Salmon Falls Creek Subbasin Assessment and Total Maximum Daily Load

TMDL Five-Year Review (HUC 17040213)



State of Idaho

Department of Environmental Quality

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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
AWS	agricultural water supply
BAG	basin advisory group
BLM	United States Bureau of Land Management
BMP	best management practice
BOR	United States Bureau of Reclamation
BURP	Beneficial Use Reconnaissance Program
C	Celsius
CFR	Code of Federal Regulations (refers to citations in the federal administrative rules)
cfs	cubic feet per second
cm	centimeters
CWAL	cold water aquatic life
CWE	cumulative watershed effects
DEQ	Idaho Department of Environmental Quality
DO	dissolved oxygen
DOI	United States Department of the Interior
DWS	domestic water supply
EPA	United States Environmental Protection Agency
F	Fahrenheit
GIS	geographic information system
HUC	hydrologic unit code
IDAPA	Refers to citations of Idaho administrative rules
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
km	kilometer
LA	load allocation
LC	load capacity
m	meter
mi	mile
MBI	Macroinvertebrate Biotic Index

mg/L	milligrams per liter
mL	milliliter
mm	millimeter
MOS	margin of safety
n/a	not applicable
NA	not assessed
NB	natural background
NFS	not fully supporting
NRCS	Natural Resources Conservation Service
NTU	nephelometric turbidity unit
PCR	primary contact recreation
QA	quality assurance
QC	quality control
SBA	subbasin assessment
SCR	secondary contact recreation
SFI	DEQ's Stream Fish Index
SS	salmonid spawning
TMDL	total maximum daily load
TP	total phosphorus
TS	total solids
TSS	total suspended solids
US	United States
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USGS	United States Geological Survey
WAG	watershed advisory group
WBAG	*Water Body Assessment Guidance*
WLA	wasteload allocation

Executive Summary

This document presents a 5-year review of the Salmon Falls Creek subbasin assessment and total maximum daily loads (TMDLs). This review addresses the water bodies, or assessment units (AU), in the subbasin that are in Category 4a of Idaho's most recent Integrated Report. This 5-year review has been developed to comply with Idaho Code § 39-3611(7). The review describes current water quality status, pollutant sources, and recent pollution control efforts in the subbasin.

Subbasin at a Glance

The Salmon Falls Creek subbasin is located in south central Idaho and shares its borders with Nevada. Counties included in the Salmon Falls Creek subbasin are portions of Twin Falls County, Idaho; Owyhee County, Idaho; and Elko County, Nevada. Salmon Falls Creek discharges into the Snake River just south of Hagerman, Idaho. Salmon Falls Creek Reservoir and Cedar Creek Reservoir are areas used by the public for recreation and fishing year round (Figure A).

The Salmon Falls Creek Subbasin begins in the mountains and highlands located along the southern and western boundaries of the subbasin and reaches northward to the lowlands of the Snake River Basin/High Desert ecoregion in the northern edges of the subbasin.

Most of the perennial streams have some origin in the mountainous areas of the subbasin. Mountainous areas are located principally in the southwest portion and southeastern portions of the subbasin. These serve as the headwater area for Big Creek, Hot Creek, and Shoshone Creek AUs. In general, Salmon Falls Creek and Cedar Creek AUs dominate the subbasin, with most of the other surface channels as intermittent or ephemeral tributaries.

Vegetation is characteristic of Northern Basin and Range, and Snake River Basin/High Desert. The Salmon Falls Creek Subbasin has a variety of brush species, sedges, forbs, grasses, and woody vegetation. Most of this area is used as rangeland, where access by livestock causes loss or reduction of streamside vegetation and streambank erosion and sedimentation, disrupting aquatic species as well as other insects and mammals. Some streams may become completely dry downstream from diversions for livestock water access or irrigated land.

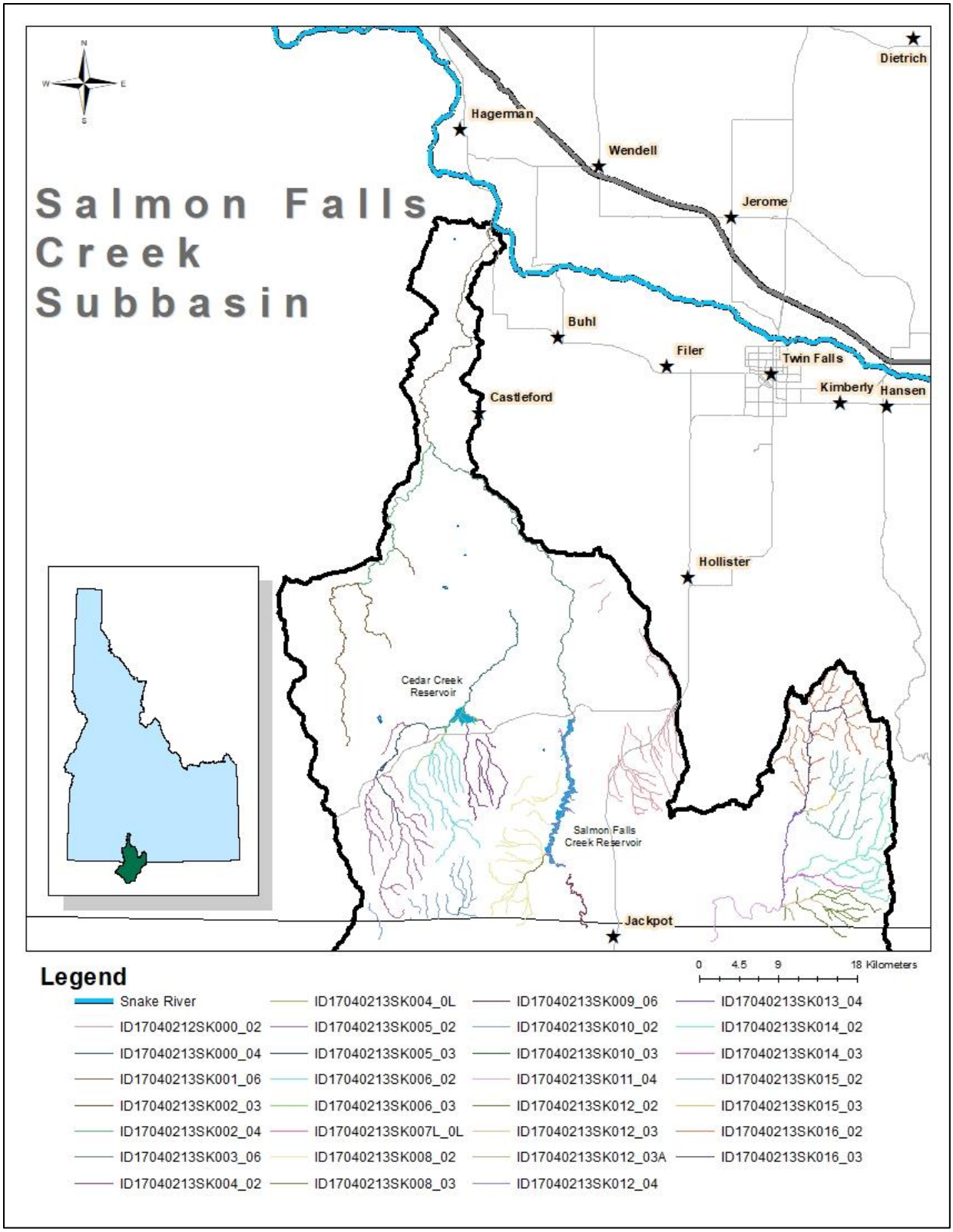


Figure A. Salmon Falls Creek subbasin.

Key Findings

The AUs and pollutants reviewed in this document are shown in Table A. Multiple AUs have been reported as dry, so it is recommended that those be placed in Category 3 (unassessed) at the submission of the next §303(d) list of impaired waters for the next IR cycle. All other AUs analyzed in this document are recommended to remain in Category 4a.

Table A. Applicable total maximum daily loads (TMDLs) targets per assessment unit.

Assessment Unit Name	Assessment Unit Number	Pollutant	TMDL Targets (daily average)	Target Cover (%)	Critical Period	Relevant TMDL Document	IR Status (2022)
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	Sediment	—	80%	Peak Flow	DEQ 2007	4A
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	TP	0.10 mg/L	—	Year Round	DEQ 2007	4A
		TSS	50.0 mg/L	—			
		TN	1.50 mg/L	—			
Salmon Falls Creek-Lower	ID17040213SK003_06	TP	0.10 mg/L	—	Year Round	DEQ 2007	4A
		TSS	50.0 mg/L	—			
		TN	1.50 mg/L	—			
Cedar Creek Reservoir	ID17040213SK004_0L	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Monument Canyon (1&2 order tributaries to Cedar Creek Reservoir)	ID17040213SK004_02	TP	0.05 mg/L	—	Peak Flow	DEQ 2007	4A
		Sediment	—	80%			
House Creek-source to Cedar Creek Reservoir	ID17040213SK005_02	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
House Creek-source to Cedar Creek Reservoir	ID17040213SK005_03	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_03	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
		Mercury	0.3 mg/kg	—			
China,	ID17040213SK008_02	TP	0.05 mg/L		Year	DEQ 2007	4A

Browns, Corral, Player Creeks				—	Round		
China Creek	ID17040213SK008_03	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Salmon Falls Creek-ID/NV Border to Salmon Falls Creek	ID17040213SK009_06	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		TSS	50.0 mg/L	—			
		Sediment	—	80%			
Shoshone Creek-Hot Creek to ID/ND border	ID17040213SK011_04	Sediment	—	80%	Year Round	DEQ 2007	4A
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	Sediment	—	80%	Peak Flow	DEQ 2007	4A
Big Creek-source to Mouth	ID17040213SK014_02	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Big Creek-source to Mouth	ID17040213SK014_03	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Cottonwood Creek-source to Mouth	ID17040213SK015_02	TP	0.05 mg/L	-—	Year Round	DEQ 2007	4A
		Sediment	-—	80%			
		E. coli	126 cfu/100mL	-—			
Cottonwood Creek-source to Mouth	ID17040213SK015_03	TP	0.05 mg/L	-—	Year Round	DEQ 2007	4A
		Sediment		80%			
		E. coli	126 cfu/100mL	-—			
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	Sediment	-—	80%	Peak Flow	DEQ 2007	4A
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_03	Sediment	-—	80%	Peak Flow	DEQ 2007	4A

Note: colony forming unit (cfu); TP=total phosphorus; TSS=total suspended solids; TN=total nitrogen.

Changes in Subbasin

Since the publication of the TMDL document in 2007, there have been several state funded projects completed to enhance the water quality in the Salmon Falls Creek Subbasin, but no major land use changes have taken place in this subbasin. The following Table (B) shows a breakdown of the land ownership in the Salmon Falls Creek Subbasin. What was lost by BLM was gained by Private landowners and State ownership loss went to USFS. Rangeland/grazing was the main land usage in the area.

Table B: Land Ownership types and differences from 2006 to 2019 within the Salmon Falls Creek Subbasin.

Ownership Type	2006 %	2019 %	% Change
Bureau of Land Management	61.6	45.1	- 16.5
Military (DOD)	0.025	0.000005	- 0.03
Private	26.89	43.4	+ 16.51
State	4.345	1.9	- 2.445
US Forest Service	7.14	9.27	+ 2.13

Review of Water Quality Data and TMDL Targets

The Salmon Falls Creek subbasin can be broken down into 5 components: Salmon Falls Creek Upper, Cedar Creek Upper, Cottonwood Creek, Big Creek, and Salmon Falls Creek Lower, all of which include assessment units (AUs) included in the 2007 TMDL. All AUs within the Salmon Falls Creek subbasin have a target streambank coverage of 80%, measured by streambank erosion inventories (SEI) in the field.

TMDL targets are listed in Table A above per AU but can also be listed in main groups of Salmon Falls Creek. For example:

- Salmon Falls Creek lower:
  - total phosphorus (TP) target of 0.10 mg/L
  - total nitrogen (TN) target of 1.5 mg/L
  - total suspended solids (TSS) target of <50 mg/L
- Salmon Falls Creek upper:
  - total phosphorus (TP) target of 0.05 mg/L
  - total suspended solids (TSS) target of <50 mg/L
- Cedar Creek upper:
  - total phosphorus (TP) target of 0.05 mg/L
- Big Creek:
  - total phosphorus (TP) target of 0.05 mg/L
- Cottonwood Creek:
  - total phosphorus (TP) target of 0.05 mg/L

The following Figure (B) presents a visual of the above information, with colored lines representing target values of pollutants. Distributions of pollutants within the five main groups listed above are displayed.

