

Upper and Lower Henry's Fork

TMDL Five-Year Review



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Department of Environmental Quality

April 2010

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Acknowledgments

Brad Higginson and Lee Maybe with the U.S. Forest Service (USFS) provided watershed improvement projects and Buffalo River fish counts completed by the Forest Service in the subbasins. Damon Keen with the Idaho Fish and Game (IDFG) provided implementation and restoration project information, as well as Dissolved Oxygen data. Jim De Rito of the Henry's Fork Foundation (HFF) provided considerable knowledge of the watershed and provided assessment data for the Shotgun Valley and Willow Creek. Dan Kotansky provided implementation projects completed by the Bureau of Land Management (BLM). Gary Vecellio of the IDFG bestowed extensive knowledge of the Buffalo River Dam. Symbiotics, LLC provided background information of the Chester Dam project. Troy Saffle and Jack Rainey both of the DEQ-Idaho Falls Regional Office imparted extensive technical and field support, along with editorial reviews.

Thank you all for contributing to the Upper and Lower Henry's Fork Five Year Review process.

Cover photo of Icehouse Creek by Heather Bohac (DEQ) taken on September 24, 2008.

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Executive Summary

This document presents a five-year review of the Upper Henry's Fork Subbasin Assessment (SBA). This review addresses the water bodies in the Upper and Lower Henry's Fork subbasins that are in Idaho's current and most recent draft Section 4(a) of the Integrated Report. This five-year review has been developed to comply with Idaho Statute 39-3611 (7). The review describes current water quality status, pollutant sources, and recent pollution control efforts in the Upper and Lower Henry's Fork subbasins, located in southeastern Idaho.

Due to the fact that the 1998 Upper Henry's Fork subbasin assessment did not have any TMDLs to implement, no implementation plan was written. However, several water quality improvement projects have been completed in the subbasins. These include the Sheridan Creek 319 nonpoint restoration project as well as several others administered by the IDFG, USFS, and BLM. Sheridan Creek did not appear on the 1994 §303(d) list, but it was identified by the Henry's Fork Watershed Council as a high priority for restoration. The Henry's Fork Watershed Council implemented a habitat restoration project on Sheridan Creek which is intended to restore aquatic life beneficial uses, potentially eliminating the need for development of a TMDL in the future. Independent of the restoration efforts, Sheridan Creek appears on the 2008 Integrated Report and DEQ is drafting TMDLs to address continued pollutant delivery to the waterbody.

Several other implementation projects were achieved by numerous agencies and groups as mentioned above. These include fish passage projects, road improvements, vegetation plantings, fence construction, trail improvements, fish ladders, and dam construction.

Watershed At A Glance

The watershed, at a glance, is as shown in Table 1.

Table 1. Watershed at a Glance.

Pending TMDLs	Pollutants Within Watershed	Pending Assessment Units Going From 4a to 2
<p style="text-align: center;">Upper Henry's 17040202</p> Warm River – Temperature Buffalo River – Sediment Howard Creek – Temperature Targhee Creek – Temperature Timber Creek – Temperature Duck Creek – Temperature, Sediment Sheridan Creek – Sediment	Sediment Temperature Bacteria	Twin Creek/ID17040202SK018_02 Icehouse Creek/ID17040202SK044_02 Willow Creek/ID17040202SK046_04
<p style="text-align: center;">Lower Henry's 17040203</p> Conant Creek (Squirrel Creek) – Sed.		
Implementation Plans	Implementation Actions	Estimated Percent of Watershed in 4a or 5
No implementation plan has been written due to the fact no TMDLs were written in the 1998 SBA.	Sheridan Creek Restoration Project USFS Projects BLM Projects	Upper Henry's = %15 Lower Henry's = %12

About Assessment Units

Prior to 2002, impaired waters were defined as stream segments with geographical descriptive boundaries. In 2002, DEQ modified the structure and format of Idaho's 303(d) list by combining it with the 305(b) report, required by the CWA to inform Congress of the state of Idaho's waters. This modification included identifying stream segments by Assessment Units (AUs) instead of non-uniform stream segments, and defining the use support of stream AUs by five categories, published as Sections, in the Integrated Report. Assessment units (AUs) now define all the waters of the state of Idaho. These units and the methods used to describe them can be found in the WBAG II (Grafe, et al., 2002). AUs are groups of similar streams that have similar land use practices, ownership, or land management. Stream order, however, is the main basis for determining AUs— even if ownership and land use change significantly, an AU remains the same. Because AUs are an extension of water body identification numbers, there is now a direct tie to the WQS for each AU, so that beneficial uses defined in the WQS are clearly tied to streams on the landscape.

To facilitate comparisons between the 1998 303 (d) list and the 2002 Section 5 “impaired waters” category in the Integrated Report, a crosswalk from the 1998 303 (d) list to the new AUs was included in the 2002 Integrated Report. A copy of the report is available from the DEQ website at

http://www.deq.state.id.us/water/data_reports/surface_water/monitoring/2002.cfm#2002final. The boundaries from the 1998 303(d)-listed segments have been transferred to the new AU framework using an approach quite similar to how DEQ has been writing SBAs and TMDLs. All AUs contained in any listed segment were carried forward to the 2002 303(d) listings in Section 5 of the integrated report (DEQ, 2005). Any AU not wholly contained within a previously listed segment, but partially contained (even minimally), was also included on the 303(d) list. This was necessary to maintain the integrity of the 1998 303(d) list and continuity with the TMDL program. The Upper and Lower Henry's Fork subbasins water bodies listed on the 2002 303 (d) list are included in this report, but the review is focused on the final 2008 status lists.

When assessing new data that indicate full support, only the AU that the monitoring data represents will be removed (de-listed) from the 303(d) list (Section 5 of the integrated report).

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Section 1: Introduction

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list (a "§303(d) list") of impaired waters. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards.

Idaho Statute 39-3611(7) requires a five-year cyclic review process for Idaho TMDLs:

The director shall review and reevaluate each TMDL, supporting subbasin assessment, implementation plan(s) and all available data periodically at intervals of no greater than five (5) years. Such reviews shall include the assessments required by section 39-3607, Idaho Code, and an evaluation of the water quality criteria, instream targets, pollutant allocations, assumptions and analyses upon which the TMDL and subbasin assessment were based. If the members of the watershed advisory group, with the concurrence of the basin advisory group, advise the director that the water quality standards, the subbasin assessment, or the implementation plan(s) are not attainable or are inappropriate based upon supporting data, the director shall initiate the process or processes to determine whether to make recommended modifications. The director shall report to the legislature annually the results of such reviews.

This report is intended to meet the intent and purpose of Idaho Statute 39-3611(7). The report documents and most current applicable information in conformance with Idaho Statute 39-3607. Evaluation of the appropriateness of the TMDL to current watershed conditions, implementation. An evaluation of the recommendations presented is provided. Final decisions for TMDL modifications are decided by the Department of Environmental Quality (DEQ) Director. Approval of TMDL modifications is decided by the U.S. EPA, with consultation by DEQ.

