

Teton River TMDL Addendum Implementation Plan for Agriculture (HUC 17040204)



Prepared by the Idaho Soil and Water Conservation Commission
in cooperation with the Teton Soil Conservation District and Madison Soil and
Water Conservation District

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SOIL & WATER
CONSERVATION COMMISSION

Original Plans: Teton River Subbasin Assessment and TMDL (IDEQ January 2003,) and Supplement to the Teton TMDL-Moody, Fox, and Spring Creeks (June 2003), Teton Subbasin Total Maximum Daily Load Implementation Plan for Agriculture (April 2005; Revised February 2014), Teton River Subbasin 2016 Total Maximum Daily Loads and Five-Year Review (October 2016)

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Introduction

Purpose

The purpose of this implementation plan is to identify and recommend best management practices (BMPs) needed to meet the updated and additional Total Maximum Daily Loads (TMDLs) identified in the Teton River Subbasin 2016 Total Maximum Daily Loads and Five-Year Review (Tables 3-5). The Idaho Soil & Water Conservation Commission (ISWCC) is the agency responsible for preparing the implementation plan for agriculture and grazing, satisfying the requirements described in the Idaho Code 39-3601.

Goals and Objectives

The goal of this plan is to restore and protect beneficial uses on the impaired segments by reducing the amount of pollutants from nonpoint agricultural sources and to provide a framework for local stakeholders to use in reaching TMDL goals. The objective of this plan is to provide guidance and recommendations for the Teton Soil Conservation District (TSCD); partnering agencies such as the Natural Resource Conservation Service (NRCS); and agricultural producers for the implementation of Best Management Practices (BMPs) that will reduce sediment and nutrient loads and increase shading along the stream corridors where feasible. This implementation plan will also build upon past conservation accomplishments that have been made and will assist other subbasin efforts in restoring beneficial uses in the Teton River subbasin.

This plan is not intended to identify site specific BMPs for agricultural fields; however, it does recommend BMPs for reducing water quality problems at a subbasin level. Agriculture is considered a nonpoint pollutant source; therefore, implementation efforts are completed on a voluntary basis. This plan recommends that agricultural landowners contact the Teton Soil Conservation District (TSCD), Natural Resources Conservation Service (NRCS), Idaho State Department of Agriculture (ISDA) and/or the Idaho Soil and Water Conservation Commission (ISWCC) for assistance. These agencies will help landowners determine the specific water quality and other natural resource concerns on their property.

Project Setting

The Teton River subbasin (HUC 17040204) is located in east-central Idaho, with portions in Wyoming. Further information and characterization for the subbasin is found in the *Teton River Subbasin Assessment and TMDL*

(https://www.deq.idaho.gov/media/452220-teton_river_entire.pdf) (DEQ 2003),

Supplement to the Teton River Total Maximum Daily Load – Moody, Fox, and Spring Creeks (https://www.deq.idaho.gov/media/452447-teton_river_supplement.pdf) (DEQ 2003),

Teton Subbasin Total Maximum Daily Load Implementation Plan for Agriculture (<https://www.deq.idaho.gov/media/1117197/teton-river-ag-imp-plan-0214.pdf>) (IASCD 2005),

and the *Teton River Subbasin: 2016 Total Daily Maximum Daily Loads and Five-Year Review* (<https://www.deq.idaho.gov/media/60179183/teton-river-subbasin-2016-tmdl-five-year-review-1016.pdf>) (DEQ 2016)

