Owyhee River Watershed TMDL Temperature Addendum: North and Middle Fork Owyhee (HUC 17050107), South Fork Owyhee (HUC 17050105), and Upper Owyhee (HUC 17050104) Agricultural Implementation Plan

Spring flowers along headwaters of the North Fork Owyhee River.

Prepared by the Idaho Soil and Water Conservation Commission in Cooperation with the Owyhee Conservation District

May 2017

Original Plans:

DEQ. February 2002. Implementation Plan for the North and Middle Fork of the Owyhee River.

DEQ. July 2004. Upper Owyhee Watershed TMDL Implementation Plan for Agriculture.

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Introduction

The objective of this plan is to provide a framework local stakeholders can use to reach the goals established in the 2012 Owyhee River Watershed Total Maximum Daily Load (TMDL) Temperature Addendum (IDEQ, 2012). The temperature TMDL provides load allocations that require an increase in riparian shade in order to restore stream temperatures to natural background conditions. Streamside vegetation and channel morphology are the factors influencing shade that are most likely to have been affected by anthropogenic activities and they are the factors most readily corrected by implementation efforts

The Idaho Soil and Water Conservation Commission is the designated agency responsible for preparing TMDL implementation plans for agricultural and grazing lands. The original implementation plans entitled "Implementation Plan for the North and Middle Fork of the Owyhee River" (SWCC, 2002), and "Upper Owyhee Watershed TMDL Implementation Plan for Agriculture" (SWCC, 2004) outline best management practices (BMPs) for increasing shade in riparian zones. The current plan will build upon the earlier plans to provide details of actions needed to meet water quality standards throughout the Owyhee River watershed.

In accordance with Idaho statute, nothing in the plan shall be interpreted as requiring BMPs for agricultural operations which are not adopted on a voluntary basis (Idaho Code, 2017).

Project Setting

The Owyhee River watershed encompasses a large area of southwest Idaho. It incorporates the Upper Owyhee River subbasin (hydrologic unit code [HUC] 17050104), South Fork Owyhee River subbasin (HUC 17050105), and North and Middle Fork Owyhee River subbasin (HUC 17050107).

The headwaters of the Owyhee River and its South Fork originate in the Independence and Bull Run Mountains of northern Nevada. Both flow through deep canyons to their confluence 8 miles upstream of the Oregon border. At that point, the river is nearly one thousand feet below the surrounding plateau. The North and Middle Forks flow from the canyons of South Mountain and the western flanks of Juniper Mountain and join the main Owyhee River at Three Forks, Oregon.

Deep Creek drains the eastern slopes of Juniper Mountain and flows through dry tablelands to its confluence with the Owyhee River. Battle Creek is more arid still and is named after a nearby 1864 battle that killed Michael Jordan and James Carroll, known for discovering gold in Silver City.

Detailed discussions of the physical and biological characteristics of the Owyhee River watershed are provided in the following three TMDLs approved by the US Environmental Protection Agency (EPA):

- *Upper Owyhee Watershed Subbasin Assessment and Total Maximum Daily Load* (approved by EPA in March 2003) (DEQ 2003)
- *South Fork Owyhee River Subbasin Assessment and Total Maximum Daily Load* (approved by EPA in March 2000) (DEQ 1999a)
- *North and Middle Fork Owyhee Subbasin Assessment and Total Maximum Daily Load* (approved by EPA in February 2000) (DEQ 1999b)

An extreme wildfire occurred in 2007, and encompassed the drainages of Red Canyon, upper Castle Creek, and upper Beaver Creek. The hydrology of the area was significantly altered by removal of dense juniper and streamside vegetation in a number of areas.

With the signing of the Owyhee Public Lands Management Act in 2009, the wilderness status of much of the land in the watershed was changed. Significant portions of the watershed are now within wilderness areas created by the Act and other portions were released from Wilderness Study Areas. However, very little privately owned land within the watershed was directly affected by the Act.

Land Use and Land Ownership

Land use in the Owyhee River watershed consists primarily of dryland grazing with very few acres of irrigated pasture or hayland. Beef cattle are the primary species of domestic livestock that utilize land within the watershed. For a detailed description of land use and landownership, please refer to the three subbasin assessments referenced above.

Table 1. Land Ownership in the Owyhee River Watershed

Subbasin	Acres				
	Private	**State**	**Federal**	**Tribal**	**Total**
Upper Owyhee River	65,653	37,428	746,833	122,375	972,289
Middle & North Fork Owyhee River	33,688	27,205	185,486		246,379
South Fork Owyhee River	654	8,314	209,465		218,433
Total	99,995	72,947	1,141,784	122,375	1,437,101

Accomplishments

Since the TMDL was written in 2012, landowners have implemented a number of conservation practices that directly or indirectly affect the hydrology and water temperature of surface waters within the Owyhee River watershed. Table 2 presents the best management practices which have been applied with technical and financial assistance from the Natural Resources Conservation Service (NRCS) since the TMDL was written in 2012. No other accomplishments were available.

