

Upper and Lower Henrys Fork

Implementation Plan for Agriculture

Hydrologic Unit Codes 17040202 and 17040203



Prepared by the Idaho Soil and Water Conservation Commission

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Introduction

Purpose

No streams were originally listed on the Idaho 1998 303d list for temperature pollution in this subbasin. However, the Environmental Protection Agency (EPA) added streams to Idaho's 1998 303d list of impaired waters that potentially exceeded Idaho's temperature criteria. Among those EPA additions, the streams in the Upper Henry's Fork Subbasin were Duck Creek, Howard Creek, Targhee Creek, Timber Creek, and Warm River. Other streams were listed as impaired due to low bioassessment scores as determined by the Idaho Department of Environmental Quality (IDEQ). Refer to the Upper and Lower Henry's Fork TMDL: Addendum to the Upper Henry's Fork Subbasin Assessment and TMDLs, (IDEQ, June 2010) for more information. Table 1 Shows the status of the 2010 TMDLs as described in the 2017 five-year review.

Table 1. Status of the 2010 TMDLs as listed in the 2017 Five-Year Review.

Stream Name	Assessment Unit Number	Pollutant	Improvement Activities	Water Quality Trend
Upper Henrys Fork				
Warm River	ID17040202SK002_04 ID17040202SK002_05 ID17040202SK005_02 ID17040202SK005_03 ID17040202SK005_04	Temperature	Riparian restoration, intensive riparian management	Improving
Buffalo River	ID17040202SK018_03	Sediment	Improving fish passage, riparian restoration, intensive riparian management	Improving
Howard Creek	ID17040202SK033_02	Temperature	Riparian restoration, intensive riparian management	Static
Targhee Creek	ID17040202SK034_02 ID17040202SK034_03	Temperature	Riparian restoration, intensive riparian management	Improving
Timber Creek	ID17040202SK035_03	Temperature	Riparian restoration, intensive riparian management	Static
Duck Creek	ID17040202SK036_03	Sediment Temperature	Riparian restoration, intensive riparian management	Improving
Sheridan Creek	ID17040202SK045_03	Sediment	Riparian restoration, intensive riparian management	Degrading
Lower Henrys Fork				

Conant Creek	ID17040203SK007_02 ID17040203SK007_03	Bacteria (<i>Escherichia coli</i>)	Intensive riparian management	Improving
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Upper and Lower Henrys Fork TMDL, Five-Year Review (IDEQ, 2017)

In the 2021 TMDL, three assessment units (AUs) within the Upper and Lower Henrys Fork subbasins were identified as not supporting aquatic life or contact recreational uses (Table 2). One *E. coli* TMDL and two sediment TMDLs were developed to address impaired uses. Please also see Table C in the Upper and Lower Henrys Fork Subbasins 2021 Sediment and Bacteria TMDLs (IDEQ, 2021), for previous and current AU re-alignments in the Upper Henrys Fork subbasin.

Table 2. Upper and Lower Henrys Fork Subbasins 2021 listed TMDLs

Stream	Pollutants
Twin Creek	Sediment
Timber Creek	<i>Escherichia coli</i>
Sand Creek	Sediment

Upper and Lower Henrys Fork Subbasins 2021 Sediment and Bacteria TMDLs (IDEQ, 2021).

The purpose of this implementation plan is to identify and recommend best management practices (BMPs) needed to meet the Total Maximum Daily Loads (TMDLs) identified in the Upper and Lower Henry's Fork Five Year Review (April 2010), the Upper and Lower Henrys Fork TMDL Addendum (June 2010), the Upper and Lower Henrys Fork TMDL Five-Year Review (2017), and the Upper and Lower Henrys Fork Subbasins Sediment and Bacteria TMDLs (2021).

