Brownlee Reservoir Subbasin – Weiser Flats

Total Maximum Daily Load – Bacteria

Hydrologic Unit Code 17050201

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Table of Contents

List of Tables

List of Figures

Abbreviations, Acronyms, and Symbols

§303(d)	refers to section 303 subsection (d) of the Clean Water Act, or a list of impaired water bodies required by this section
§	section (usually a section of federal or state rules or statutes)
AU	assessment unit
bcfu	billion colony forming units
BMP	best management practice
BURP	Beneficial Use Reconnaissance Program
CGP	Construction General Permit
CFR	Code of Federal Regulations (refers to citations in the federal administrative rules)
cfs	cubic feet per second
cfu	colony forming unit
COLD	cold water aquatic life
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
GIS	geographic information system
HUC	hydrologic unit code
IDAPA	Refers to citations of Idaho administrative rules
LA	load allocation
LC	load capacity
mL	milliliter
MOS	margin of safety
MS4s	municipal separate storm sewer systems
MSGP	Multi-Sector General Permit
NA	not assessed
NB	natural background
NPDES	National Pollutant Discharge Elimination System
PCR	primary contact recreation
SCD	soil conservation district
SCR	secondary contact recreation
TMDL	total maximum daily load
US	United States

USC United States Code

USGS United States Geological Survey

WAG watershed advisory group

WLA wasteload allocation

Executive Summary

The federal Clean Water Act 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 Clean Water Act, 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 Clean Water Act 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. Currently, this list is published every 2 years as the list of Category 5 water bodies in Idaho's Integrated Report. 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. This document addresses five water bodies (seven assessment units) in the Brownlee Reservoir - Weiser Flats subbasin that have been placed in Category 5 of Idaho's most recent federally approved Integrated Report (DEQ, 2018).

This document describes the key physical and biological characteristics of the subbasin; water quality concerns and status; pollutant sources; and recent pollution control actions in the Brownlee Reservoir - Weiser Flats subbasin, located in southwest Idaho. For more detailed information about the subbasin and previous TMDLs, see the Total Maximum Daily Loads (TMDL) for the Brownlee Reservoir (Weiser Flats) Subbasin (DEQ 2003).

The TMDL analysis establishes water quality targets and load capacities, estimates existing pollutant loads, and allocates responsibility for load reductions needed to return listed waters to a condition meeting water quality standards. It also identifies implementation strategies—including reasonable time frames, approach, responsible parties, and monitoring strategies—necessary to achieve load reductions and meet water quality standards.

Subbasin at a Glance

The Brownlee Reservoir subbasin, hydrologic unit code 17050201, encompasses Weiser Flat, including Jenkins, Scott, Warms Springs, and Hog Creeks, which drain into the Snake River as it becomes Brownlee Reservoir downstream of the Weiser River inflow. Dennett Creek drains into Brownlee Reservoir below Weiser Flat. This subbasin is located along the central portion of the Idaho-Oregon border (Figure A). The headwaters for these creeks originate i in the Hitt Mountains of western Idaho. It is a rural watershed dominated by agricultural land and rangeland.

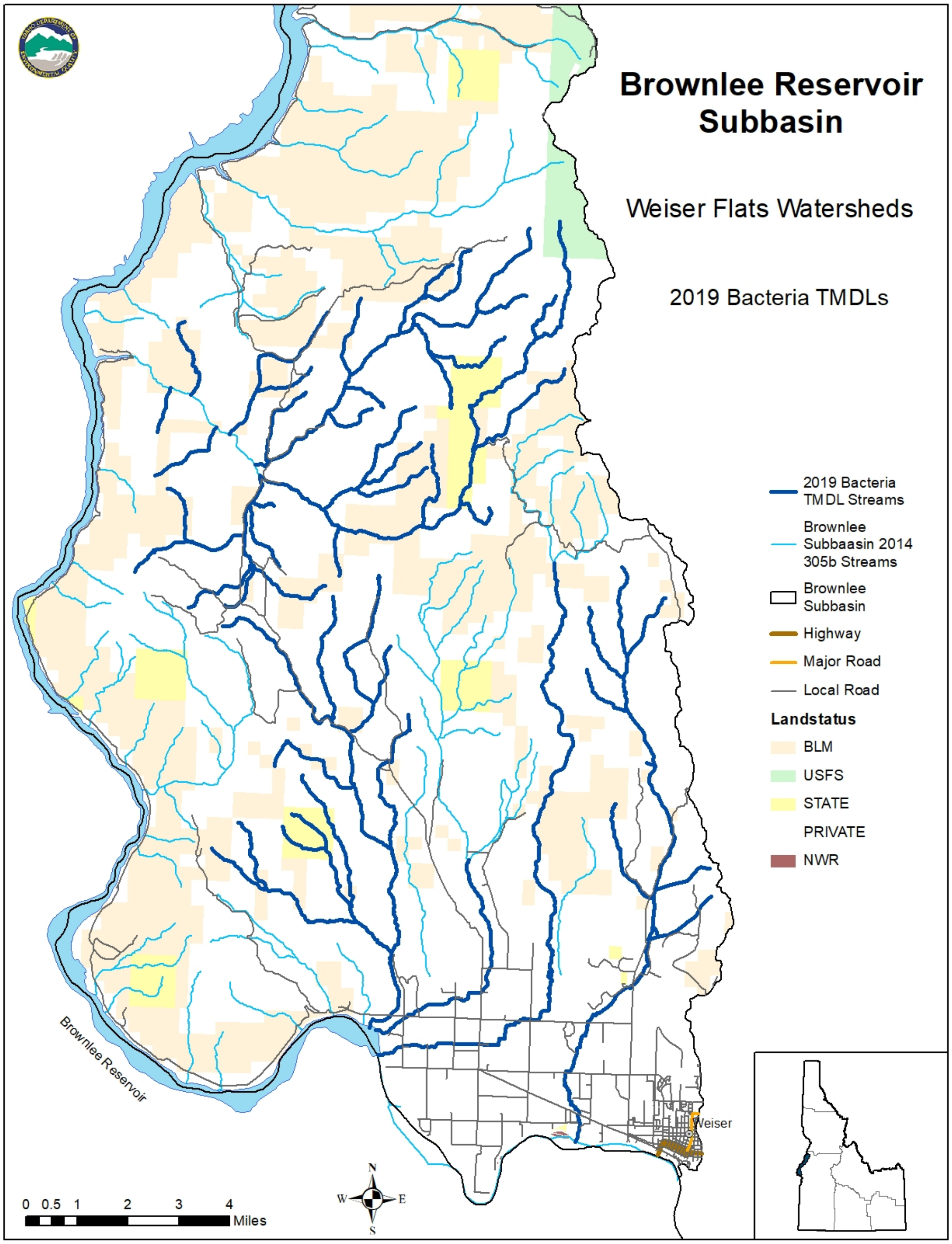

Figure A. Brownlee Reservoir – Weiser Flats subbasin.

Key Findings

Seven Assessment Units (AUs) in the Weiser Flats area are listed for bacteria impairment from historic data. Standards state that surface waters are not to contain *Escherichia coli* (*E. coli*) bacteria exceeding a geometric mean of 126 organisms per 100 milliliters ("Water Quality Standards," IDAPA 58.01.02). All AUs within the Weiser Flats portion of the Brownlee Subbasin currently listed for *E. coli* require large bacteria load reductions. The 2018 monitoring work of Rock Creek's 3rd-order segment found bacteria concentrations lower than the water quality standard and considered it a candidate for delisting. Additional data was collected in 2019 to verify the bacteria concentrations of both Rock Creek drainage AUs. The additional data collection indicated that both of the Rock Creek AUs require bacteria load reductions to meet water quality standards and the development of total maximum daily loads to help reach beneficial use support. Table A lists the water bodies receiving bacteria TMDLs in this document.

Table A. Water bodies and pollutants with TMDLs

Water Body	Assessment Unit	Pollutant(s)
Jenkins Creek – entire watershed	ID17050201SW005_02	*E. coli*
Scott Creek – 3rd order	ID17050201SW006_03	*E. coli*
Warm Springs Creek – 3rd order	ID17050201SW007_03	*E. coli*
Hog Creek – 1st and 2nd order	ID17050201SW008_02	*E. coli*
Hog Creek – 3rd order	ID17050201SW008_03	*E. coli*
Rock Creek and Tributaries – 1st and 2nd order	ID17050201SW010_02	*E. coli*
Rock, Little Rock, and Henley Creeks – 3rd order	ID17050201SW010_03	*E. coli*

Table B summarizes the TMDLs provided in this document and lists changes to the next Integrated Report.

Table B. Summary of assessment outcomes for §303(d)-listed assessment units in the Brownlee Reservoir — Weiser Flats subbasin.

Water Body	Assessment Unit	Pollutant	TMDL Completed	Recommended Changes to Next Integrated Report	Justification
Jenkins Creek – entire watershed	ID17050201SW005_02	*E. coli*	Yes	Include in Category 4a for *E. coli.*	*E. coli TMDL completed.*
Scott Creek – 3rd order	ID17050201SW006_03	*E. coli*	Yes	Include in Category 4a for *E. coli.*	*E. coli TMDL completed.*
Warm Springs Creek – 3rd order	ID17050201SW007_03	*E. coli*	Yes	Include in Category 4a for *E. coli.*	*E. coli TMDL completed.*
Hog Creek – 1st and 2nd order	ID17050201SW008_02	*E. coli*	Yes	Include in Category 4a for *E. coli.*	*E. coli TMDL completed.*
Hog Creek – 3rd order	ID17050201SW008_03	*E. coli*	Yes	Include in Category 4a for *E. coli.*	*E. coli TMDL completed.*
Rock Creek and Tributaries – 1st and 2nd order	ID17050201SW010_02	*E. coli*	Yes	Include in Category 4a for *E. coli.*	*E. coli TMDL completed.*
Rock, Little Rock and Henley Creeks – 3rd order	ID17050201SW010_03	*E. coli*	Yes	Include in Category 4a for *E. coli.*	*E. coli TMDL completed.*

The Tributaries to Snake River's 1st and 2nd-order AU (ID17050201SW003_02) currently listed for bacteria impairment is outside the geographic area investigated as part of this TMDL. The Weiser Flats area was first described by DEQ in the 2003 TMDL (DEQ, 2003) and this geographic focus was continued with the 2015 Five-Year Review (DEQ, 2015a). The geographically-focused approach to addressing impairments is common in the subbasin. In addition to the Weiser Flats documents, a TMDL and Five-Year Review was developed for the Wildhorse River watershed (DEQ, 2007; DEQ, 2015b) in the northern part of the Brownlee Reservoir subbasin.

Although not included in this TMDL, ID17050201SW003_02 will be re-examined and re-assessed in the 2022 Integrated Report. Any additional impairments identified from that assessment would support TMDL efforts for the central portion of the subbasin as well as augment condition assessments for the northern and southern areas already addressed.

Public Participation

The general public may comment on this document during a public comment period. Additionally, members of the Weiser River Watershed Advisory Group may review an early draft of the document to help inform the TMDL process.

Introduction

This document addresses five water bodies in the Brownlee Reservoir - Weiser Flats subbasin that have been placed in Category 5 of Idaho's most recent federally approved Integrated Report (DEQ 2016a). The purpose of this total maximum daily load (TMDL) is to characterize and document pollutant loads within the Brownlee Reservoir - Weiser Flats subbasin. The first portion of this document presents key characteristics or updated information for the subbasin assessment, which is divided into four major sections: subbasin characterization (section 1), water quality concerns and status (section 2), pollutant source inventory (section 3), and a summary of past and present pollution control efforts (section 4). While the subbasin assessment is not a requirement of the TMDL, DEQ performs the assessment to ensure impairment listings are up to date and accurate.

The subbasin assessment is used to develop a TMDL for each pollutant of concern for the Brownlee Reservoir - Weiser Flats subbasin. The TMDL (section 5) is a plan to improve water quality by limiting pollutant loads. Specifically, a TMDL is an estimation of the maximum pollutant amount that can be present in a water body and still allow that water body to meet water quality standards (40 CFR Part 130). Consequently, a TMDL is water body- and pollutant-specific. The TMDL also allocates allowable discharges of individual pollutants among the various sources discharging the pollutant.