Table 2. BMPs installed with NRCS assistance in the Owyhee River watershed, 2012-2017.

PRACTICE	UNITS APPLIED
Brush Management	14,979 acres
Critical Area Planting	1,503 acres
Fence	95,289 feet
Heavy Use Area Protection	2.25 acres
Herbaceous Weed Control	216 acres
Livestock Pipeline	15,237 feet
Watering Facility	21 troughs
Prescribed Grazing	21,927 acres

Resource Concerns

Temperature TMDLs were previously written for many assessment units (AUs) in the Owyhee River watershed (DEQ 1999a, 1999b, 2003). The 2012 Owyhee River Watershed Temperature TMDL revises 25 previous TMDLs and establishes 11 new TMDLs (Table 2).

Table 3. Summary of new and revised TMDLs (DEQ 2012).

Subbasin	Hydrologic Unit Code (HUC)	Assessment Units with New TMDLs	Assessment Units with Updated TMDLs
Upper Owyhee River	17050104	11	10
South Fork Owyhee River	17050105	0	2
North & Middle Fork Owyhee River	17050107	0	13

New TMDLs were established for:

- 3 AUs on Battle Creek, covering the entire length of the creek from its headwaters to its confluence with the Owyhee River.
- 1 AU on Camas Creek, the segment between Big Springs Butte and Pole Creek. This AU is located within the Pole Creek Wilderness.
- 1 AU on Camel Creek that includes the entire creek upstream of Sunshine Valley Creek.
- 3 AUs that cover Nickel, Smith, and Thomas Creeks from their headwaters to the confluence with Deep Creek.

- 3 AUs on Beaver Creek, covering the entire length of the creek from its headwaters to its confluence with Deep Creek.

Whereas previous TMDLs were based on temperature data collected using recording thermographs physically located in the stream, the revised TMDLs are based on the potential natural vegetation (PNV) method (Shumar and De Varona, 2009) which uses knowledge of local vegetation and natural stream widths as a basis for developing shade targets that are appropriate for a specific AU. The idea behind PNV TMDLs is to set shade targets equal to the levels that would be experienced by the stream naturally. *Naturally* in this case means in the absence of any anthropogenic removal of shade producing near-stream vegetation. Thus, PNV shade targets are expressed as the percentage of vegetative shade which would be present if anthropogenic activity was not influencing near-stream vegetation. Lack of shade, expressed as the difference between the existing and target shade percentages, is a valuable tool for prioritizing management activities targeted at attaining the TMDL target for a stream segment or AU. Figures 1 – 6 show the lack of shade in assessment units throughout the watershed.

Detailed discussions of nonpoint source temperature pollution are provided in the three original TMDLs (DEQ 1999a, 1999b, 2003). Simply put, nonpoint source temperature pollution is caused by removal of streamside vegetation and by morphological changes that reduce shading to the stream. The hydrology of some streams has been altered by the encroachment of Western juniper on the associated uplands (DEQ, 2012).