About Assessment Units

Prior to 2002, impaired waters were defined as stream segments with geographical descriptive boundaries. In 2002, DEQ modified the structure and format of Idaho's 303(d) list by combining it with the 305(b) report, required by the CWA to inform Congress of the state of Idaho's waters. This modification included identifying stream segments by Assessment Units (AUs) instead of non-uniform stream segments, and defining the use support of stream AUs by five categories, published as Sections, in the Integrated Report. Assessment units (AUs) now define all the waters of the state of Idaho. These units and the methods used to describe them can be found in the WBAG II (Grafe, et al., 2002). AUs are groups of similar streams that have similar land use practices, ownership, or land management. Stream order, however, is the main basis for determining AUs— even if ownership and land use change significantly, an AU remains the same. Because AUs are an extension of water body identification numbers, there is now a direct tie to the WQS for each AU, so that beneficial uses defined in the WQS are clearly tied to streams on the landscape.

To facilitate comparisons between the 1998 303 (d) list and the 2002 Section 5 "impaired waters" category in the Integrated Report, a crosswalk from the 1998 303 (d) list to the new AUs was included in the 2002 Integrated Report. A copy of the report is available from the DEQ website at http://www.deq.state.id.us/water/data_reports/surface_water/monitoring/2002.cfm#2002final. The boundaries from the 1998 303(d)-listed segments have been transferred to the new AU framework using an approach quite similar to how DEQ has been writing SBAs and TMDLs. All AUs contained in any

listed segment were carried forward to the 2002 303(d) listings in Section 5 of the integrated report (DEQ, 2005). Any AU not wholly contained within a previously listed segment, but partially contained (even minimally), was also included on the 303(d) list. This was necessary to maintain the integrity of the 1998 303(d) list and continuity with the TMDL program. The Upper and Lower Henry's subbasin waterbodies listed on the 2002 303 (d) list are included in this report, but the review is focused on the final 2008 status lists.

When assessing new data that indicate full support, only the AU that the monitoring data represents will be removed (de-listed) from the 303(d) list (Section 5 of the integrated report).

Section 2: TMDL Review and Status

In 1998 the DEQ and Henry's Fork Watershed Council evaluated the streams on the 1994 303(d) list and drafted the SBA. Information presented in the SBA indicated that development of TMDLs for two waterbodies appearing on the 1994 303(d) list was not necessary. No TMDLs were written for the Upper Henry's and no streams were listed in the Lower Henry's subbasin. Due to the fact that DEQ didn't submit any TMDLs for approval this five year review will discuss monitoring results, implementation projects and the current 303(d) listed streams.

Upper and Lower Henry's Support Status

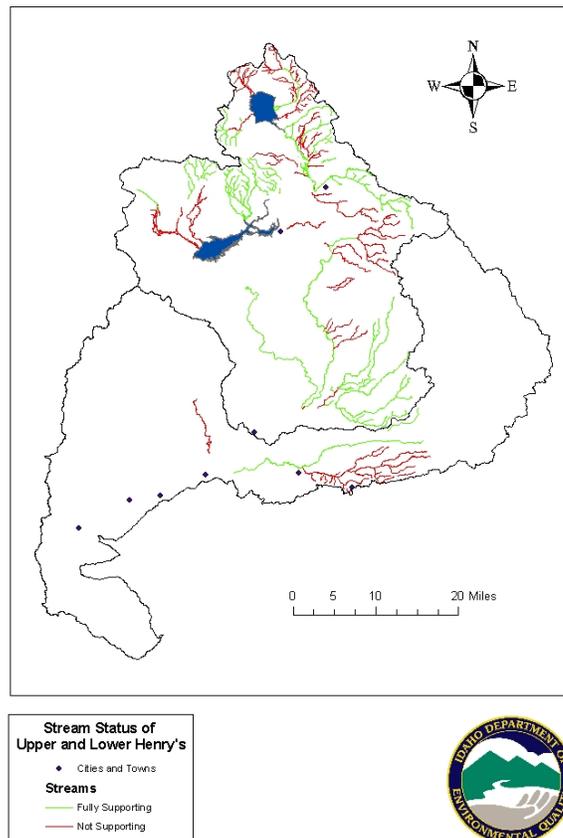


Figure 1. Upper and Lower Henry's Subbasins

The map above shows not supporting AU's in red and fully supporting AU's in green. The purpose of the map is to give the reader an idea of the status of the AU's in both the Upper and Lower Henry's subbasins. The draft Upper and Lower Henry's Fork Total Maximum Daily Loads: Addendum to the Upper Henry's Fork Subbasin Assessment and TMDLs has been set to begin public comment in mid-February 2010. In this document readers can find the newly updated TMDLs for both subbasins.

1998 Pollutant Inventory

The Henry's Fork Watershed Council members were concerned about high levels of sediment in Sheridan Creek as well as the elevated dissolved oxygen numbers in Henry's Lake prior to the 1998 SBA. Seasonal depletion of dissolved oxygen in Henry's Lake is a function of naturally high concentrations of phosphorus in the lake's watershed, and sediment loading in the Henry's Fork between Buffalo River and Riverside Reach was due to a distinct event associated with the drawdown of Island Park Reservoir in 1992. Actions to reduce phosphorus input to Henry's Lake was been analyzed, and those actions that can be reasonably implemented are not expected to eliminate winter oxygen depletion.

Suggested Monitoring

The Henry's Fork Watershed Council implemented a habitat restoration project on Sheridan Creek which intended to restore aquatic life beneficial uses, potentially eliminating the need for development of a TMDL in the future. Although, efforts have been made to continue restoration on Sheridan Creek agencies and other partners continue the work in progress. Although, Henry's Lake and Island Park Dam generally support beneficial uses, precautions must be taken to prevent major sediment releases. These precautions include: that the dam will be operated in a matter that will not violate water quality standards and turbidity and total suspended solids be monitored in drawdown operations.

Section 3: Beneficial Use Status

Idaho water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing uses, designated uses, and presumed uses. The *Water Body Assessment Guidance*, second edition (Grafe et al. 2002) gives a detailed description of beneficial use identification for use assessment purposes.

Existing uses under the CWA are “those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards”. Designated uses are specifically listed for water bodies in Idaho in tables in the Idaho water quality standards (see IDAPA 58.01.02.003.27 and .02.109-.02.160 in addition to citations for existing and presumed uses).

Undesignated uses are to be designated. In the interim, and absent information on existing uses, DEQ presumes that most waters in the state will support cold water aquatic life and either primary or secondary contact recreation (IDAPA 58.01.02.101.01). To protect these so-called “presumed uses,” DEQ will apply the numeric cold water aquatic life criteria and primary or secondary contact recreation criteria to undesignated waters

Beneficial Uses

During 1998 and 1999 the Henry's Fork Watershed Council suggested designations for all the waterbodies in the Upper and Lower Henry's Fork watershed. DEQ concurred with those recommendations and petitioned the identified streams for designation. Subsequently, the waters listed in Table 2 became part of Idaho's Water Quality Standards.