Regulatory Requirements

This document was prepared in compliance with both federal and state regulatory requirements. The federal government, through the United States Environmental Protection Agency (EPA), assumed the dominant role in defining and directing water pollution control programs across the country. The Idaho Department of Environmental Quality (DEQ) implements the Clean Water Act in Idaho, while EPA oversees Idaho and certifies the fulfillment of Clean Water Act requirements and responsibilities.

Congress passed the Federal Water Pollution Control Act, more commonly called the Clean Water Act, in 1972. The goal of this act was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 USC §1251). The act and the programs it has generated have changed over the years as experience and perceptions of water quality have changed. The Clean Water Act has been amended 15 times, most significantly in 1977, 1981, and 1987. One of the goals of the 1977 amendment was protecting and managing waters to ensure "swimmable and fishable" conditions. These goals relate water quality to more than just chemistry.

The Clean Water Act 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 Clean Water Act, 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. DEQ must review those standards every 3 years, and EPA must approve Idaho's water quality standards. Idaho adopts water quality standards to protect public health and welfare, enhance water quality, and protect biological integrity. A water quality standard defines the goals of a water body by designating the use or uses for the water, setting criteria necessary to protect those uses, and preventing degradation of water quality through antidegradation provisions.

Section 303(d) of the Clean Water Act 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. Currently, this list is published every 2 years as the list of Category 5 waters in Idaho's Integrated Report. For waters identified on this list, states and tribes must develop a TMDL for the pollutants, set at a level to achieve water quality standards.

DEQ monitors waters, and for those not meeting water quality standards, DEQ must establish a TMDL for each pollutant impairing the waters. However, some conditions that impair water quality do not require TMDLs. EPA considers certain unnatural conditions—such as flow alteration, human-caused lack of flow, or habitat alteration—that are not the result of discharging a specific pollutant as "pollution." TMDLs are not required for water bodies impaired by pollution, rather than a specific pollutant.

1 Subbasin Characterization

This document focuses on the Jenkins Creek, Scott Creek, Warm Springs Creek, Hog Creek, and Rock Creek watersheds (Figure 1). The watersheds are located within the Snake River Basin and are subwatersheds of the Brownlee Reservoir Subbasin (HUC ID17050201), and commonly referred to as the Weiser Flats. Throughout this document the area will be referenced as the Brownlee Reservoir – Weiser Flats subbasin. All of the streams investigated for bacteria impairment discharge to the Snake River.

Hog Creek, Scott Creek, Warm Springs Creek, and Jenkins Creek are located in the southern portion of the Brownlee Reservoir – Weiser Flats subbasin near the city of Weiser and the Weiser River subbasin. They generally flow north to south through the subbasin before discharging directly to the Snake River. All streams in this section of the Weiser Flats start in rangeland before passing through irrigated agricultural lands.

The Rock Creek drainage is generally oriented east to west and discharges into Brownlee Reservoir proper. Streams in this drainage are found entirely within open rangeland.

Precipitation in the subbasin primarily occurs in the summer and winter. Summer storms are short and intense storms, while winter storms are usually less intense and occur over a longer duration. The majority of the precipitation falls during the winter. Because of the precipitation characteristics, streams in the Brownlee Reservoir – Weiser Flats subbasin experience relatively brief periods of increased flows correlated with spring run-off that decreases until irrigation recharges augments flow later in the summer. Base flows in late fall and winter are generally very low volume. With the amount of irrigated cropland the streams pass through, estimating stream flows is difficult as streams are diverted with some flow returning as irrigation recharge.

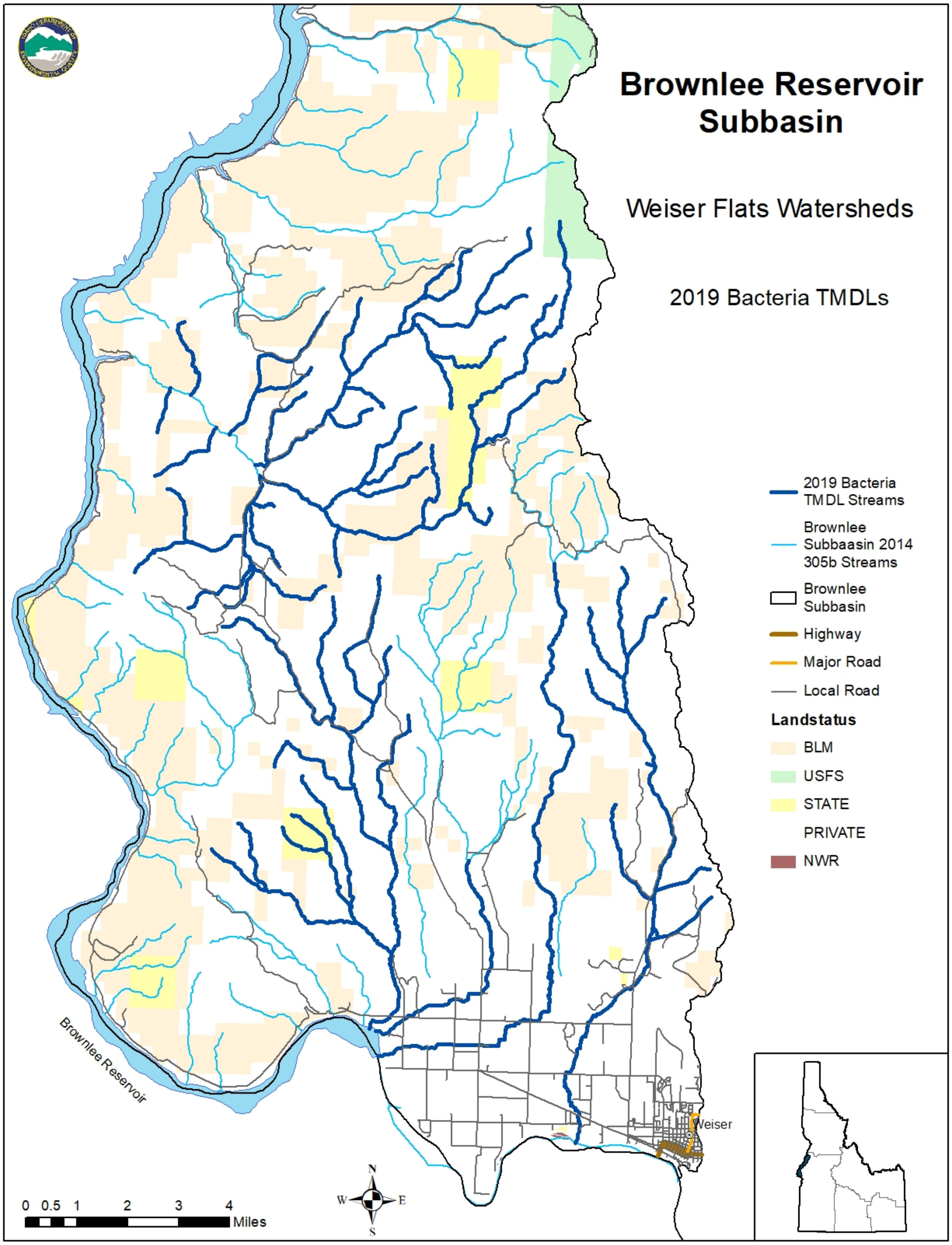

Figure 1. Brownlee Reservoir – Weiser Flats subbasin.

2 Water Quality Concerns and Status

2.1 Water Quality Limited Assessment Units Occurring in the Subbasin

Section 303(d) of the Clean Water Act states that waters that are unable to support their beneficial uses and do not meet water quality standards must be listed as water quality limited. Subsequently, these waters are required to have TMDLs developed to bring them into compliance with water quality standards.

2.1.1 Assessment Units

Assessment units (AUs) are groups of similar streams that have similar land use practices, ownership, or land management. However, stream order is the main basis for determining AUs—even if ownership and land use change significantly, the AU usually remains the same for the same stream order.

Using AUs to describe water bodies offers many benefits, primarily that all waters of the state are defined consistently. AUs are a subset of water body identification numbers, which allows them to relate directly to the water quality standards.

2.1.2 Listed Waters

Table 1 shows the pollutants listed and the basis for listing for each §303(d)-listed AU in the subbasin (i.e., AUs in Category 5 of the Integrated Report).

Table 1. Brownlee Reservoir – Weiser Flats subbasin §303(d)-listed assessment units impaired for *Escherichia coli* in the subbasin.

Water Body	Assessment Unit	Pollutant(s)
Jenkins Creek – entire watershed	ID17050201SW005_02	*Escherichia coli*
Scott Creek – 3rd order	ID17050201SW006_03	*Escherichia coli*
Warm Springs Creek – 3rd order	ID17050201SW007_03	*Escherichia coli*
Hog Creek – 1st ~~&~~and 2nd order	ID17050201SW008_02	*Escherichia coli*
Hog Creek – 3rd-order	ID17050201SW008_03	*Escherichia coli*
Rock Creek and Tributaries – 1st and 2nd order	ID17050201SW010_02	*Escherichia coli*
Rock, Little Rock, and Henley Creeks – 3rd order	ID17050201SW010_03	*Escherichia coli*

2.2 Applicable Water Quality Standards and Beneficial Uses

Idaho water quality standards (IDAPA 58.01.02) list beneficial uses and set water quality goals for waters of the state. 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 as described briefly in Appendix A. The *Water Body Assessment Guidance* (DEQ, 2016b) provides a more detailed description of beneficial use identification for use assessment purposes.

Beneficial uses include the following:

- Aquatic life support—cold water, seasonal cold water, warm water, salmonid spawning, and modified
- Contact recreation—primary (e.g., swimming) or secondary (e.g., boating)
- Water supply—domestic, agricultural, and industrial
- Wildlife habitats
- Aesthetics

2.2.1 Beneficial Uses in the Subbasin

Table 2. Brownlee Reservoir – Weiser Flats subbasin beneficial uses of §303(d)-listed streams.

Water Body	Assessment Unit Number	Beneficial Uses[a]	Type of Use
Jenkins Creek – entire watershed	ID17050201SW005_02	COLD, PCR	Designated
Scott Creek – 3rd order	ID17050201SW006_03	COLD, SCR	Presumed
Warm Springs Creek – 3rd order	ID17050201SW007_03	COLD, SCR	Presumed
Hog Creek – 1st and 2nd order	ID17050201SW008_02	COLD, SCR	Presumed
Hog Creek – 3rd order	ID17050201SW008_03	COLD, SCR	Presumed
Rock Creek and Tributaries – 1st and 2nd order	ID17050201SW010_02	COLD, SCR	Presumed
Rock, Little Rock and Henley Creeks – 3rd order	ID17050201SW010_03	COLD, SCR	Presumed

[a] cold water aquatic life (COLD), primary contact recreation (PCR), secondary contact recreation (SCR)

2.2.2 Water Quality Criteria to Support Beneficial Uses

Beneficial uses are protected by a set of water quality criteria, which include *numeric* criteria for pollutants such as bacteria, dissolved oxygen, pH, ammonia, temperature, and turbidity (Appendix B), and *narrative* criteria for pollutants such as sediment and nutrients (IDAPA 58.01.02.250–251).

DEQ's procedure to determine whether a water body fully supports designated and existing beneficial uses is outlined in IDAPA 58.01.02.050.02. The procedure relies heavily upon biological parameters and is presented in detail in the *Water Body Assessment Guidance* (Grafe et al. 2002). This guidance requires DEQ to use the most complete data available to make beneficial use support status determinations.

2.3 Summary and Analysis of Existing Water Quality Data

This section provides additional data collected in support of the development of bacteria TMDLs for the Brownlee Reservoir – Weiser Flats subbasin.

DEQ collected bacteria samples in accordance with the Standard Operating Procedures for Sampling Escherichia coli in Surface Water (DEQ, 2012). Bacteria targets are set by Idaho's water quality standards (IDAPA 58.01.02). The numeric criterion for *Escherichia coli* (*E. coli*) is not to exceed 126 *E. coli* organisms per 100 milliliters (*E. coli*/100 mL) based on the geometric mean of five samples taken 3 to 7 days apart over a 30-day period. This criterion applies to both primary and secondary contact recreation. Table 3 provides the bacteria data collected for Brownlee Reservoir – Weiser Flats subbasin in 2018.