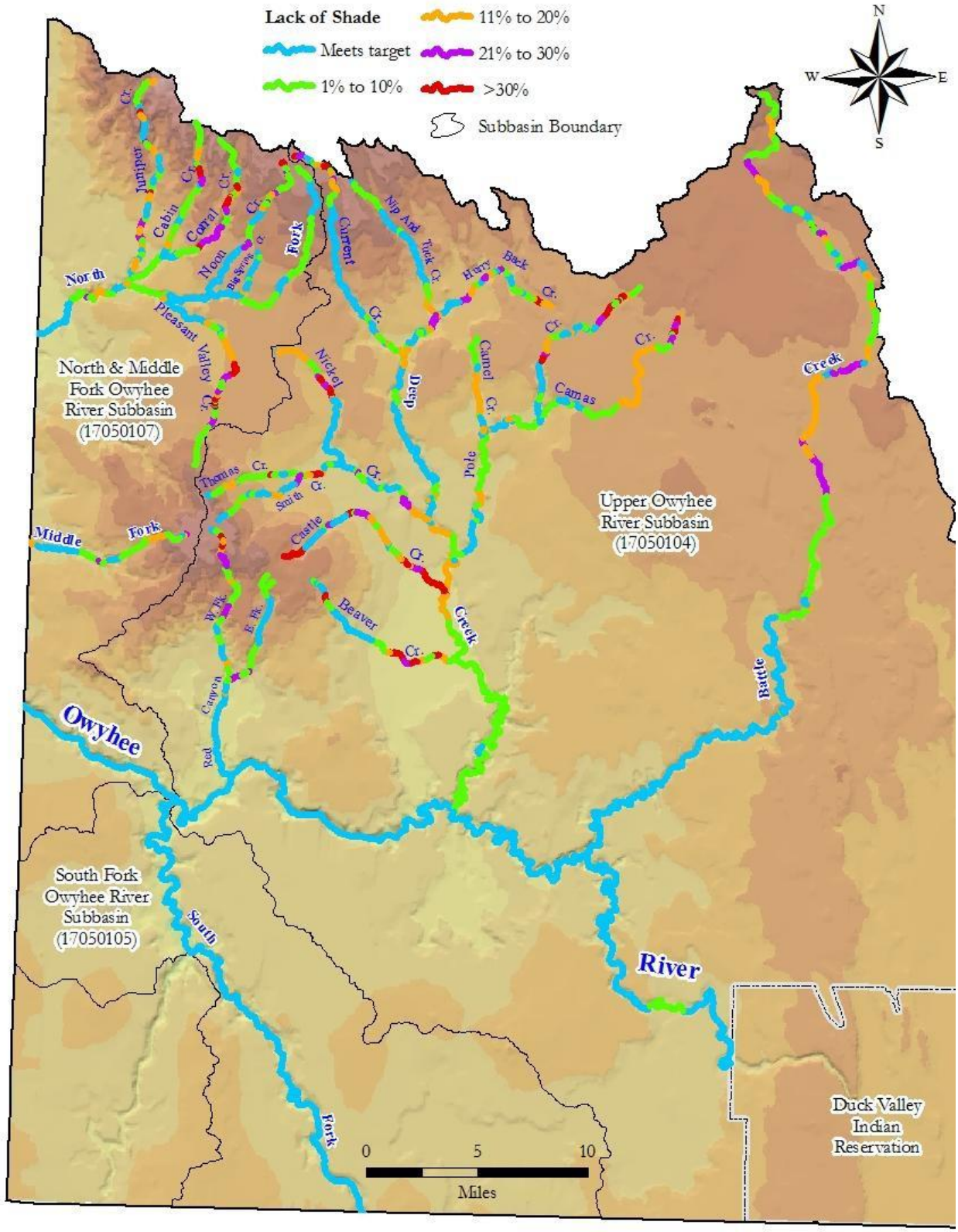

Figure 1. Lack of shade (difference between existing and target) for the Owyhee River watershed (DEQ, 2012)

