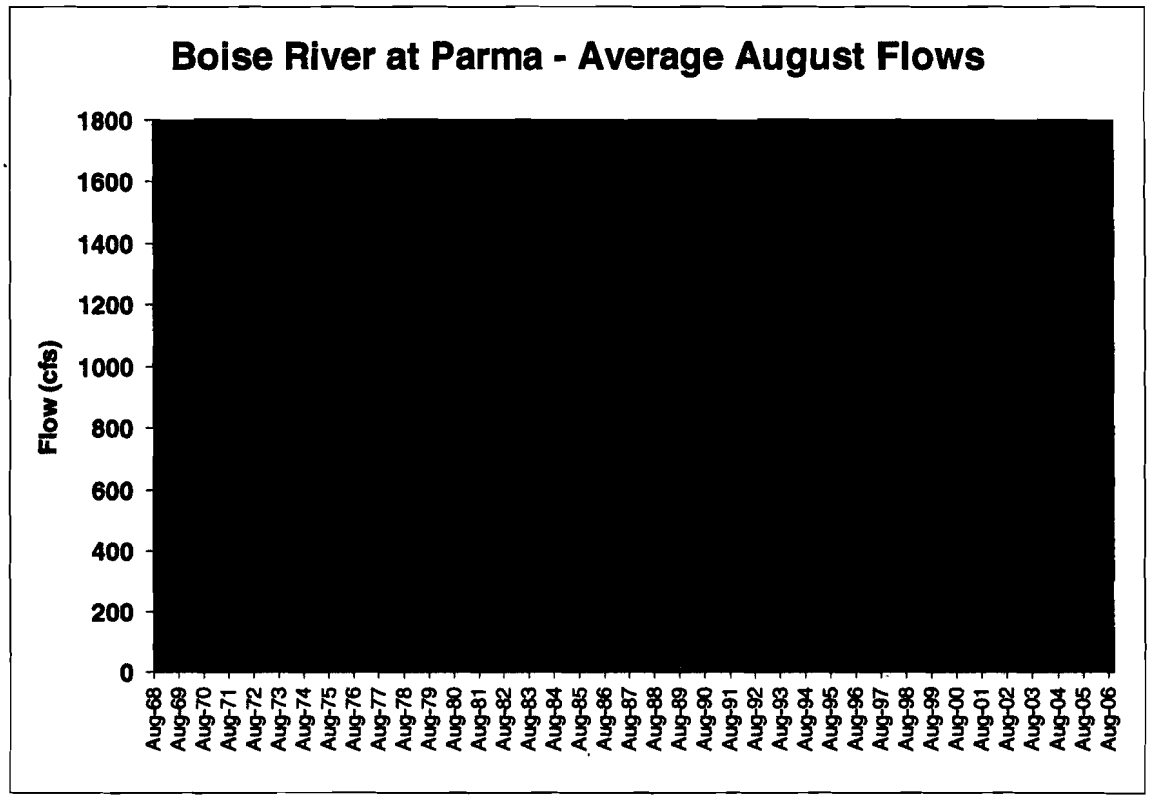

Figure 2

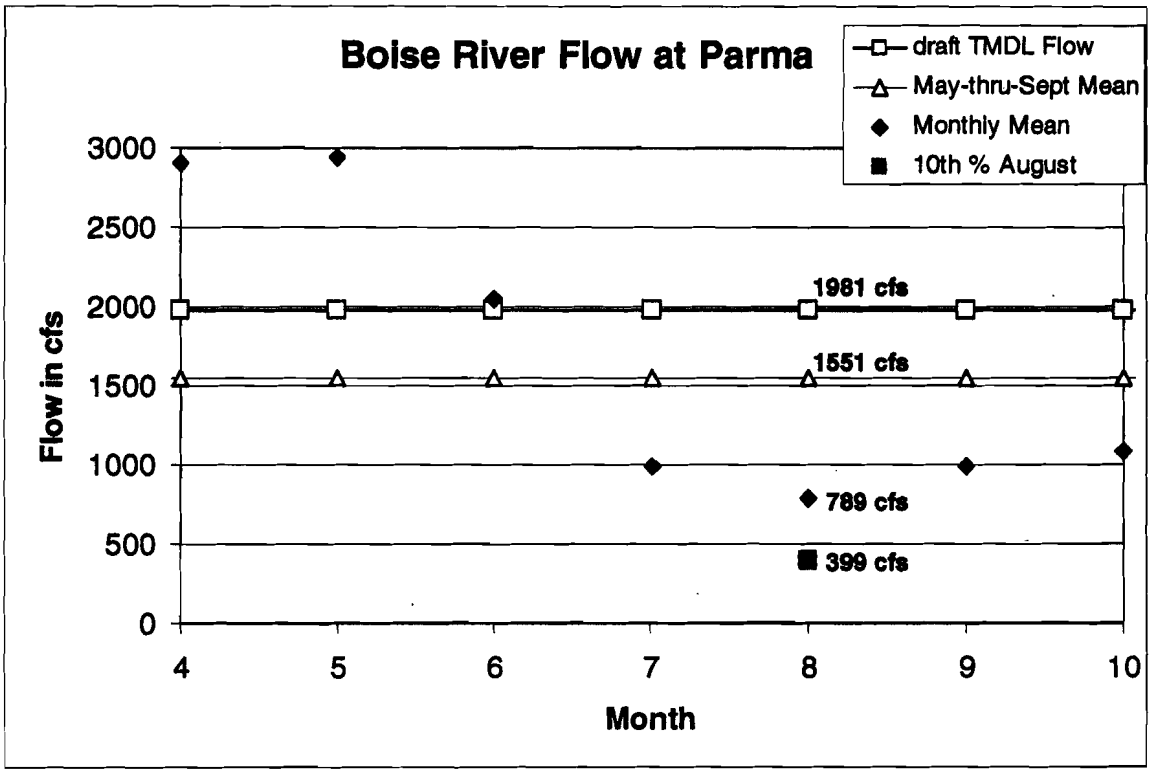
Boise River Flow at Parma
draft TMDL Flow
May-thru-Sept Mean
Monthly Mean
10th % August
3000
2500
2000
1500
1000
500
0
Flow in cfs
1981 cfs
1551 cfs
789 cfs
399 cfs
4
5
6
7
8
9
10
Month