Table 3. *E. coli* bacteria concentrations in the Brownlee Reservoir – Weiser Flats subbasin in 2018.

Assessment Unit	Creek Name	Date Sampled	*E. coli* (cfu/100mL)
ID17050201SW005_02	Jenkins Creek	5/2/2018	325.5
ID17050201SW005_02	Jenkins Creek	5/8/2018	344.8
ID17050201SW005_02	Jenkins Creek	5/14/2018	1119.9
ID17050201SW005_02	Jenkins Creek	5/17/2018	1732.9
ID17050201SW005_02	Jenkins Creek	5/23/2018	275.5
		GeoMean	**569.69**
ID17050201SW006_03	Scott Creek	5/2/2018	613.1
ID17050201SW006_03	Scott Creek	5/8/2018	866.4
ID17050201SW006_03	Scott Creek	5/14/2018	980.4
ID17050201SW006_03	Scott Creek	5/17/2018	1732.9
ID17050201SW006_03	Scott Creek	5/23/2018	410.6
		GeoMean	**819.92**
ID17050201SW007_03	Warm Springs Creek	5/2/2018	261.3
ID17050201SW007_03	Warm Springs Creek	5/8/2018	980.4
ID17050201SW007_03	Warm Springs Creek	5/14/2018	866.4
ID17050201SW007_03	Warm Springs Creek	5/17/2018	1732.9
ID17050201SW007_03	Warm Springs Creek	5/23/2018	1046.2
		GeoMean	**833.55**
ID17050201SW008_02	Hog Creek	5/2/2018	42.6
ID17050201SW008_02	Hog Creek	5/8/2018	2419.6
ID17050201SW008_02	Hog Creek	5/14/2018	1553.1
ID17050201SW008_02	Hog Creek	5/17/2018	2419.60
ID17050201SW008_02	Hog Creek	5/23/2018	1986.30
		GeoMean	**948.92**
ID17050201SW008_03	Hog Creek	5/2/2018	387.3
ID17050201SW008_03	Hog Creek	5/8/2018	547.5
ID17050201SW008_03	Hog Creek	5/14/2018	1119.9
ID17050201SW008_03	Hog Creek	5/17/2018	1413.6
ID17050201SW008_03	Hog Creek	5/23/2018	980.4
		GeoMean	**800.70**
ID17050201SW010_02	Little Rock Creek Trib	5/2/2018	39.1
ID17050201SW010_02	Little Rock Creek Trib	5/8/2018	410.6
ID17050201SW010_02	Little Rock Creek Trib	5/14/2018	209.8
ID17050201SW010_02	Little Rock Creek Trib	5/17/2018	98.5
ID17050201SW010_02	Little Rock Creek Trib	5/23/2018	307.6
		GeoMean	**159.13**
ID17050201SW010_03	Rock Creek	5/2/2018	104.6
ID17050201SW010_03	Rock Creek	5/8/2018	146.7

ID17050201SW010_03	Rock Creek	5/14/2018	85.7
ID17050201SW010_03	Rock Creek	5/17/2018	135.4
ID17050201SW010_03	Rock Creek	5/23/2018	77.1
		GeoMean	**106.54**

Before the 2018 data collection, bacteria data was last collected in 2011 and 2014. Results from those efforts concluded that bacteria were in concentrations greater than the numeric criterion in the Jenkins Creek, Scott Creek, Warm Springs Creek, Hog Creek, and Rock Creek drainages. However, the 1st and 2nd-order segments of Hog Creek were not sampled in 2011 or 2014. Jenkins Creek, Scott Creek, Warm Springs Creek, and the 3rd-order segment of Hog Creek all had two or three sampling locations within them. Reported *E. coli* concentrations from the 2011 and 2014 sampling efforts are presented in the listing notes for each AU in the 2014 Integrated Report (DEQ, 2016a). The maximum identified five-sample geometric means for bacteria in each AU included 1,566 colony forming units per 100 milliliters (cfu/100mL) in the Jenkins Creek AU, 629 cfu/100mL in the Scott Creek 3rd-order AU, 407 cfu/100mL in the Warm Springs 3rd-order AU, 589 cfu/100mL in the Hog Creek 3rd-order AU, 2,146 cfu/100mL in the Rock Creek AU, and 662 cfu/100mL in the 3rd-order Rock Creek AU. Elevated bacteria concentrations have been a persistent issue in Brownlee Reservoir – Weiser Flats watershed streams.

As both Rock Creek AUs were below or near the *E. coli* state standard in 2018 (Table 3), additional samples were collected in 2019 to verify the conditions in these streams and to provide additional evidence that could be used to justify a delisting recommendation. Samples collected in 2019 were found to have concentrations of *E. coli* that were greater than the water quality standard. Table 4 presents *E. coli* data collected in 2019. In the 3rd-order segment of Rock Creek, *E. coli* concentrations were greater than the water quality standard with a geomean of 1,362.16 cfu/100mL. As this data is the most recent and indicates an *E. coli* impairment, it will be used to calculate a TMDL for the AU.

Table 4. *E. coli* bacteria concentrations in the Brownlee Reservoir – Weiser Flats subbasin in 2019.

Assessment Unit	Creek Name	Date Sampled	*E. coli* (cfu/100mL)
ID17050201SW010_02	Little Rock Creek Trib	7/18/2019	1120
ID17050201SW010_02	Little Rock Creek Trib	7/22/2019	770
ID17050201SW010_02	Little Rock Creek Trib	7/25/2019	1733
ID17050201SW010_02	Little Rock Creek Trib	7/30/2019	649
ID17050201SW010_02	Little Rock Creek Trib	8/5/2019	Dry
		GeoMean	**992.40***
ID17050201SW010_03	Rock Creek	7/18/2019	770
ID17050201SW010_03	Rock Creek	7/22/2019	816
ID17050201SW010_03	Rock Creek	7/25/2019	1986
ID17050201SW010_03	Rock Creek	7/30/2019	1553
ID17050201SW010_03	Rock Creek	8/5/2019	2420
		GeoMean	**1362.16**

* Geomean calculated based on four samples

Similarly, samples ~~collected~~ from the 2nd-order AU of Rock Creek showed exceedances of *E. coli* concentration thresholds, but the fifth sample needed to calculate the geomean according to Idaho's water quality standards was not collected. At the time of the fifth sample collection, the stream was found dry and a sample could not be collected. A geomean calculated for the four 2019 samples ~~collected in 2019~~ resulted in a bacteria concentration of 992.40 cfu/100mL. The number of 2019 samples ~~collected in 2019~~ is inadequate to determine a violation of the geomean based state standard; however, it would be appropriate to gauge the likelihood of an exceedance of the geomean criterion through the use of single sample values presented in the surface water standards (IDAPA 58.01.02).

Based on the size and location of the 2nd-order streams within the Rock Creek AU, it is unlikely that primary contact recreation (e.g., as swimming), where the ingestion of small quantities of water is likely, is an existing use. It is much more likely that secondary contact uses of these streams (e.g., fishing, wading), where the ingestion of water is unlikely, is a presumed use. The single sample value maximum for *E. coli* in waters protected for secondary contact recreation is 576 cfu/100mL. All of the samples were above the single sample value maximum.

The existing load used in the TMDL calculation was based on a geomean of the four samples from the 2nd-order Rock Creek AU. The geomean of multiple samples provides an existing load calculation that minimizes the variability in data associated with surface waters. The data is not being used to provide a listing or delisting justification where strict application of the standard is necessary because the AU is already listed and current *E. coli* concentrations are above threshold values. The geomean of the four samples provides average bacteria concentration over a 30-day period that would be suitable and appropriate for TMDL calculation.

2.3.1 Status of Beneficial Uses

Within this document, TMDLs for *E. coli* have been calculated for selected AUs in the Brownlee Reservoir – Weiser Flats subbasin included in Category 5 of the 2016 Integrated Report (DEQ, 2018). Bacteria concentrations found in excess of the standard may impact beneficial uses (e.g., contact recreation) in the subbasin. Much of the basin is grazed by livestock on public and private lands. This activity can impact the beneficial use of contact recreation by increasing bacteria concentrations in streams.

2.3.2 Protection of Downstream Beneficial Uses

When fully implemented, waterbodies in this TMDL will deliver *E. coli* concentrations ≤ 126 *E. coli*/100mL to downstream waters. Since the *E. coli* concentration target is equivalent to the numeric criterion for primary and secondary contact recreation, the TMDL ensures downstream recreational uses are protected. The Environmental Protection Agency (EPA) notes that downstream water quality criteria and beneficial uses are the same as the upstream criteria and uses. Beneficial uses and water quality criteria noted here are found within Idaho.

2.3.3 Assessment Unit Summary

A summary of the data analysis, literature review, and field investigations and a list of conclusions for AUs included in Category 5 of the 2014 Integrated Report follows. Initiation of this study began when the 2014 Integrated Report was the most recent EPA approved list.

Through the study period, the 2016 Integrated Report was approved. No changes from the 2014 Integrated Report to the 2016 Integrated Report had the potential to impact the direction or results of this TMDL study. This section includes changes that will be documented in the next Integrated Report once the TMDLs in this document have been approved by EPA.

2.3.3.1 Assessment Units Addressed in TMDLs

ID17050201SW005_02, **Jenkins Creek – entire watershed**

- Listed for *E. coli*.
- *E. coli* is exceeding the limit for contact recreation
- Move to Category 4a for *E. coli*.

ID17050201SW006_03, **Scott Creek – 3rd order**

- Listed for *E. coli*.
- *E. coli* is exceeding the limit for contact recreation
- Move to Category 4a for *E. coli*.

ID17050201SW007_03, **Warm Springs Creek – 3rd order**

- Listed for *E. coli*.
- *E. coli* is exceeding the limit for contact recreation
- Move to Category 4a for *E. coli*.

ID17050201SW008_02, **Hog Creek – 1st and 2nd order**

- Listed for *E. coli*.
- *E. coli* is exceeding the limit for contact recreation
- Move to Category 4a for *E. coli*.

ID17050201SW008_03, **Hog Creek – 3rd order**

- Listed for *E. coli*.
- *E. coli* is exceeding the limit for contact recreation
- Move to Category 4a for *E. coli*.

ID17050201SW010_02, **Rock Creek and Tributaries – 1st and 2nd order**

- Listed for *E. coli*.
- *E. coli* is exceeding the limit for contact recreation. Data collected in 2019 to confirm bacteria concentrations.
- A fifth sample required to calculate a geomean was not collected due to dry stream conditions. Data from the four 2019 samples ~~successfully collected in 2019~~ at base flow conditions were used to calculate the TMDL.
- Move to Category 4a for *E. coli*.

ID17050201SW010_03, **Rock, Little Rock and Henley Creeks – 3rd order**

- Listed for *E. coli*.
- 2018 bacteria data showed support of beneficial use through bacteria concentrations lower than the water quality standard. Data collected in 2019 to confirm bacteria concentrations found that the AU is exceeding the *E. coli* limit for contact recreation.

- Move to Category 4a for *E. coli*.

3 Pollutant Source Inventory

Pollution within the Brownlee Reservoir – Weiser Flats subbasin is primarily from *E. coli*. Bacteria load allocations are provided in this document.

3.1 Point Sources

No permitted point sources of *E. coli* were identified as having the potential to discharge to AUs analyzed as part of this TMDL document. Due to the low population density and rural land uses in this subbasin, DEQ does not anticipate additional point sources in the foreseeable future. The 2003 TMDL contains a full description of the land use and population centers found within the subbasin.

3.2 Nonpoint Sources

Various nonpoint sources may contribute additional inputs of *E. coli* to streams of the Brownlee Reservoir – Weiser Flats subbasin. *E. coli* is an intestinal bacterium common to warm-blooded animals. Both livestock and wildlife contribute *E. coli* to streams by defecating in and near water. Elevated *E. coli* levels are often associated with riparian grazing and related streambank erosion.

Human-caused nonpoint sources within the analyzed drainages include irrigated and dryland pasture; non-permitted urban/suburban land use including runoff from impervious surfaces and construction activities; and recreational uses, including both land and water-based activities. Figure 2 presents land uses in the Brownlee Reservoir – Weiser Flats subbasin from the USGS National Land Cover Database (Yang, et al., 2018). Nonpoint source categories are discussed in detail in the 2003 Brownlee Reservoir (Weiser Flat) subbasin TMDL (DEQ, 2003).