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 Yellowstone Soil Conservation District (YSCD); partnering agencies and groups 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 Upper and Lower Henrys Fork 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 Yellowstone Soil Conservation District (YSCD), 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 Upper Henrys Hydrologic Unit Code (HUC) 17040202 subbasin contains 706,550 acres. Ninety-one percent of the subbasin is in Fremont and 6 percent in Clark Counties, Idaho. Less than 3 percent is in Teton County, Wyoming, and less than 1 percent is in Gallatin, Beaverhead, Madison Counties and Yellowstone National Park, Montana. Elevations range from 10,250 feet in the north end of the HUC at the Montana State border to 5,200 feet in the southern portion of the HUC at Ashton Dam. (NRCS, 2008).

The Lower Henrys (HUC) 17040203 subbasin contains 653,800 acres. Sixty three percent of the subbasin is in Fremont County, 5 percent in Madison County and less than one percent is in Clark and Jefferson Counties, Idaho. Thirty-two percent is in Teton County, Wyoming. Elevations range from 6,700 feet in the eastern portion of the HUC at the Wyoming State border to 4,810 feet in the south western portion of the HUC where the Henrys Fork merges with the South Fork of the Snake River to form the main stem Snake River. (NRCS, 2008). See figure A for a map of the subbasins.

Further information and characterization for the subbasins are found in the Upper and Lower Henrys Fork TMDL Addendum (IDEQ, June 2010), Upper and Lower Henrys Fork TMDL Five-Year Review (IDEQ 2017), Upper and Lower Henrys Fork Subbasins 2021 Sediment and Bacteria TMDLs (IDEQ, 2021).