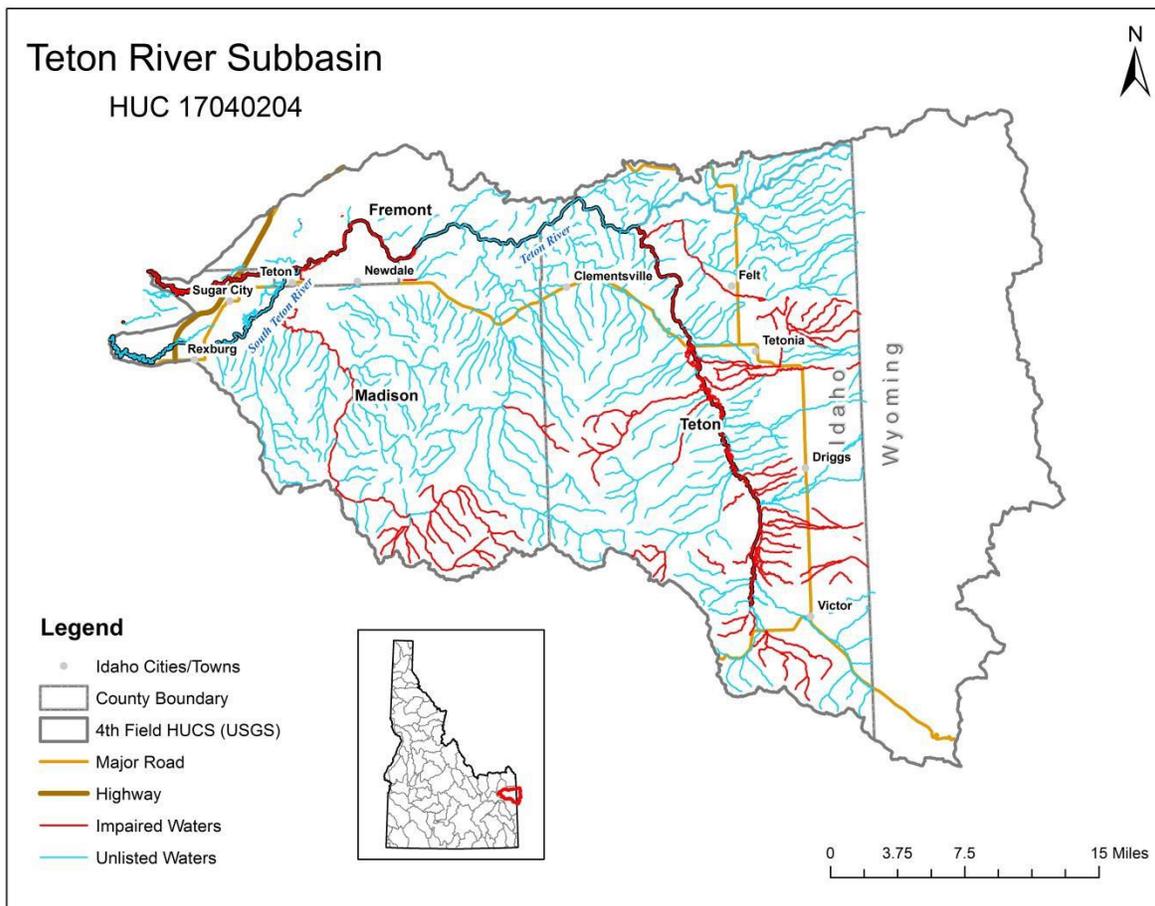


Figure A. Teton River Subbasin (TMDL and 5-Year Review, IDEQ 2016).

Land Use and Land Ownership

Land use in the Teton River watershed is primarily agriculture. The majority of the watershed is privately owned (74%), followed by US Forest Service accounting for 20%. For a detailed description of land use, refer to the original TMDL Implementation Plan and Five-Year Review as referenced on the front page of this document.

Table 1. Current landownership in the Teton River subbasin-Idaho portion only (IDEQ, 2016a)

Owner/Land Manager	Acreage	Percent of Basin
Bureau of Land Management	10,443	1.98%
Bureau of Reclamation	2,858	.54%
Private	389,835	73.81%
State	18,416	3.49%
US Forest Service	106,581	20.18%
Total	528,134	100%

Accomplishments

The Teton Subbasin TMDL Implementation Plan for Agriculture documents implementation efforts in the watershed up through the time of its publication in 2005. Projects installed were primarily funded with SAWQP and EQIP funds.

The 2016 TMDL and Five-Year Review also discusses implementation efforts up through the date of its publication in 2016 by various agencies, including the USFS, Idaho Fish and Game, and Idaho DEQ. There were several DEQ 319 grants dispersed and Idaho State Revolving Funds.

The Friends of the Teton River (FTR) has also been working diligently to improve water quality and restore and protect critical areas in the watershed. FTR was founded in 2001 and is comprised of local stakeholders. According to their website, FTR has worked for over a decade and invested \$3 million to research, restore and protect the Teton River Corridor. Some of their past and current projects are outlined below.

The Teton Valley Soil Health Initiative, which began with a request by the Teton Soil Conservation District to help purchase a no till drill, is focused on the implementation of no till methods, planting cover crops, using strategic crop rotations and implementing adaptive grazing practices. Through other partnerships, they were awarded \$750,000 in NRCS grant funding that will provide financial incentives to local producers to implement conservation farming practices.