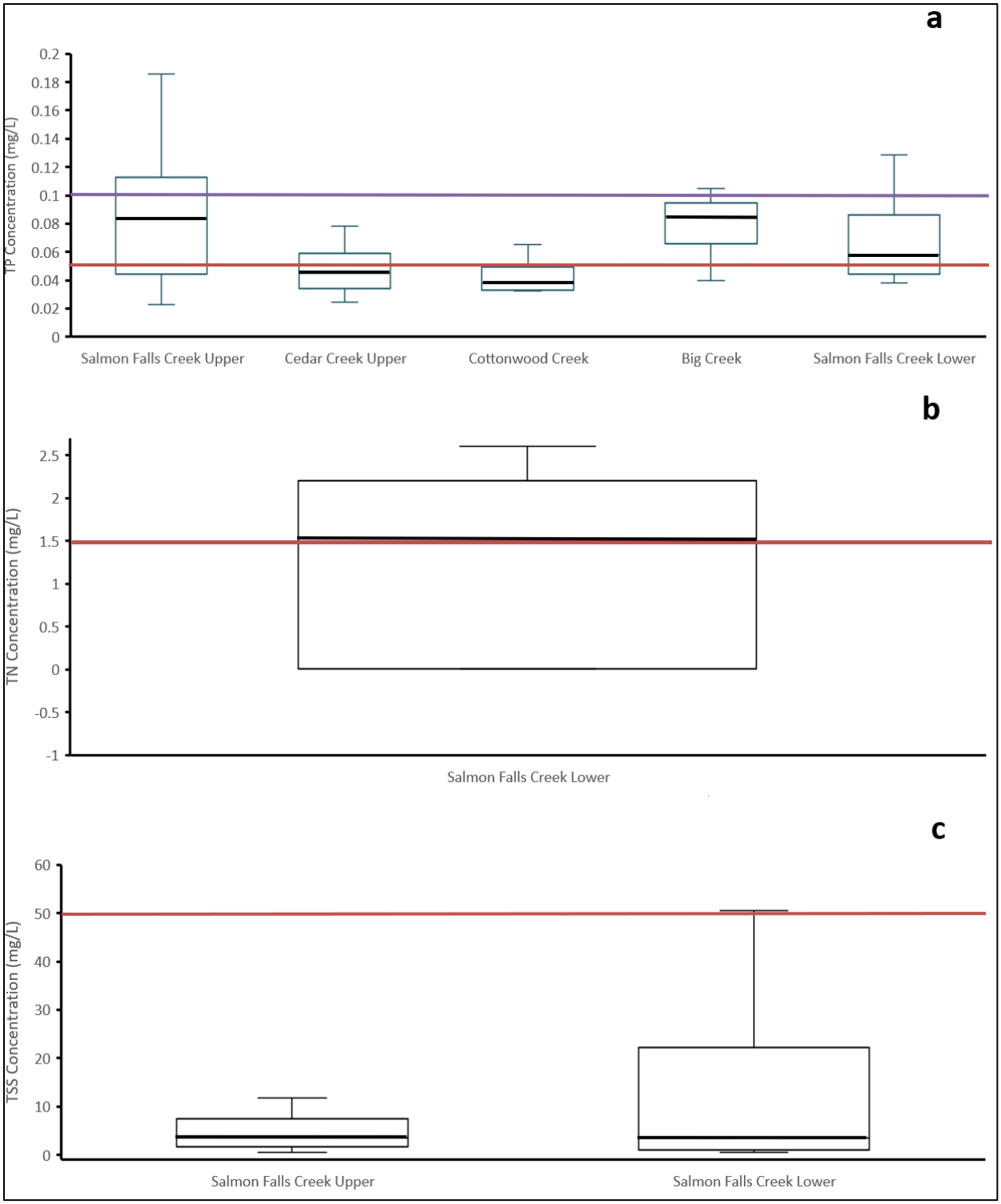


Figure B: Distribution box plots of pollutants in the Salmon Falls Creek subbasin. (a) Total Phosphorus concentrations for tributaries of the Salmon Falls Drainage. The purple line denotes the TP target of 0.1 mg/L for tributaries below the reservoir and the red line denotes TP target of 0.05 mg/L for tributaries above the reservoir. (b) Total nitrogen concentrations for Salmon Falls Creek drainage system. The red line denotes the TN target of 1.5 mg/L for the lower portion of the drainage system. (c) Total suspended solids concentrations for Salmon Falls Creek drainage system. The red line denotes the TSS target of 50 mg/L for the entire system.

After reviewing the data collected in 2019, the TMDL targets for the subbasin seem to still be relevant. The subbasin is reflecting an overall general trend towards showing improvements in TSS, sediment, and TN (Table C). TP still is high is some AUs. All TMDLs related to temperature will not be analyzed in this report, as they can be found in *Salmon Falls Creek Subbasin Total Daily Maximum Loads, 2021 Temperature TMDLs* (DEQ, 2021).

Monitoring efforts began in 2018 with streambank erosion inventories (SEI), then water quality monitoring in 2019. *In Situ* measurements for water temperature, conductivity, pH, turbidity, and DO were taken with a calibrated Hydrolab multiparameter sonde. Water chemistry samples analyzed for TP, TN, TSS, and *E. coli* were collected as grab samples, and sent to Idaho Bureau of Laboratories, Boise, Idaho for lab analysis.

Table C: Averages of TP, TN, and TSS in the five main areas of the Salmon Falls Creek Subbasin.

	Average TP (mg/L)	Average TN (mg/L)	Average TSS (mg/L)
Salmon Falls Creek Upper	0.098	—	17.941
Cedar Creek Upper	0.047	—	—
Cottonwood Creek	0.042	—	—
Big Creek	0.080	—	—
Salmon Falls Creek Lower	0.067	1.194	13.077

As a reminder, the TP target for Salmon Falls Creek Upper is 0.05 mg/L and 0.1 mg/L for Salmon Falls Creek Lower. The average TP in the Salmon Falls Creek Upper portion was 0.098 mg/L and for the lower portion, the average was 0.067 mg/L. The TP target of 0.05 mg/L also applied to Cedar Creek Upper, with an average of 0.047 mg/L, Cottonwood Creek, with an average of 0.042 mg/L, and Big Creek, with an average of 0.080 mg/L. The TN target for Salmon Falls Creek Lower is 1.5 mg/L and the average was 0.061 mg/L.

The TSS target for both upper and lower Salmon Falls Creek was <50 mg/L, and the upper portion had an average of 17.94 mg/L, with 13.08 mg/L average in the lower section of Salmon Falls Creek. To meet the water quality standard for beneficial uses of contact recreation, the *E. coli* count needs to be less than 126 cfu/100ml based on a minimum of 5 samples collected over 45 days. A geomean could not be collected for Cottonwood Creek due to dry conditions. The average of the samples that were collected was 269.25 cfu/100ml, well above the water quality standard single sample criteria for contact recreation.

Review of Beneficial Uses

The beneficial uses outlined in Table D below are either designated, presumed, or existing and have been surveyed by DEQ BURP crews in multiple years. DEQ five-year review staff also surveyed and found multiple sites dry in 2019. Currently, DEQ is not recommending any changes to the current beneficial use statuses. We do recommend, however, to update the five AUs that were dry and no data collection possible to be put in Category 3-unasssessed, as mentioned above.

Table D: Beneficial Use support status and parameters for AUs focused in this document.

Assessment Unit Name	Assessment Unit Number	Category[2]	Assessed Beneficial Uses[1,2]	BURP Data Support Status	Parameter[1]	Reported Dry BURP and/or DEQ Staff
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	4A	CWAL[3]	Not Supporting	Silt	1996, 2010, 2018, 2019
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	4A	CWAL[3]	Not Supporting	TN, TP, TSS	—
			SS[3]	Not Supporting	—	
			PCR	*Fully Supporting*	—	
Salmon Falls Creek-Salmon Falls Creek Dam to Devil Creek	ID17040213SK003_06	4A	CWAL[3]	Not Supporting	TN, TP, TSS	—
Cedar Creek Reservoir	ID17040213SK004_0L	4A	CWAL[3]	Not Supporting	TP, Silt	—
			PCR	*Fully Supporting*	—	
Monument Canyon (1&2 tribs to Cedar Creek Reservoir)	ID17040213SK004_02	4A	CWAL[3]	Not Supporting	TP, Silt	2004, 2007, 2008, 2019
House Creek-source to Cedar Reservoir	ID17040213SK005_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	—	
			SCR	*Fully Supporting*	—	
	ID17040213SK005_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SCR	*Fully Supporting*	—	
			SS	Not Supporting	TP, Silt	
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
	ID17040213SK006_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SCR	*Fully Supporting*	—	
			SS	Not Supporting	TP, Silt	
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	4A	CWAL[3]	Not Supporting	Hg, TP, Silt	—
			SS[3]	Not Supporting	Hg, TP, Silt	
			PCR	*Fully Supporting*	—	
China, Browns, Corral, Player Creeks	ID17040213SK008_02	4A	CWAL[3]	Not Supporting	TP	—
			SS[3]	Not Supporting	TP	
			SCR	*Fully Supporting*	—	
	ID17040213SK008_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	—	
			SCR	*Fully Supporting*	—	
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	4A	CWAL[3]	Not Supporting	TP, TSS, Silt	—
			SS[3]	Not Supporting	—	
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	4A	CWAL[3]	Not Supporting	Silt	2010, 2015, 2019
			SS[3]	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	4A	CWAL[3]	Not Supporting	Silt	2002, 2006, 2010
			SS[3]	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
Big Creek-source to mouth	ID17040213SK014_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
	ID17040213SK014_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	TP, Silt	
			SCR	*Fully Supporting*	—	
Cottonwood Creek-source to mouth	ID17040213SK015_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS	Not Supporting	TP	
			SCR	Not Supporting	*E. coli*	
	ID17040213SK015_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SCR	Not Supporting	*E. coli*	

Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	4A	CWAL[3]	Not Supporting	Silt	2001, 2002, 2003, 2004, 2005, 2010, 2014
			SS[3]	Not Supporting	Silt	
	ID17040213SK016_03	4A	CWAL[3]	Not Supporting	Silt	2001, 2002, 2004
			SS[3]	Not Supporting	—	

[1]CWAL—cold water aquatic life, SS—Salmonid spawning, PCR—primary contact recreation, SCR—secondary contact recreation, TP—Total phosphorus, TN—Total nitrogen, TSS—Total suspended solids, Silt—Siltation/sedimentation, *E. coli*—Escherichia coli, Hg—Mercury
[2]Table completed with data from 2022 Integrated Report (DEQ, 2022)
[3]Temperature parameter cause of Not Supporting

Implementation Activities

Implementation activities have been planned for the Salmon Falls Creek subbasin, and Table E lists the completed federally funded §319 projects since 2007. The 2019 monitoring season and analysis reflected the work completed and showed some improvements. More projects and BMP implementation are recommended to reach the full extent of the 2007 TMDL requirements.

Table E: §319 funded projects within Salmon Falls Creek Subbasin addressing 2007 TMDL.

Assessment Unit	Begin Date	End Date	Best Management Practice (BMP)	Name	Designated Management Area	Load Reduction Estimates (lbs/yr)		
						Sediment	Total Phosphorus	Total Nitrogen
ID17040213SK001_06	6/15/2003	12/30/2004	Constructed Wetland	Balanced Rock Cedar Draw/F. Coulee	Balanced Rock Soil Conservation District	11,442	45,332	NA
ID17040213SK001_06	7/1/2006	7/1/2008	Sediment Basins	Salmon Falls Pump-back Project	Balanced Rock Soil Conservation District	174	657	NA
ID17040213SK001_06	6/30/2008	6/30/2012	Constructed Wetland	E. Coulee Drain Elimination Project	Balanced Rock Soil Conservation District	1,385,605	1,315	NA
ID17040213SK005_02	7/21/2009	6/13/2011	Stream Bank Restoration	Salmon Falls Creek Ag Implementation Project	Twin Falls Soil and Water Conservation District	272,712	167	600
ID17040213SK005_03	7/15/2008	11/14/2008	Livestock Watering Facility	Salmon Falls Watershed TMDL-(INL PROJ)	Idaho Soil Conservation Commissions	38,889.5	60	NA
ID17040213SK016_02	2/18/2014	5/1/2014	Riparian Exclusion by off-site water	Western Stockgrowers Association Enhancement	Twin Falls Soil and Water Conservation District	Not Provided		
ID17040213SK016_03	10/20/2007	12/31/2010	Livestock Watering Facility	Shoshone WQ Improvement Project	Twin Falls Soil and Water Conservation District	513,677.07	379	745

Note: Information gathered from ArcGIS shapefile *Section 319 (NPS) and original applications.*

Recommendations for Further Action

Some streams, for example, Cottonwood Creek, are intermittent streams so only one *E. coli* sample was possible, therefore, a geometric mean (see Appendix A for standards) was not possible. Other sampling locations may not have been accessible on some days that DEQ staff went for sampling. Data analysis of the 2019 sampling season is not showing dramatic results so no changes are recommended until further analyses can be performed. A general and static trend is apparent in total Phosphorus (TP) in all AUs, except for China Creek, which shows a higher value in TP. General observations from SEI data indicates bank stability improvements in some locations, but more information is needed. Overall, TP is above TMDL targets for both upper and lower Salmon Falls Creek. TN is averaging within the target range, but still needs improvement. TSS is well below the target in both upper and lower portions of the drainage system. *E. coli* numbers could not be evaluated to see if they meet or exceed the target due to no geomean was collected for Cottonwood Creek.

During the next 5-year review cycle, following monitoring protocols and adding possible sample collection location alternatives might help in the collection and analysis of better data collection. Adding in some BMPs further upstream in grazing ranges might also help the Salmon Falls Creek subbasin to improve to meet the TMDL objectives established in 2007; *E. coli* TMDLs in Cottonwood Creek also are not being met. More focus on BMPs in this area may result in better results during the next 5-year cycle. Sample collection for mercury needs to take place in Salmon Falls Creek Reservoir to monitor mercury uptake in fish to meet the 2007 TMDL. Possible new technologies may assist in this type of monitoring.

Recommendations for further action to meeting the TMDL include, but are not limited to, collecting more, consistent data for better analyses, updating 2007 TMDL to include current methods of analyses and data, and/or modifying any implementation plans. The promotion of federal funded §319 and/or state AG funded projects is encouraged.

Recommended changes to the next Integrated Report are summarized in Table F.

Table F. Existing total maximum daily loads and recommendations for the next Integrated Report.

Assessment Unit Name	Assessment Unit Number	Pollutants	Recommended Change to IR	Justifications
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	sediment	Move to category 3-unassessed	Reported as Dry
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	TN, TP, TSS	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek-Salmon Falls Creek Dam to Devil Creek	ID17040213SK003_06	TN, TP, TSS	Remain in 4A	Nutrient and Sediment Load
Cedar Creek Reservoir	ID17040213SK004_0L	TP, sediment	Remain in 4A	Nutrient and Sediment Load

Monument Canyon-1&2 tribs to Cedar Creek Reservoir	ID17040213SK004_02	TP, sediment	Move to category 3-unassessed	Reported as Dry
House Creek-source to Cedar Reservoir	ID17040213SK005_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK005_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK006_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	Hg, TP, sediment	Remain in 4A	Nutrient and Sediment Load
China, Browns, Corral, Player Creeks	ID17040213SK008_02	TP	Remain in 4A	Excess Nutrient Load
	ID17040213SK008_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	TP, TSS, sediment	Remain in 4A	Nutrient and Sediment Load
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	sediment	Remain in 4A	Sediment Load
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	sediment	Move to category 3-unassessed	Reported as Dry
Big Creek-source to mouth	ID17040213SK014_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK014_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Cottonwood Creek-source to mouth	ID17040213SK015_02	TP, sediment, *E. coli*	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK015_03	TP, sediment, *E. coli*	Remain in 4A	Nutrient and Sediment Load
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	sediment	Move to category 3-unassassed	Reported as Dry
	ID17040213SK016_03	sediment	Move to category 3-unassessed	Reported as Dry

Note: TP=total phosphorus; TSS=total suspended solids; TN=total nitrogen; Hg=Mercury

1 Introduction

This document reviews the status of water bodies in the Salmon Falls Creek subbasin that were addressed by the *Salmon Falls Creek Subbasin Assessment and Total Daily Maximum Daily Loads* (DEQ 2007). The purpose of this five-year review is to evaluate current water quality data, the appropriateness of the total maximum daily load (TMDL) to current watershed conditions, and any available implementation plans. Based on this review, changes have been recommended for Idaho's next Integrated Report (IR).