Table 2. Designated Waterbodies in the Upper and Lower Henry's Fork subbasins

Waterbody	Aquatic Life	Recreation	Other
Henry's Fork – Warm River to Ashton Dam	COLD SS	PCR	DWS SRW
Warm River - Warm River Spring to mouth	COLD SS	PCR	DWS SRW
Warm River - source to Warm River Spring	COLD SS	PCR	DWS SRW
Porcupine Creek - source to mouth	COLD SS	SCR	
Henry's Fork - Thurman Creek to Warm River	COLD SS	PCR	DWS SRW
Henry's Fork - Island Park Reservoir Dam to Thurman Creek	COLD SS	PCR	DWS SRW
Buffalo River - Elk Creek to mouth	COLD SS	PCR	DWS SRW
Buffalo River - source to Elk Creek	COLD SS	PCR	DWS SRW

Waterbody	Aquatic Life	Recreation	Other
Island Park Reservoir	COLD SS	PCR	DWS SRW
Henry's Fork - Confluence of Big Springs and Henry's Lake Outlet to Island Park Reservoir	COLD SS	PCR	DWS SRW
Big Springs - source to mouth	COLD SS	PCR	DWS SRW
Thirsty Creek - Idaho/Wyoming border to mouth	COLD SS	SCR	
Henry's Lake Outlet - Henry's Lake Dam to mouth	COLD SS	PCR	DWS SRW
Henry's Lake	COLD	SCR	
Howard Creek - source to mouth	COLD SS	SCR	
Targhee Creek - source to mouth	COLD SS	SCR	
Timber Creek - source to mouth	COLD SS	SCR	
Hotel Creek - source to mouth	COLD SS	SCR	
Yale Creek - source to mouth	COLD SS	SCR	
Icehouse Creek - source to Island Park Reservoir	COLD SS	SCR	
Sheridan Creek - Kilgore Road (T13N, R41E, Sec. 07) to mouth	COLD SS	SCR	
Sheridan Creek - source to Kilgore Road (T13N, R41E, Sec. 07)	COLD SS	SCR	
Henry's Fork - South Fork Teton River to hydrologic unit boundary	COLD SS	PCR	DWS SRW
Henry's Fork - North Fork Teton River to South Fork Teton River	COLD SS	PCR	DWS SRW
Henry's Fork - Falls River to North Fork Teton River	COLD SS	PCR	DWS SRW
Falls River - Conant Creek to mouth	COLD SS	PCR	DWS SRW

Waterbody	Aquatic Life	Recreation	Other
Falls River - Boone Creek to Conant Creek	COLD SS	PCR	DWS SRW
Falls River - Idaho/Wyoming border to Boone Creek	COLD SS	PCR	DWS SRW
Henry's Fork - Ashton Reservoir Dam to Falls River	COLD SS	PCR	DWS SRW

Table 3. Common numeric criteria supportive of designated beneficial uses in Idaho water quality standards.

Designated and Existing Beneficial Uses				
Water Quality Parameter	Primary Contact Recreation	Secondary Contact Recreation	Cold Water Aquatic Life	Salmonid Spawning (During Spawning and Incubation Periods for Inhabiting Species)
Water Quality Standards: IDAPA 58.01.02.250				
Bacteria, ph, and Dissolved Oxygen	Less than 126 E. coli/100 ml ^a as a geometric mean of five samples over 30 days; no sample greater than 406 E. coli organisms/100 ml	Less than 126 E. coli/100 ml as a geometric mean of five samples over 30 days; no sample greater than 576 E. coli/100 ml	pH between 6.5 and 9.0 DO ^b exceeds 6.0 mg/L ^c	pH between 6.5 and 9.5 Water Column DO: DO exceeds 6.0 mg/L in water column or 90% saturation, whichever is greater Intergravel DO: DO exceeds 5.0 mg/L for a one day minimum and exceeds 6.0 mg/L for a seven day average
Temperature ^d			22 °C or less daily maximum; 19 °C or less daily average	13 °C or less daily maximum; 9 °C or less daily average Bull trout: not to exceed 13 °C maximum weekly maximum temperature over warmest 7-day period, June – August; not to exceed 9 °C daily average in September and October
			Seasonal Cold Water: Between summer solstice and autumn equinox: 26 °C or less daily maximum; 23 °C or less daily average	
Turbidity			Turbidity shall not exceed background by more than 50 NTU ^e instantaneously or more than 25 NTU for more than 10 consecutive days.	
Ammonia			Ammonia not to exceed calculated concentration based on pH and temperature.	
EPA Bull Trout Temperature Criteria: Water Quality Standards for Idaho, 40 CFR Part 131				
Temperature				7 day moving average of 10 °C or less maximum daily temperature for June - September

^a *Escherichia coli* per 100 milliliters

^b dissolved oxygen

^c milligrams per liter

^d Temperature Exemption - Exceeding the temperature criteria will not be considered a water quality standard violation when the air temperature exceeds the ninetieth percentile of the seven-day average daily maximum air temperature calculated in yearly series over the historic record measured at the nearest weather reporting station.