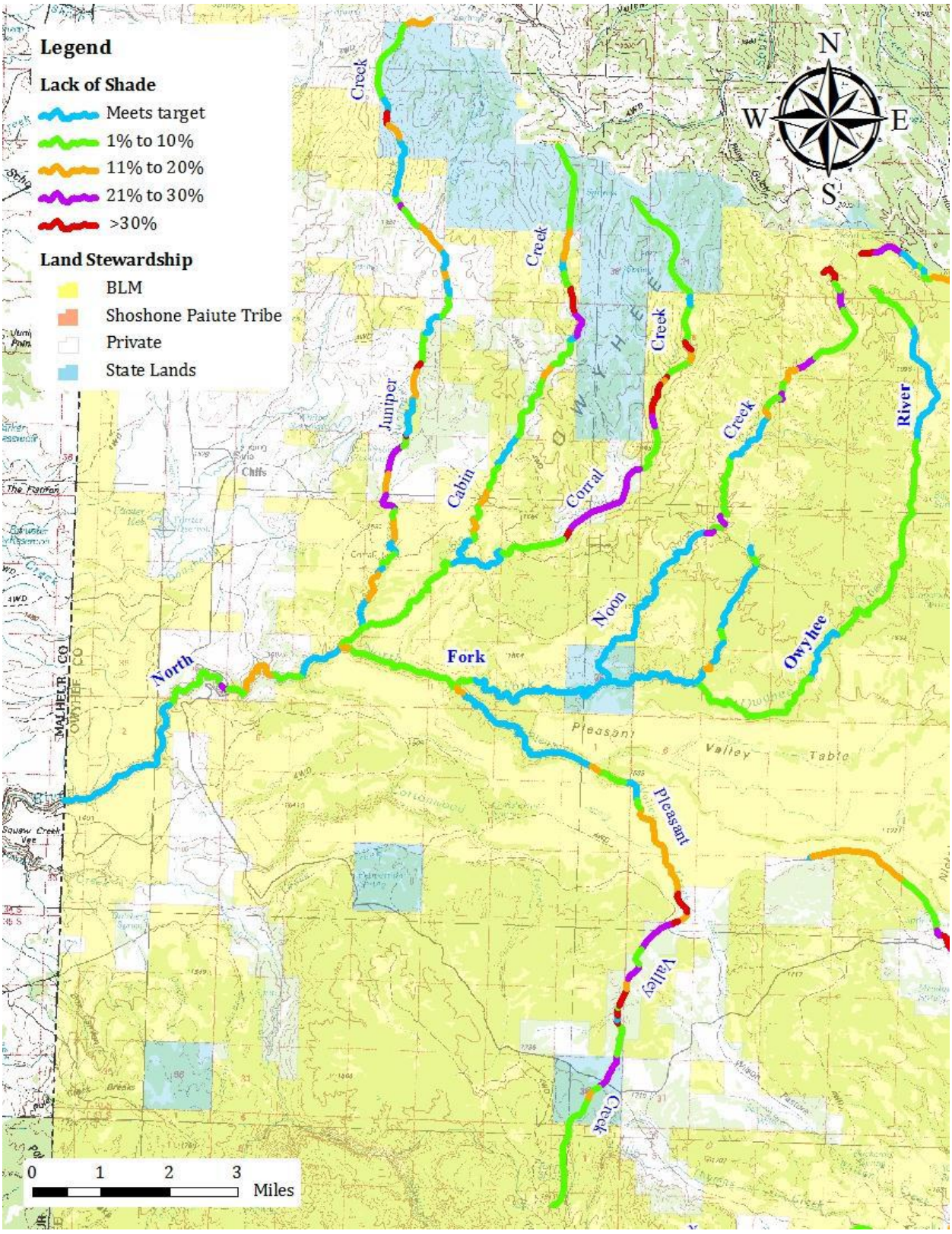

Figure 2. Lack of shade for the North Fork Owyhee River area (DEQ, 2012).

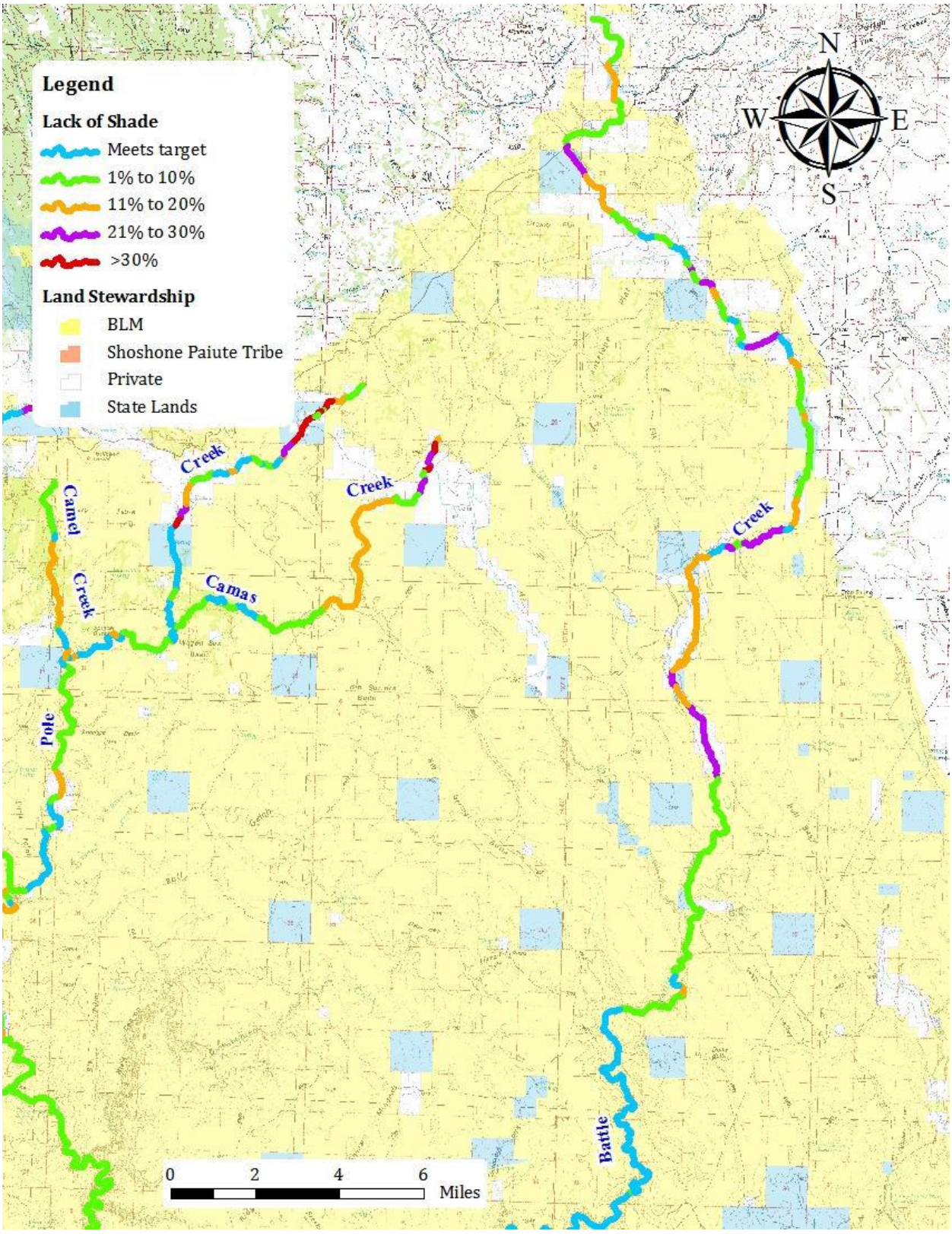

Figure 3. Lack of shade for Upper Battle Creek and Pole Creek (DEQ, 2012).