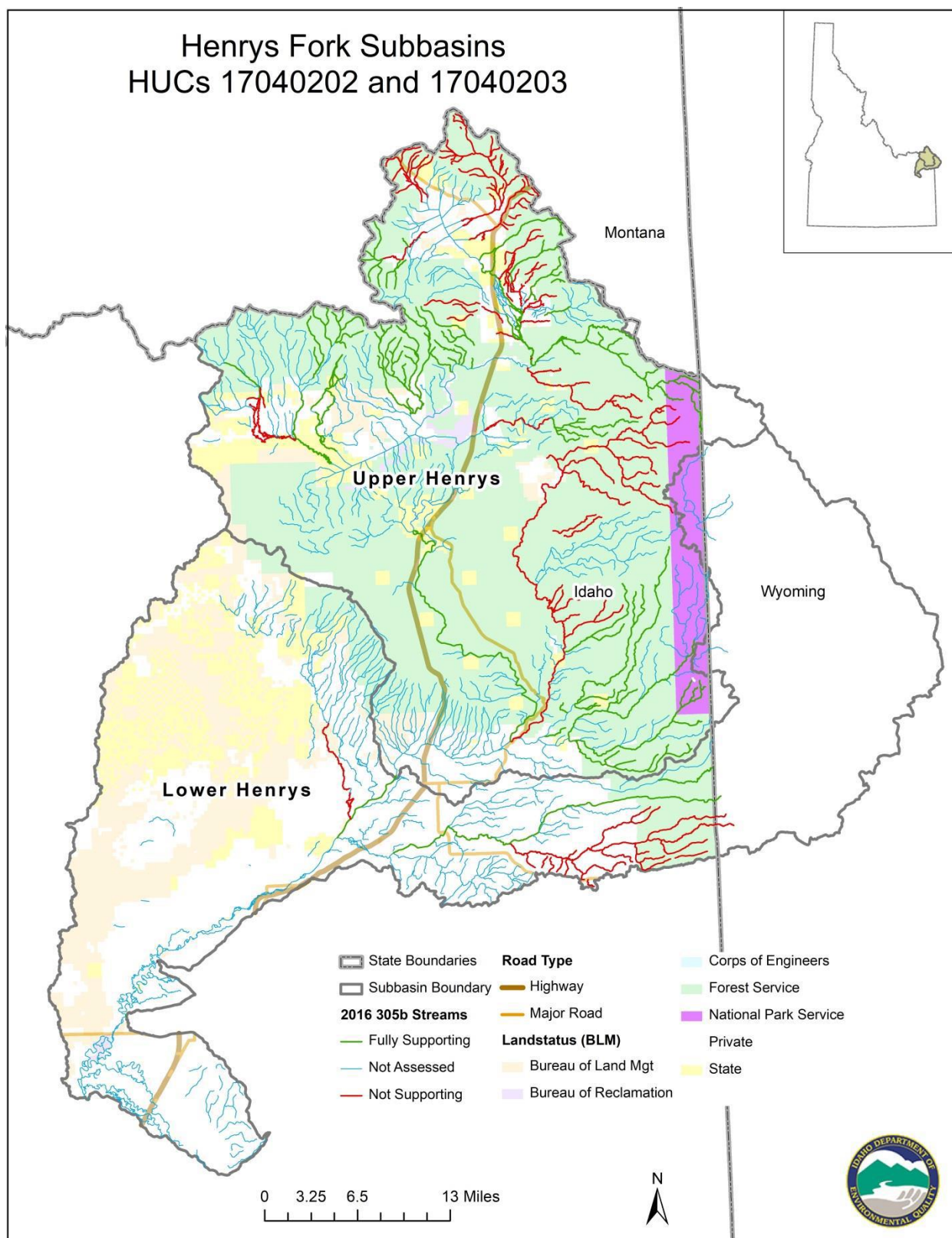


Figure 1. Upper and Lower Henrys Fork Subbasins. (TMDL 5-year Review, IDEQ 2017).

Land use and Land Ownership

Thirteen percent of the upper basin is privately owned, and 87 percent is publicly owned. Thirty seven percent of the basin is in shrubland, rangeland, grass, pasture, or hayland. Two percent is cropland, 51 percent is forest, and the remainder is water, wetlands, developed or barren. (NRCS, 2008).

Thirty seven percent of the lower basin is privately owned, and 63 percent is publicly owned. Forty one percent of the basin is in shrubland, rangeland, grass, pasture, or hayland. Twenty four percent is cropland, 31 percent is forest, and the remainder is water, wetlands, developed or barren. (NRCS, 2008).

Historically, the economy of the region has been based on livestock grazing, timber production, and cultivated agriculture. Two reservoirs provide storage for irrigated agricultural lands both inside and outside the bounds of the subbasins: Henrys Lake and Island Park. The Henrys Fork fishery has an international reputation among fly fishers, and anglers drawn to the area are becoming increasingly important to the local economy. Cold water salmonid fisheries are found within both subbasins, and many of the streams are active recreation sites (IDEQ, June 2010)

Accomplishments

Please refer to the Upper and Lower Henry's Fork TMDL Five-Year Review (IDEQ, June 2010), the Upper and Lower Henrys Fork TMDL Five-Year Review (IDEQ, 2017), and the Upper and Lower Henrys Fork Subbasins Sediment and Bacteria TMDLs (IDEQ, 2021), for an overview of implementation and monitoring efforts by various agencies and groups.

Various Partners include: The Henry's Fork Watershed Council, the Henry's Fork Foundation (HFF), Fremont-Madison Irrigation District, US Forest Service, Idaho Department of Fish and Game, The Nature Conservancy, BLM, the Natural Resources Conservation Service (NRCS), and the Yellowstone Soil Conservation District.

The Henry's Fork Foundation plays a very active role in monitoring and implementation of beneficial projects in the Henry's Fork Subbasin. For more information on the Henry's Fork Foundation's projects and activities, please refer to their website at <https://www.henrysfork.org/>.

Some improvements have taken place in the Upper and Lower Henrys Fork subbasins. Despite changes in riparian management and improvements to habitat conditions, few of these AUs are meeting their TMDLs. As more restoration projects are implemented

and changes in land management activities continue, these streams will slowly improve over time (IDEQ, 2017).

Resource Concerns

A detailed discussion of nonpoint sources is provided in the *Upper and Lower Henrys Fork TMDL* (IDEQ, 2010), the *Five-Year Review* (IDEQ, 2017), and the *Sediment and Bacteria TMDLs* (IDEQ, 2021).

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. See Table 3 for pollutant targets.