The Salmon Falls Creek subbasin is in south central Idaho and shares its borders with Nevada (Figure 1). Counties included in the Salmon Falls Creek subbasin are portions of Twin Falls County, Idaho; Owyhee County, Idaho; and Elko County, Nevada. Communities near Salmon Falls Creek Subbasin include Twin Falls, Rogerson, Castleford, Hollister and Jackpot, which house populations that impact this area most: recreationists, landowners, farmers, and land managers. Land use in the subbasin is predominantly rangeland and irrigated agriculture in the lower elevations.

The Salmon Falls Creek Subbasin begins in the mountains and highlands located along the southern and western boundaries of the subbasin and reaches northward to the lowlands of the Snake River Basin/High Desert ecoregion in the northern edges of the subbasin. The lower, or most northern, portion of the subbasin forms part of the boundary of the Western Snake River Aquifer and the Eastern Snake River Aquifer. The pronounced differences in climate from the mountains to the Snake River Plain are due to the elevation difference across the subbasin.

The natural hydrology of an area is the result of its climactic regime, topography, and geology. Topography seems to play the most significant role in determining the location of perennial water within the subbasin as the other two factors are uniform throughout the subbasin. Most of the perennial streams have some origin in the mountainous areas of the subbasin. Mountainous areas are located principally in the southwest portion and southeastern portions of the subbasin. These serve as the headwater area for Big Creek, Hot Creek, and Shoshone Creek AUs. In general, Salmon Falls Creek and Cedar Creek AUs dominate the subbasin, leaving most of the other surface channels as intermittent or ephemeral tributaries. Figure 1 shows the AUs within the Salmon Falls Creek drainage system and proximity to Twin Falls.

Water sources that feed the Salmon Falls Creek subbasin include runoff from snowpack and other precipitation events (10.1 in/year-lower portions; 20.9-38.2 in/year-upper summits), the Salmon Falls Creek/Rock Creek Aquifer below the northern portion of the subbasin, and a geothermal aquifer layer that feeds several geothermal springs (DEQ, 2007). These sources affect water quality to varying degrees.

The geology of this subbasin consists primarily of Pliocene and upper Miocene Basalt and felsic volcanic rocks. Both seem to play a significant role in water quality of the subbasin. A full map and description breakdown of the geology can be found in the original TMDL document.

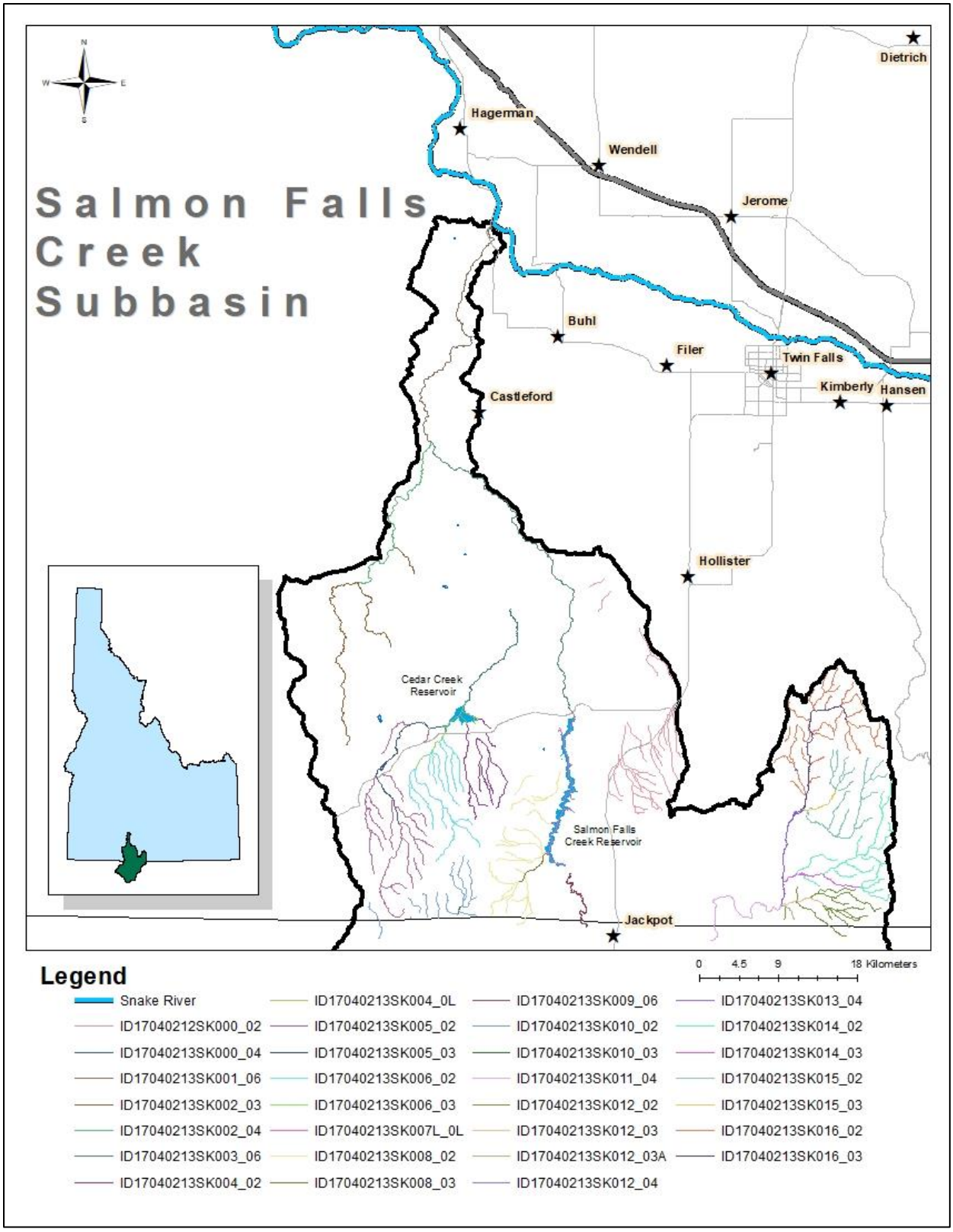


Figure 1: Salmon Falls Creek subbasin.

1.1 Public Involvement

This five-year review was conducted with participation from the Mid-Snake Watershed Advisory Group (WAG) and the Upper Snake River Basin Advisory Group (BAG). The Mid-Snake WAG and Upper Snake BAG are community based and work collaboratively in the subbasin. DEQ and the WAG and BAG will continue to work together to implement on-the-ground strategies to meet the beneficial use and water quality standards of the Snake River and tributaries in the Salmon Falls Creek subbasin.

1.2 Regulatory Requirements

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 Code § 39-3611(7) requires a 5-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 documents the review of the *Salmon Falls Creek Subbasin Assessment and Total Maximum Daily Loads*, (DEQ 2007), considers the most current and applicable information in conformance with Idaho Code § 39-3607, evaluates the appropriateness of the TMDL to current watershed conditions, evaluates the implementation plan, and consults with the watershed advisory group (WAG) and the basin advisory group (BAG). An evaluation of the recommendations presented is provided. Final decisions for TMDL modifications are decided by the Idaho Department of Environmental Quality (DEQ) director. Approval of TMDL modifications is decided by the US Environmental Protection Agency (EPA), with consultation by DEQ.

Water bodies are tracked and assessed using assessment units (AUs). 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. Using AUs to describe water bodies offers many benefits, primarily which 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 TMDL Review and Status

The TMDL information found in Table 1 and Table 2 is from the *Salmon Falls Creek Subbasin Assessment and Total Maximum Daily Loads* (DEQ, 2007), and the 2022 final Idaho Integrated Report (DEQ, 2022). All TMDLs related to temperature will not be analyzed in this report, as they can be found in *Salmon Falls Creek Subbasin Total Daily Maximum Loads, 2021 Temperature TMDLs* (DEQ, 2021). Figures 2 through 7 show locations of 2007 TMDLs, separated due to multiple streams having more than one pollutant of interest.

Table 1. Applicable TMDLs per AU in the Salmon Falls Creek subbasin.

Assessment Unit Name	Assessment Unit Number	Pollutant	TMDL Targets (daily average)	Target Cover (%)	Critical Period	Relevant TMDL Document	IR Status (2022)
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	Sediment	—	80%	Peak Flow	DEQ 2007	4A
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	TP	0.10 mg/L	—	Year Round	DEQ 2007	4A
		TSS	50.0 mg/L	—			
		TN	1.50 mg/L	—			
Salmon Falls Creek-Salmon Falls Creek Dam to Devil Creek	ID17040213SK003_06	TP	0.10 mg/L	—	Year Round	DEQ 2007	4A
		TSS	50.0 mg/L	—			
		TN	1.50 mg/L	—			
Cedar Creek Reservoir	ID17040213SK004_0L	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Monument Canyon-1&2 tribs to Cedar Creek Reservoir	ID17040213SK004_02	TP	0.05 mg/L	—	Peak Flow	DEQ 2007	4A
		Sediment	—	80%			
House Creek-source to Cedar Creek Reservoir	ID17040213SK005_02	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
House Creek-source to Cedar Creek Reservoir	ID17040213SK005_03	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Cedar Creek-	ID17040213SK006_03	TP	0.05 mg/L	—	Year	DEQ 2007	4A

source to Cedar Creek Reservoir		Sediment	—	80%	Round		
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
		Mercury	0.3 mg/kg	—			
China, Browns, Corral, Player Creeks	ID17040213SK008_02	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
China Creek	ID17040213SK008_03	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Salmon Falls Creek-Idaho/Nevada border to Salmon Falls Creek	ID17040213SK009_06	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		TSS	50.0 mg/L	—			
		Sediment	—	80%			
Shoshone Creek-Hot Creek to Idaho/Nevada border	ID17040213SK011_04	Sediment	—	80%	Year Round	DEQ 2007	4A
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	Sediment	—	80%	Peak Flow	DEQ 2007	4A
Big Creek-source to mouth	ID17040213SK014_02	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Big Creek-source to mouth	ID17040213SK014_03	TP	0.05 mg/L	—	Year Round	DEQ 2007	4A
		Sediment	—	80%			
Cottonwood Creek-source to mouth	ID17040213SK015_02	TP	0.05 mg/L	-—	Year Round	DEQ 2007	4A
		Sediment	-—	80%			
		E. coli	126 cfu/100mL	-—			
Cottonwood Creek-source to mouth	ID17040213SK015_03	TP	0.05 mg/L	-—	Year Round	DEQ 2007	4A
		Sediment		80%			
		E. coli	126 cfu/100mL	-—			
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	Sediment	-—	80%	Peak Flow	DEQ 2007	4A
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_03	Sediment	-—	80%	Peak Flow	DEQ 2007	4A

Note: colony forming unit (cfu); TP=total phosphorus; TSS=total suspended solids; TN=total nitrogen.

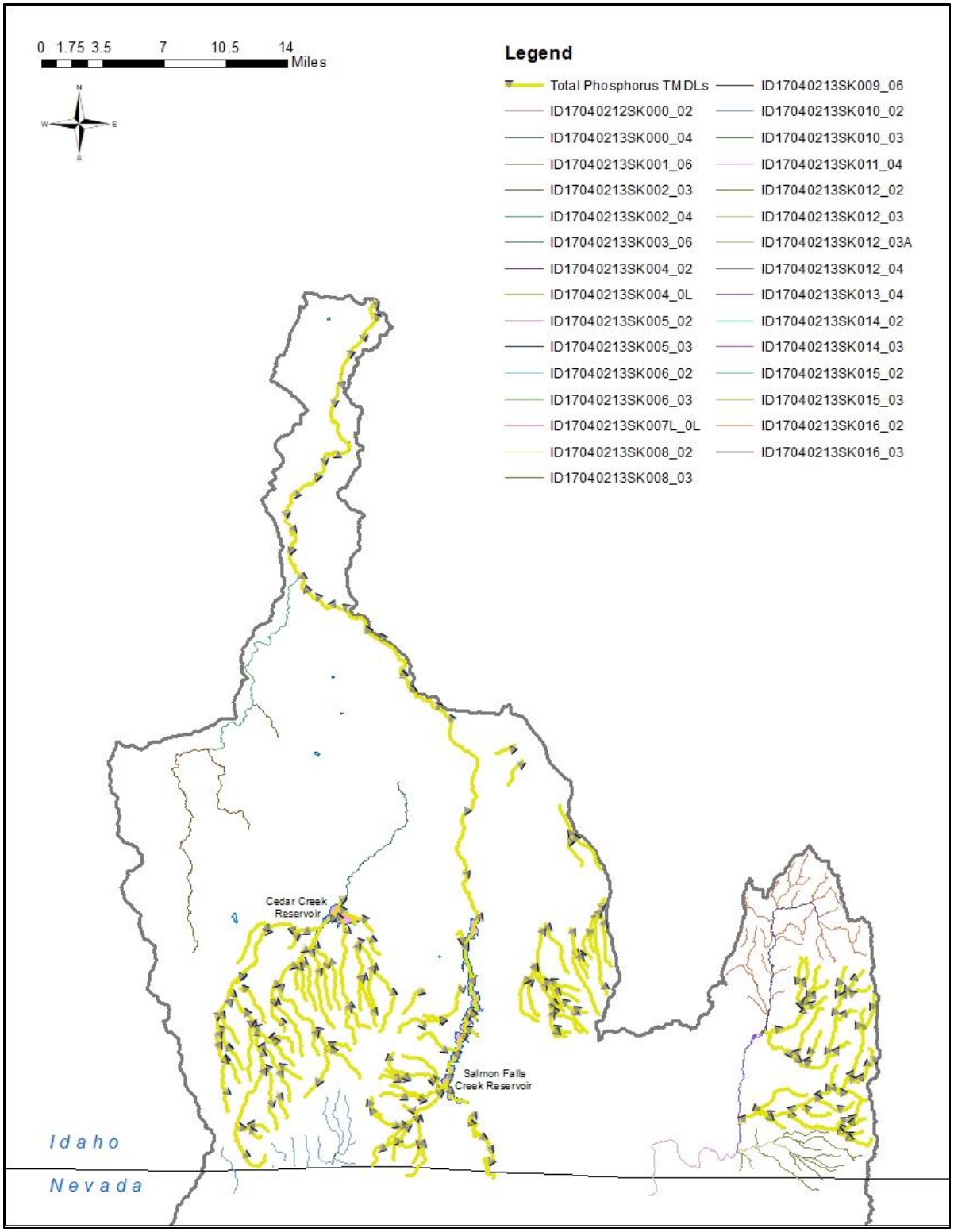


Figure 2: Locations for total phosphorus (TP) TMDLs.