^e Nephelometric turbidity units

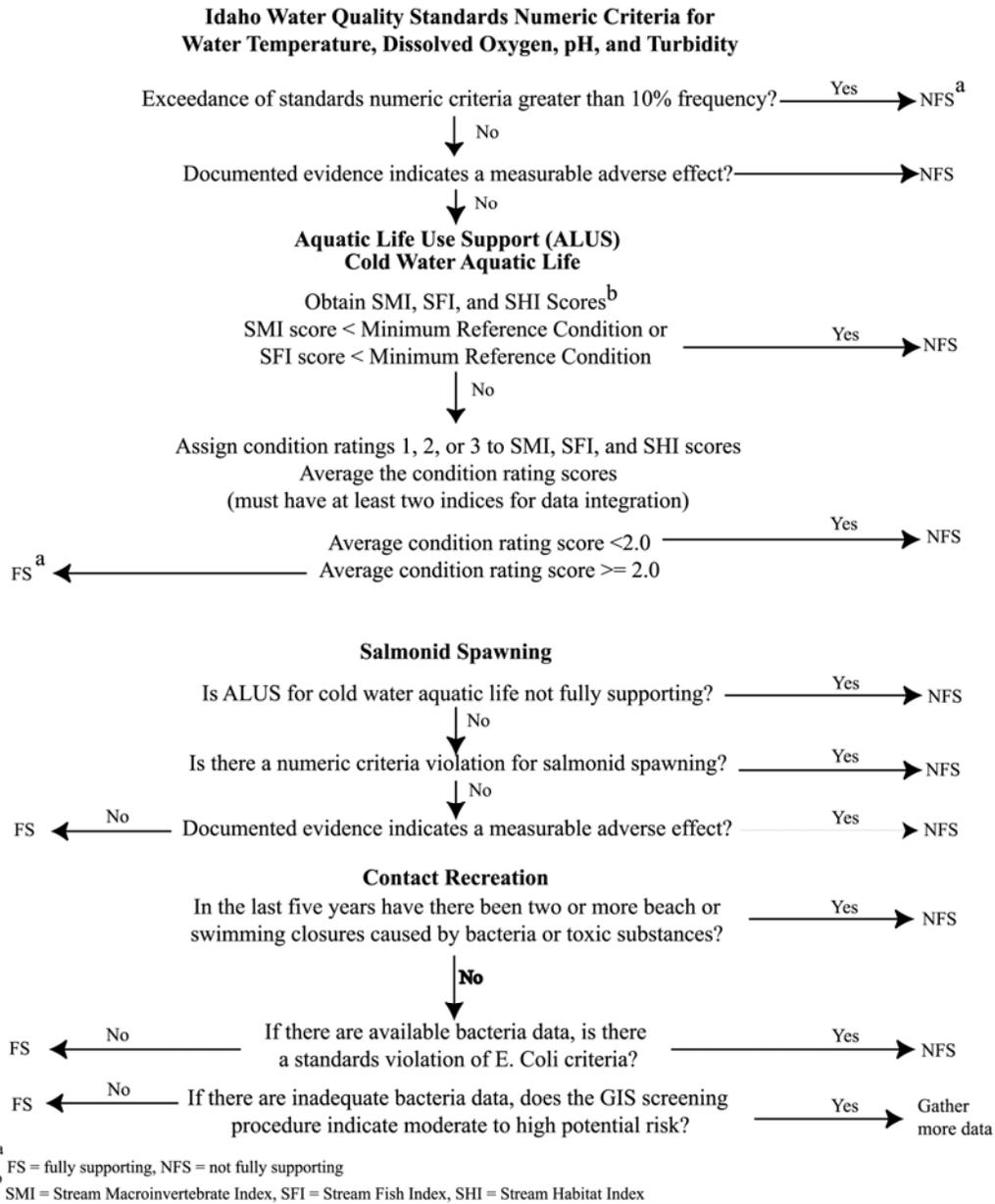


Figure 2. Determination Steps and Criteria for Determining Support Status of Beneficial Uses in Wadeable Streams: Water Body Assessment Guidance, Second Addition (Grafe et al. 2002)

Current Beneficial Use Status

DEQ completed three Integrated Reports since 1998. DEQ has received no requests to re-evaluate or change any of 1998-1999 designations and assumes those designations are still appropriate and accurate. Table 4 displays the 2008 Integrated Report for the subbasins, as well as pending DEQ actions which are outlined in the draft *Upper and Lower Henry's Fork Total Maximum Daily Loads Addendum to the Upper Henry's Fork Subbasin Assessment and TMDLs* (DEQ, 2010). DEQ intends to conduct public comment on that document in early 2010, followed by submittal to EPA for approval.

Table 4. 2008 assessment outcomes and pending outcomes

Assessment Unit	Stream Segment Description	Pollutant	Recommended Changes to Next Integrated Report	Justification
ID17040202SK002_05	Warm River Warm River Spring to mouth	Temperature	Move to § 4a.	Temperature TMDL completed
ID17040202SK005_02	Warm River source to Warm River Spring	Temperature	Move to § 4a.	Temperature TMDL completed
ID17040202SK018_03	Buffalo River - source to Elk Creek	Combined Biota/Habitat Bioassessments	Move to § 4a	Streambank impairment
ID17040202SK030_02	Twin Creek source to mouth	Combined Biota/Habitat Bioassessments	Move to § 2	No Bioassessment shows no impairment
D17040202SK033_02	Howard Creek source to mouth	Temperature	Move to § 4a.	Temperature TMDL completed
ID17040202SK034_02	Targhee Creek source to mouth	Temperature	Move to § 4a.	Temperature TMDL completed
ID17040202SK035_02	Timber Creek source to mouth	Temperature	Move to § 4a.	Temperature TMDL completed
ID17040202SK036_03	Duck Creek - source to mouth	Temperature	Move to § 4a.	Temperature TMDL completed

Changes to Subbasin Characteristics

Since the first Subbasin Assessment was written in 1998 there have been significant change in land ownership, land use and population distribution. Since the 1998 SBA a dominant shift in the population and change in land ownership has occurred with the majority of the ownership changing from public to private. Table 5 displays those changes.

Table 5. Subbasin Land Use, Ownership and Population 1998 - 2009

Year	Land Ownership	Land Use	Population Distribution
1998	Publicly owned 73 percent, 5 percent State land, 13 percent private	Grazing, timber, recreation, and residential	3, 444
2009	Publicly owned 56, 12 percent State land, and 32 percent private	Grazing, timber, recreation, and residential	11,594

Since the 1998 SBA no additional point sources have been permitted in area. Three point sources occur in the subbasins these include the Ashton and St. Anthony waste water treatment plants and the Ashton fish hatchery. Table 6 identifies the current NPDES permits in the subbasins.

Table 6. Current NPDES Permits

Facility	Permit No.
City of Ashton - WWTP	ID-002371-0
City of St. Anthony - WWTP	ID-002040-1
Ashton Fish Hatchery	IDG-130032

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Section 4: Review of Implementation Plan and Activities

Due to the fact that the 1998 Upper Henry's Fork subbasin assessment did not have any TMDLs to implement, no implementation plan was written. However, several water quality improvement projects have been completed in the subbasin. These include the Sheridan Creek 319 nonpoint restoration project as well as several others administered by the IDFG, USFS and HFF. Several new projects were implemented in the Upper and Lower Henry's Fork Subbasins which will be broken out into different agencies and foundations that have completed the projects. Sheridan Creek did not appear on the 1994 §303(d) list, but it was identified by the Henry's Fork Watershed Council as a high priority for restoration. The Henry's Fork Watershed Council implemented a habitat restoration project on Sheridan Creek which is intended to restore aquatic life beneficial uses, potentially eliminating the need for development of a TMDL in the future. Independent of the restoration efforts, Sheridan Creek appears on the 2008 Integrated Report and DEQ is drafting TMDLs to address continued pollutant delivery to the creek.

Summary and Analysis of Current Water Quality Data and Accomplished Projects

Data Summary

Idaho Department of Environmental Quality

Since, the 1998 SBA thirty-five locations were monitored in the Upper Henry's subbasin and four in the Lower Henry's subbasin. DEQ's Beneficial Use Reconnaissance Program protocols were followed. The data was evaluated using DEQ's Waterbody Assessment Guidance version 2 (WBAG2). Eighteen of these locations were determined to be fully supporting beneficial uses and seventeen locations were determined to not be supporting beneficial uses in the Upper Henry's subbasin. In the Lower Henry's one site was fully supporting and three sites were not supporting. All of this data was incorporated into the 2008 Integrated Report to help determine the 303(d) and 305(b) listings. The 2008 303(d) listed streams listed as impaired have TMDLs drafted and are due to go to public comment in early 2010.

