# MALHEUR RIVER BASIN TMDL AND WATER QUALITY MANGEMENT PLAN

# RESPONSE TO COMMENTS

**September 2010**

State of Oregon
**Department of Environmental Quality**

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# 1. INTRODUCTION

This Response to Public Comments document addresses comments received regarding the Draft *Malheur River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP)* dated May, 2010. All comments have been considered by the Oregon Department of Environmental Quality (DEQ) and, where appropriate, have been addressed in the final document that has been submitted to the US Environmental Protection Agency (USEPA). USEPA will then either approve or disapprove the TMDL. Not all comments resulted in modifications to the document.

The comments received generally led to changes that improved the TMDL. DEQ appreciates the time and effort of the reviewers.

# 2. BACKGROUND

The public comment period on the proposed Malheur River Basin TMDL opened on May 14, 2010 and extended through July 30, 2010. One informational meeting and formal public hearing was held on June 29, 2010 at the Malheur County Extension in Ontario, OR. Sixteen people attended the hearing (including 3 DEQ staff). Two people gave oral comments. The remaining comments received by DEQ were submitted in written form (paper and electronic).

The public notice for the public comment period was sent to everyone on a list of interested parties maintained by DEQ and a stakeholder mailing list of over 100 people/organizations including organizations identified as designated management agencies (DMAs) in the WQMP. The notice was placed on DEQ's website and was advertised through the local newspaper, Argus Observer.

The TMDL was available for downloading from DEQ's website throughout the comment period. Hard copies of the document were also available for viewing at the Malheur County Library, the Harney County Library and at DEQ's offices in Pendleton. Hard copies of the document were sent to DMAs: Malheur County SWCD, Harney County SWCD, Malheur Watershed Council, Old Owyhee Irrigation District, Owyhee Irrigation District, Warmsprings Irrigation District, Vale Oregon Irrigation District, U.S. EPA Region 10, the City of Ontario, Malheur County Court, and Harney County Court. Copies of the document were also provided to those individuals who requested copies.

The following entities provided comments on the TMDL and were received prior to closure of the comment period 5:00 PM, July 30 2010. There were no comments received after the close of the comment period. Commenter's are organized in alphabetical order (using agency or last name).

| Commenter ID | Name | Comments Received |
|---|---|---|
| 1 | Jim Bentz | Oral |
| 2 | Bureau of Land Management – Vale/Burns Districts | Written |
| 3 | Bureau of Reclamation Pacific Northwest Region | Written |
| 4 | EPA Region 10 | Written |
| 5 | Ken Freese | Written |
| 6 | Harney County Court | Written |
| 7 | Harney County Watershed Council | Written |
| 8 | Erik Macus, MT DEQ | Written |
| 9 | Malheur County SWCD | Written |
| 10 | Malheur Watershed Council (Dr. Clint Shock) | Written |
| 11 | Bob Moore | Written |
| 12 | Owyhee Irrigation District | Written |
| 13 | Owyhee Watershed Council | Written |
| 14 | Dr. Clint Shock, Malheur Experiment Station | Oral |

# *3. RESPONSE TO COMMENTS*

Comments and responses in the following pages are organized by commenter ID and the comment number (eg comment 2-1 corresponds to BLM comment #1). Comments received orally were summarized and follow a similar format.

## Response to Jim Bentz's Comments

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| Comment 1-1 | Mr. Bentz commented that the TMDL forces all landowners to have buffer zones and shade along the waterways and does not specify the amount of the shade or the size of the buffer zones needed to accomplish the plan goals. The TMDL does not provide information on the consequence of goals not being met, for example, will the buffer zones be widened and at whose expense... He expressed concern regarding social and cultural impacts of the requirements of the TMDL to an aging population, and the lack of ethics of some new absentee landowners. |
| DEQ Response | DEQ chose not to set specific riparian buffer specifications because this determination should be made based on site specific conditions. For example the type and extent of vegetation that can grow at any given site will vary and may have implications for the buffer width that is possible. The buffer width may also be determined based on the appropriate management measures needed at a site. It is expected that landowners will work with local representatives of agencies such as ODA to develop specific plans for riparian vegetation management on their properties. |

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| Comment 1-2 | Some in the area assume small creeks will dry up with enough willows sucking on them, for example, Little White Horse creek |
| DEQ Response | DEQ acknowledges that increase riparian vegetation may increase water demands, however, it is also likely to increase water storage in stream banks and floodplains. |

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| Comment 1-3 | Page 6 states that in stream flows may need to increase – how much, at what cost and who pays? |
| DEQ Response | Page 6 (Section 4.6) of the Water Quality Management Plan : "Improvement of flow conditions will also be necessary and should be in management strategies where possible." DEQ expects that the approach for any increase in stream flow will be on a voluntary and cooperative basis as it has been throughout Oregon for many years. Stream flow restoration is fairly commonly incorporated into projects which enhance irrigation efficiency, with a portion of the saved water going to streams. Oregon Water Resources has been successful implementing these projects in several other basins. Private groups have also been successful at leasing and buying water rights for stream restoration. |

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| Comment 1-4 | Mr. Bentz missed any discussion of warm springs and creeks and any potential geothermal influence on temperature from the warm springs and creeks. |
| DEQ Response | Geothermal springs are considered part of the natural condition of a stream. The Natural Thermal Potential criteria can accommodate streams that are heated by geothermal sources. |

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| Comment 1-5 | Natural condition page 9.13 – natural is what we strive for, no discussion of native influence in streams. |
| DEQ Response | It is not possible to observe historic riparian communities and fully understand complex interactions of wildlife and past Native Americans. The TMDL relies on the establishment of Site Potential Vegetation as defined on page 9-4 of the TMDL: *The near stream vegetation that can grow and reproduce on a site given natural plant biology, site elevation, soil characteristics, local climate, channel morphology, hydrology, and natural disturbance regime.* |

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| Comment 1-6 | Read about influence of beaver but not the influence of natives on the beaver. Upper Malheur cottonwoods likely 240 years old or older. The relationship between natives, beaver and cottonwood could be broadened. |
| DEQ Response | See response to comment 1-5. |

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| Comment 1-7 | Mr. Benz noted that the tribes still have treaty rights to Logan Valley. He gave examples to make the point that the region has the smallest population of humans in 12,000 years. |
| DEQ Response | DEQ acknowledges that the human population of the Malheur Basin is small. However, human-caused changes to the landscape continue to have a significant impact on water quality. |

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| Comment 1-8 | Appendix B B-29; was this the natural condition and should always be this way? |
| DEQ Response | The description of vegetation conditions on the lower North Fork Malheur from the 1867 US Army officer was included to give an example of what the area looked like at that point in time. It was meant to give an example of what types of conditions existed in the past and what types of vegetation that might be possible now or in the future. As stated in the response to comment 1-5, the TMDL employs the principle of Site Potential Vegetation. |

## Responses to BLM Vale and Burns District Comments

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| Comment 2-1 (Vale/Burns) | Section Number iii | Paragraph 6 | Statement from Document Revision is recommended in Statement: *"Water quality impairment on <u>most</u> federal lands will be addressed through water quality restoration plans which will be developed by the Burns and Vale Offices of the Bureau of Land Management, and the Malheur National Forest"* | Questions/Comment/Recommendation Recommend replacing with statement: *Conditions contributing to impairment on federal lands managed by the Burns and Vale Offices of the Bureau of Land Management, and the Malheur National Forest will be addressed through development of water quality restoration plans.* |
| DEQ Response | The text on page iii (now page V) of the TMDL Executive Summary has been modified as requested. | | | |

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| Comment 2-2 (Vale) | Section Number 1.2 | Paragraph 1 | Statement from Document The WQMP directs the following management agencies to prepare implementation plans leading toward TMDL attainment: | Questions/Comment/Recommendation Are all State Lands within the subbasin managed by the ODF&W? Should Oregon State Lands be designated as a DMA? |

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| DEQ Response | ODF&W owns lands along the Malheur River between Warm Springs Dam and Juntura and has been named a DMA for this area. DSL has large land holdings in the Malheur River Basin, most are in the South Fork Malheur drainage. These DSL grazing lands are subject to regulation by ODA under its AgWQMA plans. ODA is the DMA for these lands. DSL has been named a DMA in the Malheur River Basin TMDL with regard to the dredge fill program it administers. |

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| Comment 2-3 (Vale) | Section Number 1.2 | Paragraph 8 | Statement from Document "DEQ also recognizes that at various times and locations attainment of estimated natural conditions may be impeded by natural disturbance. The definition of *natural conditions* in rule includes: "…Disturbances from wildfire, floods, earthquakes, volcanic or geothermal activity, wind, insect infestation, diseased vegetation are considered natural conditions" (OAR 340-041-0002(34)). | Questions/Comment/Recommendation The effects of climate change and air temperature increases are not mentioned or discussed. Climate change should be included. |
| DEQ Response | Climate change is a global phenomenon and will influence factors addressed or used in this TMDL (water temperature, flow, vegetation, fish distribution, etc). TMDLs are developed based on the use of historical data and current conditions to meet current water quality standards. We develop allocations to meet these water quality standards. Water quality standards are reviewed periodically and are revised when appropriate. In addition, TMDLs are revisited and revised based on new information and conditions. If or when climate change affects water quality we expect to address those changes when we revisit TMDLs or revise water quality standards. | | | |

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| Comment 2-4 (Vale) | Section Number 2.1 | Paragraph 2 | Statement from Document ..”stream” (typo) | Questions/Comment/Recommendation Should it be “streams” |
| DEQ Response | The word “stream” has been made plural in the referenced section of the TMDL. | | | |

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| Comment 2-5 (Vale) | Section Number 2.4 | Paragraph 4 | Statement from Document (Typo?) “….comparisons to appropriate DO criteria need to me made. | Questions/Comment/Recommendation Should it be DO criteria need to “be” made? |
| DEQ Response | The referenced typographical error has been corrected. | | | |

| Comment 2-6 (Vale) | Section Number 3.1 | Paragraph 4 | Statement from Document "The State of Oregon Division of State Lands (DSL) manages a significant amount of state-owned land in the South Fork Malheur watershed……" | Questions/Comment/Recommendation DSL is not listed as a DMA. Should they be listed? |
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| DEQ Response | See response to comment 2-2. | | | |

| Comment 2-7 (Vale) | Section Number 3.1 | Paragraph Table 3-1 | Statement from Document Table 3-1 Property Ownership shows BLM as controlling 75% of the Lower Malheur River Basin. | Questions/Comment/Recommendation This does not give a accurate representation of amount of land directly adjacent to the reaches of the 303d listings. We acknowledge the water resources are affected by the land area in the basin as a whole, but it is the property owners with the land adjacent to the water courses, the agencies which control the reserviors, and the management of those lands and facilities that will have the greatest affect on temperature TMDLs. Within the Vale district of those streams listed, Cottonwood creek south of the mainstem Malheur is the tributary where the BLM has the greatest concentration of lands adjacent to the stream course. |
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| DEQ Response | Additional information regarding the mixed ownership of riparian areas within BLM holdings has been added to the referenced section of the TMDL. | | | |

| Comment 2-8 (Vale/Burns) | Section Number 3-9 | Paragraph Last | Statement from Document The Burns-Paiute Tribe is currently starting a feasibility study to see if they could bring back the Salmon into the Malheur River Basin. | Questions/Comment/Recommendation Recommend including this information into the document. |
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| DEQ Response | A reference to the BPT salmon feasibility study was added to this section of the TMDL. | | | |

| Comment 2-9 (Vale/Burns) | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| | 4-10<br>4-13 | Pp1 | Section suggests that "grazing" is a potential source of nutrients, considering irrigated hay meadow grazing the same as open range grazing. Section on 4-13 identifies the most likely source of loading as intensive grazing in hay meadows followed by irrigation. Open range grazing is not a likely source to measureable loading. | Suggest that variability in loading in the upper watershed is due to a combination of factors the most likely being intensive livestock grazing followed by a season of irrigation with some source from erosion |
| DEQ Response | The text has been modified to reflect the conclusion that poorly managed grazing along streams and runoff containing manure and soil from hay meadows are significant sources of nutrients and bacteria. Rotational grazing managed in accordance with BLM's Standards for Rangeland Health and Guidelines for Livestock Grazing Management or similar standards is generally not considered a significant source of these pollutants. | | | |

| Comment 2-10 (Burns) | Section Number | Paragraph | Statement from document: | Questions/Comment/Recommendation |
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| | p.4-10 | Pp – 1 | Grazing of cattle in the upper Malheur River Basin is the main economic business for the area. The tone of the document toward grazing seems to be negative. Allotments throughout the Burns district Public lands are monitored and pastures are rotated and rested depending on type of pasture and forage availability. Adjustments are made to achieve BLM's Standards for Rangeland Health and Guidelines for Livestock Grazing Management. | Is there any way you can make this section more positive? |
| DEQ Response | Section 4.1.3 of the TMDL document has been edited to include efforts that are being made on public and private grazing lands to reduce water pollution. The section also includes statements regarding the loss of riparian vegetation and over-grazing as mechanisms of nutrient loading to streams. | | | |

| Comment 2-11 (Vale/Burns) | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| | 4-17 | Pp – 1 & 2 | There is obvious discharge of turbid waters from the Beulah Reservoir during spring runoff period despite inflow (North Fork Malheur) being relatively clear. Potential re-suspension of sediment at discharge point? You refer to release from the bottom of this reservoir on page 4-22. | Section should address sedimentation due to reservoir releases. |
| DEQ Response | The WQMP requires BOR to address nutrient cycling and downstream impacts at their dams in the Malheur River Basin. This will require examination of practices which increase sediment discharges downstream. | | | |

| Comment | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| 2-12 (Vale) | 6-3 | 5 | "The algae growth appears to be moderated durng the Summer irrigation season when water clarity is reduced due to sediment loading." "Controlling phosphorus loading is also strongly related to control of sediment due to its affinity to bind to fine soil particles." | Where in the systems do the fine particles increase? |
| DEQ Response | The Malheur River and North Fork Malheur often appear cloudy in the reaches below the BOR dams, however turbidity measurements taken during the TMDL sampling events increased significantly below Little Valley. | | | |

| Comment | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| 2-13 (Vale/Burns) | 9-4 | 4 | Excerpted statement: "The temperature TMDLs in this chapter addresses year round impairments to all perennial and intermittent streams and rivers within the Malheur River." | The reference to "intermittent" and "year round impairment" is conflicting. On some intermittent streams there may be no flowing water or causal link to down-channel temperature increases during periods of most probable impairment (highest solar path) or actual recorded impairment (page 9-7). (See comment below). BLM requests further definition or description on channels this TMDL applies to. Including all intermittent streams in the TMDL is including extensive channel networks with no causal linkage or no recorded impairment. |