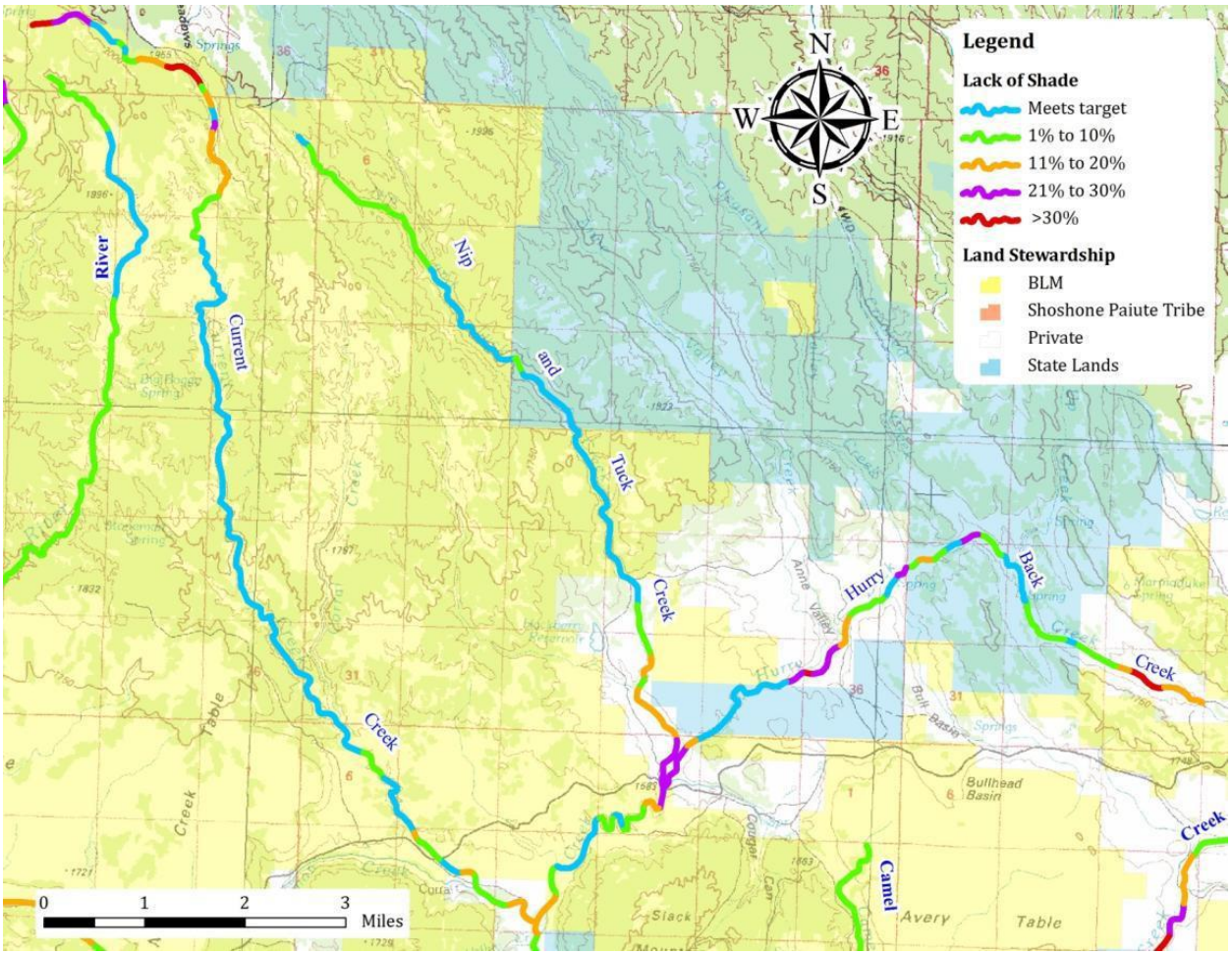

Figure 4. Lack of shade for Deep Creek headwaters (DEQ, 2012).