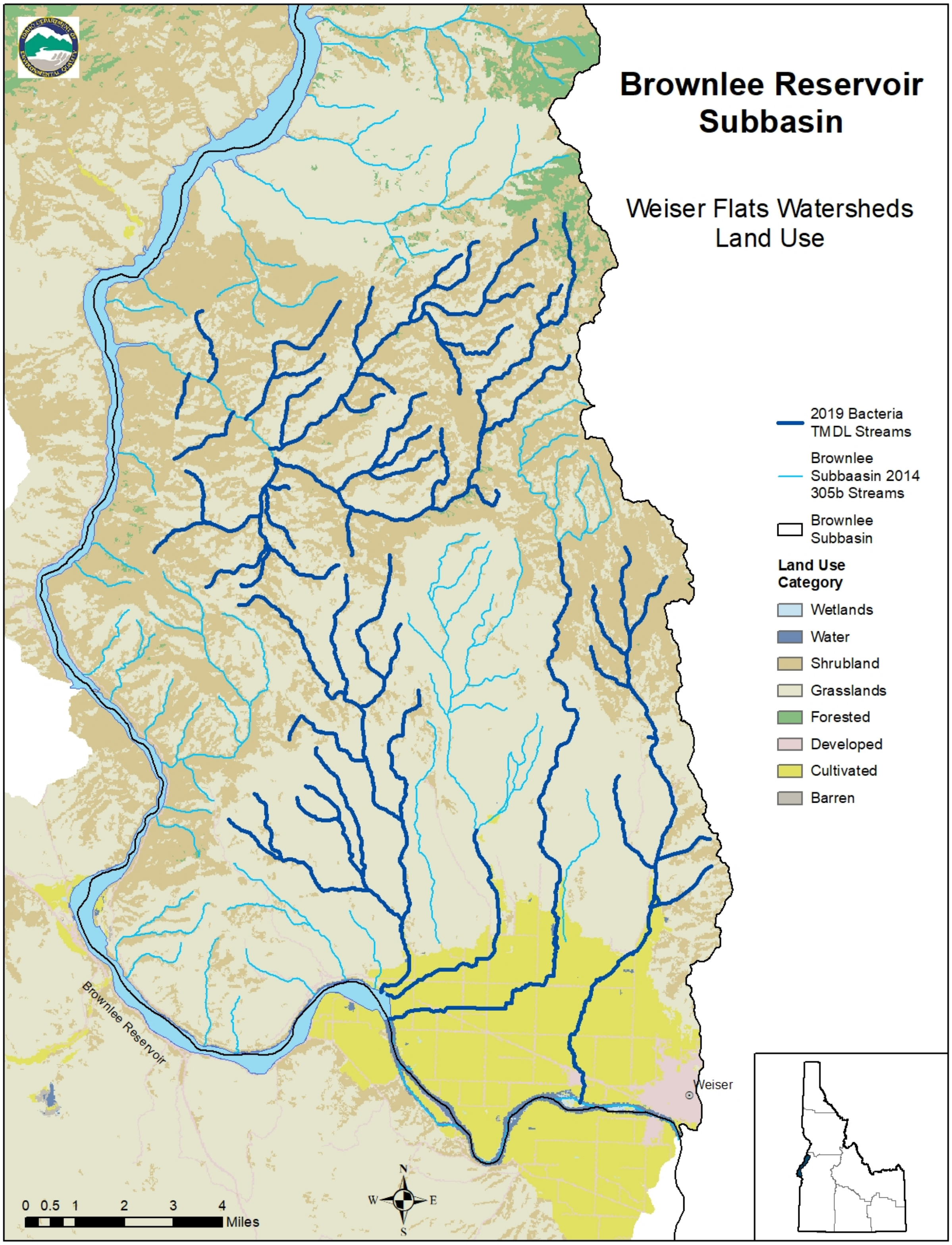

Figure 2. Brownlee Reservoir – Weiser Flats subbasin identified land uses.

3.3 Pollutant Transport

Pollutant transport refers to the pathway pollutants move from the pollutant source to a receiving water body. Increased bacteria concentrations can be found in a stream through direct or indirect contact. Direct contact includes defecation by warm-blooded mammals directly into or adjacent to a stream's edge. Indirect contact includes overland run-off from open rangeland or the introduction of bacteria from irrigation or pond drains. Typically nonpoint sources are not required to apply for or maintain a discharge permit.

4 Summary of Past and Present Pollution Control Efforts and Monitoring

The Weiser River Soil Conservation District (SCD) has secured funding from a variety of sources to implement projects to meet the targets set in the 2003 Brownlee Reservoir – Weiser Flats TMDL (IASCD and ISCC 2014). Agricultural sources of sediment, bacteria, and excess nutrients include erosion from surface-irrigated cropland and pastures, runoff from animal feedlots, livestock grazing on or near waterways, and erosion in drainage ditches from maintenance activities. Best management practices (BMPs) are selected to reduce streambank and irrigation-induced erosion; contain and filter sediment, nutrients, and bacteria from irrigation wastewater; contain and properly dispose of animal wastes; and reduce the leaching of nutrients and pesticides. Proper implementation of BMPs on agricultural fields within the Brownlee Reservoir – Weiser Flats watershed will improve surface water quality and reduce pollutant loading to the Snake River (IASCD and ISCC 2014). The following lists a variety of implementation projects that have been completed or are on-going by the Weiser River SCD. Project timelines and estimated load reductions are noted.

- Weiser Flat Water Quality Demonstration Project – Phase I (2003 – 2006)
  - Nitrogen reduced by 37,699 pounds
  - Phosphorus reduced by 405 pounds
  - Sediment reduces by 180 tons
- Weiser Flat Water Quality Demonstration Project – Phase II (2007 – 2009)
  - Nitrogen reduced by 7,830 pounds
- Payette Ditch Wetland Discharge Treatment Project (2010 – 2012)
  - Suspended Sediment Concentration reduced by 570 tons/year
  - Total Phosphorus reduced by 1.045 tons/year
- Invasive Species Inventory & Control Project (2010 – 2012)
  - Over 1,300 acres of county roadsides were inventoried and& categorized by the degree of infestation.
    - 532 acres were treated with Plateau in the fall of 2011
    - 652 acres were treated with glyphosate in the spring of 2012
    - 627 acres treated with Plateau in the fall of 2012
- Cove Creek Wetland Project (2012 – 2016)
  - Estimated sediment reduction is 724 tons/year
  - Estimated phosphorus reduction is 1,044 pounds/year

- Estimated nitrogen reduction is 1,931 pounds/year
- Galloway/Warm Springs Wetland Project (proposed 2014 – 2016)
  - Estimated sediment reduction is 1,452 tons/year
  - Estimated phosphorus reduction is 4.2 tons/year
  - Estimated nitrogen reduction is 3.3 tons/year
- Smith/Hemmenway/Grimmet Wetland Project (proposed 2014 – 2016)
  - Estimated sediment reduction is 871 tons/year
  - Estimated phosphorus reduction is 2.5 tons/year
  - Estimated nitrogen reduction is 2.0 tons/year
- Confluence Streambank Restoration Project Phase I (2017 – Present)
  - Estimated sediment reduction is 110 tons/year
  - Estimated phosphorus reduction is 176 pounds/year
  - Estimated nitrogen reduction is 352 pounds/year

Through the implementation and completion of these projects over 5,964 tons of sediment, 16.65 tons of phosphorus, and 49.69 tons of nitrogen have been or will be reduced in the Brownlee Reservoir – Weiser Flats watershed. Many of the BMPs used to control excess sedimentation would also be effective in limiting bacteria loading. The work done in riparian areas and streambanks (e.g., ~~such as~~ streambank restoration, ~~and~~ riparian fencing)~~,~~ to reduce streambank erosion is effective in limiting not only the sediment load but also any associated bacteria impairment pathways. As the majority of land ownership in the Weiser Flats area is privately held (Figure 1), the efforts of irrigation districts and land owners are the main contributors to reducing impairment loads and improving surface water quality in the watershed.

4.1 Water Quality Monitoring

Beneficial Use Reconnaissance Program (BURP) monitoring has been conducted in several AUs within the Brownlee Reservoir subbasin since the most recent five-year review was published in 2015. The purpose of BURP is to help Idaho meet the requirements of the federal Clean Water Act by monitoring and determining the support status of Idaho's water bodies. BURP conducts monitoring activities at selected sites, emphasizing sampling and analysis to support assessments of biological assemblages and physical habitat structure of streams. These assessments support the characterization of individual stream integrity and the total quality of Idaho's waters (DEQ, 2016c).

In 2016 IDEQ conducted BURP monitoring for two AUs within the Brownlee Reservoir – Weiser Flats watershed and those AUs included segments of Jenkins and Hog Creeks. The Jenkins Creek location was inaccessible and the Hogs Creek location did not meet the BURP requirements for a sampleable location because no suitable riffles could be found. Other agencies (e.g., ~~such as~~ the Weiser Soil Conservation District)~~,~~ conduct regular sampling within the watershed to assess the impacts from the installation of BMPs. The BMPs included in the implementation plan were selected to address irrigation induced erosion, irrigation tailwater delivery to receiving water bodies, inadequate riparian vegetation, and animal feedlot run~~-~~off.

Other water quality monitoring has occurred in the watershed in support of BMP effectiveness monitoring. The Weiser Flat TMDL Implementation Plan for Agriculture revised in 2014

(IASCD and ISCC 2014) detailed an annual sampling program that included bi-monthly sampling during the irrigation season and monthly sampling during the winter months. While the implementation plan only detailed data collection for two years, it is possible that some sampling regularly occurs in the watershed as BMP implementation is on-going.

5 Total Maximum Daily Loads

A TMDL prescribes an upper limit (i.e., load capacity) on discharge of a pollutant from all sources to ensure water quality standards are met. It further allocates this load capacity among the various sources of the pollutant. Pollutant sources fall into two broad classes: point sources, each of which receives a wasteload allocation, and nonpoint sources, each of which receives a load allocation. Natural background contributions, when present, are considered part of the load allocation but are often treated separately because they represent a part of the load not subject to control. Because of uncertainties about quantifying loads and the relation of specific loads to attaining water quality standards, the rules regarding TMDLs (40 CFR Part 130) require a margin of safety be included in the TMDL. Practically, the margin of safety and natural background are both reductions in the load capacity available for allocation to pollutant sources.

Load capacity can be summarized by the following equation:

$$LC = MOS + NB + LA + WLA = TMDL$$

Where:

LC = load capacity
MOS = margin of safety
NB = natural background
LA = load allocation
WLA = wasteload allocation

The equation is written in this order because it represents the logical order in which a load analysis is conducted. First, the load capacity is determined. Then the load capacity is broken down into its components. After the necessary margin of safety and natural background, if relevant, are quantified, the remainder is allocated among pollutant sources (i.e., the load allocation and wasteload allocation). When the breakdown and allocation are complete, the result is a TMDL, which must equal the load capacity.

The load capacity must be based on critical conditions—the conditions when water quality standards are most likely to be violated. If protective under critical conditions, a TMDL will be more than protective under other conditions. Because both load capacity and pollutant source loads vary, and not necessarily in concert, determining critical conditions can be more complicated than it may initially appear.

Another step in a load analysis is quantifying current pollutant loads by source. This step allows for the specification of load reductions as percentages from current conditions, considers equities in load reduction responsibility, and is necessary for pollutant trading to occur. A load is fundamentally a quantity of pollutant discharged over some period of time and is the product of concentration and flow. Due to the diverse nature of various pollutants, and the difficulty of strictly dealing with loads, the federal rules allow for “other appropriate measures” to be used when necessary (40 CFR 130.2). These other measures must still be quantifiable and relate to water quality standards, but they allow flexibility to deal with pollutant loading in more practical and tangible ways. The rules also recognize the particular difficulty of quantifying nonpoint loads and allow “gross allotment” as a load allocation where available data or appropriate predictive techniques limit more accurate estimates. For certain pollutants whose effects are long term, such as sediment and nutrients, EPA allows for seasonal or annual loads; however those loads must be expressed as an unit of pollutant per day.