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| DEQ Response | The temperature TMDLs apply to all perennial and intermittent streams in the Malheur River Basin and Middle Snake Payette Subbasin. DEQ believes that it is important that TMDLs for temperature apply to these streams because temperature impacts are cumulative and are not contained to just human activities within the reaches that are impaired. Activities in upstream tributaries or higher in the watershed influence stream temperatures downstream. For this reason the Environmental Quality Commission has developed standards protecting cold water that already meets the biological based criteria and may not be currently listed as impaired (see TMDL section 9.4.3 – section 9.4.7). In particularly, Intermittent streams are important for temperature because they can:<br><br>(1) Be "dry" but still retain residual pools primarily fed by groundwater. There is at least one published study in Oregon documenting the presence of fish in these pools over the entire summer (Wiginton et al 2006). Residual pools and the aquatic life that use them must be protected from temperature increases.<br><br>(2) Influence temperature directly during the time in which they flow. Though this typically is not during the annual "thermal peak", there are other times of year when temperature is a critical concern, such as at the beginning or end of the summer when downstream temperatures are still warmer than the biological criteria.<br><br>(3) Be sources of increased sediment loading where they are modified through land and vegetation disturbance. High sediment loading often causes stream channels to widen and shallow, increasing solar heating. Stream temperature is influenced by channel shape, which is in turn influenced by upland and headwater sediment loading. Restoration and maintenance of healthy riparian condition provides for stream bank stabilization, and reduces runoff.<br><br>(4) Be flowing subsurface because they are currently degraded. In Eastern Oregon there are examples of degraded intermittent streams becoming perennial after restoration. Restoring the riparian vegetation will allow the system to aggrade raising the water table and returning flow to the surface (Elmore and Beschta 1987).<br><br>If resource managers have data which demonstrates that conditions in a non-perennial stream does not affect downstream perennial or fish bearing stream water quality for which the TMDL has been developed then DEQ can consider alternative management on those non-perennial streams. DEQ can work with DMAs on this during the development of TMDL Implementation Plans. |

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| Comment 2-14 (Vale/Burns) | Section Number Table 9-1 | Paragraph Page 9-5 | Statement from Document Quote: "Water bodies":"All perennial and intermittent channels…" Seasonal Variation: "Peak temperatures typically occur in mid-July through mid-August. In rivers where Redband or Lahontan Cutthroat Trout use occur, the period of exceedance of the water quality standard and applicability of allocations is from May 1 – September 30. In waters where Bull Trout spawning and juvenile rearing uses occur, the period of exceedance of the water quality standard and applicability of allocations is from May 1– October 31". ODEQ has included "all intermittent" streams for the"applicable "water body. Using the traditional definitions and the NHD (National Hydrographic Dataset), there are over 1000 miles of intermittent streams managed by BLM in the TMDL area. Based on current verbal descriptions, ODEQ has indicated that only those streams that present a "loading" linkage are applicable for a temperature TMDL. This loading linkage could be through residual pools, hyporeic connection to the flowing channels or actual flow during a "standard" applicable season (e.g. trout presence during flow). | Questions/Comment/Recommendation As in the comment above, BLM recommends that "all" intermittent channels not be included in the TMDL. A significant number of intermittent channels do not flow during the peak temperature period (mid July to Mid August) or do not flow during the May 1 – October 31 criteria. They do not contribute to the listed segments or the appropriate species during these periods (see data 9-14). Effective shade targets are not appropriate for these streams in terms of solar loading and the temperature TMDL. BLM recommends that ODEQ be explicit on which intermittent streams are applicable through definition either in the text or in the definitions provided on page 9-3 . The definitions should contain an explanation of intermittent channels and specifically those that pertain to the TMDL. BLM recognizes these are more easily defined than mapped at this time. This is why it is important to define the water body appropriate for application of targets. |

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| | | | Unless ODEQ defines this, BLM will be responsible to meet surrogates on channels with no causal linkage. | |
| DEQ Response | See response to comment 2-13. | | | |

| Comment 2-15 (Vale/Burns) | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| | 9-5 and 9-13 | 1 | *Since streams in their natural state, without human caused impacts, may at times exceed the biological temperature criteria, ODEQ rules state that the naturally warm temperatures become the standard (OAR 340-041-0028 (8)).* | Can this concept be elaborated for temperature exceedance in the Malheur River Basin? Are there streams in their natural state without human impacts with sufficient data that are representative of other streams that can be used as a data control for this region? The Malheur River Basin is a system that is extremely manipulated and impacted. Maybe we need a description or an overview of what the DEQ will consider to be "natural states", how potential vegetation fits into that concept, and how vegetation can be an indicator of unmeasured parts of the natural state. |
| DEQ Response | Potential vegetation is one measure of the "natural state" and is used as the TMDL surrogate measure to meet the natural conditions criteria for temperature. We have added text to section 9.10 to clarify this linkage. In addition, the report in Appendix C: Baseline beneficial use status in the Malheur River Basin, provides the best picture of baseline water quality conditions for "reference sites". Continuation of this type of monitoring may be one way to monitor basin wide trends of beneficial use attainment and water quality condition. | | | |

| Comment 2-16 (Burns) | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| | p. 9-6 | Table 9-1 | *Surrogate measures: Effective shade targets translate nonpoint source solar radiation loads into measurable stream side site potential vegetation conditions.* | While this is suggested, would there be a point to having 1) effective shade targets and 2) site potential vegetation cover/composition targets? Just for example, one could use green line cover data to quantify the existing vegetation and develop or identify the site potential vegetation targets. |
| DEQ Response | Using the green line data for monitoring compliance could be suggested and developed in the WQRP. | | | |

| Comment 2-17 (Vale/Burns) | Section Number | Statement from Document | Questions/Comment/Recommendation |
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| | 9-13 | 9.4.3 *Subsection (b) of the rule limits the warming of salmon and steelhead spawning waters from point source discharges to 0.5°C above the 60 day average maximum temperature when the rolling average is between 10 to 12.8°C. The allowable increase is 1°C when the 60 day rolling average maximum temperature is less than 10°C unless analysis demonstrates that a greater increase will not significantly impact the use.* | Since there are no "point source discharges" for temperature, does this subsection apply to the Malheur River Basin? If that is correct, a statement should be made to point this out or the entire section should be deleted. |
| DEQ Response | TMDL language quoted applies to new point sources. | | |

| Comment | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| 2-18 (Burns) | p. 9-14 | 1 | 9.5 Seasonal Variation and Critical Condition | Delete "We" |
| DEQ Response | The suggested change has been made. | | | |

| Comment | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| 2-19 (Burns) | p.9-20 | 1 | 9.6 Sources of Temperature Increases: second sentence | Add "Eastern" in front of Oregon. |
| DEQ Response | As a general trend, streams are warmest during the summer throughout all of Oregon (not just in Eastern Oregon) so we have left the sentence as is. | | | |

| Comment | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| 2-20 (Vale/Burns) | 9-28 | Pp 1, 2 & 3 | Flow reduction due to the dams has been identified as a loss to assimilative capacity and increased heating. This flow reduction can also have an effect on vegetation and late season stress on the potential community. Dams can cause flood modification that can have an effect on the potential community and restoration therein. | BLM recommends that DEQ recognize the issues the dams present in the BLMs capacity to manage for the potential community below dams especially Beulah and Warm Springs Reservoir. This recognition could occur in the WQMP. Page 9-39 of this document states that the BOR / Dam operators are to manage flows for restoration but there is no mechanism for coordination on this, regarding target species composition and requirements. Timetables to site potential vegetation are predicated on the implementation of dam operation that allows site potential vegetation. |
| DEQ Response | We have included additional narrative in the WQMP regarding BOR's coordination role with BLM and other group's restoration efforts. | | | |

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| Comment 2-21 (Vale/Burns) | Section Number 9-28 | Statement from Document *Flow alteration may also pose problems for restoration.* | Questions/Comment/Recommendation Change this statement for flow alteration does pose a problem with restoration and invasive plants do prefer these altered flows. e.g., The Army Corps of Engineers at Alamo Dam, AZ in good water years is creating flood releases which are synchronized with cottonwood and willow seed germination. This has dramatically reduced salt cedar dominance, replaced by cottonwood and willow dominance. These flows sustain a wetland community that has become stair stepped with beaver dams. Additionally, the invertebrate, bird and fish, communities are being monitored and are showing desired improvement. Various additional studies have recently occurred along the Colorado River. |
| DEQ Response | We have edited the text to clarify that hydrological changes documented in the cited literature (similar to the observed changes at Warm Springs and Beulah Reservoirs) does pose a problem for woody vegetation regeneration and restoration but to our knowledge there has been no formal study downstream of these dams. This is the reason DEQ is requiring the Bureau of Reclamation to investigate this further and to address it in their implementation plan. | | |

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| Comment 2-22 (Vale/Burns) | Section Number 9-29 | Paragraph Add a paragraph at the end | Statement from Document Suggestion: | Questions/Comment/Recommendation This is just a suggestion for you to add a paragraph at the end of 3 that discusses the interrelationships among:<br>• Riparian vegetation<br>• Channel function to compensate for<br>• Dam operations and irrigation withdrawals and returns.<br><br>Regardless of the presence of potential riparian plant communities and functional channels downstream from a dam or irrigation canal, withdrawal or return, the impacts from operation of the dam or irrigation system will not be immediate and unlikely to be solely mitigated by vegetation or channel morphology and function. These functions will probably not quickly dissipate warmer water. |
| DEQ Response | We have added additional narrative and citations discussing the relationships of riparian vegetation and flow management at dams. | | | |

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| Comment 2-23 (Vale) | Section Number 9-30 | Paragraph 1 | Statement from Document "Withdrawal rates reducing flow from tributaries are not included in the cumulative total." | Questions/Comment/Recommendation In order to accurately reflect the impacts of water withdrawals within the basin the cumulative effects of water right withdrawals should be expanded. |
| DEQ | There is significant uncertainty with the amount of water actually withdrawn as well as | | | |

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| Response | QA/QC issues when scaling the analysis up to all upstream tributaries. For the Malheur River this would essentially include the entire basin. We agree it would be a nice addition to the TMDL but it is not necessary to demonstrate the relationship between water withdrawals and reduced assimilative capacity. This concept is already discussed in numerous places in the temperature chapter and cited references. |

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| Comment 2-24 (Vale/Burns) | Section Number 9-32 | Paragraph Pp2 | Questions/Comment/Recommendation<br>You have partially quoted Azuma et al 2005, and have left out the effect that fire suppression has played. Include Azuma et al information on fire suppression as a element of juniper encroachment. BLM is actively managing juniper using fire and mechanical methods and would appreciate the acknowledgement that the practice of replicating historic fire regimes, can be beneficial to the watershed health and ultimately water quality. |
| DEQ Response | The quoted text does include discussion of fire suppression. We have added narrative to Section 5.2 in the WQMP to recognize BLM's juniper management efforts. | | |

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| Comment 2-25 (Vale/Burns) | Section Number 9-32 | Paragraph section | Questions/Comment/Recommendation<br>No mention of climate change and the potential effects over the TMDL period. Since there is general consensus that climate change (increases in air temperature) is upon us, and that changes can occur over the term of the TMDL, it seems that climate change is felt to be more predictable than some of those listed. Suggest Climate Change be given more acknowledgement by including it in this list. The document in general is silent on the effect of Climate Change on effects to stream temperature. Section 9-32: Anthropogenic Change could address change in juniper expansion. |
| DEQ Response | See our response in comment 2-3. | | |

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| Comment 2-26 (Vale/Burns) | Section Number 9-32 | Paragraph page | Statement from Document<br>Statement: "Warmer stream temperatures from the loss of riparian vegetation and Reduced flows may be a result of these changes". | Questions/Comment/Recommendation<br>You have not made the connection between loss of riparian vegetation and encroachment by juniper. Actually juniper can provide shade. Suggest removing "loss of riparian vegetation" in this statement, unless you can make this linkage. |
| DEQ Response | Reduced soil moisture and localized flow provides a competitive advantage to juniper and results in the loss of existing riparian vegetation. We have edited the text to clarify this may not lead to reduced shade but can lead to loss of cold water refugia via local flow reductions. | | | |

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| Comment 2-27 (Vale/Burns) | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |

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| | 9-40 | Pp 2 | The section of Site Potential vegetation contains "qualities" which seem appropriate (first three bullets). | The last 2 bullets mention "buffers" which are basically BMP's. This is confusing as "effective shade" provided by the SPV is the target. Remove reference to buffers as this does not describe Site Potential vegetation. It may be a recommendation in the WQMP. |
| DEQ Response | Buffer width (like vegetation height and density – second bullet) is an important quality and consideration when establishing site potential vegetation because it is directly related to the attainment of the effective shade surrogate measure. | | | |

| Comment 2-28 (Vale/Burns) | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| | 9-40 | Pp -5 | Statement: "Land managers should use the information in the TMDL and referenced documentation as a resource but defer to site specific conditions when establishing site potential vegetation at the plot level" | BLM agrees with this statement and recommends that this appear in the WQMP. |
| DEQ Response | This statement has been added to Section 4.3 Goals and Objectives section of the WQMP. | | | |

| Comment 2-29 (Vale/Burns) | Section Number | Statement from Document | Questions/Comment/Recommendation |
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| | 9-41 | Figure 9-21: It is unsure where this photo is taken from. | Is this type of vegetation attainable for most of the Malheur River Basin? We are not sure if this is upstream or downstream. This photo really needs some clarification. |
| DEQ Response | The photo in Figure 9-21 is a picture of riparian vegetation along Big Creek in the Logan Valley looking downstream. The picture was taken on the Malheur National Forest near Big Creek Campground. It is a good example of site potential vegetation within the 11o cold basin ecoregion. We do not consider this to be representative of site potential vegetation in the entire basin – only sites in the cold basin ecoregion (Logan valley) with similar ecological controls. We have updated the text to provide better context and added pictures from other ecoregions. | | | |

| Comment 2-30 (Vale/Burns) | Section Number | Statement from Document | Questions/Comment/Recommendation |
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| | p.9-42 | Statement: "Figure 9-22 and Figure 9-23 show the simulated percent effective shade estimates on modeled streams by river kilometer." | Reader not sure upstream downstream? Clarification. "Figure 9-22 and Figure 9-23 show the simulated percent effective shade estimates on modeled streams by river kilometer upstream of Warm Springs and Beulah Reservoirs." |
| DEQ Response | Suggested text has been added. | | | |