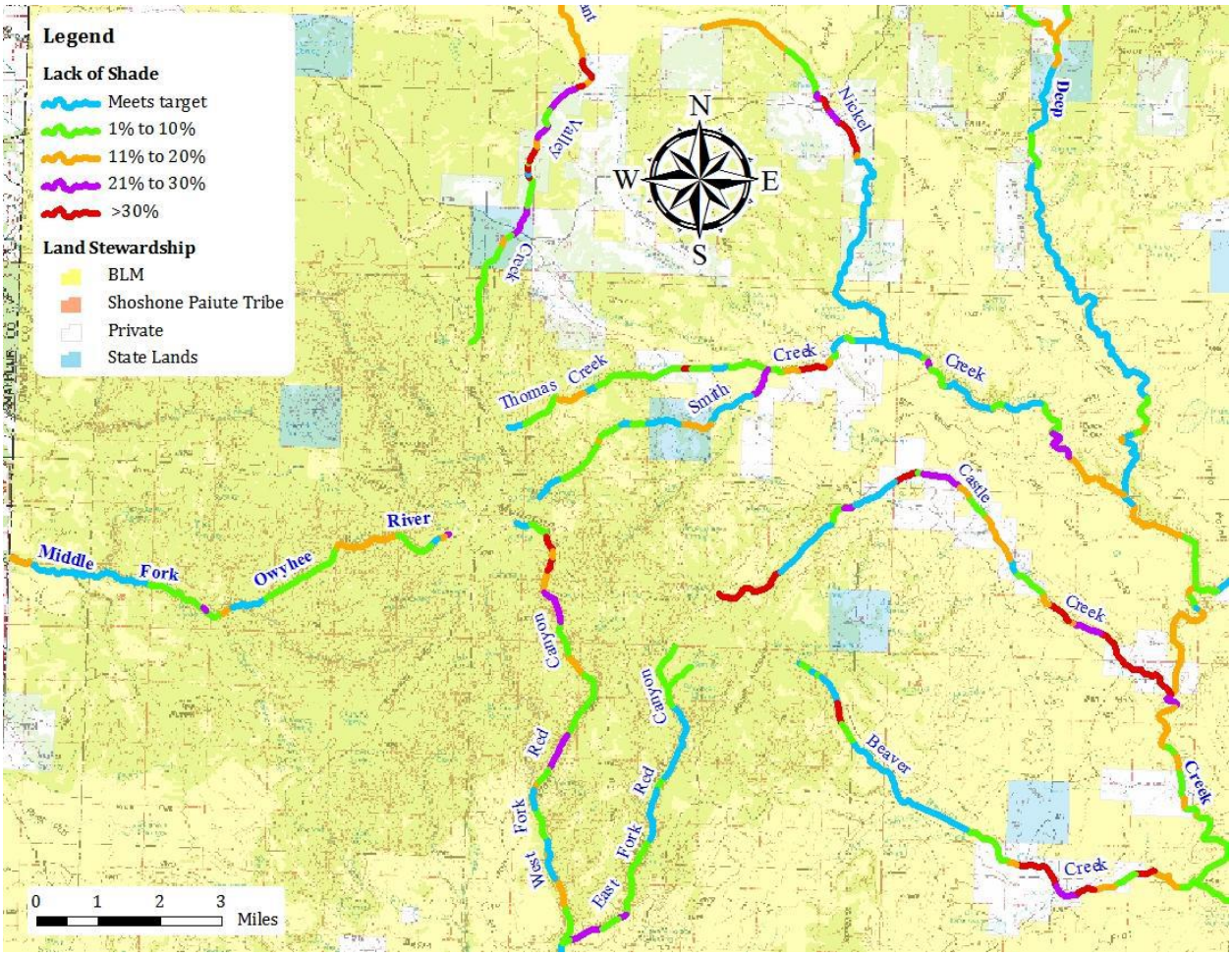

Figure 5. Lack of shade for Juniper Mountain area (DEQ, 2012).