5.1 Instream Water Quality Targets

Bacteria TMDLs were developed for seven AUs in the Brownlee Reservoir – Weiser Flats subbasin.

5.1.1 Design Conditions

The *E. coli* concentration target of 126 *E. coli*/100 mL be met at all times. To protect beneficial uses, load allocations are calculated for critical low flow conditions. Streamflow data was not collected at the time of bacteria sampling. There are no USGS gaging stations on any of the streams where TMDLs were developed. For most of the streams investigated, upstream water use and diversions may cause a situation where measured flows would be lower than the watershed potential and decrease the accuracy of the calculated daily loads. In order to address these issues, estimates of the seven day average flow expected to recur every ten years (7Q10 flow) were used to calculate the TMDLs. Estimates of flow were made using a web based application called StreamStats that includes parameters of drainage area and average precipitation to estimate low flow statistics in unregulated streams in Idaho (Hortness, 2006). StreamStats estimates of the 7Q10 flow were calculated at the locations of bacteria sampling conducted in 2018. The critical low flow values for calculating the *E. coli* load capacities are provided in Table 5.

Table 5. Critical low flow for calculating *E. coli* bacteria load capacities based on StreamStats estimates.

Water Body	Assessment Unit	Critical Low Flow (cfs)	Longitude	Latitude
Jenkins Creek – entire watershed	ID17050201SW005_02	0.061	44.2557	-117.0129
Scott Creek – 3rd order	ID17050201SW006_03	0.074	44.2730	-117.0839
Warm Springs Creek – 3rd order	ID17050201SW007_03	0.068	44.2810	-117.0839
Hog Creek – 1st and 2nd order	ID17050201SW008_02	0.009	44.3640	-117.1168
Hog Creek – 3rd order	ID17050201SW008_03	0.049	44.2925	-117.0882
Rock Creek and Tributaries – 1st and 2nd order	ID17050201SW010_02	0.001	44.4391	-117.1466
Rock, Little Rock and Henley Creeks – 3rd order	ID17050201SW010_03	0.097	44.4320	-117.1459

5.1.2 Target Selection

Bacteria targets are set by Idaho's water quality standards (IDAPA 58.01.02.251.01). The numeric criterion for *E. coli* is not to exceed 126 *E. coli*/100 mL based on the geometric mean of five samples taken 3 to 7 days apart and collected at evenly spaced intervals over a 30-day period. A geometric mean is applied to minimize random variability in data associated with surface waters prone to short-term episodic spikes in bacteria concentrations. This criterion applies to both primary and secondary contact recreation. Single samples may be collected and used to determine general compliance with the geometric mean standard.

5.1.3 Water Quality Monitoring Points

Impaired AUs were monitored for compliance with the *E. coli* criterion at locations where exceedances were originally measured. Figure 3 shows the bacteria monitoring locations sampled in 2018. 2019 data was collected at the Little Rock Creek Tributary and Rock Creek monitoring locations. These are the northern most AUs in the Weiser Flats area of the Brownlee Reservoir subbasin.

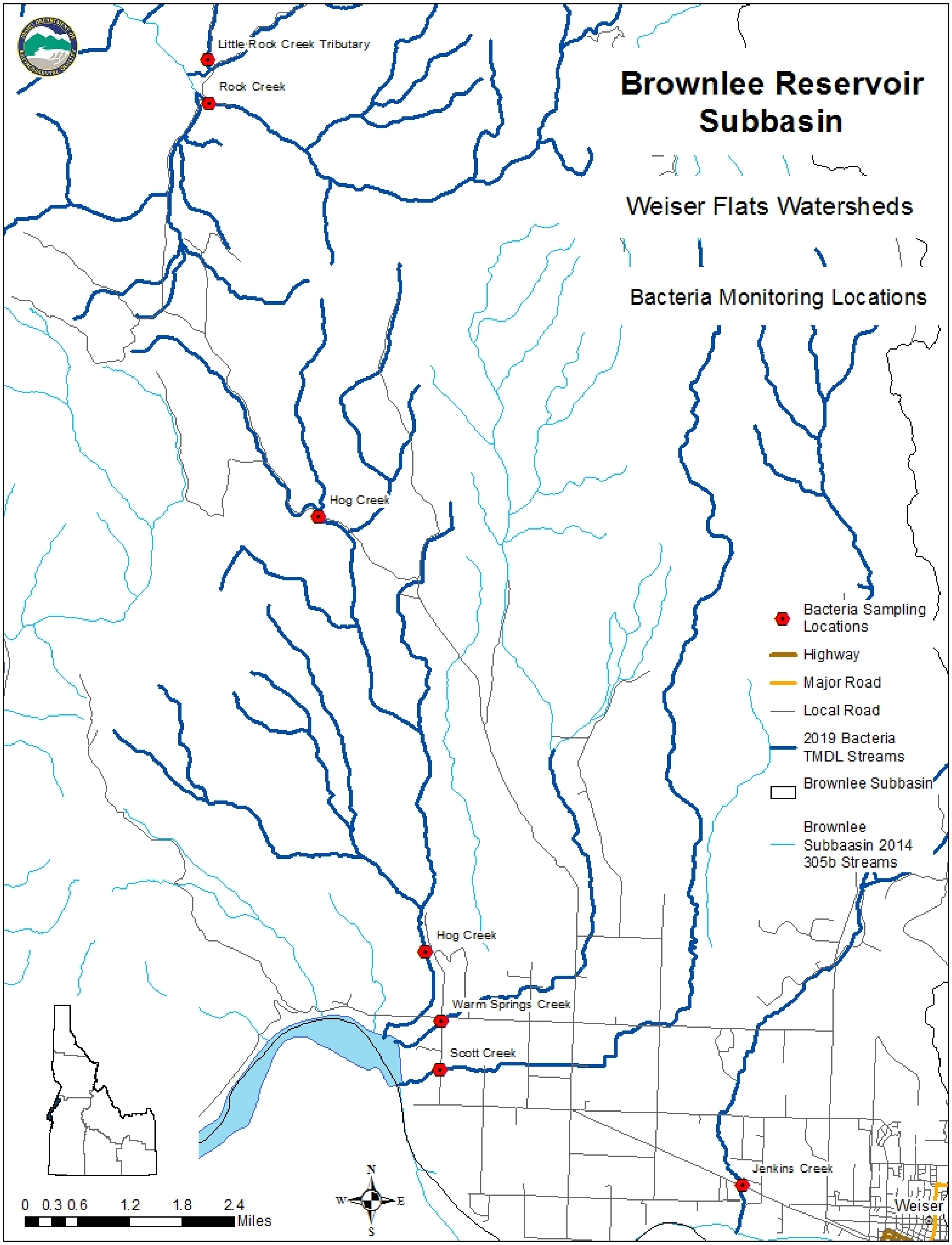

Figure 3. *E. coli* bacteria monitoring locations in Brownlee Reservoir – Weiser Flats subbasin.

5.2 Load Capacity

In bacteria TMDLs, the water quality standard is the load capacity of a system. The load capacity presented in Table 6 is based on various seasonal and annual flows. The load capacity is calculated as a function of 126 cfu/100mL as the target and the flow of the monitored AU according to the following example calculation:

$$E.coli\ load\ capacity\ \text{(LC)}\left(\frac{\text{cfu}}{day}\right) = \text{flow}\left(\frac{ft^3}{second}\right) \times target\ \left(\frac{cfu}{100\ mL}\right) \times 28{,}316.8\left(\frac{mL}{ft^3}\right) \times 86{,}400\left(\frac{second}{day}\right)$$

where:

the critical low flow is cubic feet per second (cfs)
126 colony forming units (cfu) / 100 milliliters (mL) is the *E. coli* target
28,316.8 mL per cubic foot is the volume conversion
86,400 seconds per day is the time conversion

Since the load capacity is dependent on flow, as the flow increases the load capacity increases; therefore, the load capacity estimate are considered flow variable. Table 6 provides the load capacities for the AUs listed for *E. coli* impairment at different stream flows.

Table 6. *E. coli* bacteria load capacities calculated on critical low flow, annual average flow, and 2-year peak flow.

Water Body (Assessment Unit)	Stream Flow Stage	Flow (cfs)	Target Concentration (cfu/100 mL)	Load Capacity	
				cfu/day	mcfu/day
Jenkins Creek – entire watershed (ID17050201SW005_02)	Critical Low Flow	0.061	126	188,043,487	188
	Average Annual Flow	1.950		6,011,226,225	6,011
	2-Year Peak Flow	83.000		255,862,449,562	255,862
Scott Creek – 3rd order (ID17050201SW006_03)	Critical Low Flow	0.074	126	228,118,329	228
	Average Annual Flow	1.870		5,764,611,815	5,765
	2-Year Peak Flow	96.400		297,170,363,105	297,170
Warm Springs Creek – 3rd order (ID17050201SW007_03)	Critical Low Flow	0.068	126	209,622,248	210
	Average Annual Flow	1.800		5,548,824,207	5,549
	2-Year Peak Flow	68.200		210,238,783,857	210,239
Hog Creek – 1st and& 2nd order (ID17050201SW008_02)	Critical Low Flow	0.009	126	27,744,121	28
	Average Annual Flow	0.298		918,638,674	919
	2-Year Peak Flow	18.600		57,337,850,143	57,338
Hog Creek – 3rd order (ID17050201SW008_03)	Critical Low Flow	0.049	126	151,051,326	151
	Average Annual Flow	1.530		4,716,500,576	4,717
	2-Year Peak Flow	61.200		188,660,023,050	188,660
Rock Creek and Tributaries – 1st and 2nd order (ID17050201SW010_02)	Critical Low Flow	0.001	126	3,082,680	3
	Average Annual Flow	0.048		148,893,450	149
	2-Year Peak Flow	4.660		14,365,289,337	14,365
Rock, Little Rock and Henley Creeks – 3rd order (ID17050201SW010_03)	Critical Low Flow	0.097	126	299,019,971	299
	Average Annual Flow	3.150		9,710,442,363	9,710
	2-Year Peak Flow	134.000		413,079,135,437	413,079

Notes: cubic feet per second (cfs); colony forming units per 100 milliliters (cfu/100 mL); colony forming units per day (cfu/day); million colony forming units per day (mcfu/day)

5.3 Estimates of Existing Pollutant Loads

Regulations allow that loadings "...may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading" (40 CFR 130.2(g)). The existing pollutant load is based on the most recent bacteria data. Table 7 provides the existing pollutant loads for the AUs with *E. coli* exceedances calculated on the critical low flow. Samples were collected in 2018 and 2019 during the mid-to late-summer months when flows are lower than the spring peak, but still generally consistent and usually present. Section 1 describes the general hydrology of the subbasin in greater detail.

Table 7. *E. coli* bacteria existing pollutant loads calculated on critical low flow.

Water Body	Assessment Unit	Critical Low Flow (cfs)	Measured Concentration (cfu/100 mL)	Existing Pollutant Load	
				cfu/day	mcfu/day
Jenkins Creek – entire watershed	ID17050201SW005_02	0.061	569.69	850,210,271	850.21
Scott Creek – 3rd order	ID17050201SW006_03	0.074	819.92	1,484,434,761	1,484.43
Warm Springs Creek – 3rd order	ID17050201SW007_03	0.068	833.55	1,386,750,990	1,386.75
Hog Creek – 1st and 2nd order	ID17050201SW008_02	0.009	948.92	208,944,058	208.94
Hog Creek – 3rd order	ID17050201SW008_03	0.049	800.7	959,895,210	959.90
Rock Creek and Tributaries – 1st and 2nd order	ID17050201SW010_02	0.001	992.4	24,279,776	24.28
Rock, Little Rock and Henley Creeks – 3rd order	ID17050201SW010_03	0.097	1362.16	3,232,643,206	3,232.64

Notes: cubic feet per second (cfs); colony forming units per 100 milliliters (cfu/100 mL); colony forming units per day (cfu/day); million colony forming units per day (mcfu/day)

The AUs in the Rock Creek drainage were found to have bacteria concentrations near or below the water quality standard in 2018 monitoring. Additional samples were collected in these AUs in 2019 to verify bacteria concentrations to further characterize the bacteria concentrations during base flow. The 2019 data was used to generate existing bacteria loads Bacteria concentrations were found to be in excess of the water quality standard.