| Comment 2-31 (Vale/Burns) | Section Number 9-43 | Paragraph Pp 1 | Statement from Document The BLM commends the use of the cumulative frequency distribution as a means of accounting for disturbance and a range of condition across our ownership. It is somewhat unclear how this is intended to be used in terms of the "effective shade surrogate" It would help DMA's , if an explanation of how this would be used in reporting condition of DMA lands, in regard to meeting the TMDL surrogate of effective shade. | Questions/Comment/Recommendation Recommend referencing the Cumulative Frequency curves in a short explanation on how the DEQ intends the DMAs to use these in describing current condition and future condition along the modeled reaches. |
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| DEQ Response | The following text has been added to Section 9.10.2: For assessment and monitoring, land managers could measure effective shaded using a random sample study design and compare the results to the frequency distributions. | | | |

| Comment 2-32 (Vale/Burns) | Section Number 9-48 | Paragraph Pp - 2 | Statement from Document Statement: "Natural vegetation conditions or natural disturbances (no anthropogenic) that result in effective shade below the maximum potential will not be considered out of compliance with the TMDL. This TMDL recognizes that complex vegetation communities and unpredictable natural disturbances may result in effective shade well below the levels presented in the effective shade curves." | Questions/Comment/Recommendation BLM agrees with this statement as a reasonable way to "interpret" the shade curves. We recommend that this statement be repeated in the WQMP. |
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| DEQ Response | Additional text not necessary in the WQMP as it is already stated in the TMDL. | | | |

| Comment 2-33 (Vale/Burns) | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |
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| | 9-50 | Figure 9-30 | BLM notes that the shade curves are provided for 3 major stream orientations however no average curve is provided. When dealing with implementation plan development and condition assessment it is helpful to deal with 1 curve per Eco-region. (precision?). The more site specific assessment would use the orientations provided. | Recommend providing an "average" or "mean" curve in each of the eco-region curves as has been provided in other past TMDLs |
| DEQ Response | A curve based on the average of each aspect implies that the stream/s have an equal distribution of each aspect. This is not always the case and is the reason we have discontinued the use of the average curve on our figures. We do recognize that for planning purposes precision is not as important. We recommend for plan development it would be better to estimate the most common or average stream aspect and chose the one line most appropriate. | | | |

| Comment 2-34 (Burns) | Section Number p.9-62 | Paragraph 2 | Statement from Document *DMAs will manage or eliminate human disturbance from land management activities such as road building, urban development, forest harvest, forest management, farming and grazing such that riparian vegetation can passively restore and meet the effective shade surrogates according to the qualities described in Section 9.10.1* | Questions/Comment/Recommendation BLM agrees with the first two qualities (in Section 9.10.1), but the last two dealing with buffers is a site specific determination. See comment above.<br><br>Recommend removing buffer statements from the "qualities" section. |
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| DEQ Response | See response 2-27. | | | |

| Comment 2-35 (Vale/Burns) | Section Number WQMP p.3 | Statement from Document Statement: "Because the DMAs will require some time to fully develop these Implementation Plans once the TMDLs are finalized, the first iterations of the Implementation Plans are not expected to completely describe management | Questions/Comment/Recommendation How does this relate to BLM's responsibility for WQRP's and content appearing on page 12 of the WQMP ? Statement: "DEQ expects that the USFS, BLM, and USBR will fulfill the planning expectations of Section 4.9 within 18 months of the date of receipt of their notification letter." We suggest repeating the "first iteration" statement in section |
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| | efforts". 4.1.1 of the WQMP |
| DEQ Response | The "first iteration" statement was added to the WQRP requirement language in Section 4.9 of the DEQ WQMP. |

| Comment 2-36 (Burns) | Section Number WQMP p.11 | Paragraph 1 | Statement from Document The BLM appreciates the recognition of an existing WQRP and the summary of its content. | Questions/Comment/Recommendation |
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| DEQ Response | Comment noted. | | | |

| Comment 2-37 (Vale/Burns) | Section Number WQMP p.10 | Paragraph pp-5 | Statement from Document Statement: DEQ Expectations: Within 18 months of completion of the temperature TMDL, DEQ expects the Vale District BLM to develop a WQRP which will address the percent effective shade goals for **all streams** within the Malheur River Basin that are located on Vale District BLM managed lands | Questions/Comment/Recommendation Following with the above comments, the TMDL for temperature should not include all streams (e.g. ephemeral and some intermittent) as these have no contribution to the load, the historical listing or effect to the designated beneficial use. BLM recommends that this statement be refined to include perennial streams and those intermittent channels that could provide contribution to load. |
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| DEQ Response | Changed text to read: all intermittent and perennial stream. See response to comment 2-13. | | | |

| Comment 2-38 (Burns) | Section Number WQMP p.11 | Paragraph 3 | Statement from Document *1.A schedule for completion of monitoring activities such as measurement of effective shade, Proper Functioning Condition, green line, channel morphology or other methods that can demonstrate an upward trend in riparian vegetation to meet the requirements of the* | Questions/Comment/Recommendation 1. A schedule for completion of monitoring activities such as measurement of effective shade, Proper Functioning Condition, green line, channel morphology or other methods that can demonstrate **condition in relation to the TMDL target and if necessary** an upward trend in riparian vegetation to meet the requirements of the TMDL and DEQ TMDL implementation rules and guidance. |
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| | | | *TMDL and DEQ TMDL implementation rules and guidance.* | Trend is not necessary if conditions meet the target. |
| DEQ Response | The changes to the text have been made as requested. | | | |

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| Comment 2-39 (Vale/Burns) | Section Number WQMP pp.10/11 | Paragraph Pp-6 | Statement from Document Statement: "The WQRP shall include the following: 2. A schedule for evaluation and implementation of grazing allotment management needs." | Questions/Comment/Recommendation Recommend : 2. A schedule for evaluation and implementation of grazing allotment management needs **that are related to riparian condition.** |
| DEQ Response | Statement has been added to text | | | |

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| Comment 2-40 (Vale/Burns) | Section Number WQMP pp.10/11 | Paragraph Pp - 6 | Statement from Document Statement: "The WQRP shall include the following: 3. A protocol of management strategies BLM will use to successfully manage riparian areas to meet the shade surrogates, and the protocol for implementing management changes if needed." | Questions/Comment/Recommendation Recommend: 3. Management strategies BLM will use to successfully manage riparian areas to meet the shade surrogates, and the methods for implementing management changes if needed." Our references do not use "protocol" and this language could give a impression. The Districts use standard and guidelines. |
| DEQ Response | The requested changes have been made to the text of the WQMP. | | | |

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| Comment 2-41 (Vale/Burns) | Section Number 14 | Paragraph Pp - 5 | Statement from Document Statement: "Passive restoration can be accomplished through measures such as fencing riparian vegetation or allowing vegetation to grow in areas between farm fields and streams." | Questions/Comment/Recommendation This is a minor point but the BLM views fencing riparian vegetation as an "active" restoration method. |
| DEQ Response | Comment noted. | | | |

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| Comment 2-42 | Section Number | Paragraph | Statement from Document | Questions/Comment/Recommendation |

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| (Vale/Burns) | WQMP 18 | PP | Section: "Juniper management as a component of watershed restoration" | It would be helpful to include in this section a similar statement to that mentioned under fuel treatments but with reference to juniper treatment "Disturbance caused by juniper management may cause temporary loss of shade but will ultimately result in more stable and resilient uplands and riparian areas." |
| DEQ Response | The requested changes have been made to the text of the WQMP. | | | |

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| Comment 2-43 (Vale/Burns) | Section Number N/A | Paragraph N/A | Statement from Document BLM notes that in past TMDL's the ODEQ is explicit about the timeframes involved with reduction in heat loading. The following statement occurred in the Upper Klamath and Lost river TMDL: *"ODEQ recognizes that it may take some period of time—from several years to several decades--after full implementation before management practices identified in a TMDL implementation plan become fully effective in reducing and controlling certain forms of pollution such as heat loads from lack of riparian vegetation".* | Questions/Comment/Recommendation BLM recommends repeating this statement in the Malheur TMDL. |
| DEQ Response | We have included similar narrative in Section 4.5 of the WQMP. | | | |

## Response to Bureau of Reclamation Comments

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| Comment 3-1 | **4.1 Nutrients/Chlorophyll/Dissolved Oxygen**<br>**Figure 3-4 and Table 3-1, page 4-3:** Incorrect references in this paragraph and missing information. |
| DEQ Response | The figure and table references have been corrected to refer to Section 2.3. |

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| Comment 3-2 | **4.5 Temperature**<br>**Page 4-9 paragraph 2:** "know" should be "known." |
| DEQ Response | The text has been corrected. |

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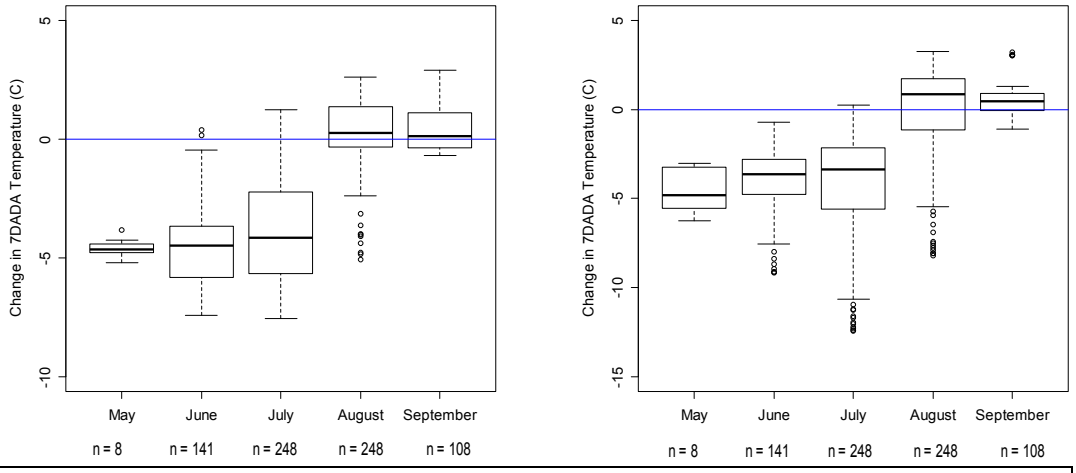
| Comment 3-3 | **4.5 Temperature**<br>**Page 4-22 paragraph 1**: it is stated that "reservoirs periodically release water which is warmer than the water entering upstream." In Figure 4-25, a few instances are presented for Beulah Reservoir in 2005, illustrating cooler inflow when compared to reservoir outflow. Is this phenomenon indicative of all years at this reservoir and how correlated is the inflow temperature to air temperature? |
| DEQ Response | Comparing up and downstream rolling seven day average of the daily average stream temperatures (7DADA), the downstream 7DADA temperatures at Beulah Reservoir were warmer than the upstream 7DADA 29% of the time for the period of available data (2002-2009). At Warm Springs Reservoir, the downstream 7DADA stream temperatures were warmer than the upstream 7DADA stream temperatures 32% of the time for the period of available data (2005-2009). At both reservoirs more than 50% of the analysis days in August and September were warmer (see **Figure 1**). All calculations were made only when the upstream rolling seven day average daily maximum (7DADM) temperatures exceeded the 20 $^{o}$C biological criterion. Similar upstream/downstream comparisons were made using the seven day average daily maximum (7DADM) temperatures (see **Figure 2**).<br><br>When the upstream 7DADM stream temperatures were >=20$^{o}$C, the gages up or downstream were not reading air temperatures.<br><br>**Figure 1. Monthly boxplot distribution of the daily difference between 7DADA stream temperatures (downstream dam minus upstream dam) when upstream 7DADM temperatures >= 20 $^{o}$C).**<br>A) Beulah Reservoir B) Warms Springs Reservoir<br>  <br><br>**Figure 2. Monthly boxplot distribution of daily difference between 7DADM stream temperatures (downstream dam minus upstream dam) when upstream 7DADM temperatures >= 20 $^{o}$C).** |

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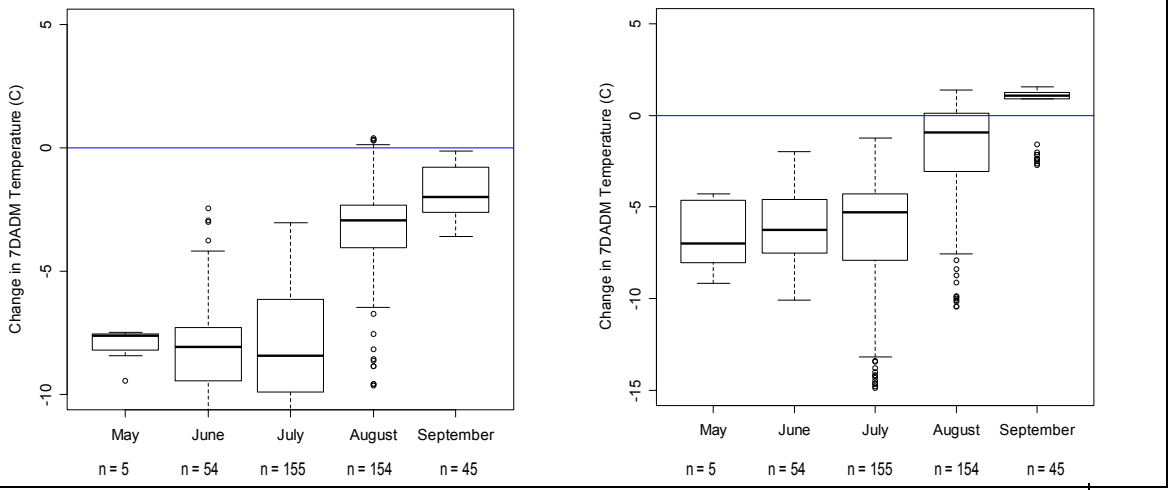
| | A) Beulah Reservoir B) Warms Springs Reservoir<br>  <br><br>These boxplots and additional narrative have been added into chapter 9. The narrative describing Figure 4-25 has been modified to reflect that the conditions described occurred in 2005. |

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| Comment 3-4 | **6.10 Phosphorus Allocations**<br>**Page 6-43 paragraph 3:** Are the range of flow conditions associated with the phosphorus allocations also summarized for the same months? It is not clear in Figures 6-32, 6-33 and 6-34 on pages 6-44 through 6-46. |
| DEQ Response | Daily flows for the entire 7 year time period were used to construct the load capacity curve (blue line). Using all flow measurements available allowed the construction of a more complete and robust curve. Individual total phosphorus loads were compared to the load capacity curve at a point where the flow duration interval for that day is equal to the flow duration interval on the curve (same flow level). The difference between the measured load and the load capacity was used to calculate the % reduction needed to meet the total phosphorus allocation. |