Figure 3

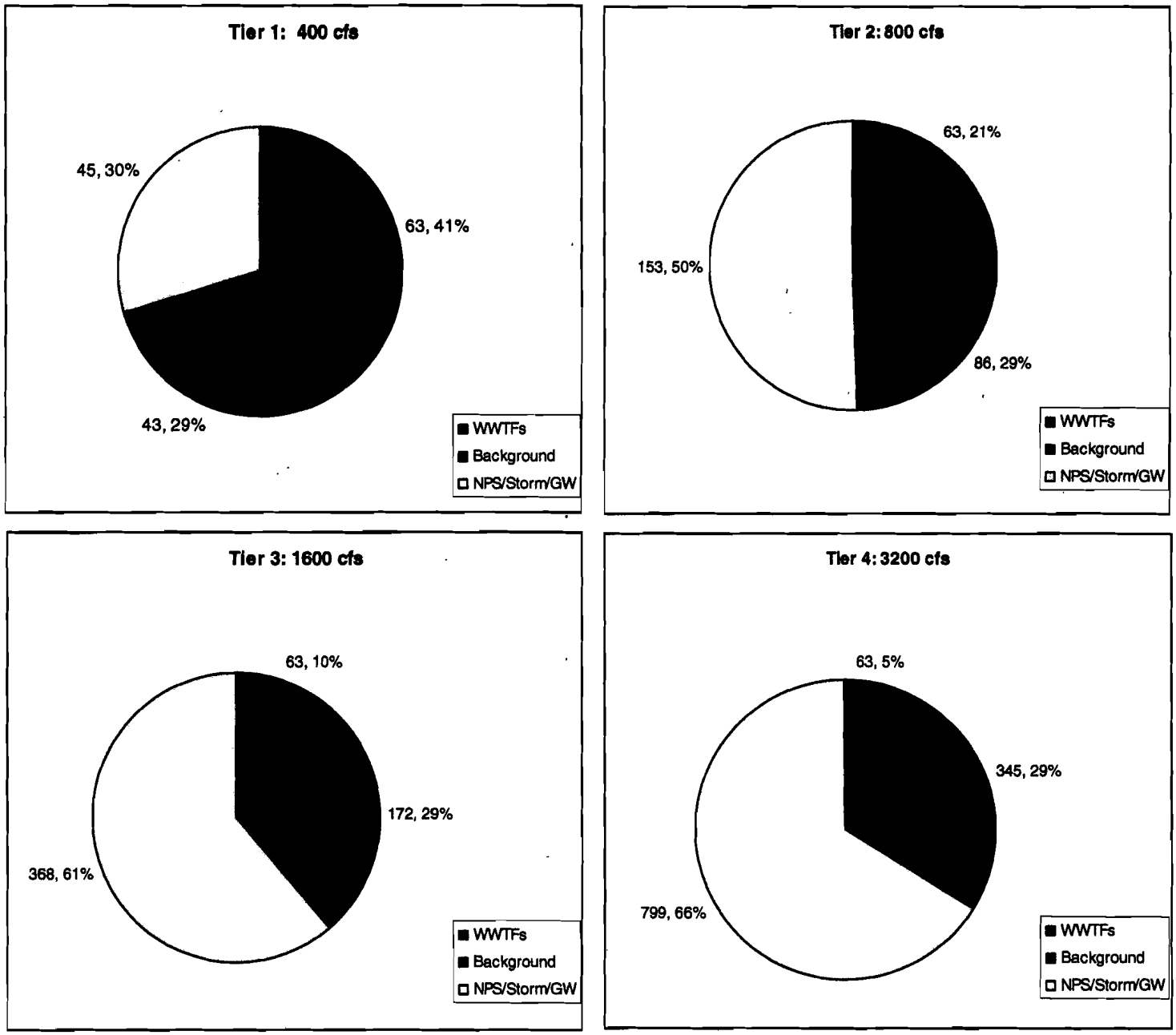

Figure 4 : Hypothetical TMDL Gross Allocation with Fixed WWTF Load and Background Concentration

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply to
Attn Of: OWW-130

May 3, 2007

Memorandum

From: Brian Nickel
Environmental Engineer
NPDES Permits Unit

To: William C. Stewart
Environmental Protection Specialist
Watershed Unit

Re: Comments on the Lower Boise River Total Maximum Daily Load for Total Phosphorus

Purpose

The purpose of this memorandum is to offer my comments on the draft of the Lower Boise River Total Maximum Daily Load for Total Phosphorus, dated March 12, 2007. In reviewing the document, I have focused my attention on issues with point sources, although some of my comments are more general in scope. My comments are divided into three sections: Point source issues, design conditions and margin of safety, and other issues. I conclude with recommendations. I hope you find these comments helpful.

Comments Specific to Point Sources

Total Load Allocated to Point Sources

On Page 35, in Exhibit 24, the TMDL proposes to allocate a total of 220 kg/day total phosphorus to existing and future point sources. It is erroneous to allocate 220 kg/day of phosphorus load to point sources to a river with a loading capacity of 57 kg of phosphorus per day under low flow conditions (per Exhibit 9, see also my discussion of design conditions and margin of safety below).

Point Source Compliance Schedules

