Paradise Creek Addendum Implementation Plan for Agriculture

(17060108)

Photo taken from Paradise Creek TMDL implementation Plan (IDEQ, 1999)

Prepared by the Idaho Soil and Water Conservation Commission
In cooperation with the Latah Soil and Water Conservation District

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Original Plan: Paradise Creek Watershed Advisory Group. December 1999. Paradise Creek TMDL Implementation Plan. Moscow, ID.

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Introduction

The objective of this plan is to address the bacteria and temperature TMDL addendums for Paradise Creek in the Palouse River subbasin; as well as the sediment 5-year review. The bacteria addendum updated the bacteria pollutant from fecal coliform to E.coli (IDEQ, 2014). This change did not affect the listed "Best Management Practices" in the original implementation plan.

The temperature TMDL addendum provided load allocations for an increase in riparian shade to restore stream temperatures to natural background conditions. Streamside vegetation and channel morphology are factors influencing shade that are most likely to have been changed by anthropogenic activities and can be most readily corrected and addressed by a Total Maximum Daily Load (TMDL) (IDEQ, 2015). Temperature was a listed pollutant in the Paradise Creek Water Body Assessment and Total Maximum Daily Load (IDEQ, 1997), but no TMDL was developed for temperature at that time. The Idaho Soil and Water Conservation Commission is the designated agency responsible for preparing an implementation plan for agriculture and grazing. The original implementation plan entitled "Paradise Creek Total Maximum Daily Load Implementation Plan" dated December 1999 outlines best management practices (BMPs) for the riparian treatment unit that when installed will work toward increasing shade (WAG, 1999).

Project Setting

Paradise Creek is in the Palouse River subbasin (Hydrologic unit code [HIUC] 17060108), located in northern Idaho bordering the state of Washington (Figure 1). The upper section starts with the headwaters located on Moscow Mountain, then flows approximately 19 miles through the middle agricultural section, and then through the urban area of Moscow, Idaho, until it joins the South Fork Palouse River in Pullman, Washington. The Paradise Creek watershed is 23,038 acres with 13,888 acres located in Idaho. (IDEQ, 2014) Elevations range from 4,356 feet at Paradise point in the Palouse range to 2,520 feet at the Idaho-Washington border.

Climate is characterized by approximately 23 inches of precipitation and an average snowfall of 48 inches. Nearly 40% of the annual precipitation falls as rain or snow during November, December and January. Mean daily temperatures range from a low of 28^{o}F in January to a high of 66^{o}F in July with an average daily temperature of about 47^{o}F. The average annual minimum temperature in January is 5^{o}F, while the average July maximum temperature is 96^{o}F. Summers are typically hot and dry. (IDEQ, 1997) In the spring months rainfall on frozen soils coincide with snowmelt driving peak flows in the watershed (Barker, 1981).