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| Comment 3-5 | **9.5 Seasonal Variation & Critical Condition**<br>**Page 9-14 paragraph 1:** Last sentence is incomplete. |
| DEQ Response | The error was corrected. |

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| Comment 3-6 | **9.5 Seasonal Variation & Critical Condition**<br>**Page 9-15 Figure 9-6:** Please explain the impairment (as stated on page 9-14) through the end of October. |
| DEQ Response | The impairment period reflected in the dataset shown in figure 9-6 drops below the bull trout biological temperature criterion on October 5th. We established the end of October as the period where "impairment is unlikely" because the federal Clean Water Act regulations require consideration of seasonal variation which can vary from year to year. We did not feel setting a date on October 5th was appropriate considering we only analyzed a few years of temperature data. The Burns Paiute Tribe provided DEQ with additional data (2006-2009) which we have reviewed and determined the end of October is too late in the season. We have revised the figures and changed the critical period ending date to October 15th. We have updated the text to reflect this information. |

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| Comment 3-7 | **9.6 Sources of Temperature Increases**<br>**Page 9-28 Figure 9-13:** Temperatures during the month of May appear suspect, particularly |

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| | during zero flow conditions below the dam. The instrument is installed in a shallow location below the project and may be recording localized warming, or potentially air temperature, when discharges below the dam are zero. Please verify that these temperatures are representative of the stream reach. Similar phenomenon is shown in Figure 9-14. |
| DEQ Response | You are correct. In 2005 the data loggers appear to be recording air temperature. We have corrected the text. Although this does not dismiss our concern that when the dams dewaters the downstream reach (particularly in May) it decreases the thermal assimilative capacity contributing to warmer temperatures downstream. |

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| Comment 3-8 | **9.8 Excess Load**<br>**Page 9-35 Table 9-9 and Table 9-10:** Please explain the assumptions used for the computations of solar load, in addition to the partitioning of load responsibility. |
| DEQ Response | Equation 2 found on the same page as Table 9-9 and Table 9-10 describes the calculation of solar load. It is as follows:<br><br>Equation 2. $\boldsymbol{Solar\ Load = A \times \Phi solar \times 0.00002064}$<br><br>where,<br>$Solar\ Load = Solar\ load\ receved\ at\ the\ stream\ surface\left(\frac{Gigacalories}{day}\right)$<br>$A = Wetted\ surface\ area\ of\ the\ stream\ (m^2) = length\ (m) \times width\ (m)$<br>$\Phi solar\ = Total\ daily\ solar\ radiation\ flux\ received\ at\ the\ stream\ surface\ \left(\frac{W}{m^2}\right)$<br>$0.00002064\ = \frac{W}{m^2} \times\ m^2 \times \left(W\ or\ \frac{J}{second}\right) \times \frac{86400\ seconds}{1\ day} \times \frac{1\ cal}{4.1868\ J} \times \frac{1\ Gigacalories}{1000000000\ calories}$<br><br>The wetted surface area of the stream was calculated per model segment (every 50 meters) by digitizing the wetted banks of the stream channel using aerial photos collected in summer of 2005. The total daily solar radiation flux was computed per model segment using the methodology described in the heat source user manual (Boyd and Kasper 2007). The total solar radiation flux at the stream surface represents the total atmospheric flux modeled on July 24, 2005 minus the solar radiation blocked by topography and vegetation.<br><br>The partitioning of load was completed using a GIS by summing the load received on lands owned/managed within each ownership for the modeled portions of the Malheur and North Fork Malheur Rivers. The excess load represents the current load (simulation 1) minus the load received under natural conditions (simulation 4). The background load shown on the pie charts in Figures 9-18 and 9-19 is the total load (for all ownerships) that is considered natural. On BOR lands, we modeled solar radiation on portions of the stream that were above the elevation of the dam. |
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| Comment 3-9 | **9.8 Excess Load**<br>**Page 9-35 paragraph 1:** Please explain how the difference shade potential simulations (Sim 1 through Sim 7) in Appendix B compute the solar loading capacity in Tables 9-9 and 9-10. Which simulation was used to determine allocation? |
| DEQ Response | See response 3-8 for excess load calculation methodology. Simulation 4 represents the natural condition that was used to compute the allocations and excess load on page 9-35. |

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| Comment 3-11 | **9.8 Excess Load**<br>**Page 9-35 paragraph 1:** Please explain the temperature model calibration results, assumptions and how resulting modeled temperatures in various reach locations, in Appendix B, compared to the stated standards. |
| DEQ Response | The modeling analysis did not include predictions of temperature. Only solar radiation and effective shade was modeled. We choose not to model temperature because in a system without point sources, the site potential vegetation and effective shade is the surrogate measure for meeting the natural conditions temperature criteria (See TMDL section 9.4.1). Knowing the temperature is not needed to understand the condition of vegetation. Comparing the current condition model effective shade to field measured effective shade (N=22), the root mean square error is ten percentage points (see Appendix B page B-36). The vegetation assumptions for current conditions and site potential are described in Appendix B (also see response for comment 3-8). On the minimal amount of BOR ownership in the riverine reach on the North Fork of the Malheur upstream of Beulah reservoir, we found that vegetation mostly meets the site potential vegetation targets (see BOR cumulative frequency distribution in Section 9.10.2). |

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| Comment 3-12 | **9.10 Load Allocations**<br>**Page 9-38 and 9-39 paragraph 2:** This paragraph states that reservoir operations will not warm downstream temperatures during period of impairment, however, Figure 9-1 on page 9-8 does not indicate the river reaches below the dam as being impaired. Similarly, page 9-10 allows 0.3 ºC above ambient, for the reaches below the projects, yet this paragraph allocates no additional temperature increase. Please define project allocations. |
| DEQ Response | Figure 9-1 shows streams listed on the 2004/2006 integrated 303 (d) list only (we have corrected the heading to be more clear). When the 303(d) assessment was completed in 2004/2006, there was no temperature data submitted for assessment downstream of the reservoirs and therefore these reaches were not listed. However, both Bureau of Reclamation gages downstream of the dams (BEUO and WARO), and data collected by DEQ at four locations downstream of Warms Springs reservoir found the 7day average daily maximums do exceed the 20$^{o}$C Redband biological criterion. The 20$^{o}$C Redband biological criterion extends downstream of the dams to about where Namorf is located. The cool water species criterion (which allows 0.3 ºC above ambient) applies downstream of Namorf. The allocation to the dams is to eliminate downstream warming where the Redband use criterion occurs. DEQ temperature data was collected at the gage downstream of Warm Springs Reservoir (LASAR #33229), at Juntura (#33177), at Jones Ranch (#33176), and at Namorf (#33175). We placed new graphs and additional narrative in the TMDL to provide context for the allocations downstream of the dams. |

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| Comment 3-13 | **9.10 Load Allocations**<br>**Page 9-39 bullet item 2:** Figure 9-1 on page 9-8 does not indicate the river reaches below the dam as being impaired. Please explain the rationale for managing flood control for vegetation management. Shade potential modeling results were not illustrated in Appendix B below, or around, Reclamation projects. |
| DEQ Response | Modeling was not completed downstream of BOR projects but stream temperatures do exceed the 20$^{o}$C Redband biological criterion and would be listed as impaired in future 303(d) assessments if they are not addressed in this TMDL (see comment 3-12). Woody vegetation such as willows and cottonwoods typically rely on the hydraulic regime to propagate and regenerate. Flooding in the riparian zone promotes physical and geomorphic conditions favorably to these species (fresh exposed soil, soil moisture, groundwater replenishment, oxygen/nutrient availability). Flooding also promotes the distribution of branches and seeds of which timing is very important. Modifications to flood timing and frequency impair these processes and affect the type and distribution of riparian vegetation longitudinally and laterally across the floodplain as documented in studies downstream of |

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| | dams in Montana, Arizona, Colorado and Canada (see TMDL for citations). We want BOR to examine this process downstream of BOR dams and modify operations if necessary to promote natural regeneration or support restoration activities. We have updated the narrative in the TMDL to provided additional discussion on these processes. |

## Response to EPA Region 10 Comments

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| Comment 4-1 | EPA reviewed the 303(d) listings in the Malheur and Middle-Snake Payette Subbasin and performed an accounting of which listing were addressed by the TMDL. EPA commented that several bacteria listings for Willow Creek, Bully Creek and two listings in the Middle Snake-Payette Subbasin were not addressed by the TMDL. |
| DEQ Response | Bacteria load allocations for Willow Creek, Bully Creek, Jacobson Gulch and Shepherd Gulch have been provided in the TMDL. See pages 7-19 and 7-20. |

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| Comment 4-2 | EPA also commented that it was questionable whether the total phosphorus allocation for phosphorus from the Hell's Canyon TMDL will be sufficient to address chlorophyll a listings in Willow Creek, Bully Creek and the Lower Malheur River. |
| DEQ Response | DEQ has added language to Section 6.5.2 of the TMDL which explains the use of the chlorophyll a criterion as an action level that triggers further investigation. The investigation is performed to determine if there is a "beneficial use impact" and if so, recommend a "control strategy for attaining compliance". DEQ generally uses dissolved oxygen (DO) and pH levels to determine if there is an impact. An analysis of DO data showed no exceedances of applicable criteria and de-listing was proposed for that parameter. An analysis of pH data resulted in a few slight exceedances of the criteria in two locations in the Malheur River where high nutrient levels combined with moderate to high water clarity allowed algae to bloom and increase pH levels. As discussed in Section 6.8, DEQ has concluded that it is very likely that reductions in phosphorus levels during TMDL implementation will address these pH issues in the Malheur River. There were no exceedances of the pH criteria in Willow and Bully Creeks. There were also no exceedances of the chlorophyll action level in the DEQ Willow Creek chlorophyll results presented in Figure 6-17. |

## Response to Ken Freese's Comments

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| Comment 5-1 | Mr. Freese expressed support for clean water and stated that he is willing to make improvements on his farm where feasible. He said that his family has made many improvements to the farm, such as land leveling, installation of concrete ditches and underground piping. Much of the runoff from his farm goes to treatment wetlands located on the nearby Luther property. |
| DEQ Response | DEQ applauds Mr. Freese's commitment to improvements which make his farm more efficient and reduce water pollution. The BMPs that he has employed are used as examples in the Water Quality Management Plan (WQMP) attached to the TMDL. If these BMPs were more widely used in the basin, water pollution would be substantially reduced. |

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| Comment 5-2 | Mr. Freese stated that he is very concerned about mandates for expensive irrigation changes such as conversion to sprinkler systems. The capital costs along with payments for additional electric power are prohibitive. |
| DEQ Response | DEQ is not mandating any particular BMP. The WQMP identifies sprinkler conversion as a possible viable alternative for farms located in areas where there is sufficient hydraulic head (generally over 50 feet) to provide most of the pressure needs for sprinkler systems. Section 5.0 of the WQMP identifies other BMPs, such as treatment wetlands, as viable alternatives for areas with less hydraulic head or other impediments to sprinkler conversion. |

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| Comment 5-3 | This document could be used by environmental groups to file litigation against farmers, ranchers, and irrigation districts to seek to prohibit them from continuing their operations and forcing them to spend money defending themselves instead of making improvements. Too much of this report will be left to interpretation. |
| DEQ Response | The federal Clean Water Act requires the development of TMDLs to address water pollution. DEQ cannot control what other groups may decide to use in litigation. DEQ was careful to point out the difficulties and expense of implementing the TMDL. Implementation efforts on private farmland and rural areas will be done through the processes covered under the Agricultural Water Quality Management Act under the authority of ODA. Section 5.0 of the WQMP describes a process which will likely take decades and expenditures of millions of dollars. It is not expected that success will be achieved easily. Incremental progress is a measure of success. |

## Response to Harney County Court Comments

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| Comment 6-1 | The Court expressed concern about the allocation of temperature loads to various sources such as loss of riparian vegetation, grazing, western Juniper expansion and water withdrawals in an equitable manner. |
| DEQ Response | DEQ was not able to quantify the impacts from these sources individually and chose to rely on obtaining natural thermal potential as a temperature standard. The TMDL identifies site potential vegetation is the major mechanism for implementing the TMDL. The TMDL and WQMP also identified projects which address stream flows, water storage, and Juniper management as being consistent with the implementation of the TMDL. |

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| Comment 6-2 | The Court asked that DEQ examine the effect of irrigation returns on stream flows and water temperatures. The Court cited studies which are reported to show irrigation return water improving late season stream flows in the Malheur and John Day Basins. |
| DEQ Response | DEQ recognizes that ground water return flow to streams from flood irrigation, leaking canals and structures such as infiltration basins can increase late season stream flows and cool surface water temperatures. The TMDL states that flow and temperature data from the lower Malheur River indicate that return flows have a positive effect. Data from the Upper Malheur River Irrigation Return Flow Study conducted by the Oregon Water Resources Department in 1988 do not indicate a significant positive effect. WRD stated: "Based on the findings of the project, no significant correlation could be seen between spring flood irrigation and summer stream flows. Major irrigation return flows, resulting from excess spring flooding , seem to have occurred in the form of overland flows before early June" The report also states: "The limited return flows observed in the summer months are most likely to have resulted from summer irrigation and not spring irrigation." The limited summer irrigation return flow mentioned here is likely responsible for the late summer cooling seen in the temperature profile for the Malheur River at Drewsey (Figure 4-26 of the TMDL document).<br><br>Despite the lack of evidence supporting the current flood irrigation practices as a significant source of improved late season flows in the upper Malheur River, DEQ is supportive of aquifer/flood plain water storage projects. Improved design and implementation of these types of practices may bring the success seen in other areas. The Section 5.2 of the WQMP includes aquifer storage and recovery and better flood plain/river channel connections as significant mechanisms of temperature TMDL implementation. |

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| Comment 6-3 | The Court asked for more consideration of the water use from expanded riparian vegetation. |
| DEQ Response | DEQ recognizes that increased riparian vegetation will consume additional water through transpiration. However, evidence from many stream enhancement projects has shown that improved riparian vegetation can contribute to bank and flood plain water storage and |

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| | improve stream flows in later summer. |

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| Comment 6-4 | The Court was concerned about the application of numeric temperature standards to streams in the Malheur River basin without testing the appropriateness of the standard in a natural setting. |
| DEQ Response | DEQ has applied the Natural Thermal Potential criteria to most Malheur River Basin streams due to the recognition that many streams in the basin will not meet numeric temperature standards even when human impacts are minimized. Applying Natural Thermal Potential will require the establishment of site potential vegetation along streams in the basin. It is expected that land owners and managers will allow the development of riparian vegetation along streams in accordance with regulatory documents such as the Malheur River Basin Agricultural Water Quality Management Area Plan and other applicable plans. |