Table 3. Pollutant targets established for Henrys Fork Subbasins (IDEQ, 2017).

Pollutant	Parameter	Numeric Target
Sediment	Streambanks	>80% stability
Temperature	Potential natural vegetation	Dependent on vegetation and stream width
Bacteria	<i>E. coli</i> geometric mean	126 cfu/100 mL

Notes: *Escherichia coli* (*E. coli*), colony forming unit (cfu), milliliter (mL)

Sediment

Load allocations were determined in the 2010 TMDL by calculating the load of sediment to the stream from eroding streambanks when 80% of the banks are stable with no erosion (natural condition or load capacity) and under current bank conditions. Comparing these two loads shows how much excess sediment is entering the stream from the banks both in terms of tons per year and as a percent reduction to meet target loads. Table 4 summarizes sediment loads and load allocations set for water bodies in the Upper Henrys Fork subbasin in the 2017 TMDL 5-year review. Table 5

summarizes sediment loads and load allocations set for water bodies in the Upper and Lower Henrys Fork subbasin in the 2021 TMDL.

Table 4. Upper Henrys Fork Subbasin sediment load allocations (IDEQ, 2017).

Water Body	Assessment Unit	Current Load	Load Capacity	Load Reduction Required	% Reduction
	Number	(tons/mil/year)			
Buffalo River	ID17040202SK018_03	23	4	19	83
Duck Creek	ID17040202SK036_03	53	15	38	71
Sheridan Creek	ID17040202SK045_03	25	5	20	80

Table 5. Upper and Lower Henrys Fork Subbasin sediment load allocations (IDEQ, 2021).

Assessment Unit	Load Capacity (tons/year) (lbs/day)	Margin of Safety (tons/year) (lbs/day)	Natural Background (tons/year) (lbs/day)	Load Allocation (tons/year) (lbs/day)	Existing Load (tons/year) (lbs/day)	Load Reduction (tons/year) (lbs/day)	Percent Reduction (%)
ID17040202SK030_02 Twin Creek - USFS boundary to mouth	2.1 11.51	0.21 1.15	0.42 2.30	1.47 8.05	8.44 46.25	6.34 34.74	75%
ID17040203SK013_04 Sand Creek - Pine Creek to mouth	62.39 341.86	6.24 34.19	12.48 68.38	43.67 239.29	70.28 385.10	7.89 43.23	11%

Note: Bold text represents allocations or loads in pounds per day

Season variation was built into the sediment TMDLs by developing loads using annual average rates determined from empirical characteristics that developed over time within the influence of runoff events and peak and base flow conditions. SEIs take into account that most bank recession occurs during peak flow event, when the banks are saturated. The annual delivery of sediment is a function of bankfull discharge. It is assumed that sediment accumulation within dry channels is continuous until flow resumes and the accumulated sediment is transported and deposited (IDEQ, 2017).

No additional margin of safety (MOS) was used in the streambank erosion estimates from the 2010 TMDL. MOS was considered implicit. Our current SEI protocols add an additional 10% MOS to the estimate of excess load (IDEQ, 2017).

Bacteria

Instream water quality targets for the bacteria (*Escherichia coli* [*E. coli*]) listed waters were set from the Idaho water quality standards, although the standards have changed slightly since the 2021 TMDL was written. The water quality standards prescribe *E. coli* criteria for both primary and secondary contact recreation. To support the beneficial use of primary or secondary contact recreation, a geometric mean of 126 colony forming units (cfu)/100 milliliters (mL) for 5 samples collected every 3 to 7 days within a 30-day period is required to determine exceedance of the standard. An *E. coli* single instantaneous sample of 576 cfu/100 mL for secondary contact recreation is not a violation of the water quality standards but acts as a trigger for more monitoring (IDEQ, 2017).