Henry's Fork Foundation

Shotgun Valley Assessment

In the summer months of 2001 the Henry's Fork Foundation (HFF) assessments were carried out in the Shotgun Valley on portions of Sheridan Creek, Hotel Creek, Sheep Creek and an unnamed tributary to Sheep Creek. A portion of Targhee Creek was also assessed. For most of these reaches the assessment consisted of basic channel and riparian description, vegetation survey, and erosion inventory study. To

finalize the study suspected causes of stream condition were noted and rehabilitation recommendations were provided.

In the summer months of 2003 a similar assessment as the 2001 study of a 6.5 mile portion of Willow Creek, between New Shotgun Road and the confluence of Sheridan Creek was completed. This stretch of the creek ran through both public (Targhee National Forest) and private (Sheridan Ranch) lands. In appendix A and B abstracts of the Shotgun Valley assessment data from 2001 and 2003 can be viewed.

Idaho Department of Fish and Game

Dissolved oxygen monitoring was completed during the winter months of 2003 and 2004 on Henry's Lake to predict dissolved oxygen depletion rates and anticipate possible fish winterkill events. Dissolved oxygen monitoring consisted of five sites on Henry's Lake and recordings were taken at various depths. According to data provided, nine measurements were less than the water quality standard of 6.0 mg/l of dissolved oxygen. Attached in Appendix C is the monitoring completed by the IDFG as part of the dissolved oxygen depletion study that affected the fish kill in the winter of 2003 and 2004.

Project Summary

Henry's Fork Watershed Council

In 1995 the Henry's Fork Watershed Council determined Sheridan Creek was its highest priority for restoration in the Upper Henry's Fork watershed. A committee was formed to develop a restoration plan and build relationships among private landowners, public land and grazing permittees, and land management agencies. In 1996, the Watershed Council designated the Idaho Department of Environmental Quality (IDEQ) as the Watershed Advisory Group (WAG) for the Henry's Fork watershed. With the help from IDEQ the Watershed Council determined restoration priorities and actions needed to reduce nonpoint pollution sources. In 1997, the Sheridan Creek Restoration Committee and technical team developed a restoration plan involving all landowners and agencies in the Sheridan Creek drainage. The goals of the Sheridan Creek restoration project were to restore stream hydrology, improve riparian and aquatic habitat, restore resident and migratory fisheries in Sheridan Creek and improve water quality in Island Park Reservoir. Those goals were to be accomplished by repairing and replacing deteriorated diversion structures, implementing improved riparian grazing management practices, revegetating streambanks and installing an off-stream livestock watering facility. The project began on June 6, 1996 and was completed in December of 2003. All together \$142,000 was spent on the restoration project along with hard work between private landowners and multiply state and federal agencies and the Henry's Fork Foundation.

United States Forest Service

The following are several different projects the Caribou-Targhee National Forest performed in the past five years. All projects include some sort of Best Management Practice to help improve water quality in the Upper Henry's subbasin.

2009 Projects

Howard Creek Passage Project: More of Howard Creek was connected to Henrys Lake with the replacement of a barrier culvert with a bridge, 200 yards upstream from Highway 87. This allows for passage of Yellowstone cutthroat trout from Henrys Lake further up the stream. The Nature Conservancy led the project, and other partners included the private landowner and Eastern Idaho Resource Advisory Committee. Two smaller culverts that are partial barriers remain upstream and are scheduled for replacement in 2010.



Pre-project Howard Creek culvert was undersized and a barrier to upstream-migrating Yellowstone cutthroat trout.



The impassable culvert was replaced with a bridge to restore Yellowstone cutthroat trout passage.

Passage Progress at Duck Creek: In 2009 the Forest Fisheries Program, in partnership with Eastern Idaho Resource Advisory Committee, U.S. Fish and Wildlife Service, and Henrys Lake Foundation, initiated the Duck Creek fish passage project, restoring upstream passage at one out of the four fish passage barriers on Duck Creek, a tributary to Henrys Lake. This project benefits Henrys Lake Yellowstone cutthroat trout. Work on the other 3 crossings is expected to occur in 2010.



Pre- (left) and post- (right) construction at Duck Creek crossing site. The impassable, under-capacity culvert was replaced by a bottomless arch with a natural stream bottom.

2008 Projects

Lyle Springs Improvement (5 acres improve): The purpose of this project was to improve Lyle Springs ability to capture spring runoff and keep water off road and running into adjacent dispersed camping area. Additional pond area was excavated to increase holding capacity. Excavated material was used to raise road system approximately 1 foot in elevation. Wildlife habitat was improved as water holding capacity was increased. Public safety in the dispersed camping areas was also improved. The work was completed by the Caribou-Targhee Road Crew.



Lyle Spring Area: center is where ponds were connected.

Elk Creek Willow Planting and Fence Construction (2 acres): Willows were planted in the fall of 2007 along a 200 foot section of Elk Creek where cattle have historically used as a watering point. Buck and rail fence was installed for additional bank protection. The project was completed by Forest Service staff. Thanks to Brad Higginson (forest hydrologist) and Kyle Moore (district range management specialist) for their help on this project.



Elk Creek and fenced off area where willows were planted along bank.



Typical willow planting results along Elk Creek (estimated 85% success first year).

Bootjack Pond Outlet Protection (1 acre): The purpose of this project was to protect the outlet area from livestock. This area is typically used as a watering point for cattle. Kyle Moore, district range management specialist, completed the work.



Hominy Peak, Hidden Lake, and Conant Creek Trail Work (5 acres): Existing water-bars were rehabilitated and new ones were installed to control: water run off, sediment control, and public safety. The work was accomplished by District Staff and crew. Funding was provided through Recreation Fee Collections.

2007 Projects

Closures of illegal roads and ATV trails (12 Acres Improved): In 2007 the district closed numerous illegal roads and ATV trails that have impacted water quality, soil productivity and other resource values with the use of boulder and signs. Work was completed on the Continental Divide Trail near Blair Lake to close an illegal road from Keg Springs to a hilltop by placing rocks and obliterating parts of the road with a dozer. More illegal ATV access in the Bootjack area was also closed with boulders and signs as shown below in the photo protecting and improving about 7.5 acres. Additional boulder closures and obliteration work was completed in the Yale Creek area improving approximately 1.5 acres from illegal ATV trails.



Barrier boulders & signs placed in the Bootjack Area to stop illegal ATV use.

Partnership/Funding: Internal FS collaboration with recreation and watershed staff identified and implemented the ground work with the aid of district trail money and funding from the Eastern Idaho Resource Advisory Council (RAC).

Henry's Fork/Last Chance Fence Project (14 plus Acres Improved): This project replaces 7 miles of 20 year-old, non-functioning fence on both federal and state lands with high-quality, low maintenance barbed wire fence. Currently, cattle grazing USFS allotments and state lands in Harriman State Park get through the existing fence virtually daily during the grazing season. These animals trample streambanks and degrade water quality in a heavily-used and world-famous stretch of the Henry's Fork, creating a constant source of conflict between forest/park recreators, the cattle, and land managers, not to mention a daily maintenance requirement and cost for USFS, park, and HFF personnel. The new fence will keep cattle off streambanks and out of the river, thus protecting and improving watershed health.