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| Comment 6-5 | The Court has asked for clarification of Harney County's roles and responsibilities regarding TMDL implementation, and about the possibility of the County preparing a TMDL implementation plan. The Court also asked if Implementation Plan templates were available. |
| DEQ Response | DEQ has named Harney County (not just the Road Department) as a Designated Management Agency (DMA) and has clarified the text in the WQMP to reflect this designation. DEQ has given Harney and Malheur counties the option of agreeing to generally support the implementation of the Malheur River Basin AgWQMA Plan rather than preparing their own TMDL implementation plans. DEQ envisioned this support to be in the form of giving consideration to plan requirements for riparian vegetation and other conservation measures when conduction activities such as road maintenance and construction, land use decisions, and other activities that may impact stream function and water quality. If Harney County would prefer to write an implementation plan, DEQ is willing to provide input and guidance. There are no templates currently available. |

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| Comment 6-6 | The Court and others have raised concerns about the preparation of TMDLs and associated load allocations for non-point sources. The Court has stated that the position of the County is that the load allocation process of the Clean Water Act (CWA) only applies to streams with point sources, and that water quality standards are arbitrary. |
| DEQ Response | DEQ has consulted with the State Attorney General's office and has been advised that that it has the legal authority to prepare TMDLs and load allocations for nonpoint pollution sources in order to protect beneficial uses of Waters of the State. A portion of that legal authority is included below:<br><br>ORS 468B.110(1), (bold emphasis added)<br><br>*468B.110 Authority to establish and enforce water quality standards by rule or order; limitation on authority; instream water quality standards.*<br>*(1) Except as provided in subsection (2) of this section, as necessary to achieve and maintain standards of water quality or purity adopted under ORS 468B.048,* ***the Environmental Quality Commission or Department of Environmental Quality may, by rule or order, impose and enforce limitations or other controls which may include total maximum daily loads, wasteload allocations for point sources and load allocations for nonpoint sources, as provided in the Federal Water Pollution Control Act (33 U.S.C.§ 1321) and federal regulations and guidelines issued pursuant thereto.***<br>*(2) Unless required to do so by the provisions of the Federal Water Pollution Control Act, neither the Environmental Quality Commission nor the Department of Environmental Quality shall promulgate or enforce any effluent limitation upon nonpoint source discharges of pollutants resulting from forest operations on forestlands in this state. Implementation of any limitations or controls applying to nonpoint source discharges or pollutants resulting from forest operations are subject to ORS 527.765 and 527.770. However, nothing in this section is intended to affect the authority of the commission or the department provided by law to impose and enforce limitations or other controls on water pollution from sources other than* |

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| | *forest operations.*<br><br>Preparation of TMDLs for nonpoint-only streams is also a requirement under the federal Clean Water Act : *Pronsolino v. Nastri, 291 F. 3d 1123 – Court of Appeals, 9th Circuit, 2002.*<br><br>Water quality standards are developed to protect beneficial uses of water through a rigorous scientific process. DEQ will continue work to implement the Malheur River Basin TMDL in a fair and equitable manner that is sensitive to the needs and economic limitations of the people in the basin. |

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| Comment 6-7 | The Court has asked DEQ to consider the impact of flow on water quality. |
| DEQ Response | DEQ does not regulate flow in streams, but the TMDL includes discussions of flow impacts and the role that flow restoration can have on water quality. Flow enhancement is recognized in the TMDL and WQMP as a significant TMDL implementation tool. The application of the Natural Thermal Potential criteria allows for the recognition of natural low flows in streams when applying temperature standards. |

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| Comment 6-8 | The Court has pointed out the significance of Western Juniper Expansion impacts to water quantity and quality in Malheur River Basin streams. |
| DEQ Response | DEQ heard concerns from public land managers as well as private landowners about the significance of juniper expansion during TMDL development. The TMDL and WQMP include sections which discuss the role of properly designed and implemented Juniper removal projects as part of TMDL implementation. DEQ supports efforts to address the situation and welcomes input on this topic to be included in TMDL implementation plans. |

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| Comment 6-9 | The Court has requested the recognition of hot springs as a source of stream heating in the basin. |
| DEQ Response | DEQ has examined some of the available data on hot springs in the basin and conducted some temperature monitoring at a hot spring on the Malheur River. DEQ feels that application of the Natural Thermal Potential criteria will accommodate the impacts of hot springs. |

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| Comment 6-10 | The Court has asked for verification of statements regarding the condition of historic riparian vegetation and has cited an example in Section 3.5 of the TMDL document. |
| DEQ Response | Section 3.5 and other sections in the TMDL document which describe historic riparian conditions were written based on reviews of historic descriptions, photographs, ecological investigations and current observations by DEQ staff. Section 3.5 was not meant to imply that wetlands and willows were abundant across the entire valley of the lower Malheur River. The description states that willows were likely present in areas subject to seasonal flooding and that other dry areas were covered by grasses, shrubs and desert playas (dry basins). This description is consistent with early pioneer journals and trapper accounts. <u>The language in this section has been modified in an attempt to clarify this intent.</u><br><br>In other areas of the basin, larger trees such as cottonwoods were likely more abundant than they are currently. This statement does not imply that extensive cottonwood galleries lined the river bank continuously. Larger woody vegetation can only grow where hydrology, climate and soils, allow. DEQ has stated that the determination of site potential vegetation during TMDL implementation will be made by local land managers such as BLM, USFS and ODA. |

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| Comment 6-11 | The Court has asked DEQ to consider the management of wild horses as sources of bacteria and riparian degradation. |
| DEQ Response | DEQ has discussed the significance of wild horse impacts on riparian zones with BLM and private landowners. DEQ expects that these impacts will be addressed to the extent |

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| | possible during TMDL implementation. Wild horse management has been added to the list of mitigation activities in Section 5.2 of the WQMP. |

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| Comment 6-12 | The Court expressed support for DEQ's efforts to use shade curves as a standard for meeting TMDL temperature requirements, and has asked for further discussion and "historical truthing". |
| DEQ Response | DEQ has included shade curves as one possible method for measuring progress during TMDL implementation. DEQ will continue to refine the use of shade curves during implementation and is open to the use of other measures of improving stream health. Authors of implementation plans are encouraged to suggest methods of applying shade curves specific to the areas they manage or other methods of measuring progress. |

## Response to Harney Watershed Council Comments

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| Comment 7-1 | The Harney County Watershed Council (WSC) has expressed concern over the use of pre-1996 fecal coliform data in the TMDL. |
| DEQ Response | As described in the first paragraph of Appendix A of the TMDL (Laboratory Bacteria Analysis Methods), some pre-1996 fecal coliform bacteria data were used in the original 303(d) water quality limited listing in 1998. Fecal coliform data generally were not used in TMDL development. Bacteria allocations for the Malheur River and North Fork Malheur River were developed using load duration curves based on e-coli data collected between 2000 and 2006. |

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| Comment 7-2 | The Harney County WSC commented that DEQ blamed most of the phosphorus loading to streams on headwater grazing and ranching practices despite the lack of high phosphorus levels in headwater streams. |
| DEQ Response | Section 6.9 of the TMDL describes phosphorus sources. In general, total phosphorus levels in headwater streams are below the TMDL water quality target of 0.07 mg/l. Well managed grazing was not identified as a source of phosphorus loading to streams. Loss of riparian vegetation leading to increased erosion is a potential source of phosphorus. Flood irrigated hay meadows were also identified as a potential source of phosphorus loading during spring and early summer when the potential for surface runoff is high. DEQ feels that these impacts to water quality could be mitigated by the use of consistent use of rotational grazing and the development of best management practices for hay meadows. |

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| Comment 7-3 | Harney County WSC commented on the difficulty of establishing riparian vegetation such as sedges and willows when perennial water was not available. |
| DEQ Response | The temperature TMDL requires that riparian vegetation be allowed to establish and grow to the extent that the local environment will allow. Water availability is expected to limit the growth of riparian vegetation in many locations. Droughts, floods, climate change and other factors are part of the natural disturbances that are described in the TMDL and WQMP. |

## Response to Erik Macus, MT DEQ, Comments

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| Comment 8-1 | Just reading through section 3 (Basin Assessment), and it appears that the last paragraph of section 3.5 (on page 3-7) should say that 80% of riparian areas used to occur BELOW 1000 meters, and now 80% occurs above this area. I think they are trying to make a comparison. |
| DEQ Response | This paragraph has been re-written to avoid the ambiguous language. |

## Response to Malheur County SWCD's Comments

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| Comment 9-1 | The Malheur SWCD expressed concern regarding unattainable standards being set in the TMDL and referred to the standards in the Middle Snake Payette TMDL which included a total phosphorus TMDL based on a concentration of 0.07 mg/l. |
| DEQ Response | DEQ realizes that this target concentration is very low when compared to current levels in the lower Malheur River. However, the background data that were examined and displayed in Section 6.9 of the TMDL do not support an increase in the total phosphorus target. The data show that the dramatic increases in phosphorus concentrations are strongly correlated with the timing of irrigation return flows and associated sediment. Information from the Malheur SWCD and others working in the basin have documented very high erosion rates in some agricultural areas, and have worked hard to mitigate them. DEQ will continue to work with land managers and groups such as the SWCD during implementation of the TMDL and will re-evaluate targets as necessary. The TMDL and WQMP describe implementation as a long term process with involves the use of adaptive management. |

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| Comment 9-2 | The SWCD commented that they have asked for a reachable standard for water temperature and has described riparian vegetation as better than in the historic past. |
| DEQ Response | The Natural Thermal Potential temperature standard can be met by allowing riparian vegetation to grow to its potential with human-caused impacts being minimized. Compliance with the Malheur River Basin Agricultural Water Quality Management Area Plan riparian vegetation requirements will be judged as compliance with the TMDL.<br><br>The potential for the growth of woody vegetation may have increased in some areas of the lower basin after construction of the major dams. Stable flows allow larger trees to grow in areas that they likely did not occur before the dams. However, there are still many areas throughout the basin where land management practices and other stressors such as invasive weeds have not allowed riparian vegetation to establish. |

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| Comment 9-3 | The SWCD has stated that the presence of sedimentary deposits in the lower Malheur River Basin make it impossible to meet the DEQ water quality standards for sediment and phosphorus, and that background phosphorus levels are much higher than the total phosphorus water quality standard. |
| DEQ Response | While the ultimate source of much of the phosphorus in the Malheur Basin is geologic, land use practices such as flood irrigation on relatively steep land, over-application of irrigation water, and other practices which dramatically increase erosion rates, mobilize phosphorus and deposit it in waterways. Chemical fertilizer and manure applications are also significant sources of phosphorus. As the Malheur SWCD has pointed out in numerous publications and grant applications, reducing irrigation induced erosion is a significant tool for achieving water quality improvements. |

## Response to Malheur Watershed Council's Comments

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| Comment 10-1 | p 1-4 paragraph 4 Implementation of good practices has been an ongoing theme for four decades and will not commence with the establishment of the TMDL. |
| DEQ Response | DEQ acknowledges the decades of work toward improving water quality that has occurred in the Malheur River Basin. Additional descriptions of this work have been added to Section 5.0 of the TMDL document as well is in Section 5.1 of the Water Quality Management Plan. |

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| Comment 10-2 | p 2-3 paragraph 1 Edit to read "known". |
| DEQ Response | The word "know" was replaced with "known" in the last sentence of the paragraph referenced. |

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| Comment 10-3 | p 2-4 Figure 2-2 contains most of the water flow lines in the county, many of which are dry washes. Ephemeral water courses should not be allocated to red band and Lahontan cutthroat trout. This is a serious and obvious error. |
| DEQ Response | DEQ agrees that many of the stream reaches shown on the Designated Fish Use map (Figure 2-2) are not perennial streams. However, a stream which is designated as fish habitat does not have to contain fish all year or even every year for the standard to apply in that waterbody. Intermittent streams can still provide fish habitat seasonally or contribute to the maintenance of water quality downstream. The primary purpose of the map was to show where the different dissolved oxygen and temperature water quality criteria apply as they are dependent on different fish uses. We have edited the text to provided additional context. |

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| Comment 10-4 | p 2-7 Figure 2-7 seems to be unreasonable, because even the highest reaches of the Malheur National Forest are out of compliance for temperature standards. It seems to us that the national forest has done a great job of management and the streams are in proper functioning condition. |
| DEQ Response | The stream segments shown on Figure 2-7 were judged to be out of compliance with numeric temperate standards based on available data prior to the development of the TMDL. The TMDL analysis allowed for a detailed review stream conditions, and the application for the natural thermal potential criteria to be applied where appropriate. Streams supporting site potential riparian vegetation are considered to be at their natural thermal potential, and have met the conditions of the TMDL. Field observations made by DEQ and the USFS indicate that many stream segments on the Malheur National Forest meet the natural thermal potential criteria, but some do not. The Malheur National Forest is developing a TMDL implementation plan which will be used to guide management decisions to maintain streams that meet the criteria and improve streams that do not. |

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| Comment 10-5 | p 2-10 paragraph 3, lines 8 & 9. The fact that nutrient loading starts very high in the landscape where there are very few human influences, should alert ODEQ of unusual processes. |
| DEQ Response | Areas with higher nutrient loading were in areas with poor riparian condition and higher rates of erosion. Land use and management appeared to be a significant factor as pointed out in the text referenced in the comment. |

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| Comment 10-6 | p 2-10 , paragraph 4, The basis of the temperature listings is rooted in opinions of what the temperature should be, not based on the environmental potential to provide cool and cold water. |
| DEQ Response | As stated in the response to comment 10-4, 303(d) temperature listings are made based on comparison to numeric temperature criteria. The TMDL process allowed the application of natural thermal potential where appropriate. |

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| Comment 10-7 | p 2-11 paragraph 2 As can be seen in the appendix, it is highly unlikely that the selection of stream segments was a random sample out of such a large set of stream segments. The study describes many more miles of perennial streams than the length described by the draft Malheur River subbasin TMDL, and it is hard to believe that so much perennial stream length actually exists in the subbasin. A random sampling of such a large length of stream segments would have likely resulted in the selection of many dry stream segments. These discrepancies alerts the reader that the assumptions and methods of the work cannot be taken at face value. |
| DEQ Response | The database of stream segments used to select sample locations for the biomonitoring project described in Appendix C did allow the selection of streams that were dry during the sample period (August). When a dry segment was encountered, a replacement segment was selected at random from the database. |