5.4 Load Allocations

Table 8 lists the *E. coli* load allocations and necessary load reductions for the AUs with measured concentrations exceeding the standard. The TMDL allocates 10% of the load capacity to an explicit margin of safety, 10% of the load capacity to Natural Background (NB), and the remaining 80% to the load allocation.

Table 8. Nonpoint source *E. coli* bacteria load allocations for Brownlee Reservoir – Weiser Flats subbasin.

Water Body and Assessment Unit	Load Capacity	Natural Background	Margin of Safety	Load Allocation	Total Existing Load	Load Reduction	Percent Reduction (%)
Jenkins Creek – entire watershed (ID17050201SW005_02) -concentration (cfu/mL)	126.0	12.6	12.6	100.8	569.7	468.9	82
-load (mcfu/day)	188.0	18.8	18.8	150.4	850.2	699.8	
Scott Creek – 3rd order (ID17050201SW006_03) -concentration (cfu/mL)	126.0	12.6	12.6	100.8	819.9	719.1	88
-load (mcfu/day)	228.1	22.8	22.8	182.5	1484.4	1301.9	
Warm Springs Creek – 3rd order (ID17050201SW007_03) -concentration (cfu/mL)	126.0	12.6	12.6	100.8	833.6	732.8	88
-load (mcfu/day)	209.6	21.0	21.0	167.7	1386.8	1219.1	
Hog Creek – 1st and 2nd order (ID17050201SW008_02) -concentration (cfu/mL)	126.0	12.6	12.6	100.8	948.9	848.1	89
-load (mcfu/day)	27.7	2.8	2.8	22.2	208.9	186.7	
Hog Creek – 3rd order (ID17050201SW008_03) -concentration (cfu/mL)	126.0	12.6	12.6	100.8	800.7	699.9	87
-load (mcfu/day)	151.1	15.1	15.1	120.8	959.9	839.1	
Rock Creek and Tributaries – 1st and 2nd order (ID17050201SW010_02) -concentration (cfu/mL)	126.0	12.6	12.6	100.8	992.4	891.6	90
-load (mcfu/day)	3.08	0.31	0.31	2.47	24.28	21.81	
Rock, Little Rock and Henley Creeks – 3rd order (ID17050201SW010_03) -concentration (cfu/mL)	126.0	12.6	12.6	100.8	1362.2	1261.4	93
oad (mcfu/day)	299.0	29.9	29.9	239.2	3232.6	2993.4	

Notes: colony forming units per 100 milliliters (cfu/100 mL); million colony forming units per day (mcfu/day)

5.4.1 Margin of Safety

Establishing a TMDL requires that a margin of safety be identified to account for uncertainty as required by federal regulations (40 CFR Part 130). The margin of safety is not allocated to any sources of a pollutant. A margin of safety is expressed as either an implicit or explicit portion of a water body's load capacity that is reserved to allow for uncertainty about the relationship between the pollutant loads and the quality of the receiving water body.

DEQ selected a 10% explicit margin of safety based on uncertainty associated with *E. coli* field duplicate measurements. Field duplicates are two samples collected at the same site and time following the same sampling and analytical procedures. One sample is termed the original sample and the other sample is termed the duplicate sample. The relative difference between the original sample and duplicate sample was calculated from data available in DEQ's water quality database from 2016 – 2019 (39 duplicate pairs) where the original sample result was less than the *E. coli* criterion (126 cfu/100 mL). The average relative difference in concentration between the original samples and duplicate samples was 10.7 cfu/100mL. This value represents the average uncertainty for individual sample results below the *E. coli* criterion, and corresponds to 8.5% of 126 cfu/100mL. A 10% margin of safety was selected to be conservative (protective) considering the data available for this analysis.

5.4.2 Seasonal Variation

The *E. coli* bacteria allocations apply daily throughout the year because secondary contact recreation may occur at any time of the year. Additionally, the loading capacity is considered flow variable which ensures the E. coli target is met at all observed flows throughout the entire year. While seasonal concentration may vary, and therefore the reduction to meet the load capacity varies, meeting this allocation ensures water quality standards are attained for the protection of public health. Future monitoring should occur during critical low flows and when grazing allotments are most active.

As stream flows are usually variable throughout the year, load capacities may also change from month to month. Load capacities are higher at higher stream flows as there is a greater volume of water to accommodate bacteria concentrations. A larger bacteria load can be present in a stream at high flow and still maintain a geomean less than or equal to water quality standards. For example, Figure 4 presents the load capacity of a tributary to Rock Creek based on typical monthly flows. Also presented are the existing bacteria loads based on data collected in the summer of 2019. In March, a concentration of bacteria can be present that is greater than the critical low flow load capacity, but still meet water quality standards as there is a larger amount of water to lessen the concentration of bacteria.

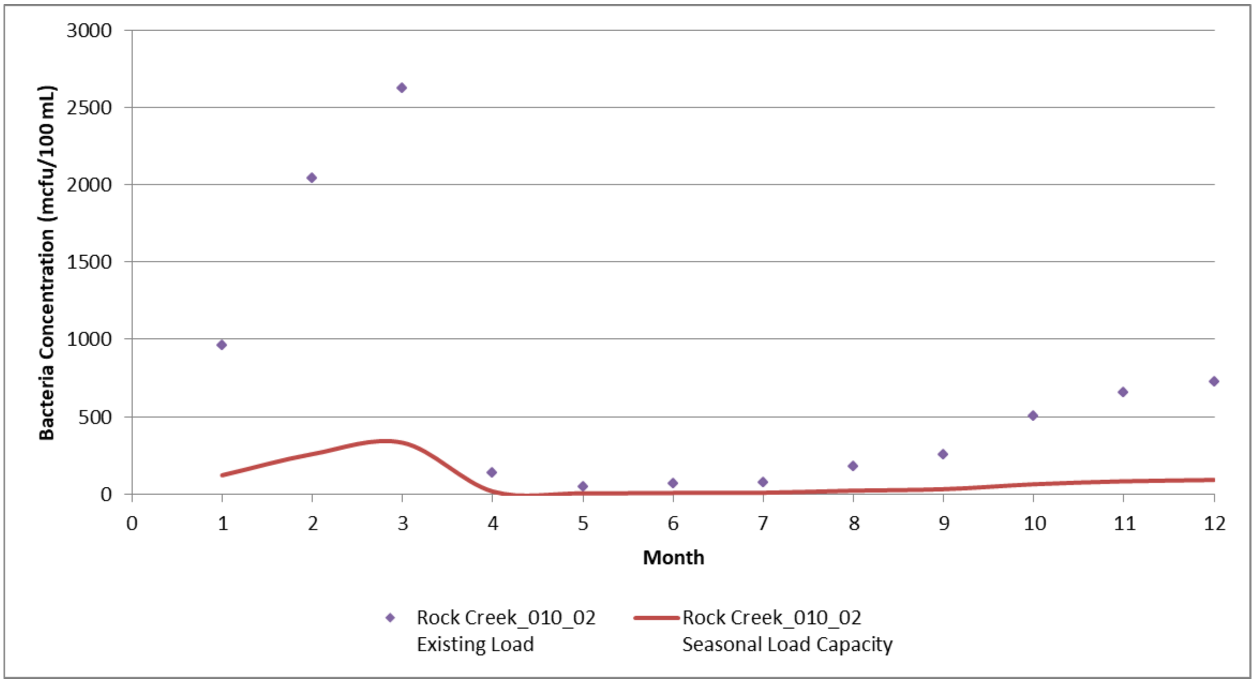

Figure 4. Seasonal *E. coli* load capacities for typical monthly stream flows at Rock Creek and Tributaries (ID17050201SW010_02)

5.4.3 Reasonable Assurance

The Clean Water Act §319 requires each state to develop and submit a nonpoint source management plan. The *Idaho Nonpoint Source Management Plan* was approved by EPA in March 2015 (DEQ, 2015c). The plan identifies programs to achieve implementation of nonpoint source best management practices (BMPs), includes a schedule for program milestones, outlines key agencies and agency roles, is certified by the state attorney general to ensure that adequate authorities exist to implement the plan, and identifies available funding sources.

Idaho's nonpoint source management program describes many of the voluntary and regulatory approaches the state will take to abate nonpoint pollution sources. One of the prominent programs described in the plan is the provision for public involvement, including basin advisory groups and watershed advisory groups (WAGs). The Weiser River Watershed Advisory Group is the designated WAG for the Brownlee Reservoir – Weiser Flats watershed.

The Idaho water quality standards refer to existing authorities to control nonpoint pollution sources in Idaho. Some of these authorities and responsible agencies are listed in Table 9.

Table 9. State of Idaho's regulatory authority for nonpoint pollution sources.

Authority	Water Quality Standard	Responsible Agency
Rules Pertaining to the Idaho Forest Practices Act (IDAPA 20.02.01)	58.01.02.350.03(a)	Idaho Department of Lands
Solid Waste Management Rules and Standards (IDAPA 58.01.06)	58.01.02.350.03(b)	Idaho Department of Environmental Quality
Individual/Subsurface Sewage Disposal Rules (IDAPA 58.01.03)	58.01.02.350.03(c)	Idaho Department of Environmental Quality
Stream channel Alteration Rules (IDAPA 37.03.07)	58.01.02.350.03(d)	Idaho Department of Water Resources
Rathdrum Prairie Sewage Disposal Regulations (Panhandle District Health Department)	58.01.02.350.03(e)	Idaho Department of Environmental Quality/Panhandle District Health Department
Rules Governing Exploration, Surface Mining and Closure of Cyanidation Facilities (IDAPA 20.03.02)	58.01.02.350.03(f)	Idaho Department of Lands
Dredge and Placer Mining Operations in Idaho (IDAPA 20.03.01)	58.01.02.350.03(g)	Idaho Department of Lands
Rules Governing Dairy Waste (IDAPA 02.04.14)	58.01.02.350.03(h)	Idaho State Department of Agriculture

Idaho uses a voluntary approach to address agricultural nonpoint sources; however, regulatory authority is found in the water quality standards (IDAPA 58.01.02.350.01–03). IDAPA 58.01.02.055.07 refers to the Idaho Agricultural Pollution Abatement Plan (Ag Plan) (SCC and DEQ 2003), which provides direction to the agricultural community regarding approved BMPs. A portion of the Ag Plan outlines responsible agencies or elected groups (soil conservation districts) that will take the lead if nonpoint source pollution problems need to be addressed. For agricultural activity, the Ag Plan assigns the local soil conservation districts to assist the landowner/operator with developing and implementing BMPs to abate nonpoint source pollution associated with the land use. If a voluntary approach does not succeed in abating the pollutant problem, the state may seek injunctive relief for those situations determined to be an imminent and substantial danger to public health or the environment (IDAPA 58.01.02.350.02(a)).

The Idaho water quality standards and wastewater treatment requirements specify that if water quality monitoring indicates that water quality standards are not being met, even with the use of BMPs or knowledgeable and reasonable practices, the state may request that the designated agency evaluate and/or modify the BMPs to protect beneficial uses. If necessary, the state may seek injunctive or other judicial relief against the operator of a nonpoint source activity in accordance with the DEQ director's authority provided in Idaho Code §39-108 (IDAPA 58.01.02.350). The water quality standards list designated agencies responsible for reviewing and revising nonpoint source BMPs: the Idaho Department of Lands for timber harvest activities, oil and gas exploration and development, and mining activities; Idaho Soil and Water Conservation Commission for grazing and agricultural activities; Idaho Transportation Department for public road construction; Idaho State Department of Agriculture for aquaculture; and DEQ for all other activities (IDAPA 58.01.02.010.24).

5.4.4 Natural Background

Natural background sources of *E. coli* are inherent to the Brownlee Reservoir – Weiser Flats subbasin. Wildlife are present in the upper elevations of the subbasin and migrate to lower elevations as the winter season progresses. A study that may assist in determining the genetic sourcing of *E. coli* has been considered for the subbasin yet has not occurred. As such an additional 10% of the bacterial load has been allocated to natural background sources as an initial estimate that may be refined as more information becomes available in the future.