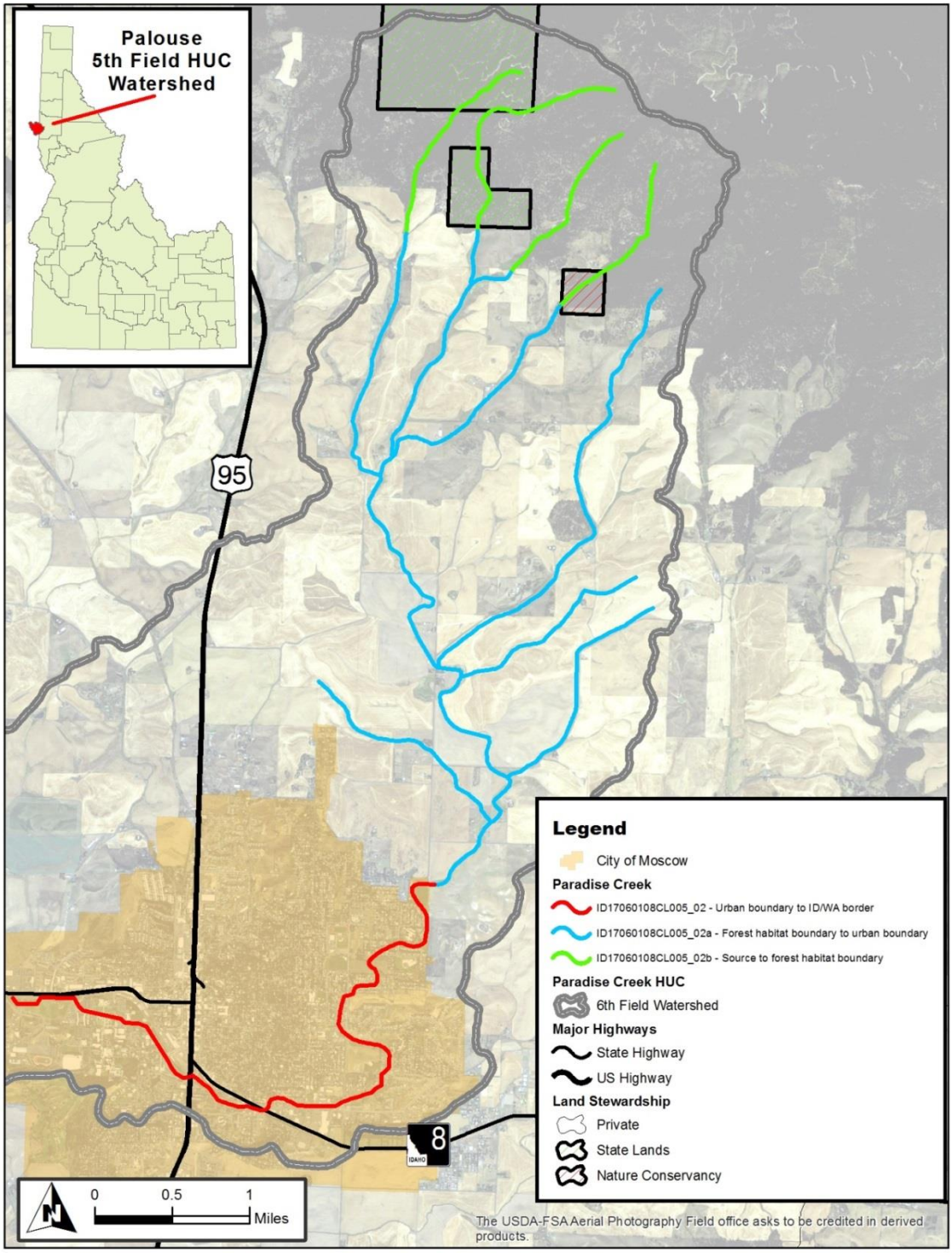

Figure 1. Paradise Creek Watershed Location Map (IDEQ, 2014)

The majority of the soils in Paradise Creek are loess soils. Loess soils are windblown sediments characterized by their silt sized particles, and fertility. Soils are comprised of the Palouse-Naff complex, the Southwick-Larkin complex, and the Taney-Joel complex with gentle to moderately steep slopes. Palouse and Naff are very deep, well drained soils. Southwick, Larkin, Taney and Joel are very deep, moderately well to well drained soils. The Vassar-Uvi complex are comprised of deep to very deep, well drained soils formed in volcanic ash, loess and granitic residuum commonly found in the upper portion of the watershed (Barker, 1981).

Land Use and Land Ownership

Land use in the Paradise Creek watershed is primarily dryland agriculture. The majority of the watershed is privately owned. Ownership is mixed geographically and not necessarily contiguous. The town of Moscow is the only urban area in the watershed. The upper watershed has some forest land owned by the State of Idaho, University of Idaho, non-industrial private forest land owners, and private industrial forest product companies. For a detailed description of land use, please refer to the original Paradise Creek TMDL.

Accomplishments

The "Paradise Creek TMDL: 2014 Addendum" summarizes the implementation work that was done in the Paradise Creek watershed between 1998 and 2014. Table 1 summarizes the practices installed using NRCS federal funds between 1998 and 2015, which were not included in the TMDL Addendum. No further additional implementation work was available.