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| Comment 10-8 | p 3-3 Edit to read “owned and managed by” |
| DEQ Response | First sentence edited to read “public land managed by federal and state agencies” |

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| Comment 10-9 | p 3-5 Edit to read “continuing intermittently” |
| DEQ Response | Line 2 of paragraph 4 was edited to read “continuing intermittently until approximately 11,000 years ago.” |

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| Comment 10-10 | p 3-5 paragraph 5 the geological description lacks many of the most import aspects, because what is missing goes to the heart of the predominance of fine sediment in the subbasin. The Malheur River basin has been a source of the formation, deposition, and delivery of fine particle material for millions of years. Much of the landscape in the central part of the basin contains vast lake bed sediment deposits with varied composition of silt, diatomaceous earth, and volcanic ash. |
| DEQ Response | The geology section describes thousands of feet of fine sediments in the basin. |

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| Comment 10-11 | p 3-6 Edit to read “are alkaline”. Change the reference to the soil survey (Lowell, 1980). |
| DEQ Response | The word “alkali” has been replaced with “alkaline” in the line 5 of the first paragraph. |

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| Comment 10-12 | p 3-6 The text is in error. Edit to read “but November through June generally have the most precipitation”. |
| DEQ Response | The text has been corrected as requested. |

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| Comment 10-13 | p 3-7 paragraph 1. Please provide the evidence to back the claim why the loss of a small beaver population, should have such a dramatic influence on river function. |
| DEQ Response | Beaver are considered a “keystone” species which create essential habitat for many other aquatic and terrestrial species. Beaver create many acres of wetland/pond habitat and provide areas for storing water, nutrients, and sediment (Naimen et al 1988). Loss of beaver in a watershed can cause major changes to riparian habitats and eventual reduction of the water table, as well as loss of sediment and nutrient storage thereby influencing water quality. Naimen et al (1988) Butler and Malanson (2005), Wolf et al (2007), and Persico and Meyer (2009) are examples of studies documenting the influence of beaver on geomorphology, vegetation and sediment production. As pointed out in the TMDL text, loss of beaver was one step in a series of changes which have impacted the hydrology of the Malheur River. The Burns Paiute Tribe is working to restore riparian vegetation and beaver to the headwaters of the Malheur River in Logan Valley in hopes of regaining some of these benefits.<br><br>The following references were added to Section 3.5 of the TMDL:<br><br>Butler DR, Malanson GP. 2005. The geomorphic influences of beaver dams and failures of beaver dams. *Geomorphology* 71(1-2): 48-60.<br><br>Naiman RJ, Johnston CA, Kelley JC. 1998. Alteration of North American streams by beaver. *BioScience* 38(11): 753-762.<br><br>Persico L, Meyer G. 2009. Holocene beaver damming, fluvial geomorphogy, and climate in Yellowstone National Park, Wyoming. *Quaternary Reserarch* 71(3) 340-353. |

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| | Wolf EC, Cooper DJ, Hobbs NT. 2007. Hydrological regime and herbivory stabilize an alternative state in Yellowsotne National Park. *Ecological Applications* 7(6): 1572-1587. |
| Comment 10-14 | p 3-7 paragraph 2 . Please provide reliable information on cattle ranching established on the Malheur River in the 1860s. Please check the cattle sources, timing, and location of the cattle first moved into Malheur County that may have actually occurred in response to gold mines at Silver City and Malheur City. |
| DEQ Response | The text states that cattle were introduced to Southeast Oregon in the 1860s, but most of the Malheur River Basin was closed to settlement because it was part of the Shoshone Reservation. The Reservation was abolished after the 1878 "Bannock War", and soon opened to settlement. Cattle and sheep were introduced in the 1880's. Further research into this history has revealed that a general store was established the community of Drewsey in 1883 in order to serve local ranches. |

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| Comment 10-15 | p 3-7 paragraph 3 Please provide an indication of where riparian vegetation existed that was cleared for agriculture by the early 1900s. While this claim has frequently been made, there is no objective evidence. The large areas of lower Malheur County soils that were converted to intensive agriculture had sagebrush steppe natural vegetation and soil series and soil properties that contradict this claim (Lowell). |
| DEQ Response | The text states that the riparian shrub communities were located in areas subject to seasonal flooding. Other areas converted to agriculture are described as desert playa and salt scrub. This statement is supported by early settler and trapper accounts which describe willow communities along riverbanks and desert shrub and grass communities elsewhere in the river valley. Aerial photos of the community of Vale taken in the early 1900s show areas near the mouth of Willow Creek which appear to have been covered with dense stands of willows. |

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| Comment 10-16 | p 3-7 paragraph 3. Please provide the specific locations of the aspen and cottonwood stands in the Malheur River basin that have been greatly reduced. Just because this phenomenon has occurred in the intermountain west, does not necessarily mean that it has occurred in the Malheur River subbasin unless there is solid evidence. Current cottonwood stands in the lower river reaches are apparently the result of flooding followed by periods of greater flow stability due to dam construction and reservoir management. |
| DEQ Response | The TMDL text states that cottonwood and other larger trees such as alder were more common in mid-elevation areas in the basin. BLM has identified cottonwood stands in the upper canyon reaches of Cottonwood Creek (Cottonwood Creek in vicinity of Harper). DEQ has observed cottonwood saplings growing amongst abundant willow trees in portions of the floodplain that was scoured bare during historic floods on lower Cottonwood Creek. A few large mature cottonwoods are still present in this reach. BLM and the Burns-Paiute Tribe (BPT) have also identified cottonwood stands in several small tributary drainages in the vicinity of Jonesboro. The BPT has planted groups of cottonwood trees along the Malheur River floodplain on the Jonesboro property in hopes of re-establishing them.<br>The BPT and others have stated that the altered flow regime of the Malheur River below the major reservoirs has made cottonwood recruitment difficult. This observation is supported by the OSU Extension Service publication referenced in the TMDL, Cottonwood Establishment Survival and Stand Characteristics, (Borman and Larson, 2002), which describes the environment needed for cottonwood growth and recruitment. This paper describes the process of brief flooding of bare sand and gravel substrates, followed by a moderate retreat of the water table that is needed to establish cottonwood seedlings. These conditions do not usually occur below the reservoirs due to the release of water for summer irrigation. |

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| Comment 10-17 | p 3-7 paragraph 4 The official description of the soils and their natural vegetation (Lowell) is in contradiction with the draft TMDL claim that riparian wetland plant communities were historically present along the Malheur River between little Valley and Ontario. The official descriptions of the soil series and their natural vegetation is in contradiction with the claim that riparian wetland plant communities were historically present along the Snake River in Ontario and Idaho (Lowell). The TMDL claims are based on previous citations that are themselves based on wishful thinking and preciously little evidence. The erroneous statements can be repeated and quoted from one manuscript to the next, but they are not based on facts. |
| DEQ Response | See response to comment 10-15. |

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| Comment 10-18 | p 3-7 paragraph 5. It is very important to realize that black cottonwood and white alder were not main complements of the riparian vegetation along the main stream of the Malheur River. The main component was coyote willow that graded rapidly into salt brush and sagebrush. |
| DEQ Response | DEQ generally agrees with this statement as it applies to the lower Malheur River below Vale. |

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| Comment 10-19 | p 3-8 paragraph 1, Edit to read “Most of this area has seasonal livestock grazing.” The words “is subject to” has an unnecessary negative connotation. |
| DEQ Response | The text has been edited to read: “Most of this area is used for seasonal livestock grazing” |

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| Comment 10-20 | p 3-8 , paragraph 1 Edit to read “Evergreen forests (including areas of invasive juniper)”. |
| DEQ Response | The text has been edited as requested. |

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| Comment 10-21 | p 3-8 paragraph 2 . The figures in this paragraph are in error, and reflect negatively on agricultural activity. Please check whether the figure of 5% shouldn’t be closer to 1% in the South Fork subbasin, and whether that figure of 25% shouldn’t be closer to 8% in the Willow Creek subbasin. |
| DEQ Response | The figures quoted in the paragraph match with those in the bar graph on page 13 of the Malheur Subbasin Plan Appendix A, Part 1. |

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| Comment 10-22 | p 3-9 last paragraph Edit to read “Their extinction was ...”. |
| DEQ Response | The text has been edited as requested. |

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| Comment 10-23 | p 3-10 paragraph 5, line 3 Please reference who documented brook trout/bull trout hybrids in Logan Valley or if it has only been documented elsewhere in the Pacific Northwest, please be specific. |
| DEQ Response | Bull Trout/Brook trout hybrids were observed in Lake Creek, Meadow Fork Creek and Big Creek by Burns-Paiute biologists and reported in their 2004 annual Native Salmonids in the Malheur Subbasin Monitoring Report. Hybridization was verified through the use of genetic testing. This report reference was added to the TMDL text. |

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| Comment 10-24 | p 3-10 paragraph 5, lines 3-4 Please explain that a state governmental agency poisoned the fish and why this was done. This was not an activity of Malheur County. |
| DEQ Response | ODF&W treated portions of the Middle Fork Malheur and the North Fork Malheur Rivers in 1955 with Rotenone to kill Northern Pike Minnow and Bridge Lip Suckers. The goal was improvement of the trout fishery. No dead Bull trout were observed during treatment (Ray |

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| | Perkins personal communication, 7/20/10). The referenced text has been modified to state that Bull Trout were not the target of the poisoning project. |

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| Comment 10-25 | p 3-11 paragraph 1, lines 1 & 2. The Malheur River basin needs better definition of perennial, intermittent, and ephemeral streams. The perennial stream lengths are contradicted on page 2 of Appendix C. Just because there are flow lines on a map does not make flow lines into streams. |
| DEQ Response | The number of perennial stream miles (1400) reported on page 3-11 of the draft TMDL is referenced from the NW Power Planning Council Malheur Subbasin Assessment Report. The database used to choose sample reaches for the biomonitoring project reported in Appendix C of the TMDL includes 6,458 kilometers or approximately 3,875 miles of perennial streams. Only a detailed field investigation of individual stream reaches can be used to determine which are actually perennial. Only streams which had water present during the August 2006 biomonitoring project were sampled. |

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| Comment 10-26 | p 3-11 paragraph 2. The paragraph fails to describe how reservoirs significantly reduce sediment transport, and increase vegetation below their outlets. |
| DEQ Response | Additional information regarding the effects on sediment transport and vegetation growth has been added to this section. |

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| Comment 10-27 | p 3-12 This page fails to describe how very large water flow events overwhelm the capacity of the reservoirs to control river flows. |
| DEQ Response | See response to comment 10-26. |

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| Comment 10-28 | p 3-14, paragraph 2 The TMDL frequently fails to note that the unconfined nature of the aquifer is demonstrated by the rapid rise in water level with the onset of the irrigation season. |
| DEQ Response | DEQ agrees that the rapid rise in groundwater at the start of irrigation season is further evidence of the unconfined nature of the shallow aquifer system. The text has been modified to reflect this conclusion. |

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| Comment 10-29 | p 3-15 Figure 3-11 has an error on the far right-hand side since the water tables in the Malheur basin tend to drop off sharply past the point of Canal leakage (Gannett). |
| DEQ Response | The figure is schematic in nature and has been presented as it was published in the report (Gannett, 1990). |

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| Comment 10-30 | p 3-16 paragraph 2. The text would have you believe that surface irrigation efficiency in Malheur County is in the order of 20 to 30% or less while there are highly inefficient fields. Most fields have much greater efficiency. Even surface irrigated fields with 50 % efficiency are normally irrigated sequentially so that the runoff from one field is used in the next field resulting in much higher overall efficiencies which can approach those of other irrigation systems. The selectivity of the use of data is biased. |
| DEQ Response | The efficiency of the water delivery system in the Malheur is often estimated in the range of 25-30% by local irrigation districts. DEQ acknowledges that field efficiencies are more variable than was initially reported in the TMDL, and has modified the text of the TMDL. |

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| Comment 10-31 | p 4-4 . What about the chemical activity in Bully Creek reservoir itself? |
| DEQ Response | The text identifies the reservoir lands as a potential source of nitrate. Cattle feeding operations have been observed on the Bully Creek reservoir lands which are seasonally submerged. |

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| Comment 10-32 | p 4-6 paragraph 3. The background level of phosphorus is high, without any phosphorus fertilization. The amount of phosphorus movement increases as the amount of water increases and can be expected to move more sediment. It's unlikely that manure would |

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| | contain high levels of phosphorus and relatively low levels of nitrogen. The lower Owyhee subbasin can be considered as analogous to the lower reaches of the Malheur basin. Analyzing the USGS data on sediment and phosphorus in the water of Owyhee River in the lower Owyhee subbasin, there is a linear relationship between the amount of sediment and the amount of phosphorus (Hardy). As the amount of sediment increases, the amount of phosphorus increases. This indicates that much of the phosphorus load is being transported with the sediment. The highest concentrations of sediment increase exponentially with increased runoff (Hardy, Shock). Analogously, we infer that the largest phosphorous loads occur at times of peak flow in the Malheur River. |
| DEQ Response | DEQ agrees that movement of phosphorus is often related to the movement of soil. However, the peak in phosphorus concentrations in the Malheur River is not at the time of peak stream flow. It appears to be at the time of peak irrigation induced runoff. Manure can also be a significant source of phosphorus without being a significant source of nitrogen. Plants can use up the available nitrogen in manure before depleting the phosphorus which remains in the soil available to erode into streams. The effect of manure as an "unbalanced" fertilizer is discussed on page 4-13 of the TMDL. |

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| Comment 10-33 | p 4-7 , paragraph 1 Based on water samples above and downstream, the increase in phosphorus in the North Fork is apparently due to processes both within Beulah Reservoir and below the reservoir. |
| DEQ Response | DEQ has stated that nutrient loading in the vicinity of the reservoir and downstream of the reservoir appear to be significant. This could be a combination of factors involving the land uses along with the chemistry of the reservoir itself. BOR will be required to investigate nutrient loading to its reservoirs during TMDL implementation. |

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| Comment 10-34 | p 4-13 paragraph 2 , the high-level of background of phosphorus throughout the upper Malheur River basin suggests significant geological sources. River samples could be taken when there are high flow events not related to irrigation. It is expected that those would show very high levels of phosphorus. |
| DEQ Response | Detailed water quality sampling during storm events would be useful in determining phosphorus transporting mechanisms and sources. The TMDL aims to reduce both storm and irrigation induced erosion throughout the basin. |

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| Comment 10-35 | p 4-15 paragraph 1, line 6 Edit to read " between 1970 and 2002." |
| DEQ Response | The text has been edited as requested. |