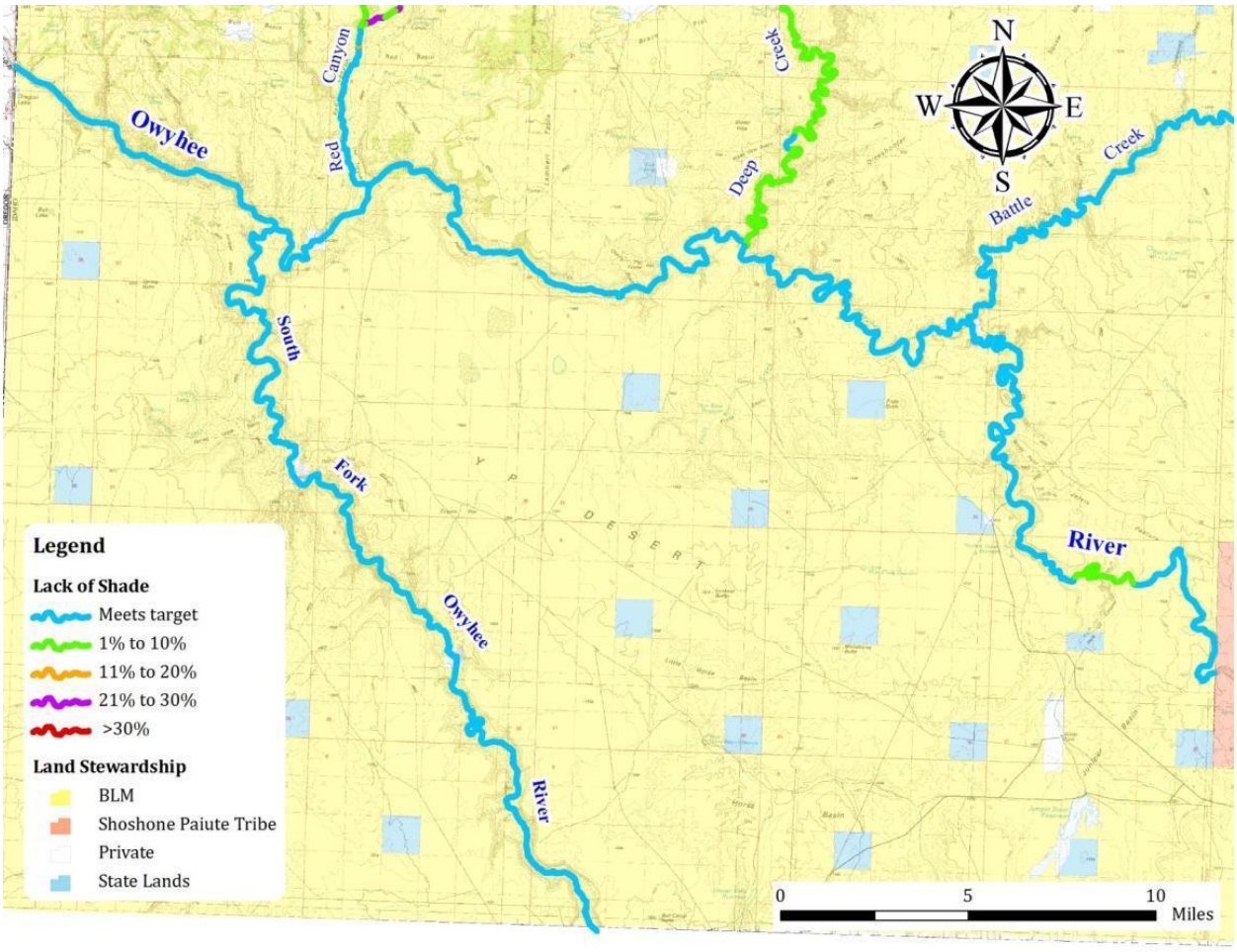

Figure 6. Lack of shade for Owyhee River area (DEQ, 2012).

Implementation

Appropriate methods to maintain or improve shade have been outlined in previous implementation plans (DEQ, 2002, 2004). Those methods should continue to be pursued. However, the PNV-based shade maps contained in the 2012 TMDL and reproduced as Figures 1–6 of this plan should be used to prioritize implementation activities.

It is important to note that in order for a stream to meet water quality standards for temperature, each assessment unit, or segment, must attain target shade levels. In other words, the *entire stream* must be at natural background shade levels to satisfy the TMDL (DEQ, 2012).

Treatment Priorities

To implement the TMDL, land managers should work to attain target shade levels for individual stream reaches with priority given to areas with the greatest discrepancies between existing

and target shade levels, described in this plan as “lack of shade”. Because of the analysis methodology used, AUs with lack of shade less than 10% (light green in figures 1 - 6) can be considered in good condition and should be treated with low priority (DEQ, 2012).

Those AUs with lack of shade between 10% and 30% (yellow and purple) have real shade deficiencies, and those above 30% (red) have serious problems. These stream segments should be the highest priority for treatment.

Implementation Practices

Tables 3 and 4 list BMPs that can be implemented to increase stream shading on irrigated land and on rangeland areas. Refer to previous implementation plans for details regarding BMP implementation (DEQ, 2002, 2004).

Table 4. BMPs for irrigated hay and pasture land.

Heavy Use Area Protection	Pasture & Hayland Planting
Brush Management	Pasture & Hayland Management
Critical Area Planting	Stream Channel Stabilization
Fence	Spring Development
Herbaceous Weed Control	Livestock Watering Facility
Prescribed Grazing	Irrigation System

Table 5. BMPs for rangeland.

Brush Management	Spring Development
Critical Area Planting	Rangeland Management
Fence	Watering Facility
Heavy Use Area Protection	Prescribed Grazing
Herbaceous Weed Control	Livestock Pipeline

Time Line

Because private agricultural lands constitute only 7% of the Owyhee River watershed, management improvements on private lands alone will have limited effects on reducing stream temperatures. If public land managers as well as private landowners aggressively pursue implementation of BMPs, some improvements might be seen within several years. However, the slow rate of ecological change means that full satisfaction of the TMDL requirements will likely take decades (DEQ, 2012).