5.4.5 Stormwater

Stormwater runoff is water from rain or snowmelt that does not immediately infiltrate into the ground and flows over or through natural or man-made storage or conveyance systems. When undeveloped areas are converted to land uses with impervious surfaces—such as buildings, parking lots, and roads—the natural hydrology of the land is altered and can result in increased surface runoff rates, volumes, and pollutant loads. Certain types of stormwater runoff are considered point source discharges for Clean Water Act purposes, including stormwater that is associated with municipal separate storm sewer systems (MS4s), industrial stormwater covered under the Multi-Sector General Permit (MSGP), and construction stormwater covered under the Construction General Permit (CGP). For more information about these permits and managing stormwater, see Appendix D.

5.4.6 Reserve for Growth

A growth reserve has not been included in this TMDL. The load capacity has been allocated to the existing sources in the watershed. Any new sources will need to obtain an allocation from the existing load allocation, which would be reallocated in a TMDL revision. No new permitted point sources are anticipated in the subbasin.

5.5 Implementation Strategies

DEQ 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. Reasonable assurance (addressed in section 5.4.3) for the TMDL to meet water quality standards is based on the implementation strategy.

5.5.1 Time Frame

E. coli impairments are extremely variable by season and mitigation options. For example, exclosure fencing can cause nearly instant improvements. If the primary source for the *E. coli* is not from domesticated animal sources, the time frame is more difficult to reconcile and adjust via restoration activities.

5.5.2 Approach

Funding provided under Clean Water Act §319 and other funds will be used to encourage voluntary projects to reduce nonpoint source pollution.

5.5.3 Responsible Parties

DEQ and the designated management agencies in Idaho have primary responsibility for overseeing implementation in cooperation with landowners and managers. In Idaho, these agencies, and their federal and state partners, are charged by the Clean Water Act to lend available technical assistance and other appropriate support to local efforts for water quality improvements. Designated state agencies are responsible for assisting with preparation of specific implementation plans, particularly for those resources for which they have regulatory authority or programmatic responsibilities:

- Idaho Department of Lands for timber harvest, oil and gas exploration and development, and mining
- Idaho Soil and Water Conservation Commission for grazing and agricultural activities
- Idaho Transportation Department for public road construction
- Idaho State Department of Agriculture for aquaculture
- DEQ for all other activities

In addition to the designated management agencies, the public—through the WAG and other equivalent organizations or processes—will have opportunities to be involved in developing the implementation plan to the maximum extent practical. Public participation will significantly affect public acceptance of the document and the proposed control actions. Stakeholders (e.g., landowners, local governing authorities, taxpayers, industries, and land managers) are the most educated regarding the pollutant sources and will be called upon to help identify the most appropriate control actions for each area. Experience has shown that the best and most effective implementation plans are those developed with substantial public cooperation and involvement.

5.5.4 Implementation Monitoring Strategy

The objectives of a monitoring strategy are to demonstrate long-term recovery, better understand natural variability, track project and BMP implementation, and track the effectiveness of TMDL implementation. This monitoring and feedback mechanism is a major component of the reasonable assurance component of the TMDL implementation plan.

Monitoring will provide information on progress being made toward achieving TMDL allocations and water quality standards and will help in the interim evaluation of progress, including in the development of 5-year reviews and future TMDLs.

The implementation plan will be tracked by accounting for the numbers, types, and locations of projects, BMPs, educational activities, or other actions taken to improve or protect water quality. Implementation plan monitoring will include watershed monitoring and BMP monitoring.

6 Conclusions

Bacteria TMDLs are provided for seven AUs currently in Category 5 for *E. coli*. The AUs generally have high bacteria loads that would require large reductions in bacteria counts to meet Idaho Water Quality Standards. Two AUs in the Rock Creek drainage were found to have bacteria concentrations that were near the standard in 2018. The first and second order segments of Rock Creek are near the standard, and the 3rd order portion of Rock Creek was found to have bacteria concentrations that were below the water quality standard. Additional samples were collected in 2019 to verify that the conditions observed in 2018 are consistent and normal for the AUs. The additional 2019 samples collected in 2019 provided information that these AUs are not meeting water quality standards and should have TMDLs in place to help meet those standards.

Table 10. Summary of assessment outcomes.

Water Body	Assessment Unit	Pollutant	TMDL Completed	Recommended Changes to Next Integrated Report	Justification
Jenkins Creek – entire watershed	ID17050201SW005_02	*Escherichia coli*	Yes	Include in Category 4a for *Escherichia coli.*	*Escherichia coli* TMDL completed.
Scott Creek – 3rd order	ID17050201SW006_03	*Escherichia coli*	Yes	Include in Category 4a for *Escherichia coli.*	*Escherichia coli* TMDL completed.
Warm Springs Creek – 3rd order	ID17050201SW007_03	*Escherichia coli*	Yes	Include in Category 4a for *Escherichia coli.*	*Escherichia coli* TMDL completed.
Hog Creek – 1st and& 2nd order	ID17050201SW008_02	*Escherichia coli*	Yes	Include in Category 4a for *Escherichia coli.*	*Escherichia coli* TMDL completed.
Hog Creek – 3rd order section	ID17050201SW008_03	*Escherichia coli*	Yes	Include in Category 4a for *Escherichia coli.*	*Escherichia coli* TMDL completed.
Rock Creek and Tributaries – 1st and 2nd order	ID17050201SW010_02	*Escherichia coli*	Yes	Include in Category 4a for *Escherichia coli.*	*Escherichia coli* TMDL completed.
Rock, Little Rock and Henley Creeks – 3rd order sections	ID17050201SW010_03	*Escherichia coli*	Yes	Include in Category 4a for *Escherichia coli.*	*Escherichia coli* TMDL completed.

This document was prepared with input from the public, as described in Appendix F. Following the public comment period, comments and DEQ responses will also be included in this Appendix, and a distribution list will be included in Appendix G.

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GIS Coverages

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Glossary

§303(d)

Refers to section 303 subsection “d” of the Clean Water Act. Section 303(d) requires states to develop a list of water bodies that do not meet water quality standards. This section also requires total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to United States Environmental Protection Agency approval.

Assessment Unit (AU)

A group of similar streams that have similar land use practices, ownership, or land management. However, stream order is the main basis for determining AUs. All the waters of the state are defined using AUs, and because AUs are a subset of water body identification numbers, they tie directly to the water quality standards so that beneficial uses defined in the water quality standards are clearly tied to streams on the landscape.

Beneficial Use

Any of the various uses of water that are recognized in water quality standards, including, but not limited to, aquatic life, recreation, water supply, wildlife habitat, and aesthetics.

Beneficial Use Reconnaissance Program (BURP)

A program for conducting systematic biological and physical habitat surveys of water bodies in Idaho. BURP protocols address lakes, reservoirs, and wadeable streams and rivers.

Exceedance

A violation (according to DEQ policy) of the pollutant levels permitted by water quality criteria.

Fully Supporting

In compliance with water quality standards and within the range of biological reference conditions for all designated and existing beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).

Load Allocation (LA)

A portion of a water body’s load capacity for a given pollutant that is given to a particular nonpoint source (by class, type, or geographic area).

Load

The quantity of a substance entering a receiving stream, usually expressed in pounds or kilograms per day or tons per year. Load is the product of flow (discharge) and concentration.

Load Capacity (LC)

How much pollutant a water body can receive over a given period without causing violations of state water quality standards. Upon allocation to various sources, a margin of safety, and natural background contributions, it becomes a total maximum daily load.

Margin of Safety (MOS)

An implicit or explicit portion of a water body’s load capacity set aside to allow for uncertainly about the relationship between the pollutant loads and the quality of the receiving water body. The margin of safety is a required component of a total maximum daily load (TMDL) and is often incorporated into conservative assumptions used to develop the TMDL (generally within the calculations and/or models). The margin of safety is not allocated to any sources of pollution.

Nonpoint Source

A dispersed source of pollutants generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state. Nonpoint sources are without a discernable point or origin. They include, but are not limited to, irrigated and nonirrigated lands used for grazing, crop production, and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.

Not Assessed (NA)

A concept and an assessment category describing water bodies that have been studied but are missing critical information needed to complete an assessment.

Not Fully Supporting

Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).

Point Source

A source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable “point” of discharge into a receiving water. Common point sources of pollution are industrial and municipal wastewater plants.

Pollutant

Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.

Pollution

A very broad concept that encompasses human-caused changes in the environment that alter the functioning of natural processes and produce undesirable environmental and health effects. Pollution includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.

Stream Order

Hierarchical ordering of streams based on the degree of branching. A 1st-order stream is an unforked or unbranched stream. Under Strahler’s (1957) system, higher-order streams result from the joining of two streams of the same order.

Total Maximum Daily Load (TMDL)

A TMDL is a water body’s load capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual basis. A TMDL is equal to the load capacity, such that load capacity = margin of safety + natural background + load allocation + wasteload allocation = TMDL. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.

Wasteload Allocation (WLA)

The portion of receiving water’s load capacity that is allocated to one of its existing or future point sources of pollution. Wasteload allocations specify how much pollutant each point source may release to a water body.

Water Body

A stream, river, lake, estuary, coastline, or other water feature, or portion thereof.

Water Quality Criteria

Levels of water quality expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, aquatic habitat, or industrial processes.

Water Quality Standards

State-adopted and United States Environmental Protection Agency-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Appendix A. Beneficial Uses

Idaho water quality standards (IDAPA 58.01.02) list beneficial uses and set water quality goals for waters of the state. 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.

Existing Uses

Existing uses under the Clean Water Act 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" (40 CFR 131.3). The existing instream water uses and the level of water quality necessary to protect the uses shall be maintained and protected (IDAPA 58.01.02.051.01). Existing uses need to be protected, whether or not the level of water quality to fully support the uses currently exists. A practical application of this concept would be to apply the existing use of salmonid spawning to a water that supported salmonid spawning since November 28, 1975, but does not now due to other factors, such as blockage of migration, channelization, sedimentation, or excess heat.

Designated Uses

Designated uses under the Clean Water Act are "those uses specified in water quality standards for each water body or segment, whether or not they are being attained" (40 CFR 131.3). Designated uses are simply uses officially recognized by the state. In Idaho, these include uses such as aquatic life support, recreation in and on the water, domestic water supply, and agricultural uses. Multiple uses often apply to the same water; in this case, water quality must be sufficiently maintained to meet the most sensitive use (designated or existing). Designated uses may be added or removed using specific procedures provided for in state law, but the effect must not be to preclude protection of an existing higher quality use such as cold water aquatic life or salmonid spawning. Designated uses are described in the Idaho water quality standards (IDAPA 58.01.02.100) and specifically listed by water body in sections 110–160.

Undesignated Surface Waters and Presumed Use Protection

In Idaho, due to a change in scale of cataloging waters in 2000, most water bodies listed in the tables of designated uses in the water quality standards do not yet have specific use designations (IDAPA 58.01.02.110–160). The water quality standards have three sections that address nondesignated waters. Sections 101.02 and 101.03 specifically address nondesignated man-made waterways and private waters. Man-made waterways and private waters have no presumed use protections. Man-made waters are protected for the use for which they were constructed unless otherwise designated in the water quality standards. Private waters are not protected for any beneficial uses unless specifically designated in the water quality standards.

All other undesignated waters are addressed by section 101.01. Under this section, absent information on existing uses, DEQ presumes that most Idaho waters 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 applies the numeric cold water and recreation criteria to undesignated waters. If in addition to presumed uses, an additional existing use (e.g., salmonid spawning) exists, then the additional numeric criteria for salmonid spawning would also apply (e.g., intergravel dissolved oxygen, temperature) because of the requirement to protect water quality for that existing use. However, if some other use that requires less stringent criteria for protection (such as seasonal cold aquatic life) is found to be an existing use, then a use designation (rulemaking) is needed before that use can be applied in lieu of cold water criteria (IDAPA 58.01.02.101.01).

Appendix B. State and Site-Specific Water Quality Standards and Criteria

Table B1. Selected numeric criteria supportive of designated beneficial uses in Idaho water quality standards.

Parameter	Primary Contact Recreation	Secondary Contact Recreation	Cold Water Aquatic Life	Salmonid Spawning[a]
Water Quality Standards: IDAPA 58.01.02.250–251				
Bacteria				
• Geometric mean	<126 *E. coli*/100 mL[b]	<126 *E. coli*/100 mL	—	—
• Single sample	≤406 *E. coli*/100 mL	≤576 *E. coli*/100 mL	—	—

[a] During spawning and incubation periods for inhabiting species
[b] *Escherichia coli* per 100 milliliters

Appendix C. Data Sources

Table C1. Data sources for Brownlee Reservoir – Weiser Flats subbasin assessment.