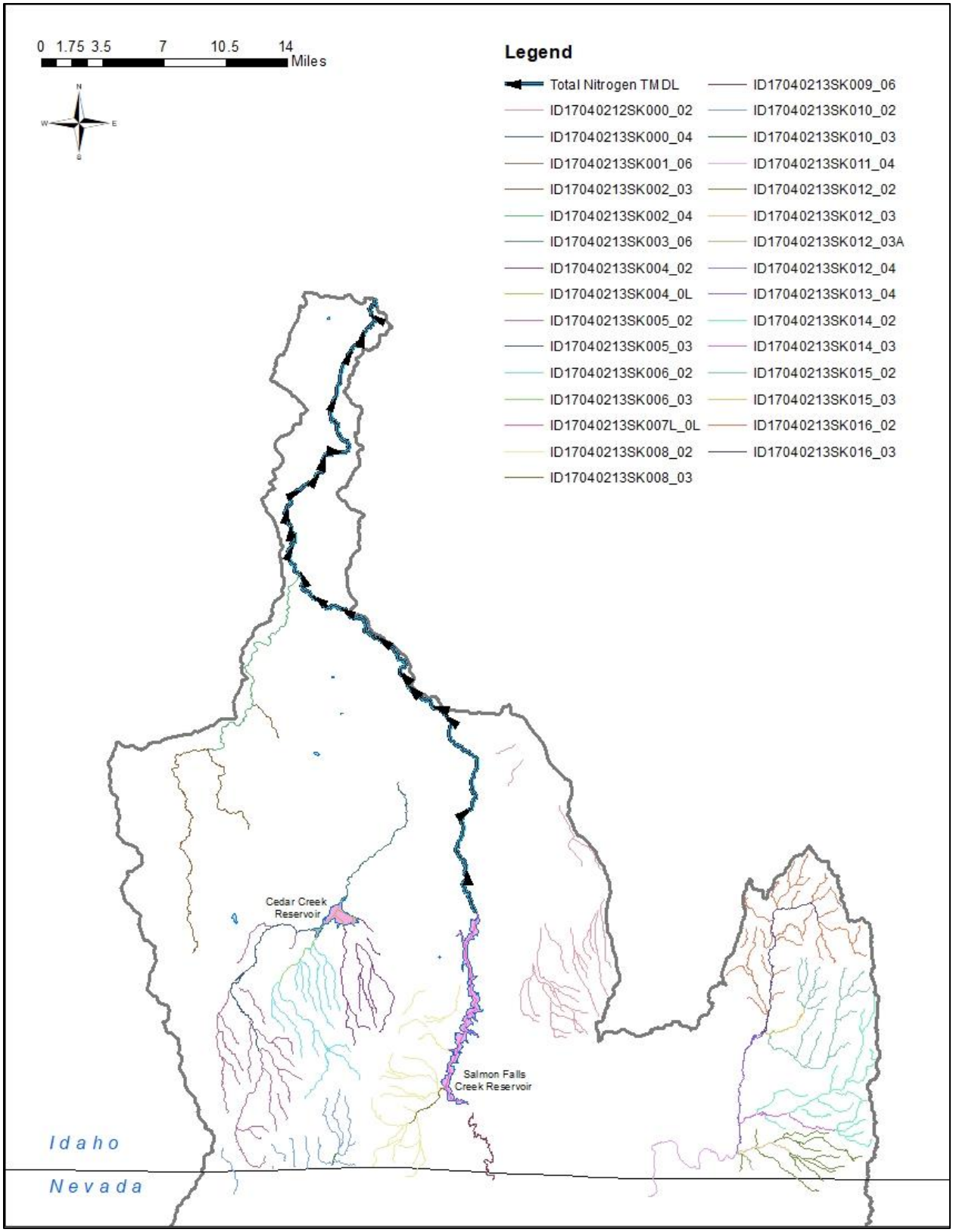


Figure 3: Total nitrogen (TN) TMDL location in the Salmon Falls Creek drainage system.

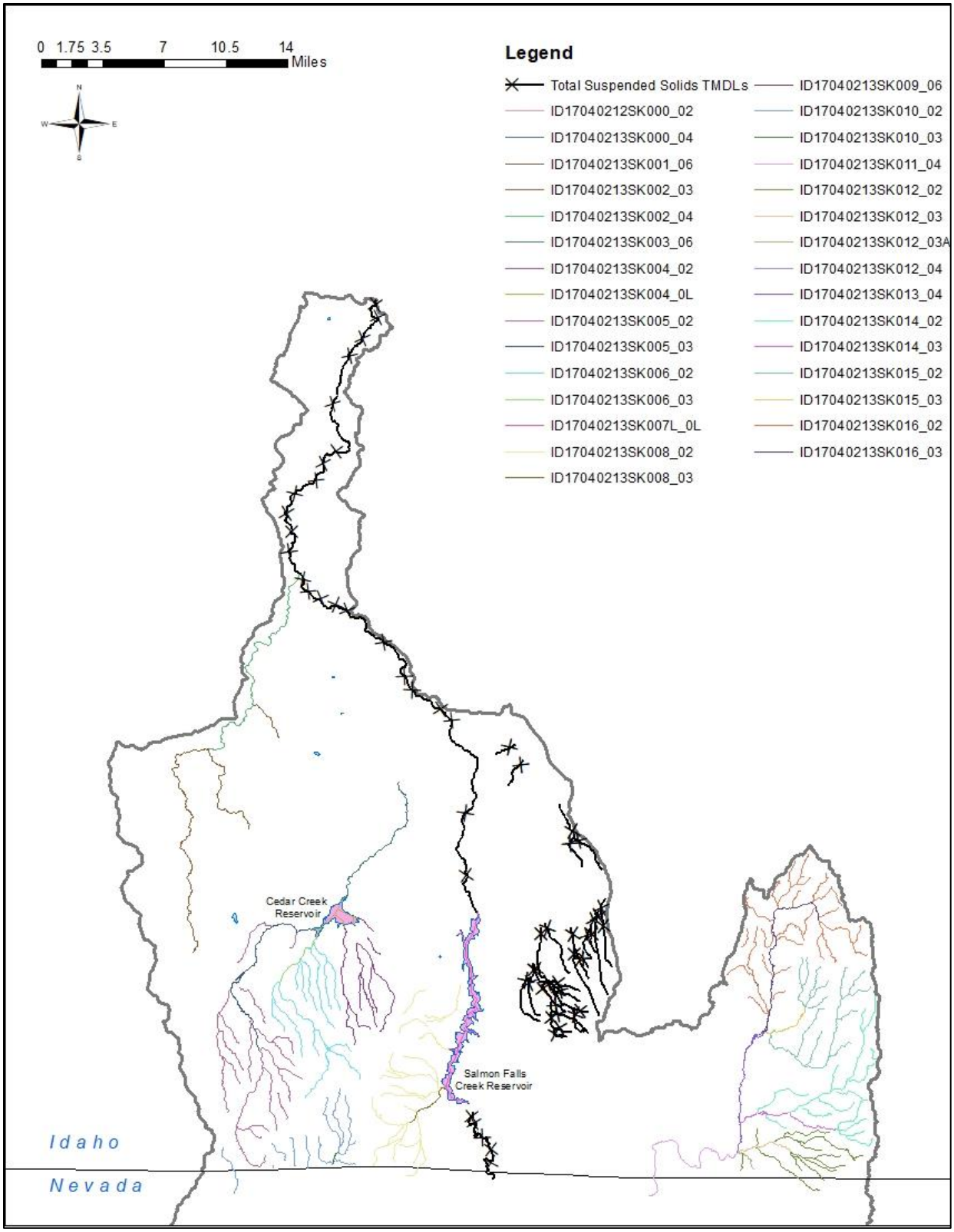


Figure 4: Total Suspended Solids (TSS) TMDL locations.

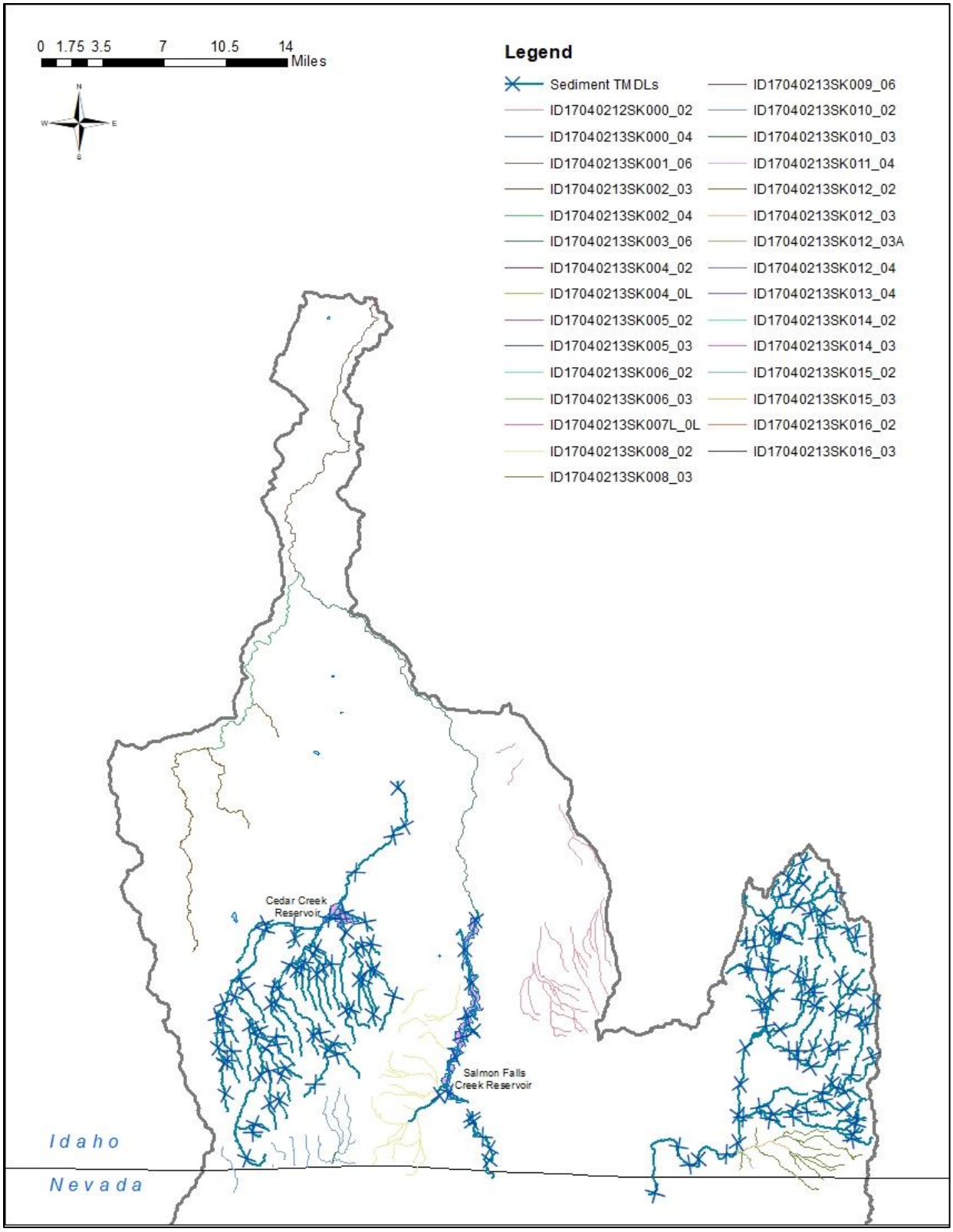


Figure 5: Sediment TMDL locations in the Salmon Falls drainage system.

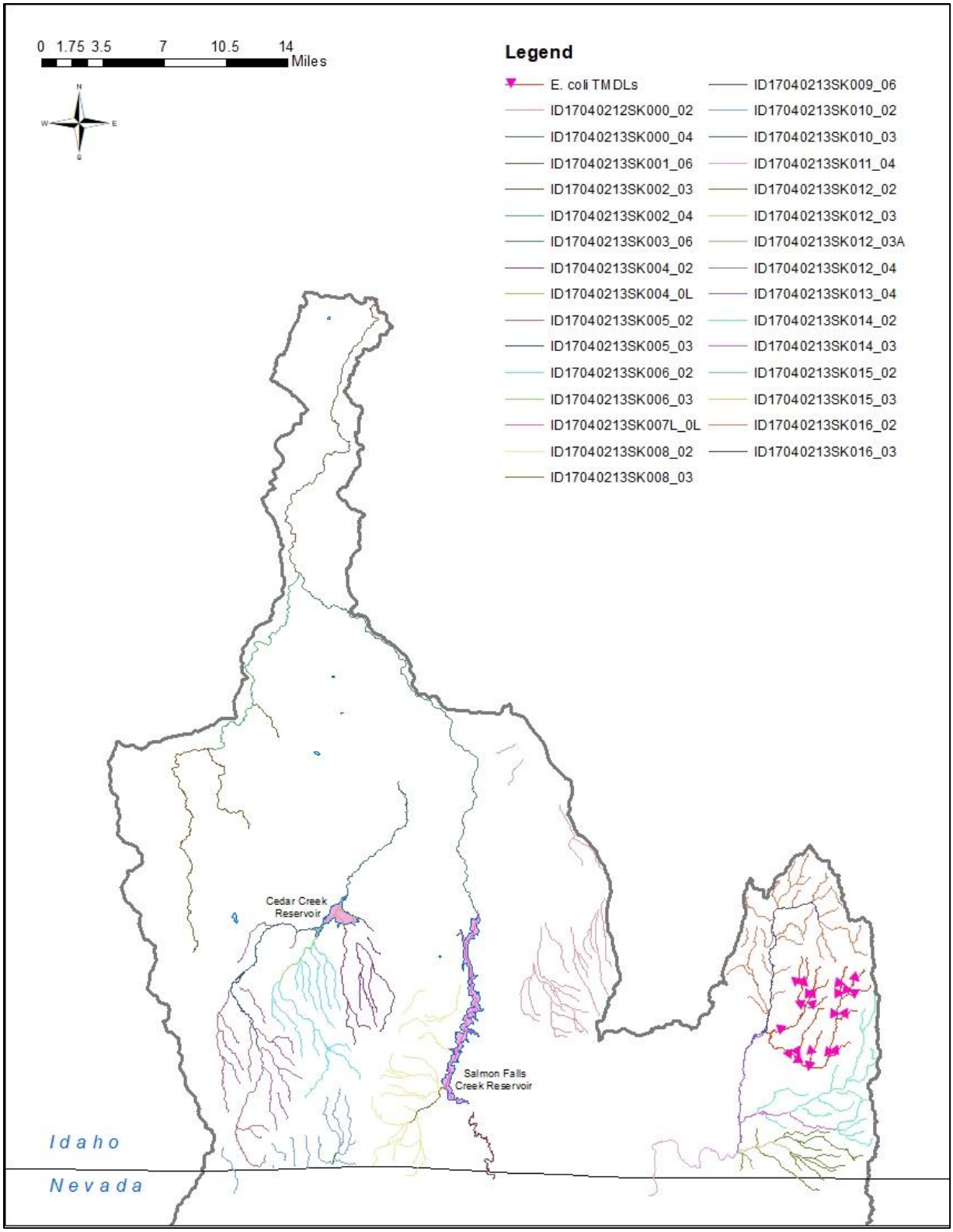


Figure 6: Locations for *E. coli* TMDLs.