Exhibit ES-2 (which is reproduced as Exhibit 23, on Page 32) proposes a 15-20 year schedule of compliance to meet the proposed 200 ppb wasteload allocation for point sources (which itself appears inadequate to meet the 70 ppb target at the mouth of the Boise under low flow conditions, as discussed below). A 15-20 year schedule would not comply with Federal regulations governing compliance schedules in NPDES permits (40 CFR 122.47) which requires that compliance be achieved "as soon as possible," nor is it consistent with proposed compliance schedules for low phosphorus limits elsewhere in the Pacific Northwest.

Proposed compliance schedules for point source dischargers to the Spokane River in both Idaho and Washington will require dischargers in that watershed to reduce effluent

phosphorus concentrations to much lower levels, in a shorter period of time. For example, the draft NPDES permits for the Idaho communities of Coeur d'Alene, Post Falls and Hayden would require these dischargers to meet summertime monthly average phosphorus limits of 50 ppb or less, within nine years[1]. These compliance schedules require construction of advanced treatment facilities to be completed within seven years, with the final two years of the schedule reserved for process optimization. Like the Boise watershed dischargers, these dischargers are upgrading their treatment plants to provide increased hydraulic capacity and the compliance schedules consider this complication. These compliance schedules were proposed by the Coeur d'Alene Regional Office of IDEQ after consultation with the dischargers.