The Teton Valley Aquifer Recharge Program works with willing agricultural and livestock producers to manage water on farms and ranches early in the irrigation season, so sustain water supplies for humans, fish, and wildlife into the late summer months.

By providing participants with the financial support to plan, implement, and monitor innovative methods, they reduce the financial risk associated with trying a new farming or ranching practice while also providing support for education through workshops and peer-to-peer learning.

For more information on FTR projects please refer to their website at <https://www.tetonwater.org/>.

The Fox Creek Mitigation Project with Teton County and the Teton Soil Conservation District. This project restored a section of Fox Creek to its original channel with vegetation and willow plantings, improving fish habitat, reducing erosion, stabilizing streambanks, and providing potential stream shade and stream temperature reduction.

Resource Concerns

A detailed discussion of nonpoint sources is provided in the 2003 TMDL (DEQ 2003a). The nonpoint source pollutants addressed in this plan include sediment, bacteria and temperature. Sediment sources include streambank erosion, erosion from roads, and surface irrigated cropland. A large portion of streambank erosion occurs during spring snowmelt and runoff. Other causes of streambank erosion can include unmanaged livestock grazing in riparian areas and degradation of streambanks from high use by recreationalists.

Bacteria sources can also be attributed to unmanaged livestock grazing in riparian areas, concentrated livestock feeding and watering areas, waterfowl and wildlife, as well as failing septic systems

Altered stream segments and destabilized streambanks contribute to reduced riparian vegetation that would provide shade, which leads to excess solar load and increased instream water temperatures. The failure of the Teton Dam is also thought to increase the summer river temperatures.

Sediment

The Teton River Subbasin 2016 TMDL and Five-Year Review identified 6 assessment units (AUs) requiring sediment load reductions (Table 2). Three AUs are updated TMDLs from 2003 and Three AUs have newly developed TMDLs.

Table 2. Current sediment loads and necessary reductions.

AU (ID17040204)	Segment	Current Load (tons/year)	Load Alloc. (tons/year)	Load Red. (tons/year)	% Red.	TMDL Status
SK006_02	South Fork Moody Creek	137	130	7	5%	New
	Fish Creek	1582	77	1505	95%	
	State Creek	178	13	165	93%	
SK017_04	Teton River	1222	405	817	64%	Updated
SK020_04	Teton River	934	361	573	59%	Updated
SK026_04	Teton River	166	57	109	63%	Updated
SK028_03	Teton River	137	46	91	64%	New
SK035_03	Trail Creek	854	114	740	87%	New

Three AU's (main stem Teton River, AU's listed in Table 2) received updated sediment TMDLs based on new in-channel load estimates. According to the Five-Year Review, monitoring in 2013 found a need to add streambank and substrate load within the main stem as a loading source. Idaho DEQ acknowledges that including the substrate as a loading source may lead to allocating loads and reductions twice because the actual source may have been accounted for as an upland source or upstream bank erosion. The recommendations set forth in the original agriculture implementation plan (IASCD 2005) for these AU's remain relevant as the treatment plan to reduce sediment and help to achieve necessary load reductions.

Three AUs require newly developed load reductions.

SK 006_02 – South Fork Moody Creek

AU also includes Fish Creek State Creek.

SK 028-03 - Teton River Warm and Drake Creeks Confluence to Trail Creek

This segment was found to be a source to downstream AUs.

Excessive bank erosion and silt deposits on substrate were identified in-channel.

SK 035-03 - Trail Creek pipeline diversion to mouth

When water is present, this stream becomes a source of sediment to the Teton River.

Bacteria

Water quality monitoring conducted by IDEQ since the 2003 Teton River subbasin TMDL was approved indicated that three additional stream segments required bacteria TMDLs because they did not meet water quality standards for *E. coli*. Idaho water quality standards (IDAPA 58.01.02.251.01) stipulate that *E. coli* is not to exceed 126 colony forming units (cfu) per 100 mL water sample, based on a geometric mean of several samples collected according to a specific protocol. The data collection and analyses are described in detail in the 2016 TMDL Five-Year Review (IDEQ, 2016).

For the Driggs Spring Complex and Woods Creek, a 2006 report by the FTR found that the primary source of *E. coli* was wildlife, particularly avian and/or waterfowl. According to the Five-Year Review, the discharges of these streams are minor compared to the Teton River and thought to be adequately diluted within a reasonable distance with no adverse impacts on primary contact recreation. North Fork Moody Creek is thought to be impacted by late summer grazing and wildlife.