Resource Concerns

Since the original impaired listing in 1997, Paradise Creek was identified as needing an addendum TMDL for bacteria and temperature.

Bacteria

The criteria for bacteria impairment was changed from fecal coliform to *Escherichia coli (E. coli*), since the original implementation plan. The Paradise Creek TMDL Addendum (DEQ, 2015) characterizes and documents the E. coli pollutant loads within the Paradise Creek watershed. Table 2 summarizes the E. coli concentrations in Paradise Creek between May 2013 and April 2014.

Table 1: BMP Practices installed with NRCS funds FY 1998 thru FY 2014 in Paradise Creek

Practice Name	Amount Installed	Units
Access Control	787.90	acres
Comprehensive Nutrient Management Plan	1.00	plan
Conservation Cover	2529.40	acres
Conservation Crop Rotation	3812.90	acres
Contour Farming	3177.40	acres
Cover Crop	2.00	acres
Filter Strip	15.90	acres
Firebreak	22500.00	feet
Forage and Biomass Planting	89.50	acres
Forest Stand Improvement	4.00	acres
Grassed Waterway	14.00	acres
Integrated Pest Management (IPM)	749.20	acres
Irrigation Reservoir	1.00	acre-foot
Nutrient Management	650.10	acres
Prescribed Burning	3.20	acres
Residue Management, No-Till/Direct Seed	1148.60	acres
Restoration and Management of Rare and Declining Habitats	4.00	acres
Seasonal High Tunnel System for Crops	1536.00	square feet
Stream Crossing	1.00	crossing
Stripcropping, Field	746.00	acres
Tree/Shrub Establishment	139.30	acres
Upland Wildlife Habitat Management	2608.00	acres
Water and Sediment Control Basin	1.00	basin
Wetland Wildlife Habitat Management	15.00	acres
Wildlife Watering Facility	5	troughs
Woody Residue Treatment	4	acres

Table 2. *E. coli* bacteria concentration in Paradise Creek (DEQ, 2014).

Date	Geometric Mean Concentration (cfu/100 mL)[a]
May 2013	688.1
June 2013	1192.0
August/September 2013	485.7
October 2013	437.0
November 2013	209.3
December 2013	785.1
January 2014	200.2
February 2014	167.9
March 2014	149.6
April 2014	185.1

[a] Colony-forming units per 100 milliliters of solution

Temperature

The "*Paradise Creek Temperature TMDL: 2015 Addendum to the Paradise Creek Subbasin Assessment and TMDL*" used Potential Natural Vegetation (PNV) for the temperature TMDL. The PNV was modeled for plant community structures using aerial photography. The PNV shade was converted to solar loads. The lower segment of Paradise creek that extends through the city of Moscow (AU # ID17060108CL005_02) was in the best condition with respect to shade with only an 18% reduction needed in solar load. The corresponding shade deficit was -14%. The middle region (AU # ID17060108CL005_02a) and its tributaries are conversely affected by agricultural activities, which resulted in an excess solar load of 51% or an average shade deficit of -25%. The headwater region (AU # ID17060108CL005_02b) is dominantly forested resulting in a target for shade of 95%. The deficit was on average -22% for this region. Table 3 and Figure 2 display the data findings. All three AU's combined require a reduction of 32% in solar load with an average shade deficit of -20%. (IDEQ, 2015)

Table 3: Total solar loads and average lack of shade for all waters.

Water Body/ Assessment Unit	Total Existing Load	Total Target Load	Excess Load (Reduction)	Average Lack of Shade (%)
	(kWh/day)			
Paradise Creek (ID17060108CL005_02a)	85,000	41,000	43,000 (51%)	-25
Paradise Creek (ID17060108CL005_02)	120,000	98,000	21,000 (18%)	-14
Paradise Creek (ID17060108CL005_02b)	4,600	1,500	3,200 (70%)	-22
Paradise Creek (Total All 3 AUs)	210,000	140,000	67,000 (32%)	-20

Note: Load data are rounded to two significant figures, which may present rounding errors.