It is unreasonable and inequitable to allow dischargers in the Boise watershed more time to achieve a less-stringent wasteload allocation compared to the dischargers in the Spokane watershed. The time frame for achieving necessary reductions in non-point sources (and therefore the in-stream water quality standard) is irrelevant when establishing compliance schedules for point sources. A reasonable compliance schedule to achieve the effluent total phosphorus would be five to seven years or less, in most cases, though some dischargers may require more time (and could be given it at the State's discretion through Clean Water Act section 401 certifications of NPDES permits). Also, NPDES regulations prohibit schedules of compliance for new sources and new dischargers in most cases (40 CFR 122.47(a)(2)).

Averaging Period for Effluent Limits

On Page 47, in part 3.5, the document correctly points out that the Parma target applies seasonally, however, the statement that permit limits should be expressed as seasonal averages is inconsistent with the "less than or equal to" nature of the target. It is also inconsistent with requirements of NPDES regulations (40 CFR 122.45(d)) that effluent limits for continuous discharges be expressed as either average monthly and average weekly limits (for POTWs) or average monthly and maximum daily limits (for all other dischargers) unless impracticable.

Point Source Treatment Cost and Feasibility

In appendices F and J, the TMDL discusses point source phosphorus treatment feasibility and cost concerns. These concerns are overstated and irrelevant.

A recent EPA report shows that a number of wastewater treatment plants across the country are achieving effluent phosphorus concentrations far lower than the proposed wasteload allocations in the draft TMDL (*Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus*, EPA 910-R-07-002[2]). Residential sewer rates for these utilities are generally less than $30 per month.

A number of vendors offer tertiary filtration systems that can be added to existing wastewater treatment facilities that are affordable and reduce phosphorus to levels far below those proposed in the draft TMDL. For example, this is the EPA report's discussion of costs for BlueWater Technologies BluePRO filters, which are being tested at the Hayden Area Regional Sewer Board wastewater treatment plant in Hayden,

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[1] The permits and fact sheets can be obtained here:
http://yosemite.epa.gov/r10/WATER.NSF/NPDES+Permits/DraftPermitsID

[2] http://yosemite.epa.gov/r10/water.nsf/Water+Quality+Standards/AWT-Phosphorus

Idaho: "Company representatives estimate that were the BluePRO phosphorus removal system added to the existing Hayden WWTP as tertiary treatment, the residential sewer use fee would increase by only $1.20/month to cover all costs of construction and operation. Company representatives estimate the capital cost for the Blue PRO phosphorus removal system as tertiary treatment is $178,000 for a 1-mgd treatment plant and $494,000 for a 3-mgd treatment plant." This type of filter has also been successfully piloted on effluent from a lagoon wastewater treatment plant[3]. These cost estimates are specific to the BluePRO system (which may or may not be the best treatment option for the Boise dischargers). However, they illustrate that advanced treatment for phosphorus removal is affordable. Costs of this magnitude do not justify the proposed point source compliance schedules.

Comments on Design Conditions and Margin of Safety

Absolute versus Relative Reductions

The load duration curve (Exhibit 8, Page 11) is used in conjunction with Exhibit 9 to show that relative (percent) reductions necessary to meet the 70 ppb target are similar for a range of flow conditions (about 80%). This is a valid observation; however, it does not change the fact that the river has much less loading capacity for phosphorus under low-flow conditions as opposed to "medium" (median or average) flow conditions, because the target concentration does not change with flow. Twenty percent of the existing low-flow load is a smaller load than 20% of the existing medium-flow load. While necessary relative reductions are similar for a range of river flow rates, necessary absolute reductions are not.

Federal regulations require the TMDL to assure attainment of the 70 ppb target under "critical conditions for stream flow" (40 CFR 130.7(c)(1)). The Snake River Hells Canyon TMDL states that the 70 ppb target is a "less than or equal to" target, and must be met under all flow conditions[4]. Therefore, the "low flow" loading capacity is all the capacity that can be allocated to point and non-point sources, unless a flow-tiered allocation scheme is used. Nonetheless, the load-duration curve and percent reduction figures (Exhibits 8 and 9) are cited throughout the document as evidence that the TMDL need not consider low flow conditions and the reduced loading capacity that accompanies them. This is erroneous.