A bacteria TMDL was developed for one AU (Table 6) in the Lower Henrys Fork subbasin in 2010 (DEQ 2010). The load capacity is simply the water quality standard for bacteria (geometric mean of 126 cfu/100 mL). The 2010 TMDL allocation accounts for both natural background and MOS values. Presently, DEQ subtracts a 10% MOS from the load capacity to determine the load allocation but does not include a natural background value, as the water quality standard should be sufficient to account for natural bacteria levels (IDEQ, 2017).

Table 6. Conant Creek *E. coli* results from TMDL (IDEQ, June 2010).

Stream Name	Load Capacity	Total Existing Load	Natural Background	Margin of Safety	Load Allocation	Load Reduction	% Reduction Required
Colony forming units per 100 milliliters							
Conant Creek (Squirrel Creek)	126	950	13	13	328	824	87

Upper and Lower Henrys Fork TMDL Five-Year Review (IDEQ, 2017).

Based on *E. coli* samples taken in 2013, 2014, and 2015, Conant Creek did not exceed the single sample threshold for secondary contact recreation during the critical time period; therefore, no geometric mean sampling was necessary. Geometric mean sampling in 2009 resulted in a value of 950 cfu/100 mL, with the lowest single sample value being 517.2 cfu/100 mL. Comparing the most recent single sample value of 56.3 cfu/100 mL, Conant Creek has significantly improved (Table 7) its bacteria load since the 2010 TMDL (IDEQ, 2017).

Table 7. Conant Creek *E. coli* results from 2017 TMDL Five-Year Review.

Conant Creek	ID17040203SK007_02 ID17040203SK007_03	Bacteria (<i>Escherichia coli</i>)	Intensive riparian management	Improving
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The Timber Creek AU ID17040202SK035_03 was listed in 2010 for bacteria impairment, 2003 water samples indicated an exceedance of DEQ's surface water standard for *E. coli* and was not listed on subsequent IRs until the 2010 IR cycle, nor was this AU addressed in TMDL addendums or five-year reviews in the time following the initial water sample collections. As a TMDL was not established for this AU in previous documentation, a TMDL for *E. coli* has been calculated in the 2021 TMDL document. Table 8 presents a flow-based, load analysis for the Timber Creek AU receiving a TMDL. Because flow measurements were not taken at the time of sampling, modeled critical low flows were used for load calculations (IDEQ, 2021).

Table 8. Nonpoint source *E. coli* bacteria load allocation for Timber Creek.

Water Body and Assessment Unit	Load Capacity	Natural Background	Margin of Safety	Load Allocation	Total Existing Load	Load Reduction	Percent Reduction
Timber Creek - source to mouth - concentration (cfu/mL)	126.0	12.6	12.6	100.8	176.3	50.35	29%
-load (bcfu/day)	7.80	0.780		0.780	6.24	10.92	3.11

Upper and Lower Henrys Fork Subbasins 2021 Sediment and Bacteria TMDLs (IDEQ, 2021).

IDEQ recommends Conant Creek (AU ID17040203SK007_02), Idaho/Wyoming border to mouth, should be moved to Category 3 due to an insufficient amount of recent data available. If dry conditions persist, this AU should be removed from the analysis of beneficial use support as a nonperennial water (IDEQ, 2021).

Fish were not sampled for Conant Creek (ID17040203SK007_03), Idaho/Wyoming border to mouth, in 2013, but in 2014 cold water fish species and juvenile fish were captured during fish sampling. This new data indicate that the 3rd order of Conant Creek has existing uses of cold water aquatic life and salmonid spawning. The data suggest this AU is fully supporting the presumed use of cold water aquatic life (IDEQ, 2021).

Bacteria concentrations generally vary as a function of grazing activity and streamflow. Bacteria TMDLs are developed based on these periods with the highest *E. coli* concentrations, which generally occurs during August. Bacteria TMDLs include a 10% explicit margin of safety (IDEQ, 2017).

Temperature

The Upper Henrys Fork temperature TMDLs (IDEQ, 2010) were developed based on PNV and estimate of background load. TMDL load allocation is essentially the desire to

achieve natural background conditions. To achieve that objective, load allocations were assigned to nonpoint source activities that have impacted or may impact riparian vegetation. Load allocations (Table 9) are stream reach specific and depend on the target load for a given reach (IDEQ, 2017).