Agricultural Inventory and Evaluation

As projects are implemented the existing shade levels should be documented before implementation of practices to verify the PNV aerial photo interpretation of the site. These before values should be compared to shade levels after implementation to determine actual shade increases of each project. This process will help evaluate the approach that was used in developing the temperature TMDL.

Treatment

The BMP's listed in the original TMDL implementation plan for bacteria, remain as the treatment plan for bacteria concerns (WAG, 1999). The change from fecal coliform to E.coli did not affect the needed BMP's.

Temperature critical areas were defined as those areas with more than 20% lack of shade. The high priority area was the middle agricultural section. The headwater region was the next priority with the urban section being the third priority. Treatments will include BMP's that will focus on increasing shade. Establishment of vegetation may be challenging due to periods of low flows and drought conditions.

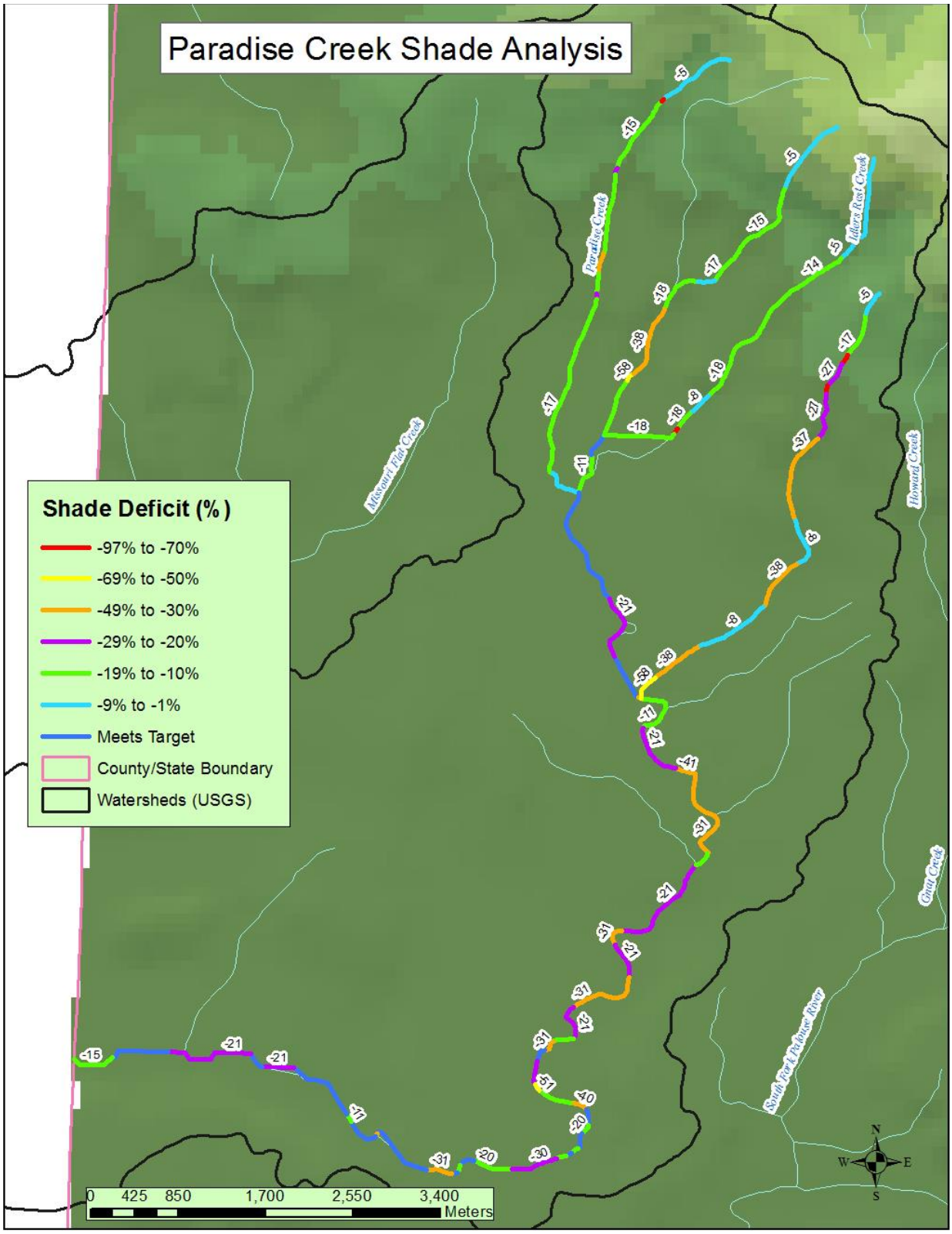

Figure 2: Paradise Creek Lack of shade (difference between existing and target shade) (IDEQ, 2015)

Table 4: Potential BMP Practices for middle agricultural section

Practice	Amount	Units
Grassed Filter Strips	300	acres
Riparian Forest Buffers	300	acres
Sediment Basins	20	basins
Erosion Control Structures	50	structures
Field Borders	50	acres
Critical Area Treatment	50	acres
Streambank Stabilization	10,000	feet

Funding

Financial and technical assistance for installation of BMPs may be needed to ensure success of this implementation plan. The Latah 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. The SWC and NRCS can provide technical assistance when needed. 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/water/prog_issues/surface_water/nonpoint.cfm#management

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.scc.state.id.us/programs.htm

Environmental Quality Incentives Program (EQIP): EQIP provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation or improved or created wildlife habitat. http://www.nrcs.usda.gov/programs/eqip/

Regional Conservation Partnership Program (RCPP) - RCPP promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements.
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/farmbill/rcpp/

The Agricultural Conservation Easement Program (ACEP) – ACEP provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits.. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands.
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/acep/

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/programs/cta/