Partners: The project is a cooperative effort between the HFF (whose members and volunteers constructed much of the existing fence in the 1980s and work to maintain sections of it to this day), the USFS, and the Park.

2006 Projects

Native Fish Returned to Sawtell Creek: Forest Fisheries Personnel have been working with their partners on the Sawtell Creek Yellowstone Cutthroat Trout Reintroduction Project in the upper Henry's Fork for the last couple of years. The previous years' activities included eradication of non-native brook trout and improvement of habitat in the system. The multi year restoration project achieved its primary objective in 2006 with the transplanting of over 700 Yellowstone cutthroat trout from Tygee and Corral Creeks. Tygee Creek is a nearby tributary of the Henry's Fork and Corral Creek is in the neighboring Sinks Drainage. These two streams are believed to have populations of Yellowstone cutthroat trout that are remnants of historic Henry's Fork Yellowstone cutthroat trout populations. The fish reintroduction in Sawtell Creek adds approximately 6 more stream miles in the Henry's Fork system inhabited by Yellowstone cutthroat trout. This project was a partnership between Idaho Department of Fish and Game, Henry's Fork Foundation, and Natural Resources Conservation Service.

2005 Projects

Buffalo River Dam Fish Passage: Fish can now effectively migrate past the Buffalo River hydroelectric dam on the Henry's Fork, thanks to the efforts of Lee Mabey and his partners in the hydropower dam relicensing effort. The dam was built in 1936 to provide electricity to construct Island Park Dam. When it was originally constructed, no environmental reviews were required. Today, fisheries biologists on the Forest participate in hydroelectric relicensing processes because it is an excellent way of accomplishing meaningful fisheries conservation. Lee Mabey participated in the Buffalo River hydro negotiations with Fall River Rural Electric and several C-T Fisheries Program partners, including Henry's Fork Foundation and Idaho Department of Fish and Game.

The resulting settlement agreement included a fish ladder and fish screens on the turbine intake system. The new ladder is designed to allow migrating adult fish to spawn in the Buffalo River and allow young trout migrating from the Henry's Fork to find more favorable over-wintering areas above the dam. The weirs in the ladder allow fish to swim through or jump over each weir. A layer of river rocks was provided for resting areas at the bottom of the fishway. The screening of the water intake to the powerhouse will exclude all but the smallest of fish. This project will benefit the Buffalo River and Henry's Fork fisheries.

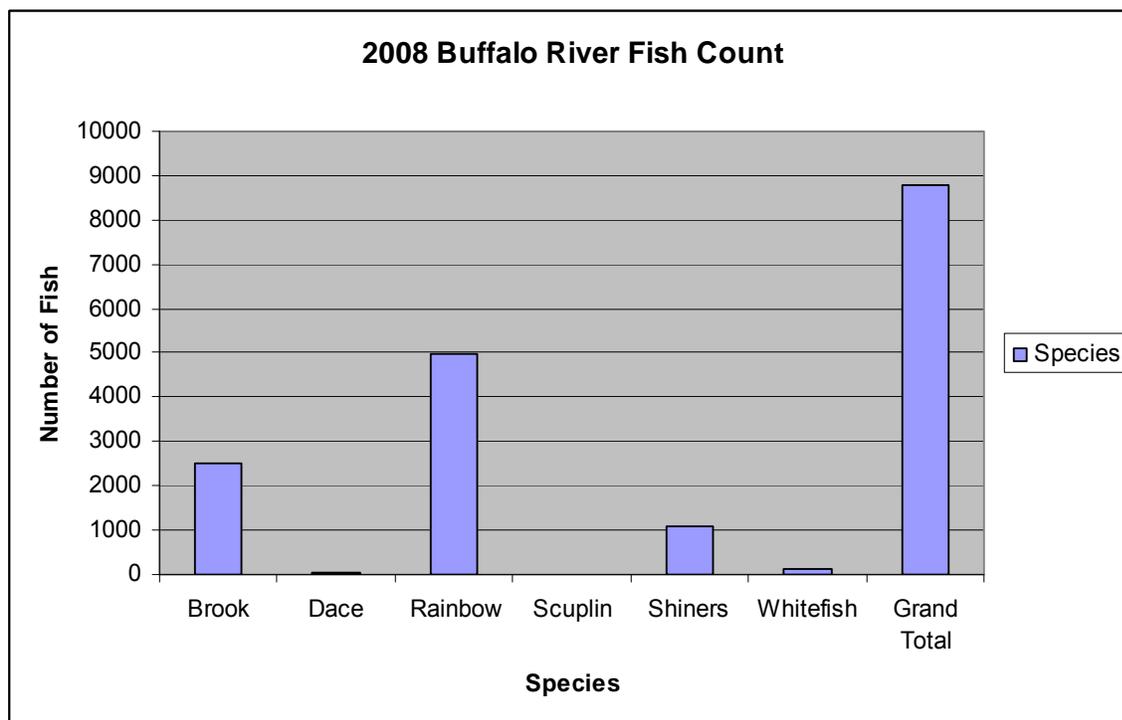


Figure 3. 2008 Buffalo River Fish Count

The chart above represents the number of fish that passed through the Buffalo River fish ladder during 2008. According to State and Federal agencies fish numbers increased considerably since the new fish ladder has been installed.



Figure 5. Buffalo River Powerhouse



Figure 4. Newly constructed Fish Ladder



Figure 7. Fish Ladder



Figure 6. View of Raceway

Howard & Targhee Creek Fish Passage: Howard and Targhee Creeks were reconnected to Henry's Lake as the Idaho Transportation Department (ITD) replaced the existing culverts that have been in place since the 1970's with full span bridges. For the last 35 years, Yellowstone cutthroat trout migrating upstream from Henry's Lake, met barriers at these highway crossings. The speed at which this project came together is a testament of how important everyone involved felt this project was. This project went from hope and desire to completion in one year, and emphasizes the importance of partnerships. The Transportation Department provided the funding and design, and the other partners (Idaho Department of Fish and Game, Greater Yellowstone Coalition, Henry's Fork Foundation, Henry's Lake Foundation, and Senator Crapo's office) provided the motivation and environmental work. The Forest provided the biological assessment, cultural resource report and clearance, and wetland delineation. Most importantly Yellowstone cutthroat trout, native to Henry's Lake, are once again able to access the largest and most important spawning tributaries to Henry's Lake.



Targhee Creek Culvert under Highway 20 before replacement was a barrier to upstream-migrating Yellowstone cutthroat trout.



The Targhee Creek crossing at Highway 20 after construction. The impassable culvert was replaced by a fish-friendly bridge.

With the help from the Caribou-Targhee National Forest these projects will help mitigate sediment and sustain migratory habitat for Yellowstone cutthroat trout. For more information on the Caribou-Targhee NF's Watershed and Fisheries programs, please visit these websites.