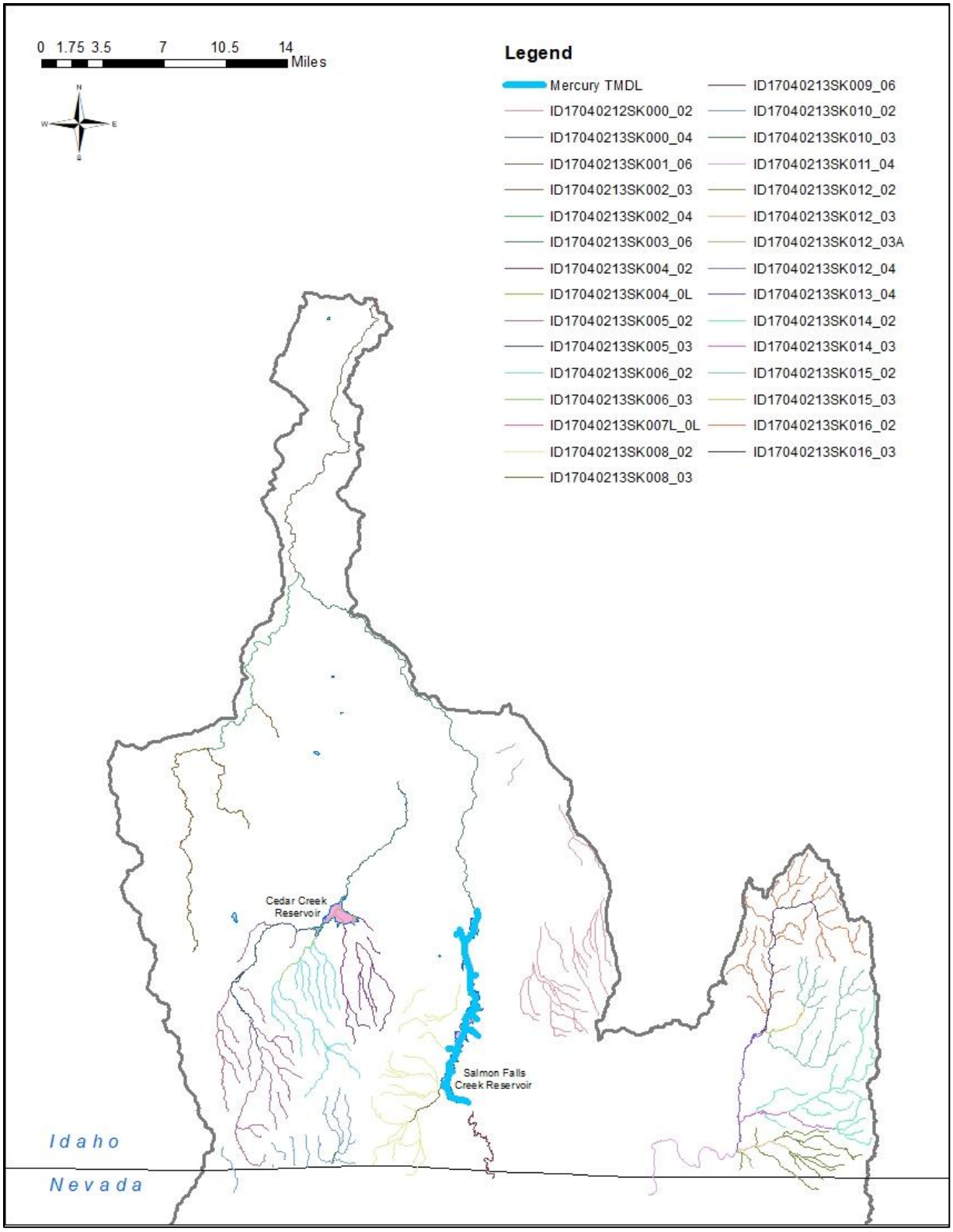


Figure 7: Mercury (Hg) TMDL location-Salmon Falls Creek Reservoir.

2.1 Pollutant Targets

The Salmon Falls Creek TMDL established instream water quality targets to meet Idaho Water Quality Standards (see Appendix A for Idaho Water Quality Standards). Table 2 indicates a breakdown of each pollutant for each AU in the subbasin, relevant to nutrients, sediment, and bacteria only. The following is explained in more detail in Salmon Falls Creek Subbasin Assessment and Total Maximum Daily Loads (DEQ, 2007), pages 247-253.

Nutrients

The nutrient limits were set at a level such that the segments would not exceed the estimated load capacities supportive of a good to excellent fisheries, and to hopefully allow the water quality to improve to restore degraded beneficial uses. These targets were set at a daily maximum of 0.05 mg/L of TP within the flow duration of the stream, which allowed for natural variability in the tributaries to Cedar Creek Reservoir and Salmon Falls Creek Reservoir, specifically Salmon Falls Creek, China Creek, House Creek and Cedar Creek. TP targets for Cottonwood Creek, Big Creek, and Salmon Falls Creek below the reservoir were set at 0.100 mg/L TP daily maximum within the flow duration of the stream.

Total nitrogen targets for Salmon Falls Creek below the reservoir shall be set at 1.5 mg/L of TN as a daily maximum. This value conforms to water quality criteria from other arid states such as Arizona (2 mg/L daily max), as well as TN target values set in other TMDLs such as California (1.0 mg/L). Furthermore, the target selection conforms with the Redfield ratio of approximately 16:1 for TN: TP. This ratio is thought to indicate nutrients that are balanced, and the primary production of a system is neither nitrogen nor phosphorus limited.

Table 2: Instream water quality targets established for the Salmon Falls Creek subbasin.

Assessment Unit Name	Assessment Unit Number	TMDL Targets					
		Hg (mg/kg)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	Sediment (% bank coverage)	*E. coli* (cfu/100 mL)
Cedar Creek-Lower	ID17040213SK000_04	—	—	—	—	80	—
Salmon Falls Creek-Devil Creek to Mouth	ID17040213SK001_06	—	<50[a]	0.10[a]	1.50[a]	—	—
Salmon Falls Creek-Lower	ID17040213SK003_06	—	<50[a]	0.10[a]	1.50[a]	—	—
Cedar Creek Reservoir	ID17040213SK004_0L	—	—	0.05[a]	—	80	—
Monument Canyon (1&2 order tributaries to Cedar Creek Reservoir)	ID17040213SK004_02	—	—	0.05[a]	—	80	—
House Creek-Source to Cedar Reservoir	ID17040213SK005_02 ID17040213SK005_03	—	—	0.05[a]	—	80	—
Cedar Creek-Source to Cedar Creek Reservoir	ID17040213SK006_02 ID17040213SK006_03	—	—	0.05[a]	—	80	—
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	0.3	—	0.05[a]	—	80	—
China, Browns, Corral, Player Creeks	ID17040213SK008_02 ID17040213SK008_03	—	—	0.05[a]	—	80	—
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	—	<50[a]	0.05[a]	—	80	—
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	—	—	—	—	80	—
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	—	—	—	—	80	—
Big Creek-Source to Mouth	ID17040213SK014_02 ID17040213SK014_03	—	—	0.05[a]	—	80	—
Cottonwood Creek-Source to Mouth	ID17040213SK015_02 ID17040213SK015_03	—	—	0.05[a]	—	80	126[b]
Shoshone Creek-Source to Cottonwood Creek	ID17040213SK016_02 ID17040213SK016_03	—	—	—	—	80	—

[a] Daily average
[b] Geometric mean

Bacteria

The State of Idaho has a water quality standard for *E. coli* that covers any recreational contact with the water body. As of 2022, bacteria targets are now <126 count *E.* coli per 100 milliliters as a geometric mean of five samples collected in a 45 day period, or a statistical threshold of ≤ 410 count per 100 milliliters.

Sediment

The sediment limit in the TMDL for listed segments of the subbasin were set at a level such that the rivers and streams will not exceed the estimated load capacity (duration) supportive of a good fishery and not allow the water quality to degrade worse than current levels. This target was set at a daily maximum of 50 mg/L. TSS values <50 mg/L do not imply that water quality may be degraded by TSS up to 50 mg/L. Rather, TSS values should be < 50 mg/L on an average daily basis, while the load duration curve methodology will allow for the in-stream standard to account for seasonal variation, calculated in the 2007 TMDL document.
Loads for the bedload fraction of sediment will be developed to meet the beneficial uses of the streams and maintain the above TSS targets using a stream bank erosion estimate developed by the NRCS and refined for TMDLs by the Idaho Falls DEQ Regional office. The current state of science does not allow precise statement of a sediment load or load capacity that would translate into characteristics (e.g., TSS percent depth fines) known to support beneficial uses for cold water aquatic life and salmonid spawning and thus meet Idaho's narrative criterion for sediment. The load capacity lies somewhere between current loading and levels that relate to natural stream bank erosion levels. It is assumed that beneficial uses were or would be fully supported at natural background sediment loading rates. These rates were assumed to equate to the 80 percent bank stability regimes and taken to meet state water quality standards.

Mercury

The State of Idaho has adopted EPA's recommended fish tissue criterion for methylmercury and developed a guidance document to explain the implementation of this novel water quality criterion. Due to its complexity the reader is referred to The Implementation Guidance for the Idaho Mercury Water Quality Criteria. This document can be found at *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/4836*, portions of which are paraphrased below:

> Idaho will rely on a simple percent reduction approach where mercury TMDLs will be expressed as a percent reduction required to achieve 0.3 mg/kg methylmercury fish tissue values. Water column concentrations of methylmercury in the impaired water body would need to be reduced by the same percentage. The relationship between fish tissue methylmercury levels mercury loads to the water body has been assumed to be linear, consistent with numerous other cases (EPA Region 6 and Louisiana DEQ 2001, FTN 2002, Parsons 2003). In addition, EPA models in the Florida Everglades have shown that the relationship between current atmospheric deposition rates and current fish tissue concentrations is approximately linear (Florida DEP 2003). This approach is consistent with TMDL rules that clearly indicate TMDLs can be expressed in terms of either mass per unit time, toxicity, or other appropriate measures (40 CFR 130.2(I)).

By using proportionality of the target tissue concentration to load, calculation of load capacity becomes a unitless percent reduction. This overcomes the inherent problems of calculating loads for fish tissue which does not lend itself to traditional loading calculations (flow multiplied by concentration). The resulting load reduction percentage can then be allocated among mercury sources. Due to lack of funding, no samples were taken for mercury during this review cycle; therefore, no load allocations are presented.

2.2 Control and Monitoring Points

Monitoring methodology for pollutants of concern (i.e., total phosphorus, total nitrogen, bacteria (*E. coli*), total mercury, and fish tissue concentration of mercury) will follow the accepted methodologies as outlined in the *Salmon Falls Subbasin Quality Assurance Project Plan.* For sediment TMDLs, percent bank stability and bank recession rate estimates, as described in previous sections, will serve as the surrogate measure for sediment delivery.

Monitoring efforts began in 2018 with streambank erosion inventories (SEI), then water quality monitoring in 2019, after preparation of the QAPP. The Idaho Bureau of Laboratories, Boise Idaho, completed the lab analysis of the surface water samples for DEQ. Twenty-one AUs are reviewed in the QAPP and can be seen in Table 3, along with Twin Falls Regional offices' description of site codes. A map showing the locations of these monitoring sites can be seen in Figure 8. Table 4 indicates reported dry sites from DEQ 2018-2019 monitoring staff and BURP technicians from past years.

Table 3: Monitoring sites in the Salmon Falls Creek subbasin for 2018–2019 data collection.

Assessment Unit Name	Assessment Unit Number	Latitude	Longitude	Site Code
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	42.2477	-114.86569	CDR3
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	42.69629	-114.85495	SF3
Salmon Falls Creek-Lower	ID17040213SK003_06	42.45294	-114.86323	SF2
Cedar Creek Reservoir	ID17040213SK004_0L	42.21345	-114.88781	CCR1, CCR2
Monument Canyon (1&2 order tributaries to Cedar Creek Reservoir)	ID17040213SK004_02	42.19026	-114.88079	MCN
House Creek-source to Cedar Reservoir	ID17040213SK005_02	42.08337, 42.10417	-114.97056, -115.01974	LHC, HS1
	ID17040213SK005_03	42.14325	-115.00482	HS2
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	42.15199	-114.95174	CDR1, CDR1 ALT
	ID17040213SK006_03	42.18965	-114.91193	CDR2
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	42.12859	-114.74056	SFR3
China, Browns, Corral, Player Creeks	ID17040213SK008_02	42.0371	-114.83032	CH1
	ID17040213SK008_03	42.06659	-114.77214	CH2
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	42.04685	-114.73615	SF1
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	42.0234	-114.53144	SH4
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	42.04007	-114.44189	SH2
Big Creek-source to mouth	ID17040213SK014_02	42.07678	-114.32345	BC1
	ID17040213SK014_03	42.04095	-114.43814	BC2
Cottonwood Creek-source to mouth	ID17040213SK015_02	42.09538, 42.13632	-114.34369, -114.3697	LF1, CW
	ID17040213SK015_03	42.11528	-114.39686	LF2
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	42.20607	-114.35547	SFSH
	ID17040213SK016_03	42.1937	-114.40407	SH1

Table 4: Reported dry sites from 2018–2019 monitoring seasons and BURP dates.