River Flow Rate

Load and wasteload allocations are apparently based on a "future" flow rate at Parma of 1981 CFS (Appendix B, Page 74), which results in a total loading capacity of 338 kg/day. The "future" flow rate represents a 50% increase from the "current" flow rate of 1312 CFS (Page 67). Based on the USGS flow record at Parma (USGS Station #13213000) for May through September, 1312 CFS is the 74th percentile river flow rate for that location and season. Assuming that the estimated 50% increase in flow rate is accurate, the proposed "future" design flow will be protective only 26% of the time. It is therefore unacceptable. Even if 338 kg/day was an acceptable estimate of the river's loading capacity, the TMDL allocates a total of 570 kg/day to point and non-point sources

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[3] http://www.blueh2o.net/blueh2o/uploads/documents/BWT_Page_Summary_081406_V3_0.pdf

[4] See footnotes to Table 4.0.9 of the Snake River Hells Canyon TMDL.

(Exhibit 30). The reason for the discrepancy between the loading capacity and the sum of the allocations is not clear.

Exhibit 9 shows that the loading capacity at Parma (for all sources, under current conditions) can be as little as 57 kg/day. This load corresponds to a concentration of 70 ppb at a river flow rate of 335 CFS, which is the 8th percentile daily flow rate observed at Parma from May through September. This would not be an unreasonably low design flow rate, given that the 70 ppb target must be met under all flow conditions. Even if flows increase over time by 50%, as predicted by the model, the "future" low flow loading capacity would only be 57 kg/day × 1.5 = 86 kg/day. In any case, the TMDL unacceptably inflates the river's loading capacity by dismissing low flow conditions.

Margin of Safety

The load duration curve is once again mentioned in the "Margin of Safety" section, on Page 47. This discussion states that there is a 4% difference between the low and median flow percent reductions required to meet the target (76% for median-flow years and 80% for low-flow).

This does not mean that adjusting the projected (at Parma concentrations) (based on the chosen design conditions) upward by 4% constitutes a margin of safety. If percent reductions are considered in a vacuum, adjusting the median flow allocations downward by 4% would be just enough to meet the target under low flow conditions. Exactly meeting water quality standards under low flow conditions does not constitute a margin of safety.

However, if absolute reductions are duly considered, the fact that allocations derived based on the chosen design flow are adjusted downward by 4% does not begin to account for the large difference in loading capacity between median and low flow conditions, much less constitute a margin of safety. The fact that allocations are 4% lower than they need to be under the chosen design flow conditions is meaningless when the low flow loading capacity (57 kg/day, Exhibit 9) is 83% lower than the loading capacity at the chosen "future" design flow rate of 1981 CFS (338 kg/day).

Other Comments

EPA Recommended Criterion for Phosphorus

On page 3 in Exhibits 2 and 3, the "Gold Book" phosphorus criterion of 0.1 mg/L is referenced. This 21-year-old EPA-recommended criterion has been superseded by ecoregion-specific nutrient criteria. If an EPA-recommended (CWA section 304(a)) criterion for phosphorus is referenced, it should be the ecoregional criterion for this particular level III ecoregion (42.5 ppb, Table 3c, EPA 822 B-00-016).

Overall Percent Reduction

On page xi, the TMDL states that a 76% reduction is necessary to meet the target at the mouth of the river (Parma). This is misleading, because it uses the average concentration as the baseline when, in fact, the 70 ppb target at the mouth of the Boise is a maximum allowable concentration. Therefore, the target should be compared to existing upper percentile (e.g. 90th or 95th percentile) concentrations in order to calculate the necessary percent reduction (>80%).

Recommendations

1. The TMDL must address low-flow conditions in a meaningful way.
2. The TMDL must have a meaningful margin of safety.
3. Discussions of compliance schedules for point sources should either propose reasonable schedules, or they should be deleted. Compliance schedules for point sources are normally established through the State's certification of NPDES permits under Section 401 of the Clean Water Act.
4. Discussions of cost and feasibility of treatment for point sources should be rewritten to consider current information, or they should be deleted.
5. Discussions of the appropriateness of the Boise River's less than or equal to 70 ppb phosphorus load allocation in the approved Snake River Hells Canyon TMDL are irrelevant and should be deleted.