<http://www.fs.fed.us/r4/caribou-targhee/watershed/>

<http://www.fs.fed.us/r4/caribou-targhee/fisheries/index.shtml>

Idaho Department of Fish and Game

The following habitat improvement projects at Henry's Lake and tributaries feeding into Henry's Lake include fencing projects, fish screen installation, and riparian improvements. All of these projects improve the water quality and fisheries of Henry's Lake and its tributaries.

Empey Property Duck Creek Fencing Project: Approximately .5 miles of electric fencing was installed along the riparian buffer area of Duck Creek during the fall of 2008. One rock-hardened water gap was installed within this fence boundary. The fencing completes riparian protection from grazing along Duck Creek from the mouth to the junction with Henry's Lake road.

In addition, this project also included installation of a rock weir to facilitate fish passage at an irrigation lateral located with the aforementioned project boundary.

Empey Property Kelly Springs Fencing Project: Approximately .75 miles of electric fencing was installed along the riparian buffer area of Kelly Springs during the fall of 2008. Two rock-hardened water gaps were installed within this boundary and one flat-bottomed culvert was installed at a designated crossing. The fencing completes riparian protection from grazing along Duck Creek from the mouth to the junction with Henrys Lake road.

Howard Creek Fish Screen Installation: A modular fish screen was installed at a previously unscreened irrigation lateral on Howard Creek on the Tom Cole property during the fall of 2008. This screen installation completes screening of all irrigation laterals from the mouth of Howard Creek to its junction with highway 87.

Targhee Creek Fish Screen Installation: A modular fish screen was installed at a previously unscreened irrigation lateral on Targhee Creek on the Ray Clement property during the fall of 2008. This screen installation completes screening of all irrigation laterals on Targhee Creek.

Shoreline Buffer Fencing near County Boat Dock: Approximately .5 miles of electric fencing was installed north and south of the county boat dock during 2005. The electric fencing prevents shoreline grazing of this area and facilitates improved water quality at this site.

Ongoing Projects: Approximately 10 miles of riparian electric fencing is maintained on an annual basis on tributaries of Henrys Lake. Riparian fencing is maintained on tributaries including: Targhee, Duck, Howard, Timber and Kelly Springs. Additionally, 11 drum type fish screens are maintained on an annual basis.

Bureau of Land Management

The Bureau of Land Management was responsible for two fencing projects completed in 2003. The first on Kinney Creek in which the BLM fenced approximately ¼ mile of the stream and used the riparian area to filter sediment before entering Henry's Lake. The second project included fencing off livestock from entering the lakes' riparian area in the surrounding Kinney Creek watershed.

Chester Diversion Hydroelectric Project

(Information provided by Symbiotics, LLC)

On July 23, 2008, a license was issued by the Federal Energy Regulatory Commission (FERC) for the construction and operation of the Chester Diversion Hydroelectric Project (Project). The 3.3 megawatt (mW) run-of-river Project is located on the Henry's Fork of the Snake River in Fremont County, Idaho. The Project was "shovel ready" and began construction April 1, 2009 and commenced commercial operation on or before December 31, 2010. The Project proposes to improve the surrounding recreation area as well as the sportsman access, which should benefit those visiting the area. Measures have been taken to fully protect and mitigate for impacts of the Project on fish, wildlife, recreation and aesthetic resources associated with the surrounding area. Project representatives have worked diligently with state and federal agencies and various private interest groups to establish a Settlement Agreement (SA) regarding environmental issues associated with the proposed Project. State agencies that participated

include the Idaho Department of Fish and Game, Idaho Department of Environmental Quality and Idaho Department of Parks and Recreation. Federal agencies include the U.S. Fish and Wildlife Service and the U.S. Forest Service. Trout Unlimited, the Henry's Fork Foundation and the Greater Yellowstone Coalition, collectively referred to as the Conservation Groups in the SA, and are also participants. This SA has recently been finalized to the satisfaction of all parties.

To address fish migration issues, fish screens will be put in place at the entrances to both the Crosscut and Last Chance canals and a pathway will be provided to allow downstream passage. Boat ramps will be constructed upstream and downstream of the dam and gravel parking areas will be added. Restrooms will also be built to benefit those recreational users in the area. The Conservation Groups agreed to provide all necessary funding for a fish ladder to be designed, engineered, and constructed upstream of the dam. The Project has addressed all environmental issues and believes this Project to be a benefit to the area and its users upon its completion.



Figure 8. View of Old Dam



Figure 9. Construction of Dam



Figure 10. Construction of Chester Dam

Responsible Parties

As outlined in the State's Non-Point Source Management Plan (IDEQ, 1999), all DMAs have some responsibility and involvement in the TMDL process. This shared responsibility among state and federal DMAs is intended to increase information. Many of the DMAs listed below actively participate in the local WAG as needed. Table 7 displays the DMA and each resource responsibility and type of involvement in the TMDL process. These DMAs are recognized as state and federal agencies having key roles in the implementation of the states nonpoint source management program.

Table 7. Designated Management Agencies, resource responsibility and type of involvement in the TMDL process

Designated Management Agency	Resource Responsibility	Type of involvement
Idaho Department of Environmental Quality (IDEQ)	Water Quality	Control and abatement of both ground and surface water pollution
Idaho State Department of Agriculture (ISDA)	Aquaculture	Regulating aquaculture facilities
Idaho Department of Fish and Game (IDFG)	Fish and Wildlife	Water Quality enhancement projects
Idaho Department of Lands (IDL)	Managing state endowment lands	Managing BMP's for forestry and mining activities on state land.
Soil Conservation Commission (SCC)	Grazing and Agriculture activities on private land	Watershed implementation strategies
Soil Conservation Districts (SCDs)	Soil erosion from farm, ranch, range, and forest lands on private land	Agriculture implementation plans
Idaho Department of Water Resources (IDWR)	State Water Plan	Regulating water uses
Idaho Department of Transportation (ITD)	Administration of state highways	Stormwater BMP's
Environmental Protection Agency (EPA)	Training, Technical and financial assistance to ensure a effective NPS program	Support States and Tribes for the protection and restoration of beneficial uses
USDA – Forest Service (USFS)	National Forest lands	Regulate and permit land use activities
USDA – Natural Resources Conservation Service (NRCS)	Assist private landowners to use soil, water and vegetation resources with most applicable BMPs	Private landowners agriculture implementation plans
USDI – Bureau of Land Management (BLM)	Public land	Regulate, license and enforce land use activities
USDI – Bureau of Reclamation (BOR)	Oversees the planning, construction, operation, and maintenance of federal irrigation projects	Enhancing fish passage, habitat, water quality monitoring, agricultural drain relocations and studies
USDI – Geological Survey (USGS)	Collects, analyzes, and reports general hydrologic and water quality data	Ambient ground and surface water monitoring

Planned Activities

No activities in the Upper and Lower Henry's subbasins are planned due to timing and funding constraints. However, the USFS and BLM continue to implement watershed improvement projects as their budgets allow. The HFF also continues to implement watershed improvement projects as willing land owners are identified.

Future Strategy

Sheridan Creek is an on going restoration project as funding becomes available. The future strategy for both the Upper and Lower Henry's Fork subbasins remain the same which are to restore impaired streams and reduce nonpoint source pollution.