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| Comment 10-36 | p 4-17 Paragraph 1, line 6. Edit to read "15-20 tons per acre per year in fields too steep for efficient furrow irrigation." Otherwise the sentence serves as an unrepresentative criticism of furrow irrigation. At the other end of the spectrum, the Malheur Experiment Station measured season-long sediment loss from furrow irrigated wheat on leveled soil<br>to be 131 pounds per acre per year. |
| DEQ Response | The text has been edited to show the range of soil loss estimates. |

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| Comment 10-37 | p 4-19 paragraphs 3 and 4. The existence of a fish specie in a tributary or river only indicates that there is habitat within that system supportive of that fish specie. It does not indicate that the entire river can or does support the fish. It is possible that limited cold water refugia allow the existence of a specie in a stream and the thermal potential<br>of the stream is actually outside the environmental limits of the specie. Administrative rules should not be written to regulate physical processes outside of the normal range of human intervention. |
| DEQ | DEQ applies the Natural Thermal Potential standard to streams which are not capable of |

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| Response | meeting numeric standards. |

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| Comment 10-38 | This is a very small chapter for a really large body of work. Since we want to inspire future cooperative actions, it would be best to the full range of activities. The chapter only documents administrative paperwork. The chapter lacks an accounting of the activities of the "Current and Past Pollution Control Efforts" including changes in grazing practices, irrigation transformations, changes in pesticide and fertilizer use, the construction of sedimentation ponds, public education, innovative research initiatives, etc. The actual extent and breadth of these activities would paint a<br>picture quite distinct from the picture in the draft Malheur River subbasin TMDL. |
| DEQ Response | DEQ agrees that this section did not capture the full range of conservation activities in the basin. Additional summary information has been added to the Section 5.0 of the TMDL and Section 5.1 of the Water Quality Management Plan. |

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| Comment 10-39 | p 5-3 paragraph 1. Please add at the end of this paragraph the documentation to show that funding was ever made available for these efforts. |
| DEQ Response | The text was modified to state that funding sources are limited. Funding sources for research and implementation are also discussed in the WQMP. |

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| Comment 10-40 | p 5-3 paragraph 3. Omit the word "split" and its false negative connotation. Edit the sentence to read "With increased interest in watershed projects by ranchers in the Owyhees (southern part of Malheur County) the Malheur-Owyhee Watershed Council had the opportunity to develop an Owyhee Watershed Council in the southern part of the county, increasing the local restoration efforts." |
| DEQ Response | The word "split" has been replaced by "evolved". |

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| Comment 10-41 | p 5-3 paragraph 4, line 1. This sentence fabricates a misleading history. This sentence should read "In 1999 the MOWC developed the Malheur Watershed Action Plan in response to citizen-member interest in correcting environmental problems and willingness to volunteer time and involvement in the writing and editing of the plan." The 303d list was not a significant motive. |
| DEQ Response | The first sentence of the introduction of the Malheur Watershed Action Plan states that the document was prepared in response to the listing of streams as polluted under the federal Clean Water Act. |

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| Comment 10-42 | p 5.4 -5.6. The Malheur Watershed Council participants of this federal mandate were not in full agreement. |
| DEQ Response | Acknowledged. |

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| Comment 10-43 | p 5-6 paragraphs 2-6 ODEQ promised that the feasibility of the standards of the Mid-Snake TMDL would be carefully reconsidered with the writing of the Malheur River basin TMDL. What has actually happened is that the standards for the Mid-Snake TMDL have been applied to the and Malheur Basin TMDL without serious consideration of their feasibility. |
| DEQ Response | The feasibility of the water quality standards (particularly total phosphorus) is discussed in Section 5.0 of the Water Quality Management Plan. An effort was made to point out the large amount of effort that has been expended to date and the amount that remains to be done over the next several decades. |

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| Comment 10-44 | p 6-3 paragraph 1 It is highly unlikely that reducing P and sediment will reduce chlorophyll a in the Malheur River subbasin. Since the background P throughout the basin will remain high enough to grow substantial algae, decreased sediment will increase effective sunlight through the water, increasing algae growth and aggravating dissolved oxygen, and pH problems. Once again the straightforward thinking of applying the environmental realities of |

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| | the cooler, mesic, P deficient parts of Oregon to the hot, xeric, P rich Malheur River subbasin is untenable. |
| DEQ Response | Elevated sediment and nutrient levels have been recognized problems in the Malheur River Basin for decades. Local groups and individual researchers have worked hard to develop and implement Best Management Practices to address these pollutant sources. If clear water results in some increased algae blooms in the future, DEQ will work with local groups to address the issue. Meanwhile reductions in sediment and nutrient loading will be a worthwhile goal that will benefit the Malheur River and downstream in the Snake River where algae blooms are currently more severe. |

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| Comment 10-45 | p 6-3 paragraph 2 and p 6-4 Figure 6-3. The reasoning and figure are in error. Common sense is that it is inappropriate to designate streams as specific habitat just based on the existence of a specie when the survival of the specie in the environment is dependent on cold or cool water refugia. Common sense is that it is nonsensical to designate water courses as “redband and cut throat trout habitat" when most of these water courses are only flow lines. Flow lines are merely the a description of the path water runoff will take during rapid snow melt or high rainfall events. |
| DEQ Response | See response to comment 10-3. |

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| Comment 10-46 | Long before the flow lines or streams are designated for use by fish or studied as part of a TMDL, flow lines and streams need to be carefully evaluated as to whether they are ephemeral, intermittent, or perennial streams. As stated earlier, this inventory has evidently not been made. |
| DEQ Response | Changing designated fish use maps that are part of Oregon Administrative Rules (OAR) is beyond the scope and authority of this TMDL. Reasonable judgment based on hydrologic and fish population surveys will be used in the application of water quality standards. Also see response to comment 10-3. |

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| Comment 10-47 | The random sampling of 24 stream segments out of an excessively large length of perennial streams in excess of those that actually do carry water, inevitably would have resulted in an attempt to collect aquatic insects from dry stream beds. Since the collection of samples from dry intermittent and ephemeral stream beds obviously did not occur as no samples lacked aquatic insects, this infers that the sampling was not random from the stated perennial stream reaches.<br><br>The evaluation of aquatic insects must necessarily rely on representative reference sites that have similar geology and conditions. The lack of comparable reference sites for the evaluation of aquatic insects compromises the value of the study. Comparative reference sites might show that it is entirely possible that many of these sites possess the insects that they should have under natural conditions.<br><br>A conservative assessment would embrace cautious, scientific approaches and scientifically refereed results. |
| DEQ Response | The biomonitoring survey included in Appendix C of the TMDL involved the use of a database includes stream segments which were dry during the sampling events conducted in August of 2006. When a dry segment was observed by field crews, another random selection was made from the database. Results of the aquatic insect surveys were compared to applicable reference sites. As stated in the report, many more reference sites were available for sites in the Blue Mountains than those in the lower elevation areas of the basin. |

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| Comment 10-48 | p 6-14 Figure 6-4. The figure provides a dissolved oxygen criteria to every flow line in the Malheur River subbasin. How can a dissolved oxygen criteria be applied to dry washes? |
| DEQ | Water quality criteria are applied to waters of the state. If there is no water, the criteria |

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| Response | cannot be applied. |

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| Comment 10-49 | The big picture with pesticide listing is that the listed chemicals are legacy chemicals and the data show dramatic improvements over time. These truths are obscured by the wording of the draft Malheur River subbasin TMDL.<br><br>In describing the changes over time, it is important to show how consistent cooperative action leads to improvements. If there ever there were clear downward contamination trends, here they are, but the draft TMDL on p 8-11 paragraph 1 line 1 uses “may suggest” rather than “shows” and on p 8-11 paragraph 2 line 2 uses “suggest” rather than “show”. When solid data points towards environmental improvements, the draft TMDL should not equivocate.<br><br>p 8-2 paragraph 1 last line. Edit to read “... from diffuse legacy non-point sources. No point sources have been identified. The rest of this section deals with the movement and degradation of these legacy pesticides.” It is essential that the TMDL places the source of the problems discussed here in the past. |
| DEQ Response | The first paragraph of the introduction on page 8-2 has been modified to describe the pollutant sources as “legacy”. DEQ has stated that the available data appear to show declines in DDT and Dieldrin concentrations over time. DEQ has avoided stronger wording due to the lack of comparable data that has been collected over time. The available data were collected using a variety of methods and detection limits, and do not cover a range of seasons. |

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| Comment 10-50 | p 8-4 paragraph 1 line 2 Edit to read “basis as agricultural, domestic, silviculture insecticides”. It is important to provide proper dimensions to the use of these products. Aldrin was widely used on ants. |
| DEQ Response | The text has been modified as requested. |

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| Comment 10-51 | p 8-4 paragraph 1 line 9 Edit to read “in 1972, but remained in continued use in the Malheur River basin by the US Forest Service for some time.” Substitute the cut off date for “for some time” if it can be documented. |
| DEQ Response | DEQ has no information to support or refute this claim. |

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| Comment 10-52 | p 8-10 paragraph 1 line Omit the word “event” and substitute the sampling dates. The use of the word event has the connotation that the sampling was somehow very brief and is of less value than the other samplings. |
| DEQ Response | The word “event” was used consistently to describe individual sampling efforts and does not imply that one is better than the other. |

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| Comment 10-53 | p 8-11 paragraph 2 lines 3 and 4 Edit to read “After decades of lack of use and their continued breakdown, the concentrations of DDT, Endrin, and their related residues should continue to decrease.” |
| DEQ Response | The text has been modified as requested. |

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| Comment 10-54 | A large portion of the stream banks also have little capability to support vegetation due to their deeply incised position in bedrock and lack of sediment. There is little possibility of vegetation shading the river at these incised locations. |
| DEQ Response | It may be difficult to establish vegetation in these areas but some of these streams have a new flood plain established within the incised channel, and are able to support riparian vegetation. Vegetation growth should be supported by proper management. |

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| Comment 10-55 | When the relationship of shade to maximum stream temperatures was studied by Kruegar et al., they concluded that the "study does not provide evidence that shade is a driving force in temperature change on these streams." Similarly Meays et al. found that canopy cover alone was not sufficient to prevent water temperature from trending toward equilibrium with air temperature. And, Carr et al. concluded that shade functioned in a subordinate role to climate in affecting stream temperature. |
| DEQ Response | There are many studies that correlate air temperature and stream temperature. These two parameters often correlate but in the case of temperature this does not imply causation. See Beschta (1997) and Johnson (2003). The methods in Krueger et al were confusing and not well described (what is subtracted from what to determine “change”?). In Meays et al there was no control to screen for upstream factors. Water temperatures are influenced by many factors including the conditions and temperatures of upstream reaches (advection). In our view, the stated conclusions regarding shade are not supported by their own analysis nor are they consistent with a larger sample of peer reviewed articles, such as those cited in the TMDL.<br><br>Beschta RL. 1997. Riparian shade and stream temperature: an alternative perspective. *Rangelands* 19(2): 25-28.<br><br>Johnson SL. 2003. Stream temperatures: scaling of observations and issues for modeling. *Hydrological Processes* 17(2):497-499. |

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| Comment 10-56 | A reasoned approach would focus the analysis of temperature and riparian vegetation on the places in the landscape being negatively impacted by human activity. The sweeping condemnation of riparian management throughout the Malheur River subbasin lacks both objectivity and focus. |
| DEQ Response | DEQ agrees that areas being negatively impacted by human activity should be addressed but we disagree that the TMDL condemns riparian management basinwide. We recognize vegetation management is site specific and have used language to that effect. Areas which don’t meet management measures need improvement and those that do should be maintained. |

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| Comment 10-57 | p 9-4 paragraph 6 Major causes of high water temperature are water scarcity and heat load from solar and other ambient sources. Anthropogenic causes are site specific. Some of the anthropogenic effects have cooled water. |
| DEQ Response | Some cooling effects are acknowledged, such as downstream of dams. |

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| Comment 10-58 | p 9-12 Figure 9-3 The description of most of the flow lines in the subbasin as redband trout habitat is conceptually in error, regardless of the source. |
| DEQ Response | See response to comment 10-3. |

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| Comment 10-59 | p 9-21 last paragraph 1. How does legacy overgrazing affect water temperature? 2. current overgrazing is a site specific phenomenon. |
| DEQ Response | Historic year-round grazing severely damaged riparian and upland vegetation in many areas of the basin. Loss of riparian vegetation destabilized stream banks, causing downcutting of stream channels and the lowering of the flood plain water table. These effects are still a major factor affecting and inhibiting current riparian vegetation growth, stream channel morphology and water temperatures. |

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| Comment 10-60 | p 9-21 last paragraph The statement “and historical vegetation removal in agricultural areas appears to be the largest sources of riparian vegetation removal in the Malheur River Basin” is based on erroneous assumptions discussed previously. |

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| DEQ Response | While there is room for argument as to nature and extent of historic riparian vegetation it seems clear that agriculture is the dominant land use in the basin. Current agricultural and other land uses have eliminated much of whatever riparian vegetation existed previously. |

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| Comment 10-61 | p 9-22 last paragraph The inference is that something that could have occurred has occurred. This is presented with no evidence that this is a representative process in this watershed. What if human activities have led to greater water storage in groundwater? |
| DEQ Response | This section is a general discussion of channel modifications and their impacts. It is not intended as a list of confirmed problems in the Malheur river Basin. |

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| Comment 10-62 | p 9-21 paragraph 2 The inference is that things that could have occurred have occurred. These concepts are presented with no evidence that these effects are representative processes in this watershed. |
| DEQ Response | The processes described are known processes that affect stream temperature. We have presented evidence in the TMDL where we know some of these processes to be occurring (eg. riparian vegetation disturbance, water withdrawals, hydromodification). We have described and included the other processes (eg. sediment filled pools, less base flow storage, decreased hyporheic and groundwater exchange) because there is potential for them to occur in the Malheur Basin and it is important that any such activities be addressed to reduce stream warming. |

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| Comment 10-63 | p 9-23 paragraph 7 Which harmful pesticides? |
| DEQ Response | DDT and Dieldrin have been sampled in the D Drain irrigation canal although we decided to remove this text as it is not relevant to main point of the paragraph. |

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| Comment 10-64 | p 9-28 paragraphs 3 and 4 The assumptions stated in these paragraphs have not been substantiated and appear to be in error. |
| DEQ Response | Changes to riparian vegetation caused by modification of the hydrologic regime is documented in the literature and cited in the TMDL. Hydrologic modification patterns occurring at large dams in the Malheur Basin are similar to those documented elsewhere. See the long term flow patterns up/downstream of Warm Springs Reservoir in section 9.5. You are correct however that there has been no direct study in the Malheur which is why we are asking the Bureau of Reclamation to pursue such a study downstream of their dams and make management changes if needed. |