Table 9. Upper Henrys Fork excess solar loads and percent reduction estimates.

Water Body	Assessment Unit Number	Total Existing Load	Total Target Load	Excess Load	Average Lack of Shade
		Kilowatt hour per day			
Warm River	ID17040202SK002_04	3,665,140	3,260,351	404,790	-8%
	ID17040202SK002_05				
	ID17040202SK005_02				
	ID17040202SK005_03				
	ID17040202SK005_04				
Howard Creek	ID17040202SK033_02	175,034	141,084	33,950	-11%
Targhee Creek	ID17040202SK034_03	321,794	303,594	18,200	-6%
Timber Creek	ID17040202SK035_03	26,873	15,967	10,906	-31%
Duck Creek	ID17040202SK036_03	103,938	90,205	13,733	-12%

(Upper and Lower Henrys Fork TMDL 5-Year Review, 2017).

Stream temperature may be affected by diversions of water for water rights purposes. Diversion of flow reduces the amount of water exposed to a given level of solar radiation in the stream channel, which can result in increased water temperature in that channel. Loss of flow in the channel also affects the ability of the near-stream environment to support shade-producing vegetation, resulting in an increase in solar load to the channel. This aspect of temperature influence was not taken into account in the 2010 temperature TMDLs; however, TMDLs may not supersede any water appropriation in the affected watershed (IDEQ, 2017).

The Upper Henrys Fork subbasin contains 1,120 surface water rights (1,532 including ground water rights). The Lower Henrys Fork contains 888 surface water rights (2,383 including ground water rights) (IDEQ, 2017).

The margin of safety for the temperature TMDLs is considered implicit in the design. Since the target is equivalent to background conditions, loads (shade levels) are

allocated to lands adjacent to the TMDL waters at natural background levels. It is unrealistic to set shade targets at higher or more conservative levels than what can realistically be achieved by natural conditions. Additionally, existing shade levels were reduced to the next lower 10% shade class interval, which likely underestimated the actual shade in the load analysis (IDEQ, 2017).

The temperature TMDL was based on average summer loads. All loads were calculated to be inclusive of the 6-month period from April through September. This time period was chosen because it represented when the combination of increasing air and water temperatures coincides with increasing solar inputs and increasing vegetative shade. The critical time period is May when spring SS occurs, July and August when maximum temperatures exceed CWAL criteria, and October during fall SS. Water temperature is not likely to be a problem for beneficial uses outside of this time period due to cooler weather and a lower sun angle (IDEQ, 2017).

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 Tables 10 and 11. These lists were drawn from information contained in the Conservation Practices Physical Effects section of the NRCS Field Office Technical Guide.

Table 10. BMPs recommended to decrease E.coli levels.

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

(NRCS Field Office Technical Guide).

Table 11. BMPs recommended to increase shade and decrease stream temperature.

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

(NRCS Field Office Technical Guide).

The lists of potentially beneficial BMPs are to serve as a starting point for implementation activities in the subbasins. 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.

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 Yellowstone 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/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/>

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 (Idaho Department of Environmental Quality). April 2010. *Upper and Lower Henry's Fork Five Year Review*. Idaho Falls, ID. DEQ.

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IDEQ (Idaho Department of Environmental Quality). 2017. *Upper and Lower Henrys Fork TMDL Five-Year Review*. Idaho Falls, ID. DEQ.

IDEQ (Idaho Department of Environmental Quality). 2021. *Upper and Lower Henrys Fork Subbasins 2021 Sediment and Bacteria TMDLs*. Idaho Falls, ID. DEQ.

NRCS (Natural Resource Conservation Service). 2008. *Lower Henrys - 17040203 Idaho 8 Digit Hydrologic Unit Profile*.

NRCS (Natural Resource Conservation Service). 2008. *Upper Henrys - 17040202 Idaho 8 Digit Hydrologic Unit Profile*.