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Section 5: Summary of Five Year Review

Review process

Spring of 2008 we sent out a “call” for data where DEQ sat down with selected members of the Henry’s Fork Watershed Council and explained to them the manner of the five year review process. In turn agencies and partnerships relinquished data that was applicable to both the Upper and Lower Henry’s Fork subbasins. All data was reviewed by DEQ and pertinent information was then implemented into the five year review document.

Changes in Subbasin

Over the past several years the subbasins population base has grown quite substantially. Land use still remains the same as in the past with cattle grazing, recreational and residential consuming the majority of the land use practices. Water quality in the subbasins continues to be of concern both for residents and stakeholders. Water quality implementation projects continue to be a priority in the subbasins.

TMDL Analysis

As mentioned in section two the Henry’s Fork Watershed Council evaluated the streams listed on the 1994 303(d) list and decided that no TMDLs would be necessary. Therefore, this five year review consists of monitoring results, implementation projects and the current 303(d) listed streams. A draft Addendum to the Upper Henry’s Fork Subbasin Assessment and TMDLs is set to begin public comment in mid-January 2010. This document consists of newly written TMDLs for both the Upper and Lower Henry’s Subbasins.

Review of Beneficial Uses

DEQ has concurred with the designations that the Henry’s Fork Watershed Council made back in 1998. No changes are recommended for beneficial uses or the designations for those particular water bodies

Water Quality Criteria

Since the 1998 SBA a couple of state water quality standards have been either changed or implemented. Instead of fecal coliform the standard has changed to *E.Coli*. The biggest change to the standards has been temperature. DEQ uses the process of Potential Natural Vegetation (PNV) to measure amounts of shade vegetation gives a particular portion of the stream.

Watershed Group Consultation

DEQ remains involved with the Henry’s Fork Watershed Council and its monthly meetings. With the good standing working relationship between the Council and DEQ both groups strive to maintain water quality standards in the subbasins. In particular DEQ formed a technical committee which involves selected members from the Council. These members have been instrumental in helping with the five year review and TMDL process.

Recommendations for Further Action

Due to the fact that the 1998 Upper Henry's Fork subbasin assessment did not have any TMDLs to implement, no implementation plan was written. However, several water quality improvement projects have been completed in the subbasin. These include the Sheridan Creek 319 nonpoint restoration project as well as several others administered by the IDFG, USFS and HFF. Several new projects have been implemented in the Upper and Lower Henry's Subbasins' which will be broken out into different agencies and foundations who have completed the projects. Sheridan Creek did not appear on the 1994 §303(d) list, but it was identified by the Henry's Fork Watershed Council as a high priority for restoration. The Henry's Fork Watershed Council has implemented a habitat restoration project on Sheridan Creek which is intended to restore aquatic life beneficial uses, potentially eliminating the need for development of a TMDL in the future. Independent of the restoration efforts, Sheridan Creek appears on the 2008 Integrated Report and DEQ is drafting TMDLs to address continued pollutant delivery to the creek. Water quality monitoring continues in both subbasins by both DEQ and the HFF. DEQ continues to attend monthly WAG meetings with the HFWC and works with all groups on issues that may arise.

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Appendix A. Shotgun Valley Stream Assessment 2001 (Abstract from the Shotgun Valley Stream Assessment)

During July and August 2001, assessments were carried out in the Shotgun Valley on portions of Sheridan Creek, Hotel Creek, Sheep Creek and an unnamed tributary to Sheep Creek. A portion of Targhee Creek in the Henry's Lake watershed was also assessed. Each stream was divided into relatively homogenous reaches within which a shorter representative reference reach was selected for the assessment.

For most reaches the assessment consisted of a basic channel and riparian area description including a Rosgen classification; a greenline riparian vegetation survey (according to USDA Forest Service General Technical Report RMRS-GTR-47); an erosion survey including an erosion condition rating (according to NRCS Idaho's Stream Erosion Condition Worksheet); and a present and potential stream condition rating according to the NRCS's Stream Visual Assessment Protocol (see National Water and Climate Center Technical Note 99-1). Suspected causes of stream condition problems were noted and recommendations for rehabilitation provided. Due to the lack of a defined channel the assessment of a few reaches was abbreviated.

This work was completed by hydrologic technicians Bentley Knight and Jason Szakacs with the assistance of interns Alex Egbert and Rebecca Eckersell. See the accompanying file folder for draft assessment records, rating factors and reference reach sketches.

Appendix B. Willow Creek Assessment: Shotgun Valley 2003 (Abstract from the Willow Creek Assessment)

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An assessment of a 6.5 mile portion of Willow Creek between New Shotgun Road (030) and the confluence with Sheridan Creek was carried out during June and July 2003. This stretch of the creek ran through both public (Targhee National Forest) and private (Sheridan Ranch) lands. The study stretch of Willow Creek was divided into five reaches of varying length based on distinct changes in creek flow, riparian vegetation, or local geology. A representative transect for each reach was then chosen for more detailed measurements.

An assessment of each reach consisted of the following: a basic channel and riparian area description including a Rosgen classification; an erosion survey including an erosion condition rating according to NRCS Idaho's Stream Erosion Condition Inventory Worksheet; and a stream condition rating according to NRCS's Stream Visual assessment Protocol (see National Water and Climate Center Technical Note 99-1). Adjacent land use and suspected causes of creek condition problems were recorded for each reach. It should be noted that water flow ceased in the last reach at N 44° 26' 14.3" W 111° 37' 23.7" rendering the creekbed dry beyond this point.

This work was completed by Henry's Fork Foundation volunteers David Griffith and Emily Huhn. Please see the following report for summary data, detailed reach maps, USGS topographic map of study area, comprehensive aerial photo marking reach and transect locations, as well as photos of transects, representative eroding banks and notable creek features.

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Appendix C. 2004 Henry's Lake Dissolved Oxygen Data

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The data below represents one sampling event that took place on February 20, 2004 for Dissolved Oxygen in Henry's Lake. Idaho Fish and Game sampled for Dissolved Oxygen a total of seven times between December 2003 and February 2004.

Henry's Lake Dissolved Oxygen Measurements February 20 2004

Location	Snow Depth/Inches	Ice Thickness Inches	D.O. Ice Bottom Mg/L	D.O. 1 Meter Mg/L	D.O. 2 Meter Mg/L	D.O. 3 Meter Mg/L	D.O. 4 Meter Mg/L	D.O. 5 Meter Mg/L	Sum 2-5m	Ave Ice-1m	Total g/m ²
One Mile South of Pittsburg Creek	4"	28"	4.93	2.89	0.67	0.15			0.82	3.91	4.73
300 Yds. Off of Co. Boat Dock	11"	23"	2.5	2.9	0.34	0.2			0.54	2.7	3.24
300 Yds. Off of Wild Rose	10"	25"	2.6	2.4	0.8	0.13			0.93	2.5	3.43
Middle of Outlet Bay	N/A								0	0	0
300 Yards in front of cabin	N/A								0	0	0

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