Table 3. Bacteria loads and necessary reductions

AU (ID17040204)	Segment	Current Load (cfu/day)	Load Alloc. (cfu/day)	Load Red. (cfu/day)	% Red.
SK007_02	North Fork Moody Creek	3.36×10^{10}	4.66×10^9	2.89×10^{10}	86%
SK049_02	Driggs Springs Complex	4.25×10^9	2.52×10^9	1.73×10^9	41%
SK050_02	Woods Creek	1.07×10^{10}	6.33×10^9	4.32×10^9	40%

Temperature

The Teton River Subbasin 2016 TMDL and Five-Year Review updated 6 AU's (Table 4) for temperature using the potential natural vegetation (PNV) temperature TMDL methodology. PNV represents the "system potential" in a broad scale view. Shade targets are derived from shade curves of similar vegetation types and aerial photo interpretation. Aerial photo interpretations were partially field verified with Solar Pathfinder data. The recommendations in the original agriculture implementation plan (IASCD 2005) for these AU's remains relevant as the treatment plan to reduce temperature and help to achieve necessary load reductions.

The Teton River Subbasin 2016 TMDL and Five-Year Review addresses temperature TMDLs for 4 new AU's (Table 4) where monitoring determined exceedances of the salmonid spawning standard. Again, the effective target shade levels were established using the PNV methodology. Most of the excess heat loads result from lack of shade, rehabilitation is needed to achieve shade targets.

Table 4. Solar loads and necessary reductions

AU (ID17040204)	Segment	Current Load (kWh/day)	Target Load	Load Red.	% Red.	TMDL Status
SK026_02	Teton River	1,000,000	820,000	220,000	22%	Updated
SK041_02	Fox Creek	520,000	340,000	180,000	35%	Updated
SK042_02	Fox Creek	23,000	31,000	0	0	Updated
SK054_03	Spring Creek	520,000	470,000	57,000	11%	Updated
SK056_02	Spring Creek	420,000	240,000	180,000	35%	Updated
SK056_03	Spring Creek	68,000	58,000	10,000	15%	Updated
SK017_04	Teton River	2,500,000	2,100,000	340,000	20%	New
SK020_04	Teton River	3,700,000	2,700,000	1,000,000	27%	New
SK026_04	Teton River	2,300,000	870,000	1,500,000	65%	New
SK028_03	Teton River	310,000	220,000	89,000	29%	New

According to the Five-Year Review (DEQ 2016) all assessment units, with the exception of Fox Creek, lacked shade. Heat loads from the lack of shade contribute to impairments to beneficial uses. It was also noted that the main stem Teton River at its headwaters at the confluence of Drake and Warm Creeks has significant ground water inputs that may be an additional temperature source, but it is not deemed as the causal factor leading to exceedances of the salmonid spawning temperature standard. Multiple springs and wetlands also exist within the basin and it is unknown if they have a positive or negative effect on heat loads.

Treatment/Priority

Treatment

Individual conservation planning will determine the most appropriate BMP and quantity needed. Some of the voluntary BMPs that may be implemented for all assessment units would include fence, offsite watering, prescribed grazing, riparian herbaceous cover and tree and shrub establishment. Riparian planting and restoration techniques will stabilize the streambanks and make them resistant to water flow. Fencing off portions of these creeks would improve bank stability and allow for vegetation re-growth and new growth establishment. The riparian fencing could be installed to temporarily

exclude livestock during recovery and then allow the area to be part of a managed grazing system controlling the timing, frequency, duration and intensity of grazing. Offsite watering facilities, where feasible, would help to remove animal traffic and reduce erosion on the streambanks. Recommended BMPs are listed below in Table 5 and 6. These lists were drawn from information contained in the Conservation Practices Physical Effects section of the NRCS Field Office Technical Guide.

Table 5. BMPs recommended to decrease *E. coli* levels (NRCS Field Office Technical Guide)

Practice Name	NRCS Practice Code
Animal Trails and Walkways	575
Channel Stabilization	584
Channel Bank Vegetation	322
Conservation Cover	327
Constructed Wetland	656
Critical Area Planting	342
Grazing Land Mechanical Treatment	548
Prescribed Grazing	528
Range Planting	550
Riparian Forest Buffer	391
Riparian Herbaceous Cover	390
Spring Development	574
Tree/Shrub Establishment	612
Use Exclusion	472
Watering Facility	614

Table 6. BMPs recommended to increase shade and decrease stream temperature (NRCS Field Office Technical Guide)