Assessment Unit Name	Assessment Unit Number	Latitude	Longitude	Site Code	BURP Dry Year
Cedar Creek-Lower	ID17040213SK000_04	42.2477	-114.86569	CDR3	1996, 2010, 2018
Monument Canyon (1&2 tribs to Cedar Creek Reservoir)	ID17040213SK004_02	42.19026	-114.88079	MCN	2004, 2007, 2008
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	42.0234	-114.53144	SH4	2010, 2015, 2019
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	42.04007	-114.44189	SH2	2002, 2006, 2010
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	42.20607	-114.35547	SFSH	2001–2005, 2010, 2014
	ID17040213SK016_03	42.1937	-114.40407	SH1	2001, 2002, 2004

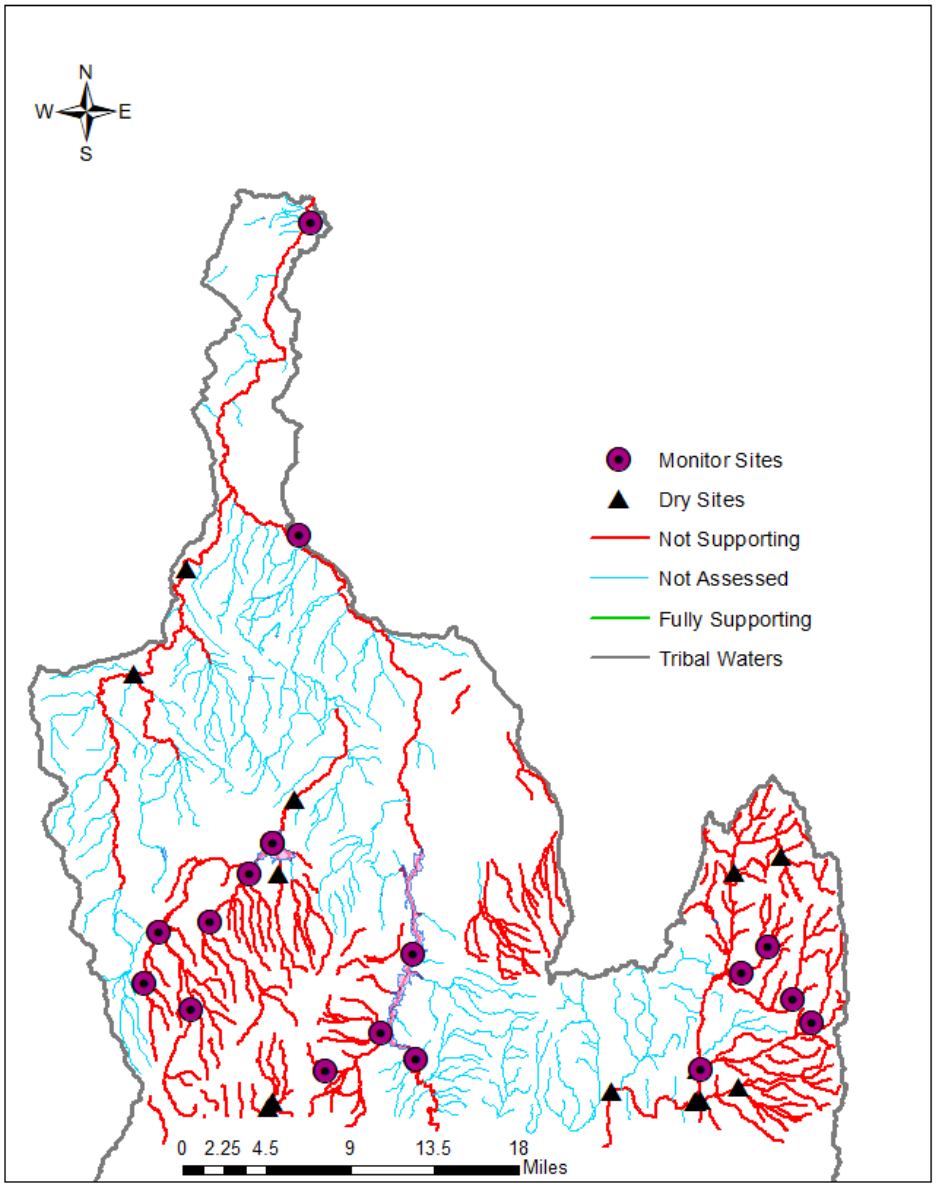


Figure 8: Map showing locations of monitoring sites and dry sites in relation to supporting/not supporting streams throughout the Salmon Falls Creek Subbasin.

2.2.1 Description of Monitoring Sites from TMDL Document

The upper reaches of Salmon Falls Creek were monitored near the confluence with the Salmon Falls Creek Reservoir in the area known as "The Backwaters". The lower reaches of Salmon Falls Creek were monitored near the USGS gauge for compliance with the TMDLs. Various monitoring locations throughout the streams were used to determine if bank stability was changing throughout the reach.

Cedar Creek Reservoir was monitored at four locations to determine compliance with the nutrient TMDL. House Creek and Cedar Creek near the confluence with the reservoir served as compliance points for the input from upper watersheds. The final monitoring point was the

outlet of the reservoir during the irrigation season to determine the net loading to the reservoir and for future mass balance models to determine the internal loading of nutrients. Bank stability measures in the upper watersheds followed a similar fashion as Salmon Falls Creek.

Cottonwood Creek was monitored for *E. coli* bacteria near the confluence with Shoshone Creek at the Shoshone Basin Road compliance with the nutrient and bacteria TMDLs. Bank stability measures in the upper watersheds followed a similar fashion as Salmon Falls Creek.

Salmon Falls Creek Reservoir was monitored at four locations to determine compliance with the nutrient TMDLs. Salmon Falls Creek and China Creek near the confluence with the reservoir served as compliance points for the input from upper watersheds. The final monitoring point was the canal outlet of the reservoir during the irrigation season to determine the net loading to the reservoir, and for refinement of the mass balance model used to determine the internal loading of nutrients.

Shoshone Creek was monitored at three locations for compliance with the TMDLs. The first of these was near the Idaho Nevada state line. This location served as the compliance point for the lower assessment unit. The second monitoring location was near the confluence with Hot Creek and served as the compliance point for the middle assessment unit. The third monitoring location was near the confluence with Cottonwood Creek at the Shoshone Basin Road crossing above Langford Flat Creek and served as the compliance point for the upper AU.

The Big Creek Assessment Unit was monitored in two locations for compliance with the nutrient TMDL. The first of these was at the lower road crossing of Hanna's Fork prior to the confluence with Big Creek. The second was near the confluence with Shoshone Creek at the road crossing with the Basin Cutoff Road.

The China Creek AU is six water bodies including the upper China Creek System. Monitoring locations for compliance with the nutrient TMDLs was placed at the mouth of China Creek near the confluence with Salmon Falls Creek Reservoir, at Whiskey Slough near the lower road crossing above the confluence with the reservoir, and Corral Creek near the China Creek Road Crossing. Bank stability measures in the AU followed in a similar fashion as Salmon Falls Creek Bank Stability was reassessed on Browns Creek, China Creek, both upper and lower segments, Corral Creek, Player Creek, and Whiskey Slough.

Site locations, listed with latitudes and longitudes in Table 3, were established in original TMDL document. Monitoring for this five-year review began with SEIs in 2018, with water quality monitoring continued in 2019. Some sites were reported as dry by DEQ staff, listed in Table 4, so data acquisition was not possible. Dry sites may be intermittent or ephemeral. Figure 8 shows a map of these dry site locations.

2.3 Load Capacity

The Clean Water Act requires that a TMDL be developed from a load capacity. A load capacity is the greatest amount of load that a water body can carry without violating water quality standards. The load capacity and loading analysis models for the various streams and pollutants were derived from load duration analysis of monitoring data, upstream monitoring, downstream monitoring, source monitoring, and estimations of loads from that data. TMDLs can be expressed as different maximum loads allowable under different flow conditions, rather than a single maximum load value. Most of the pollutants in the Salmon Falls Creek TMDL fit into this category.

The load capacity of the various segments and tributaries pollutant combinations in the Salmon Falls Creek Subbasin were calculated from flow and load duration curves developed from the flow records available from USGS or DEQ.

Specific load capacities were calculated from flow regimes identified as critical periods in the load duration curve methodology. These critical periods or categories were defined as: high flow conditions, where the flow duration interval (FDI) was less than 10 percent; moist conditions, where the FDI was between 10 and 40 percent; mid-range flows, where the FDI was between 40 and 60 percent; dry conditions, where the FDI was between 60 and 90 percent; and low flow conditions where the FDI was greater than 90 percent. In some cases, the flow regime during the critical period was determined to be at or near zero for several very small intermittent streams. In these cases, the lowest flow that water quality standards apply, which is 5 ft^3/sec for recreational uses and 1 ft^3/sec for aquatic life uses (IDAPA 58.01.02.070.07) was used to calculate the load capacity. The tabularized data are presented for ease of understanding the load capacity of a specific water body pollutant combination, but the load duration curve over the entire range of FDIs is considered the load capacity of a system. (DEQ, 2007)

Nutrients

The load duration curve for nutrients was determined by calculation using the target of 0.1 mg/L TP, and 1.5 mg/L TN for free flowing streams or natural background concentrations, daily average flow values (calculated from predicted annual hydrographs or USGS data), and a 5.39 conversion factor to convert from mg/L and ft^3/second to pounds per day. For streams flowing into reservoirs the LC was determined using the 0.05 mg/L TP target, daily average flow values (calculated from predicted annual hydrographs or USGS data), and a conversion factor of 5.39.

The nutrient LC is identified for the various flow categories, which are defined within DEQ 2007. The target shown to result in attainment of water quality standards and support of designated uses in the reach is an instream concentration of less than or equal to 0.1 mg/L TP, and 1.5 mg/L TN. Transport and deposition of nutrients, and the resulting algal growth within the reach, is seasonal in nature and captured by the different flow durations.

Table 5 shows the TP load capacities within the different load duration categories; Table 6 shows the same for TN, as calculated in DEQ 2007.

Table 5: Average TP Load Capacities within Load Duration Categories from 2007 TMDL.

Load duration categories (duration interval)	**High 0–10**	**Moist 10–40**	**Midrange 40–60**	**Dry 60–90**	**Low Flow 90–100**
Waterbody	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Salmon Falls Creek Reservoir					
Salmon Falls Creek	172.06	45.49	16.92	11.43	4.87
China Creek	1.74	0.43	0.14	0.08	0.01
Whiskey Slough	0.27	0.27	0.27	0.27	0.27
Corral Creek	0.27	0.27	0.27	0.27	0.27
Cedar Creek Reservoir					
House Creek	8.42	3.53	2.43	2.21	1.96
Cedar Creek	2.52	2.06	1.96	1.94	1.92
Cotton Wood Creek	16.80	4.04	1.16	0.60	0.03
Big Creek	20.67	6.08	2.90	2.27	1.53
Hanna's Fork	2.79	0.67	0.21	0.12	0.01
Salmon Falls Creek-Lower	165.42	103.03	82.23	58.97	24.55

Table 6: TN Load Capacities and Load Duration Categories from 2007 TMDL.

Load duration categories (duration interval)	**High 0–10**	**Moist 10–40**	**Midrange 40–60**	**Dry 60–90**	**Low Flow 90–100**
Waterbody	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Salmon Falls Creek Lower	2,481	1,545	1,233	885	368

Bacteria

The load capacity for bacteria is based on the state water quality standard for *E. coli* and is expressed in terms of organisms per day.

The bacteria load capacity is derived from the following equation:

Bacteria Load Capacity = WQS x flow x unit conversion factor

Where:

WQS = the secondary contact recreation water quality standard (576 org/ 100 ml, WQS in 2007)

Flow = the daily average flow (ft^3/sec) from predicted or USGS data

Unit conversion factor = 24,468,480

Table 7 shows the load capacity of bacteria within the different load durations categories, as calculated in DEQ, 2007.

Table 7: Average Bacteria Load Capacities within Load Duration Categories from 2007 TMDL.

Load duration categories (duration interval)	High 0–10	Moist 10–40	Midrange 40–60	Dry 60–90	Low Flow 90–100
Waterbody	org/day	org/day	org/day	org/day	org/day
Cottonwood Creek	4.391×10^{11}	1.055×10^{11}	3.029×10^{10}	1.581×10^{10}	7.189×10^{8}

Sediment

The load capacity for sediment was determined based on the origin of the sediment. In the Salmon Falls Creek Subbasin most of the sediment impacting the beneficial uses is from stream bank erosion. The load capacity is based on the load generated from banks that are greater than 80% stable.

Total suspended sediments (TSS) also were elevated and impacting the beneficial uses of two water bodies within the subbasin, Salmon Falls Creek above the reservoir and Salmon Falls Creek below the reservoir. The load duration curve for suspended sediments was determined by calculation using the target of 50 mg/L suspended sediments, daily average flow values (calculated from predicted annual hydrographs or USGS data in DEQ 2007), and a 5.39 conversion factor to convert from mg/L and ft3/second to pounds per day. The target that has been shown to result in attainment of water quality standards and support of designated uses in the reach is an instream concentration of less than or equal to 50 mg/L TSS. Refer to Table 63 in DEQ 2007 for bank erosion rates and load capacity on a per reach basis. Table 8 indicates load capacities on the upper and lower portions of Salmon Falls Creek Reservoir.

Table 8: Average TSS Load Capacities within Load Duration Categories from 2007 TMDL.