National Grazing Lands Coalition (NatGLC) –The National Grazing Lands Coalition' promotes ecologically and economically sound management of grazing lands. Grants are available that facilitate the following: (1) demonstration of how improved soil health affects grazing lands sustainability (2) establishment of conservation partnerships, leadership and outreach, (3) education of grazing land managers, professionals, youth and the public (4) enhancement of technical capabilities, and (5) improvement in the understanding of the values and multiple services that grazing lands provide.
http://www.glci.org/

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.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index

Conservation Innovation Grants (CIG) –CIG is a voluntary program to stimulate the development and adoption of innovative conservation approaches and technologies for agricultural production.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig/

State Revolving Loan Funds (**SRF) –**These funds are administered through the IDEQ. https://www.deq.idaho.gov/water-quality/grants-loans/water-system-construction-loans.aspx

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/wps/portal/nrcs/main/national/programs/alphabetical/csp/

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/cms/wildlife/hip/default.cfm

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/partners/pdfs/ID-needs.pdf

Maintenance, Monitoring, Evaluation

DEQ will continue to monitor the watersheds as per Idaho Code 39-3611, at least 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 Latah Soil and Water Conservation District follows 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. 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

Barker, 1981. Soil Survey of Latah County Area, Idaho. U.S. Department of Agriculture, Soil Conservation Service. Washington, D.C. 168pp plus maps.

Idaho Code § 39.3611. Development and implementation of total maximum daily load or equivalent processes.

IDEQ. 2015. "Paradise Creek Temperature TMDL." Idaho Department of Environmental Quality, Lewiston Regional Office.

IDEQ. 2014. "Paradise Creek TMDL: 2014 Addendum". Idaho Department of Environmental Quality, Lewiston Regional Office.

IDEQ. 1997. "Paradise Creek TMDL: Water Body Assessment and Total Maximum Daily Load." Boise, ID: DEQ.

Paradise Creek Watershed Advisory Group (WAG). 1999. "Paradise Creek Total Maximum Daily Load Implementation Plan". Moscow, Idaho: Latah Soil and Water Conservation District.

Shumar,M.L.andJ.DeVarona.2009.ThePotentialNaturalVegetation(PNV)TemperatureTotalMaximumDailyLoad(TMDL)ProceduresManual.Boise,ID:DEQ.