Practice Name	NRCS Practice Code
Channel Stabilization	584
Channel Bank Vegetation	322
Critical Area Planting	342
Grade Stabilization Structure	410
Grassed Waterway	412
Grazing Land Mechanical Treatment	548
Prescribed Grazing	528
Range Planting	550
Riparian Forest Buffer	391
Riparian Herbaceous Cover	390
Spring Development	574
Streambank and Shoreline Protection	580
Stream Habitat Improvement and Manage	395
Tree/Shrub Establishment	612
Upland Wildlife Habitat Management	645
Use Exclusion	472
Watering Facility	614

The lists of potentially beneficial BMPs are to serve as a starting point for implementation activities in the subbasin. IDEQ recognizes that implementation strategies for TMDLs may need to be modified if monitoring shows that TMDL goals are not being met or significant progress is not being made toward achieving the goals.

The implementation strategies for addressing temperature TMDLs that are discussed in the 2005 Teton River subbasin TMDL implementation remain appropriate treatment recommendations. The change from a numeric temperature criterion to the PNV approach did not change implementation strategies for achieving the TMDL targets.

Priority

Agricultural lands that contribute excessive pollutants to waterbodies were defined as critical areas for BMP implementation. Critical areas are prioritized based on proximity to the waterbody; potential for transport and delivery of pollutant to the waterbody; and water quality impact. Critical areas are those areas where treatment is considered necessary to address the resource concerns affecting water quality.

Site specific BMPs will be chosen based on a variety of factors, but typically reflect the landowner's objectives in conjunction with the resource concerns identified by the assisting agency. Implementation priority should focus on the critical areas that have the greatest potential for pollutant transport. However, implementation priority will likely be based on landowner interest and available funding.

Funding

Financial and technical assistance for installation of BMPs may be needed to ensure success of this implementation plan. The Teton Soil Conservation District can assist interested landowners in actively pursuing potential funding sources to implement water quality improvements on private agricultural and grazing lands. The ISWCC 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 (IDEQ) 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/farbill/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/>

Habitat Improvement Program (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>

Monitoring and Evaluation

Field Level

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.

During the conservation planning process with individual participants, planned BMPs will be evaluated for effectiveness in addressing water quality. Erosion is predicted using the *Revised Universal Soil Loss Equation (RUSLE)* to estimate sheet and rill erosion and the *Surface Irrigation Soil Loss (SISL)* model to estimate irrigation-induced erosion. The *Water Quality Indicators Guide* is utilized to assess nitrogen, phosphorus, sediment, and bacteria contamination from agricultural land.

Participants who install BMPs in conjunction with a state or federal cost-share incentive program will be responsible for following NRCS standards and specifications and for maintaining the installed BMPs for the practice life span. The contract and/or conservation plan will outline the responsibility of the participant regarding operation and maintenance (O&M) for each BMP. Annual status reviews of contracts will be conducted to ensure the contract is on schedule and BMPs are being installed as planned.

BMP effectiveness monitoring will be conducted following installation to determine the relative effectiveness of implemented BMPs in reducing water quality impacts. These BMP effectiveness evaluations will be conducted according to the protocols outlined in the *Agriculture Pollution Abatement Plan* and the *ISWCC Field Guide for Evaluating BMP Effectiveness*.

Idaho's *OnePlan CAFO/AFO Assessment Worksheet* can be used by participants to evaluate and manage livestock waste, feeding, storage, and application areas.

Watershed Level

At the watershed level, there are governmental agencies such as the ISDA and IDEQ involved with water quality monitoring. Water quality monitoring is a key component in determining the results of implementation efforts and tracking progress towards achieving water quality standards. Trends are an important factor in determining whether or not standards are achievable given the level of effort expended.

IDEQ uses the Beneficial Use Reconnaissance Protocol (BURP) to collect and measure key water quality variables that aid in determining the beneficial use support status of Idaho's water bodies. Their determination reports if a water body is in compliance with water quality standards and criteria. In addition, IDEQ conducts five-year TMDL reviews to update implementation and monitoring efforts.

References

IDEQ (January 2003). Teton River Subbasin Assessment and Total Maximum Daily Load.

IDEQ (June 2003). Supplement to the Teton River Total Maximum Daily Load – Moody, Fox, and Spring Creeks.

IDEQ. (April 2005; Revised February 2014). Teton Subbasin Total Maximum Daily Load Implementation Plan for Agriculture.

IDEQ (October 2016). Teton River Subbasin: 2016 Total Daily Maximum Daily Loads and Five-Year Review.