Load duration categories (duration interval)	High 0-10	Moist 10-40	Midrange 40-60	Dry 60-90	Low Flow 90-100
Waterbody	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Salmon Falls Creek Upper	172,056	45,492	16,925	11,428	4,870
Salmon Falls Creek Lower	82,711	51,513	41,117	29,485	12,275

2.4 Load Allocations

Under the CWA, Congress recognized two sources of pollution: point sources and nonpoint sources. Point source pollution represents wasteload allocations and nonpoint source pollution represents load allocations. The Salmon Falls Creek TMDL (DEQ, 2007) allocated allowable loads among different pollutant sources so appropriate control actions could be taken and water quality standards would be achieved. The total pollutant load to the water body was derived from nonpoint sources and the margin of safety (MOS), found in Tables 13 to 16, as there are no point sources in this subbasin. The effects of all activities or processes, and all potential sources, not just those water bodies listed on the 2007 §303(d) list were considered.

No point sources contribute to the nutrient loads seen in the streams and rivers of the subbasin; therefore, no waste load allocations are made. Nonpoint sources are allocated by subwatershed. Therefore, it is incumbent upon the land management agencies and private individuals to develop the appropriate BMPs to meet the nonpoint source load allocations during the implementation plan development.

Tables 9 through Table 12 list AUs with data collected in 2019 for load allocation calculations and reduction requirements. Current load is based on this data and flow measurements. Current load estimates were determined by measured concentrations during *high* discharges from 2019 data only. High discharges usually ran between May to July and had corresponding concentration measurements. Some discharge data did not have corresponding concentration measurements and therefore, were not considered when completing the following tables.

Load capacities were calculated from the high flow discharge, as used in the current load calculations, the TMDL concentration targets, and the conversion factors. The following equations and conversion factors were used:

Current Load Estimate (lbs/day) = Concentration (mg/L) x Discharge (ft^3/sec) x 5.39

Load Capacity = TP (lbs/day) = TP target (mg/L) x Discharge (ft^3/sec) x 5.39

TSS (lbs/day) = TSS target (mg/L) x Discharge (ft^3/sec) x 5.39

E. coli (cfu) = *E. coli* (cfu/100mL) x Discharge (ft^3/sec) x 0.02445

Table 9. Salmon Falls Creek subbasin TP load allocations.

Assessment Unit Name	Assessment Unit Number	Current Load[a]	Load Capacity[b] (lbs/day)	Load Reduction Required	Percent Reduction Required
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	247.46	192.42	55.04	29
Salmon Falls Creek-Lower	ID17040213SK003_06	21.6	28.80	*Meets TMDL*	*Meets TMDL*
Cedar Creek Reservoir	ID17040213SK004_0L	31.09[c]	20.74[c]	10.35	50
Monument Canyon (1&2 order tributaries to Cedar Creek Reservoir)	ID17040213SK004_02	*Dry*	*Dry*	*Dry*	*Dry*
House Creek-source to Cedar Reservoir	ID17040213SK005_02 ID17040213SK005_03	42.69	15.24	27.45	56
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02 ID17040213SK006_03	5.93	5.50	0.43	8
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	42.30[c]	24.32[c]	17.97	74
China, Browns, Corral, Player Creeks	ID17040213SK008_02 ID17040213SK008_03	2.60	1.78	0.82	46
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	25.85	22.55	3.3	15
Big Creek-source to mouth	ID17040213SK014_02 ID17040213SK014_03	7.61	4.70	2.91	62
Cottonwood Creek-source to mouth	ID17040213SK015_02 ID17040213SK015_03	17.31	17.45	*Meets TMDL*	*Meets TMDL*

[a] Current load calculated from current high flow data sampled in 2019 and contaminate on the day
[b] Load Capacity from *High* flow data only, calculated from current data and 2007 TMDL targets for TP
[c] Calculated by adding what flows into reservoir from tributaries

Table 10: Salmon Falls Creek Subbasin TN load allocations and required reductions.

Assessment Unit Name	Assessment Unit Number	Current Load[a]	Load Capacity[b] (lbs/day)	Load Reduction Required	Percent Reduction Required
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	2607.33	2886.35	*Meets TMDL*	*Meets TMDL*
Salmon Falls Creek-Lower	ID17040213SK003_06	1.44	432.02	*Meets TMDL*	*Meets TMDL*

[a] Current load calculated from current high flow data sampled in 2019 and contaminate on the day
[b] Load Capacity from *High* flow duration data only, calculated from current data and 2007 TMDL for TP

Table 11: Salmon Falls Creek Subbasin TSS load allocations and required reductions.

Assessment Unit Name	Assessment Unit Number	Current Load[a]	Load Capacity[b] (org/day)	Load Reduction Required	Percent Reduction Required
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	97173.6	96211.5	962.1	1
Salmon Falls Creek-Lower	ID17040213SK003_06	576.0	14400.8	*Meets TMDL*	*Meets TMDL*
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	5298.9	22548.5	*Meets TMDL*	*Meets TMDL*

[a] Current load calculated from current high flow data sampled in 2019 and contaminate on the day
[b] Load Capacity from *High* flow duration data only, calculated from current data and 2007 TMDL for TP

Table 12: Salmon Falls Creek Subbasin bacteria load allocations and required reductions.

Assessment Unit Name	Assessment Unit Number	Current Load	Load Capacity (org/day)	Load Reduction Required	Percent Reduction Required
Cottonwood Creek-source to mouth	ID17040213SK015_02 ID17040213SK015_03	1937.9	199.5	1738.4	89

2.5 Margin of Safety

In addition to estimating a load capacity a water body can carry, the Clean Water Act includes statutory requirements for a margin of safety (MOS) in a TMDL. The MOS is intended to account for uncertainties in available data or in the actual effect controls will have on load reductions and the receiving water body's water quality. The MOS may be implicit, such as conservative assumptions used in various calculations, specifically those of natural background, loading capacity, waste load allocations, and load allocations. Otherwise, a MOS must be clearly defined. For the Salmon Falls Creek Subbasin TMDLs, an explicit 10 percent MOS will be used for most pollutant water body combinations. The following tables include MOS values calculated in original DEQ 2007.Load duration curves were used in the analyses of the 2007 data, establishing the TMDLs. The data collected in 2019 for this this 5 year review did not use load duration curves in the analysis, but rather used peak flows and the corresponding concentrations to complete the calculations.

The MOS section in DEQ 2007 addresses temperature and mercury within these parameters for the MOS. Temperature and mercury are not discussed in this five-year review document.

Table 13: TP MOS Load and Load Duration Categories calculated in 2007 TMDL.

Load duration categories (duration interval)	High 0–10	Moist 10–40	Midrange 40–60	Dry 60–90	Low Flow 90–100
Water Body	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Salmon Falls Creek Reservoir					
Salmon Falls Creek	17.21	4.55	1.69	1.14	0.49
China Creek	0.17	0.04	0.01	0.01	0.01
Whiskey Slough	0.027	0.027	0.027	0.027	0.027
Cedar Creek Reservoir					
House Creek	0.84	0.35	0.24	0.22	0.20
Cedar Creek	0.25	0.21	0.20	0.19	0.19
Cottonwood Creek	1.68	0.40	0.12	0.06	0.01
Big Creek	2.07	0.61	0.29	0.23	0.15
Hanna's Fork	0.28	0.07	0.02	0.01	0.00
Salmon Falls Creek Lower	16.54	10.30	8.22	5.90	2.45

Table 14: TN MOS Load and Load Duration Categories calculated in 2007 TMDL.

Load duration categories (duration interval)	High 0–10	Moist 10–40	Midrange 40–60	Dry 60–90	Low Flow 90–100
Water Body	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Salmon Falls Creek Lower	248	155	123	88	37

Table 15: Bacteria MOS Load and Load Duration Categories calculated in 2007 TMDL.

Load duration categories (duration interval)	High 0–10	Moist 10–40	Midrange 40–60	Dry 60–90	Low Flow 90–100
Water Body	org/day	org/day	org/day	org/day	org/day
Cottonwood Creek	4.391×10^{10}	1.056×10^{10}	3.029×10^{9}	1.580×10^{9}	7.189 x 10

Table 16: TSS MOS Load and Load Duration Categories calculated in 2007 TMDL.

Load duration categories (duration interval)	High 0–10	Moist 10–40	Midrange 40–60	Dry 60–90	Low Flow 90–100
Water Body	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Salmon Falls Creek Upper	17,206	4,549	1,692	1,143	487
Salmon Falls Creek Lower	8,271	5,151	4,112	2,949	1,227

2.6 Seasonal Variation

The Clean Water Act states that TMDLs "shall be established at a level necessary to implement the applicable water quality standards with seasonal variation". Load duration curves have, as an integral part in their development, the seasonal variation in flow incorporated in them. As a result, seasonal variation is clearly shown in the existing loads as well as the load capacity of a given system. Load duration curves also allow for critical periods and watershed processes to be more clearly identified for a given water body pollutant combination. As most TMDLs proposed

from the Salmon Falls Subbasin utilize load duration curves for the development of load capacity seasonal variation has been accounted for.

2.7 Reserve

In the Salmon Falls Creek Subbasin, little discussion with the local stakeholders has occurred regarding a reserve load. In fact, the history of the Mid-Snake WAG has been to forgo the use of a reserve. Further discussions with the Salmon Falls Creek stakeholders are required. If it is deemed feasible, a reserve may be developed in a similar fashion as the Wood River WAG used. In that the reserve will be developed during the implementation of the TMDL. Nevertheless, it should be noted that developing a reserve post hoc will result in more stringent load reductions than presented in the various TMDLs.

2.8 Changes to Subbasin Characteristics

No major land use changes have taken place in this subbasin. Refer to Figure 9 for detailed maps of land ownerships in 2006 to 2019. A side by side comparison of the land usage/ownership shows no major land ownership changes from 2006 to 2019.

The following Table indicates percentages gathered from sums of acres on the shapefile's attribute table in ArcGIS, represented by the color coded differences in the previous maps. What acreage was lost by BLM was gained by Private owners and the loss of State ground was absorbed by USFS.

Table 17: Land Ownership in the Salmon Falls Creek Subbasin.

Ownership Type	2006 %	2019 %	% CHANGE
Bureau of Land Management	61.6	45.1	- 16.5
Military (DOD)	0.025	0.000005	- 0.03
Private	26.89	43.4	+ 16.51
State	4.345	1.9	- 2.445
US Forest Service	7.14	9.27	+ 2.13

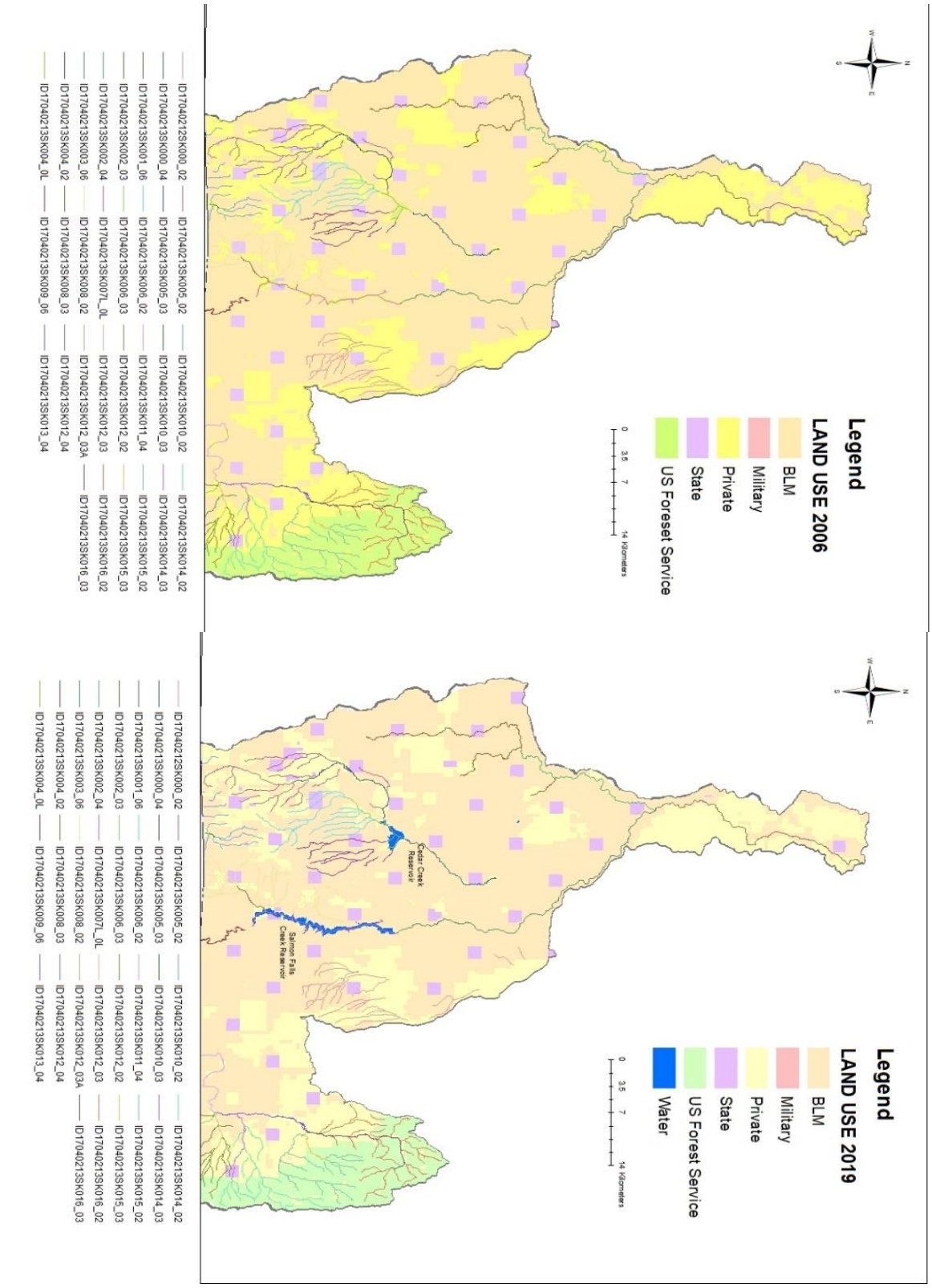


Figure 9: Maps of (left) Land use ownership in 2006; (right) Land use ownership in 2019.

3 Beneficial Use Status

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. The *Water Body Assessment Guidance* (DEQ, 2016) 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

3.1 Beneficial Uses

Beneficial uses of the water bodies included in this 5-year review are provided in Table 18.