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| Comment 10-65 | p 9-65 paragraph 1 lines 2 and 10 Remove the word “conservative” and replace it with an accurate description of what is being proposed. |
| DEQ Response | We have edited the text. |

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| Comment 10-66 | p 9-68 paragraphs 6 and 7 The calculations were based on assumptions and computer models (Appendix B). The vegetation was not based on actual specie distributions in the subbasin and the site potentials but literature references of theoretically generalized site potentials (Figure B-14) and the theoretical ranges of native species (Tables B-3, 4 and 5). The woody species ponderosa pine, Douglas fir, subalpine fir, Engleman spruce, lodgepole pine, and grand fir do not naturally extend to as low elevations as assumed in the modeling. |
| DEQ Response | The TMDL was never intended to be an analysis where the site potential vegetation of each and every local site was evaluated and determined. It was intended to be a watershed scale analysis. That is why we believe developing generalized ecoregion based site potential vegetation is appropriate and properly scaled for the TMDL analysis. When determining site potential vegetation at the site specific scale the TMDL includes language on pages 9-47 and B-17 that site specific conditions assessment will determine the type of site potential vegetation rather than solely relying on the general classifications found in the tables and ecoregion maps. |

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| | DEQ did use field data and aerial photos to develop distribution and vegetation attributes (eg height and density). The literature used and cited in the TMDL is also not theoretical. These studies had extensive field work. The plant association types cited were observed in the field (with many sites in the Malheur) and they were then mapped and classified into specific landscape and climatic ranges which is documented in these studies. The TMDL site potential vegetation is based on these plant associations and uses the same ecoregion and climatic/landscape ranges in which they were found and presented.<br><br>The location of conifer species in our modeling along the North Fork Malheur and Malheur Rivers is also not assumed or theoretical. As shown in Table B-9 on page B-28, site potential conifer trees were only modeled at locations where conifers currently exist as determined by aerial photos and site visits by DEQ. |

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| Comment 10-67 | page 9-69 paragraph 3. The paragraph describes the guiding value of ODEQ in writing the TMDL is to assure that ODEQ will minimize the likelihood of stating that no impairment has occurred where impairment may have occurred. If this is true, it should be stated at the outset of the draft TMDL.<br><br>This value calls into question the objectivity of the draft TMDL. A danger that ODEQ runs with this guiding value is to depict the risk of impairment in every way possible, whether or not it is actually occurring. This guiding value risks the temptation of using every fragment of evidence that can be brought to bear against the poor stewardship of land and water, even if the evidence is not representative or has not been critically evaluated.<br><br>This value also risks that the TMDL will actually fail to bring into focus where improvements have been achieved, where deficient management is still occurring, and where returns to better management could actually be beneficial.<br><br>The stated value risks imposing costs on individuals and other agencies to plan and fix things which are not actually subject to improvement. It risks establishing TMDL goals that cannot be achieved, leaving ODEQ and others vulnerable to legal action for failing to meet an infeasible TMDL. |
| DEQ Response | DEQ made every effort to remain objective and to critically evaluate the data used in the TMDL. Successful efforts and practices for improving water quality were described in hopes of furthering their implementation on a wider scale. Impediments to implementation of the TMDL were pointed out wherever possible. DEQ has described TMDL implementation as a long-term iterative process that will come with a cost and without effort to communities in the Malheur River Basin. Upon completion of the TMDL, DEQ will continue to work with local stakeholders to devise and implement practical and effective solutions to water quality problems. |

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| Comment 10-68 | Results on Total Phosphorus tests taken from the sample site named MAL160 in the Bureau of Reclamation's database. Site is near Malheur Reservoir off Hwy. 26 and above any major agricultural activity. [GPS location: N44.29362, W117.55233] Samples were taken weekly from 7/2004 to 9/2009 and monthy from 10/2009 through current. 263 total samples taken over a six year period with a simple average of 0.192 DEQ must take these results into consideration. With ZERO additional input we are already more than twice the current standard. Even with the provision that the standard for a site can be changed once all possible negative input has been eliminated; there is no procedure set for when, by whom and after how many years and millions of dollars spent that decision will be made. At the very least the TMDL must make sense. If not, it is pointless and will become another part of the downfall of our agricultural economy. |
| DEQ Response | DEQ has reviewed the total phosphorus data for sample location MAL160 along with the land uses in the watershed above the sample location. The site is located in a canyon |

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| | downstream of Malheur Reservoir. There is a considerable amount of agricultural activity in the form of irrigated pastures, hay meadows and agricultural fields above the reservoir continuing upstream approximately 15 miles to Ironside. DEQ does not agree that it is likely that there are zero inputs of phosphorus above natural background levels in the watershed above site MAL160. These data will be used during TMDL implementation to aid in the identification of potential source areas and priorities for water quality improvement projects. |

## Response to Bob Moore's Comments

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| Comment 11-1 | Mr. Moore expressed support for the numerous water quality projects that have been implemented in the Willow Creek Valley. |
| DEQ Response | DEQ appreciates the support of these large scale irrigation improvement projects that have clear benefits to water quality. |

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| Comment 11-2 | Mr. Moore stated that he thinks that a large majority of the pollution in the Malheur River Basin is related to agriculture, and that it is the legal liability of agricultural interests to clean it up. He went on to say that many plans for improving water quality in the Malheur River Basin have been developed but none have been implemented. He feels that the same will happen to the TMDL. The only motivator for change appears to be in the form of enforcement actions from U.S. EPA. |
| DEQ Response | DEQ will work with stakeholders in the basin to implement the TMDL and gain improvements to water quality. DEQ acknowledges that some interest in water quality improvements was motivated by EPA enforcement actions. However, that initial interest in improving practices has matured into extensive programs which are dependent on the contributions and good will of local agricultural producers and groups such as Watershed Councils, SWCDs, and irrigation districts. Enforcement must be tempered so that it provides sufficient incentive, without causing a general backlash against further progress. |

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| Comment 11-3 | Mr. Moore expressed support for using Proper Functioning Condition (PFC) surveys and restoration principles to improve riparian vegetation condition in the Malheur River Basin. |
| DEQ Response | DEQ is supportive of PFC as a riparian assessment and planning/restoration tool. ODA has started work in the upper Malheur Basin by coordinating training sessions for local agricultural producers and other interested parties. DEQ will continue to support the expansion of these programs during TMDL implementation. |

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| Comment 11-4 | As return flows are the largest contributor of turbidity in the basin, DEQ needs to seriously consider changing the language stating that "only natural streams come under guidelines…" All return flows to the Malheur River basin should be included. |
| DEQ Response | DEQ generally does not directly regulate water quality in irrigation ditches. When water from irrigation return ditches discharges to other waters of the state with more sensitive beneficial uses, such as the Malheur River and its tributaries, it is subject to regulation. The TMDL addresses water pollution from irrigation returns. |

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| Comment 11-5 | Mr. Moore suggested that DEQ and ODA organize a training program for irrigators emphasizing Best Management Practices (BMPs) for preventing water pollution. |
| DEQ Response | DEQ will work to support ODA and other groups, such as the SWCD, Malheur Experiment Station and Malheur Extension Office in the development and implementation of BMPs during TMDL implementation. |

## Response to Owyhee Irrigation District Comments

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| Comment 12-1 | There were many very good comments made prior to the hearing that evening, that most likely will not be included in the comment section. |
| DEQ Response | DEQ will attempt to address the concerns expressed during the informal portion of the public hearing during TMDL implementation. Only the formal comments received during the hearing and public comment period will be part of the administrative record for the TMDL. |

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| Comment 12-2 | The water sheds can be and are very complex. We must be very careful as we make assumptions that will move implementation forward that may not work or make water quality issues worse than they are right now. Agriculture is and has been working on Best Management Practices which are showing improvements in many areas. These efforts take time and money and have been done voluntarily. Though there has been great improvement still more can be done. There has been drip and sprinkler systems installed on farms and there is improvement with sediment loading and top soil movement. However, let us be very careful not to over look the larger picture with ground recharge, wetlands and irrigation districts using their own return flow. The water flow can be used up to three times and then passed onto the next irrigation organization.<br><br>There should be thoughtful attention and consideration made before a final plan is completed. |
| DEQ Response | TMDL implementation is a flexible and iterative process. The TMDL was drafted in a way that does not prescribe methods of implementation. Local stakeholders will be able to develop strategies which fit conditions in the basin and adapt them over time. DEQ encourages the Owyhee Irrigation District and other groups to participate in TMDL implementation plan development so that these concerns can be addressed. |

## Response to Owyhee Watershed Council Comments

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| Comment 13-1 | The Owyhee Watershed Council has expressed concern over the perceived lack of consideration of background phosphorus concentrations when developing the TMDL. |
| DEQ Response | DEQ examined available phosphorus data from throughout the Malheur River Basin during TMDL development. It was possible to use these data to get an estimation of background phosphorus concentrations in the upper basin headwater streams. These streams are relatively undisturbed and many had total phosphorus levels well below the TMDL target total phosphorus limit of 0.07 mg/l. Due to increasing levels of modification of the environment in the form of roads, dams, urban development, and agricultural activity, it is not possible to locate streams which can be used to give a picture of background water chemistry in the lower basin. The target total phosphorus concentration limit of 0.07 mg/l was set in the Middle Snake-Payette TMDL based on the level of total phosphorus that will trigger excessive algal blooms. The review of background data in the upper basin resulted in strong correlations between reduced riparian vegetation, high levels of turbidity, high total suspended solids, high total organic carbon, high organic nitrogen and increased total phosphorus. This evidence suggests a link between high total phosphorus and practices which increase erosion and nutrient loading from sources such as animal manure. The background phosphorus data and phosphorus correlations with other water quality parameters are discussed in Section 6.9 of the TMDL document. |

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| Comment 13-2 | The Owyhee WSC commented that the historic riparian communities along the Malheur River did not include trees and that much of the current riparian habitat was created by irrigation. |
| DEQ Response | The Malheur River Basin is large and ecologically diverse. The temperature TMDL was written based on an approach which employs the application of Natural Thermal Potential. If a reach of stream is allowed to develop riparian vegetation which is consistent with its current site hydrology, climate and soils, it is in compliance with the TMDL. The TMDL calls for minimizing human influences which impair riparian vegetation growth. |

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| Comment 13-3 | The Owyhee WSC commented on the influence of springs (both geothermal and non-geothermal) and hyporheic interactions which involve surface water and shallow groundwater exchange. |
| DEQ Response | Most groundwater inflows and hyporheic exchanges result in cooling river water during summer. Geothermal springs would provide heating. The TMDL targets Natural Thermal Potential through the establishment of site potential vegetation and natural channel forms which allow stored water in floodplains to supplement and exchange with river water. The Natural Thermal Potential criterion is used in place of numeric temperature criteria when the temperature of the river exceeds the numeric criteria under natural conditions where human influences are minimized. Geothermal springs are considered to be part of the natural condition of the watershed. |

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| Comment 13-4 | The Owyhee WSC commented on phosphorus background levels and the apparent lack of use of Malheur Watershed Council data in TMDL development. |
| DEQ Response | As discussed in the response to comment 13-1, DEQ did evaluate and consider phosphorus data collected throughout the basin. Watershed Council data were used in the calculation of total phosphorus and bacteria load allocations for the Malheur River at Drewsey and the North Fork Malheur River at Juntura. |

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| Comment 13-5 | The Designated Fish Use Map contains intermittent and ephemeral stream segments. |
| DEQ Response | See response to Malheur WSC comment 11-3. |

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| Comment 13-6 | Not enough discussion of existing Best Management Practices and water quality improvement projects. |
| DEQ Response | Examples of Best Management Practices and a link to the Malheur Experiment Station BMP website and the Oregon Department of Agriculture website were included in Section 5.0 of the WQMP. Additional information regarding water quality improvement projects has been added to this section along with section 5.0 of the TMDL. |

## Response to Dr. Clint Shock's Comments

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| Comment 14-1 | Dr. Shock commented at the public hearing on June 29, 2010, that this region has a long history of addressing problems of many types head on. Once an irrigation system is in place, it is very difficult to remove or change that investment and we are saddled with that inheritance. Despite these challenges there have been continuous improvements to the irrigation systems for decades. He cited examples of successful voluntary activities to address groundwater contamination as well as watershed issues such as excessive sediment in streams, invasive species, and juniper encroachment. |
| DEQ Response | DEQ has attempted to summarize the long history of hard work and progress toward addressing water quality issues in the Malheur River Basin in Section 4.0 and 5.0 of the TMDL. Section 5.1 of the WQMP describes many activities and projects and provides a list of Best Management Practices that have been developed for agricultural activities. Section 5.2 includes a list and brief description of additional flow and temperature management activities that have been conducted in the basin or are proposed in the future. A majority of these proposals came from local stakeholders. DEQ included this information in the TMDL in order to provide support for them during TMDL implementation. The lists are not meant of be inclusive of all activities. DEQ intends to work with stakeholders to support existing water quality activities and develop new projects. |

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| Comment | Many more modernizations are needed which do not always pay off economically. Benefits |

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| 14-2 | derived from innovations over that last thirty years not realized by the farmer and rancher sector. Therefore, resources are not available to implement innovations they know would benefit the basin. |
| DEQ Response | DEQ is sympathetic regarding the shortage of funding for water quality projects and agricultural improvements and will support effective projects to the maximum extent possible. DEQ recognizes that water quality improvements have been incremental and will continue to be that way. |

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| Comment 14-3 | Dr. Shock closed his discussion with statements about the TMDL being "well meaning" but it sets up the community for great difficulty. He felt that the goals will not be met and they could be the source of further legal actions. He also stated his objections to statements in the TMDL regarding types of vegetation and extent of wetlands in the past. He said that incorrect assumptions regarding extent of wetlands and riparian vegetation are being propagated from one document to the next. |
| DEQ Response | The federal Clean Water Act requires the development of TMDLs to address water pollution. DEQ cannot control what other groups may decide to use in litigation. DEQ was careful to point out the difficulties and expense of implementing the TMDL. Section 5.0 of the WQMP describes a process which will likely take decades and expenditures of millions of dollars. It is not expected that success will be achieved easily. Incremental progress is a measure of success.<br><br>The Malheur River Basin is large and ecologically diverse. The temperature TMDL was written based on an approach which employs the application of Natural Thermal Potential. The TMDL calls for minimizing human influences which impair riparian vegetation growth. If a reach of stream is allowed to develop riparian vegetation which is consistent with its current site hydrology, climate and soils, it is in compliance with the TMDL. |