Water Body/Area	Data Source	Type of Data	Collection Date
Weiser Flats	DEQ Boise Regional Office	*E. coli* concentrations	May 2018
Rock Creek drainage	DEQ Technical Services division	*E. coli* concentrations	July – August 2019

Table C1. 2018 Weiser Flats *E. coli* bacteria sampling results.

Weiser Flats E. coli Monitoring 2018							
AU	**Creek Name**	**Site ID**	**Sample Number**	**Date Sampled**	***E. coli*** **(MPN/100mL)**	**Total Coliform (MPN/100mL)**	
ID17050201 SW008_02	Hog Creek	HogCr2	1	5/2/2018	42.6	1732.9	Blank
ID17050201 SW008_02	Hog Creek	HogCr2	2	5/8/2018	2419.60	>2419.6	Duplicate
ID17050201 SW008_02	Hog Creek	HogCr2	3	5/8/2018	2419.6	>2419.6	
ID17050201 SW008_02	Hog Creek	HogCr2	4	5/14/2018	1553.1	>2419.6	
ID17050201 SW008_02	Hog Creek	HogCr2	5	5/17/2018	2419.60	>2419.6	
ID17050201 SW008_02	Hog Creek	HogCr2	6	5/23/2018	1986.30	>2419.6	
				GeoMean	948.92		
ID17050201 SW008_03	Hog Creek	HogCr3	1	5/2/2018	387.3	>2419.6	
ID17050201 SW008_03	Hog Creek	HogCr3	2	5/8/2018	547.5	>2419.6	
ID17050201 SW008_03	Hog Creek	HogCr3	3	5/14/2018	1119.9	>2419.6	
ID17050201 SW008_03	Hog Creek	HogCr3	4	5/17/2018	1413.6	>2419.6	
ID17050201 SW008_03	Hog Creek	HogCr3	5	5/23/2018	980.4	>2419.6	
				GeoMean	800.70		
ID17050201 SW010_02	Rock Creek	RockCr2	1	5/2/2018	39.1	1119.9	
ID17050201 SW010_02	Rock Creek	RockCr2	2	5/8/2018	410.6	>2419.6	
ID17050201 SW010_02	Rock Creek	RockCr2	3	5/14/2018	209.8	>2419.6	
ID17050201 SW010_02	Rock Creek	RockCr2	4	5/17/2018	119.8	>2419.6	
ID17050201 SW010_02	Rock Creek	RockCr2	5	5/17/2018	98.5	>2419.6	
ID17050201 SW010_02	Rock Creek	RockCr2	6	5/23/2018	307.6	>2419.6	
				GeoMean	159.13		
ID17050201 SW010_03	Rock Creek	RockCr3	1	5/2/2018	104.6	204.6	
ID17050201 SW010_03	Rock Creek	RockCr3	2	5/8/2018	146.7	>2419.6	
ID17050201 SW010_03	Rock Creek	RockCr3	3	5/8/2018	<1.0	<1.0	
ID17050201 SW010_03	Rock Creek	RockCr3	4	5/14/2018	85.7	1119.9	
ID17050201 SW010_03	Rock Creek	RockCr3	5	5/17/2018	135.4	1553.1	

ID17050201 SW010_03	Rock Creek	RockCr3	6	5/23/2018	77.1	>2419.6
ID17050201 SW010_03	Rock Creek	RockCr3	7	5/23/2018	<1.0	<1.0
				GeoMean	106.54	
ID17050201 SW005_02	Jenkins Creek	Jenkins Cr	1	5/2/2018	325.5	>2419.6
ID17050201 SW005_02	Jenkins Creek	Jenkins Cr	2	5/8/2018	344.8	>2419.6
ID17050201 SW005_02	Jenkins Creek	Jenkins Cr	3	5/14/2018	1119.9	>2419.6
ID17050201 SW005_02	Jenkins Creek	Jenkins Cr	4	5/17/2018	1732.9	>2419.6
ID17050201 SW005_02	Jenkins Creek	Jenkins Cr	5	5/23/2018	275.5	>2419.6
				GeoMean	569.69	
ID17050201 SW007_03	Warm Springs Creek	WarmSpringsCr	1	5/2/2018	261.3	>2419.6
ID17050201 SW007_03	Warm Springs Creek	WarmSpringsCr	2	5/8/2018	980.4	>2419.6
ID17050201 SW007_03	Warm Springs Creek	WarmSpringsCr	3	5/14/2018	866.4	>2419.6
ID17050201 SW007_03	Warm Springs Creek	WarmSpringsCr	4	5/17/2018	1732.9	>2419.6
ID17050201 SW007_03	Warm Springs Creek	WarmSpringsCr	5	5/23/2018	1046.2	>2419.6
				GeoMean	833.55	
ID17050201 SW006_03	Scott Creek	ScottCr	1	5/2/2018	613.1	>2419.6
ID17050201 SW006_03	Scott Creek	ScottCr	2	5/8/2018	866.4	>2419.6
ID17050201 SW006_03	Scott Creek	ScottCr	3	5/14/2018	980.4	>2419.6
ID17050201 SW006_03	Scott Creek	ScottCr	4	5/17/2018	1732.9	>2419.6
ID17050201 SW006_03	Scott Creek	ScottCr	5	5/23/2018	410.6	>2419.6

Table C2. 2019 Weiser Flats *E. coli* bacteria sampling results.

Weiser Flats E. coli Monitoring 2019						
AU	**Creek Name**	**Site ID**	**Sample Number**	**Date Sampled**	***E. coli* (MPN/100mL)**	**Total Coliform (MPN/100mL)**
ID17050201 SW010_02	Rock Creek	RockCr2	7	7/18/2019	1120	>2420
ID17050201 SW010_02	Rock Creek	RockCr2	8	7/22/2019	770	>2420
ID17050201 SW010_02	Rock Creek	RockCr2	9	7/25/2019	1733	>2420
ID17050201 SW010_02	Rock Creek	RockCr2	10	7/25/2019	<1	<1
ID17050201 SW010_02	Rock Creek	RockCr2	11	7/30/2019	649	>2420
ID17050201 SW010_02	Rock Creek	RockCr2	12	8/5/2019	Dry	Dry
				GeoMean	992.40	
ID17050201 SW010_03	Rock Creek	RockCr3	8	7/18/2019	770	>2420
ID17050201 SW010_03	Rock Creek	RockCr3	9	7/18/2019	980	>2420
ID17050201 SW010_03	Rock Creek	RockCr3	10	7/22/2019	816	>2420
ID17050201 SW010_03	Rock Creek	RockCr3	11	7/25/2019	1986	2420
ID17050201 SW010_03	Rock Creek	RockCr3	12	7/30/2019	1553	>2420
ID17050201 SW010_03	Rock Creek	RockCr3	13	8/5/2019	2420	>2420
				GeoMean	1362.16	

Appendix D. Managing Stormwater

Municipal Separate Storm Sewer Systems

Polluted stormwater runoff is commonly transported through municipal separate storm sewer systems (MS4s), from which it is often discharged untreated into local water bodies. An MS4, according to 40 CFR 122.26(b)(8), is a conveyance or system of conveyances that meets the following criteria:

- Owned by a state, city, town, village, or other public entity that discharges to waters of the US
- Designed or used to collect or convey stormwater (including storm drains, pipes, ditches, etc.)
- Not a combined sewer
- Not part of a publicly owned treatment works (sewage treatment plant)

To prevent harmful pollutants from being washed or dumped into an MS4, operators must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the US Environmental Protection Agency (EPA), implement a comprehensive municipal stormwater management program (SWMP), and use best management practices (BMPs) to control pollutants in stormwater discharges to the maximum extent practicable.

Industrial Stormwater Requirements

Stormwater runoff picks up industrial pollutants and typically discharges them into nearby water bodies directly or indirectly via storm sewer systems. When facility practices allow exposure of industrial materials to stormwater, runoff from industrial areas can contain toxic pollutants (e.g., heavy metals and organic chemicals) and other pollutants (e.g.,~~such as~~ trash, debris, ~~and~~ oil and grease). This increased flow and pollutant load can impair water bodies, degrade biological habitats, pollute drinking water sources, and cause flooding and hydrologic changes (e.g., ~~such as~~ channel erosion)~~,~~ to the receiving water body.

Multi-Sector General Permit and Stormwater Pollution Prevention Plans

In Idaho, if an industrial facility discharges industrial stormwater into waters of the US, the facility must be permitted under EPA's most recent Multi-Sector General Permit (MSGP). To obtain an MSGP, the facility must prepare a stormwater pollution prevention plan (SWPPP) before submitting a notice of intent for permit coverage. The SWPPP must document the site description, design, and installation of control measures; describe monitoring procedures; and summarize potential pollutant sources. A copy of the SWPPP must be kept on site in a format that is accessible to workers and inspectors and be updated to reflect changes in site conditions, personnel, and stormwater infrastructure.

Industrial Facilities Discharging to Impaired Water Bodies

Any facility that discharges to an impaired water body must monitor all pollutants for which the water body is impaired and for which a standard analytical method exists (see 40 CFR Part 136).

Also, because different industrial activities have sector-specific types of material that may be exposed to stormwater, EPA grouped the different regulated industries into 29 sectors, based on their typical activities. Part 8 of EPA's MSGP details the stormwater management practices and monitoring that are required for the different industrial sectors. DEQ anticipates including specific requirements for impaired waters as a condition of the 401 certification. The MSGP will detail the specific monitoring requirements.

TMDL Industrial Stormwater Requirements

When a stream is on Idaho's §303(d) list and has a TMDL developed, DEQ may incorporate a wasteload allocation for industrial stormwater activities under the MSGP. However, most load analyses developed in the past have not identified sector-specific numeric wasteload allocations for industrial stormwater activities. Industrial stormwater activities are considered in compliance with provisions of the TMDL if operators obtain an MSGP under the NPDES program and implement the appropriate BMPs. Typically, operators must also follow specific requirements to be consistent with any local pollutant allocations. The next MSGP will have specific monitoring requirements that must be followed.

Construction Stormwater

The Clean Water Act requires operators of construction sites to obtain permit coverage to discharge stormwater to a water body or municipal storm sewer. In Idaho, EPA has issued a general permit for stormwater discharges from construction sites.

Construction General Permit (CGP) and Stormwater Pollution Prevention Plans

If a construction project disturbs more than 1 acre of land (or is part of a larger common development that will disturb more than 1 acre), the operator is required to apply for a CGP from EPA after developing a site-specific SWPPP. The SWPPP must provide for the erosion, sediment, and pollution controls they intend to use; inspection of the controls periodically; and maintenance of BMPs throughout the life of the project. Operators are required to keep a current copy of their SWPPP on site or at an easily accessible location.

TMDL Construction Stormwater Requirements

When a stream is on Idaho's §303(d) list and has a TMDL developed, DEQ may incorporate a gross wasteload allocation for anticipated construction stormwater activities. Most loads developed in the past did not have a numeric wasteload allocation for construction stormwater activities. Construction stormwater activities are considered in compliance with provisions of the TMDL if operators obtain a CGP under the NPDES program and implement the appropriate BMPs. Typically, operators must also follow specific requirements to be consistent with any local pollutant allocations. The CGP has monitoring requirements that must be followed.

Postconstruction Stormwater Management

Many communities throughout Idaho are currently developing rules for postconstruction stormwater management. Sediment is usually the main pollutant of concern in construction site stormwater. DEQ's *Catalog of Stormwater Best Management Practices for Idaho Cities and Counties* (DEQ 2005) should be used to select the proper suite of BMPs for the specific site, soils, climate, and project phasing in order to sufficiently meet the standards and requirements of the CGP to protect water quality. Where local ordinances have more stringent and site-specific standards, those are applicable.

Appendix E. Public Participation and Public Comments

This TMDL was developed with participation from the Weiser River WAG. Meeting dates and public comment period are yet to be determined.

[Public comments and DEQ responses to be inserted following public comment period.]

Appendix F. Distribution List

[To be inserted following public comment period.]