Funding

Financial and technical assistance for installation of BMPs may be needed to ensure success of this implementation plan. The Owyhee Conservation District and the Bruneau River Soil and Water Conservation District can assist interested landowners in actively pursuing potential funding sources to implement water quality improvements on private agricultural and grazing lands. Many of these programs can be used in combination with each other to implement BMPs. These sources include (but are not limited to):

CWA 319 –These are Environmental Protection Agency funds allocated to Tribal entities and the State of Idaho. The Idaho Department of Environmental Quality (DEQ) administers the Clean Water Act §319 Non-point Source Management Program for areas outside the Tribal Reservations. Funds focus on projects to improve water quality and are usually related to the TMDL process. http://www.deq.idaho.gov/

Resource Conservation and Rangeland Development Program (RCRDP) –The RCRDP is a loan program administered by the ISWCC for implementation of agricultural and rangeland best management practices or loans to purchase equipment to increase conservation. http://www.swc.idaho.gov/

Conservation Reserve Program (CRP) –The CRP is a land retirement program for blocks of land or strips of land that protect the soil and water resources, such as buffers and grassed waterways http://www.nrcs.usda.gov/

Conservation Technical Assistance (CTA) –The CTA provides free technical assistance to help farmers and ranchers identify and solve natural resource problems on their farms and ranches. This might come as advice and counsel, through the design and implementation of a practice or treatment, or as part of an active conservation plan. http://www.nrcs.usda.gov/

Environmental Quality Incentives Program (EQIP): EQIP offers cost-share and incentive payments and technical help to assist eligible participants in installing or implementing structural and management practices on eligible agricultural land. http://www.nrcs.usda.gov/

Wetlands Reserve Program (WRP) –The WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. Easements and restoration payments are offered as part of the program. http://www.nrcs.usda.gov/

Wildlife Habitat Incentives Program (WHIP) –WHIP is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Cost-share payments for construction or re-establishment of wetlands may be included. http://www.nrcs.usda.gov/

State Revolving Loan Funds (**SRF) –**These funds are administered through the ISWCC. http://www.swc.idaho.gov/

Conservation Security Program (CSP) –CSP is a voluntary program that rewards the Nation's premier farm and ranch land conservationists who meet the highest standards of conservation environmental management. http://www.nrcs.usda.gov

HIP – This is an Idaho Department of Fish and Game program to provide technical and financial assistance to private landowners and public land managers who want to enhance upland game bird and waterfowl habitat. Funds are available for cost sharing on habitat projects in partnership with private landowners, non-profit organizations, and state and federal agencies. http://fishandgame.idaho.gov/

Partners for Fish and Wildlife Program in Idaho – This is a U.S. Fish and Wildlife program providing funds for the restoration of degraded riparian areas along streams, and shallow wetland restoration. http://www.fws.gov/

Maintenance, Monitoring, Evaluation

DEQ will continue to monitor the watersheds as per Idaho statute (Idaho Code, 2017), on a 5-year interval using BURP protocol. Additional monitoring of BMP's and the maintenance of BMP's installed will be performed by the designated agency or the agency that funded the BMP installations. The local conservation districts (Owyhee Conservation District and Bruneau River Soil Conservation District) follow the Natural Resource Conservation Service guidelines for BMP life expectancy and monitors BMP installations for the expected life of each practice to ensure proper maintenance of the practices. Typically, when a volunteer approaches the district for BMP assistance the district evaluates the current site-specific resource concerns. Individual conservation planning with willing landowners will determine the most appropriate BMPs to install on a case-by-case basis.

All BMP's will be maintained by the landowner for the life of the practice. Installed BMP's will be monitored and evaluated upon completion of the project, during annual reviews, and throughout the life of the practice. Monitoring and evaluations will enable staff to ensure practices are maintained and to evaluate BMP effectiveness for future projects.

References

DEQ (Idaho Department of Environmental Quality). 1999a. *South Fork Owyhee River Subbasin Assessment and Total Maximum Daily Load*. Boise, ID: DEQ.

DEQ (Idaho Department of Environmental Quality). 1999b. *North and Middle Fork Owyhee Subbasin Assessment and Total Maximum Daily Load*. Boise, ID: DEQ, Boise Regional Office.

DEQ (Idaho Department of Environmental Quality). 2002. *Implementation Plan for the North and Middle Forks of the Owyhee River.* Boise, ID: DEQ.

DEQ (Idaho Department of Environmental Quality). 2003. *Upper Owyhee Watershed Subbasin Assessment and Total Maximum Daily Load, Owyhee County, Idaho.* Boise, ID: DEQ, Boise Regional Office.

DEQ (Idaho Department of Environmental Quality). 2004. *Upper Owyhee Watershed TMDL Implementation Plan for Agriculture*. Boise, ID: DEQ.

DEQ (Idaho Department of Environmental Quality). 2012. *Owyhee River Watershed Total Maximum Daily Loads: North and Middle Fork Owyhee (HUC 17050107) South Fork Owyhee (HUC 17050105) Upper Owyhee (HUC 17050104)*. Boise, ID: DEQ, Boise Regional Office.

Idaho Code. 2017. "Water Quality." Idaho Code Title 39, Chapter 36.

Shumar, M.L. and J. DeVarona. 2009. *The Potential Natural Vegetation (PNV) Temperature Total Maximum Daily Load (TMDL) Procedures Manual.* Boise, ID:DEQ.