Idaho water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). The beneficial uses of aquatic life and contact recreation may be identified as existing, designated, or presumed. These terms are briefly described in the following paragraphs. The Water Body Assessment Guidance, third edition (DEQ, 2016a) gives a more detailed description of beneficial use identification for use assessment purposes. The beneficial uses of Salmon Falls Creek Subbasin are identified in Table 18. The status support and what parameter is causing degradation are listed in Table 19 below.

Existing Uses

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.” The existing in-stream water uses and the level of water quality necessary to protect the uses shall be maintained and protected (IDAPA 58.01.02.050.02, .02.051.01, and .02.053). Existing uses include uses occurring, whether the level of quality to fully support the uses exists. A practical application of this concept would be to apply the existing use of salmonid spawning to water that could support salmonid spawning, but salmonid spawning is not occurring due to other factors, such as dams blocking migration.

Designated Uses

Designated uses under the CWA are “those uses specified in water quality standards for each water body or segment, whether or not they are being attained.” 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. Water quality must be sufficiently maintained to meet the most sensitive use. 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 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 uses).

Table 18. Beneficial uses of water bodies addressed by this 5-year review.

Assessment Unit Name	Assessment Unit Number	Beneficial Uses[a,b]	Type of Use[b]
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	CWAL, PCR, SCR, AWS, IWS, WH, AE	Designated
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	CWAL, SS, PCR, AWS, IWS, WH, AE	Designated
Salmon Falls Creek-Salmon Falls Creek Dam to Devil Creek	ID17040213SK003_06	CWAL, SS, PCR, AWS, IWR, WH, AE	Designated
Cedar Creek Reservoir	ID17040213SK004_0L	CWAL, PCR, AWS, IWS, WH, AE	Existing/Presumed/ Designated
Monument Canyon (1&2 tribs to Cedar Creek Reservoir)	ID17040213SK004_02	CWAL, AWS, IWS, WH, AE	Presumed/Designated
House Creek-source to Cedar Reservoir	ID17040213SK005_02 ID17040213SK005_03	CWAL, SS, SCR, AWS, IWS, WH, AE	Existing/Presumed/ Designated
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02 ID17040213SK006_03	CWAL, SS, SCR, AWS, IWS, WH, AE	Existing/Presumed/ Designated
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	CWAL, SS, PCR, AWS, IWS, WH, AE	Designated
China, Browns, Corral, Player Creeks	ID17040213SK008_02 ID17040213SK008_03	CWAL, SS, SCR, AWS, IWS, WH, AE	Existing/Presumed/ Designated
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	CWAL, SS, PCR, AWS, IWS, WH, AE	Designated
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	CWAL, SS, SCR, AWS, IWS WH, AE	Existing/Presumed/ Designated
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	CWAL, SS, SCR, AWS, IWS, WH, AE	Presumed/ Designated
Big Creek-source to mouth	ID17040213SK014_02 ID17040213SK014_03	CWAL, SS, SCR, AWS, IWS, WH, AE	Existing/Presumed/ Designated
Cottonwood Creek-source to mouth	ID17040213SK015_02 ID17040213SK015_03	CWAL, SS, SCR, AWS, IWR, WH, AE	Existing/Presumed/ Designated
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02 ID17040213SK016_03	CWAL, SS, SCR, AWS, IWR, WH, AE	Existing/Presumed/ Designated

[a]CWAL—cold water aquatic life, SS—Salmonid spawning, PCR—primary contact recreation, SCR—secondary contact recreation, AWS—agricultural water supply, IWS—industrial water supply, DWS—domestic water supply, WH—wildlife habitat, AE—aesthetics. AWS, IWS, DWS, WH, and AE are usually unassessed beneficial uses.
[b]Table completed with data from original TMDL document (DEQ, 2007) and the 2022 Integrated Report (DEQ, 2022)

Presumed Uses

In Idaho, a majority of water bodies do not yet have designated uses identified in the water quality standards. In the interim, and absent information on existing uses, DEQ presumes that most waters in the state support cold water aquatic life and contact recreation (IDAPA 58.01.02.101.01). To protect these so-called "presumed uses," DEQ applies the numeric cold water aquatic life and contact recreation criteria to undesignated waters. If, in the course of assessment, cold water aquatic life is not found to be an existing use, a use designation to that effect is needed before some other aquatic life criteria (such as seasonal cold) can be applied in lieu of cold water criteria (IDAPA 58.01.02.101.01).

To determine support of beneficial uses, DEQ collected aquatic data through the Beneficial Use Reconnaissance Program (BURP) during the years since the TMDL was approved. The following table summarizes the BURP data and parameters as "fully supporting" or "not supporting" and provides the category for each stream. Data for this table was collected from the 2022 Integrated Report, found at *https://mapcase.deq.idaho.gov/wq2022/default.html*.

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 A), and *narrative* criteria for pollutants such as sediment and nutrients (IDAPA 58.01.02.250–251).

Narrative criteria for excess sediment are described in the water quality standards:

> Sediment shall not exceed quantities specified in Sections 250 and 252, or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in Subsection 350. (IDAPA 58.01.02.200.08)

Narrative criteria for excess nutrients are described in the water quality standards:

> Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses. (IDAPA 58.01.02.200.06)

Narrative criteria for floating, suspended, or submerged matter are described in the water quality standards:

> Surface waters of the state shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses. This matter does not include suspended sediment produced as a result of nonpoint source activities. (IDAPA 58.01.02.200.05)

Table 19: Beneficial Use support status and parameters for AUs focused in this document.

Assessment Unit Name	Assessment Unit Number	Category[2]	Assessed Beneficial Uses[1,2]	BURP Data Support Status	Parameter[1]	Reported Dry BURP and/or DEQ Staff
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	4A	CWAL[3]	Not Supporting	Silt	1996, 2010, 2018, 2019
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	4A	CWAL[3]	Not Supporting	TN, TP, TSS	—
			SS[3]	Not Supporting	—	
			PCR	*Fully Supporting*	—	
Salmon Falls Creek-Salmon Falls Creek Dam to Devil Creek	ID17040213SK003_06	4A	CWAL[3]	Not Supporting	TN, TP, TSS	—
Cedar Creek Reservoir	ID17040213SK004_0L	4A	CWAL[3]	Not Supporting	TP, Silt	—
			PCR	*Fully Supporting*	—	
Monument Canyon (1&2 tribs to Cedar Creek Reservoir)	ID17040213SK004_02	4A	CWAL[3]	Not Supporting	TP, Silt	2004, 2007, 2008, 2019
House Creek-source to Cedar Reservoir	ID17040213SK005_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	—	
			SCR	*Fully Supporting*	—	
	ID17040213SK005_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SCR	*Fully Supporting*	—	
			SS	Not Supporting	TP, Silt	
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
	ID17040213SK006_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SCR	*Fully Supporting*	—	
			SS	Not Supporting	TP, Silt	
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	4A	CWAL[3]	Not Supporting	Hg, TP, Silt	—
			SS[3]	Not Supporting	Hg, TP, Silt	
			PCR	*Fully Supporting*	—	
China, Browns, Corral, Player Creeks	ID17040213SK008_02	4A	CWAL[3]	Not Supporting	TP	—
			SS[3]	Not Supporting	TP	
			SCR	*Fully Supporting*	—	
	ID17040213SK008_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	—	
			SCR	*Fully Supporting*	—	
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	4A	CWAL[3]	Not Supporting	TP, TSS, Silt	—
			SS[3]	Not Supporting	—	
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	4A	CWAL[3]	Not Supporting	Silt	2010, 2015, 2019
			SS[3]	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	4A	CWAL[3]	Not Supporting	Silt	2002, 2006, 2010
			SS[3]	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
Big Creek-source to mouth	ID17040213SK014_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	Silt	
			SCR	*Fully Supporting*	—	
	ID17040213SK014_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS[3]	Not Supporting	TP, Silt	
			SCR	*Fully Supporting*	—	
Cottonwood Creek-source to mouth	ID17040213SK015_02	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SS	Not Supporting	TP	
			SCR	Not Supporting	*E. coli*	
	ID17040213SK015_03	4A	CWAL[3]	Not Supporting	TP, Silt	—
			SCR	Not Supporting	*E. coli*	

Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	4A	CWAL[3]	Not Supporting	Silt	2001, 2002, 2003, 2004, 2005, 2010, 2014
			SS[3]	Not Supporting	Silt	
	ID17040213SK016_03	4A	CWAL[3]	Not Supporting	Silt	2001, 2002, 2004
			SS[3]	Not Supporting	—	

[1]CWAL—cold water aquatic life, SS—Salmonid spawning, PCR—primary contact recreation, SCR—secondary contact recreation, TP—Total phosphorus, TN—Total nitrogen, TSS—Total suspended solids, Silt—Siltation/sedimentation, *E. coli*—Escherichia coli, Hg—Mercury,
[2]Table completed with data from 2022 Integrated Report (DEQ, 2022)
[3]Temperature parameter cause of Not Supporting

3.2 Summary and Analysis of Current Water Quality Data

This section includes a list of available water quality data gathered for this five-year review of the 2007 TMDL, along with a discussion of what the data say about TMDL targets and beneficial use status. Discernable trends in water quality are considered along with TMDL achievements and current beneficial use status.

3.2.1 Water Quality Data Collection Efforts

DEQ's monitoring effort was limited to streams identified in the original TMDL document. However, some streams are intermittent or dry starting July 1st through August, after the snow runoff season. Due to this, data were collected on only 15 of the 21 AUs listed in the original TMDL document. Since finalization of the TMDL document in 2007, the Beneficial Use Reconnaissance Program (BURP) has been collecting data in the Salmon Falls Creek HUC on flowing streams.

3.2.2 Summary of Streambank Erosion Inventories and Suspended Sediment

Streambank erosion inventories (SEIs) were conducted by DEQ staff in 2018 and 2020 to categorize the erosion potential as a percent. Since the publication of the TMDL document in 2007, SEIs have become an additional protocol for DEQ staff to quantify this data and develop load reductions for AUs. SEIs are performed on 10% of an AU, on an area that is representative of the entire AU. This helps determine an estimate of the entire load entering a system.

In the 2007 TMDL, bank stability measurements were collected using BURP protocols on two locations in the Upper Salmon Falls Creek system and within 5 miles in the lower portion of the system. See pages 77-78 in original document for a description of where the sampling sites were located. Based on their findings, an estimate of 162.94 tons of sediment per year was being delivered to the downstream reach. The proposed target for sediment delivery in the backwaters reach was 108.86 tons per year. It was estimated that the total amount of mobilized sediment moving through the system was 1,080 tons per year, requiring a reduction of about 87% from 2007.

In 2018-2020, SEIs in the Salmon Falls Creek drainage system generated the following information listed in Table 20.

Table 20: 2018-2020 streambank erosion inventory results in the Salmon Falls Creek Drainage.

Assessment Unit Name	Assessment Unit Number	Target Cover (%)	Actual Stream Bank Cover (%)	SEI Current Load *ton/day*	SEI Load Capacity *ton/day*
Cedar Creek-Reservoir to Salmon Falls Creek	ID17040213SK000_04	80	69.5	5.82	1.76
Monument Canyon-to Cedar Reservoir	ID17040213SK004_02	80	99.4	0.05	1.46
House Creek-Source to Cedar Reservoir	ID17040213SK005_02	80	99.0	0.104	2.097
	ID17040213SK005_03	80	98.8	0.039	0.634
Cedar Creek-Source to Cedar Creek Reservoir	ID17040213SK006_02	80	96.2	0.077	0.403
	ID17040213SK006_03	80	99.2	0.007	0.172
China Creek	ID17040213SK008_03	80	99.1	0.017	0.375
Salmon Falls Creek-Upper	ID17040213SK009_06	80	85.5	3.36	4.63
Shoshone Creek-Hot Creek to State Border	ID17040213SK011_04	80	99.0	0.024	0.478
Shoshone Creek-Cottonwood to Hot Creek	ID17040213SK013_04	80	97.5	0.142	1.14
Big Creek-Source to Mouth	ID17040213SK014_02	80	97.6	0.223	1.83
	ID17040213SK014_03	80	98.8	0.008	0.136
Cottonwood Creek-Source to Mouth	ID17040213SK015_02	80	95.8	0.45	2.36
	ID17040213SK015_03	80	98.3	0.035	0.4
Shoshone Creek-Source to Cottonwood Creek	ID17040213SK016_02	80	97.1	0.169	1.154
	ID17040213SK016_03	80	94.2	1.482	2.565

Still impaired, Cedar Creek from Cedar Creek Reservoir to Salmon Falls Creek, exceeds the load capacity generated from SEI data. The current load generated from SEI data is at 5.82 tons per day, and the load capacity is 1.76 tons per day. A load reduction is still needed of about 70 percent in this reach to Salmon Falls Creek. Notes from DEQ staff indicate impairments are caused by animal/cattle trampling and activity. The rest of the reaches where SEIs were performed appear to be meeting sediment delivery requirements for the system.

3.2.3 Water Quality in Salmon Falls Creek

In 2019, DEQ collected water quality data (pH, dissolved oxygen [DO], temperature, conductivity, total dissolved solids [TDS], total nitrogen [TN], total phosphorus [TP], total suspended solids [TSS], turbidity and bacteria [*E. coli*]) throughout the Salmon Falls Creek subbasin. Due to some locations reported as dry and/or intermittent, geomeans could not be

collected for the bacteria TMDL on Cottonwood Creek. Other locations were also dry so samples could not be collected for TSS monitoring.

As a reminder, the TP target for Salmon Falls Creek Upper is 0.05 mg/L and 0.1 mg/L for Salmon Falls Creek Lower. The average TP in the Salmon Falls Creek Upper portion was 0.098 mg/L and for the lower portion, the average was 0.067 mg/L. The TP target of 0.05 mg/L also applied to Cedar Creek Upper, with an average of 0.047 mg/L, Cottonwood Creek, with an average of 0.042 mg/L, and Big Creek, with an average of 0.080 mg/L. The TN target for Salmon Falls Creek Lower is 1.5 mg/L and the average was 0.061 mg/L. The TSS target for both upper and lower Salmon Falls Creek was <50 mg/L, and the upper portion had an average of 17.94 mg/L, with 13.08 mg/L average in the lower section of Salmon Falls Creek. To meet the water quality standard for beneficial uses of primary contact recreation or secondary contact recreation, the *E. coli* count needs to be a geometric mean of less than 126 cfu/100ml based on a minimum of 5 samples collected over 45 days. A geomean could not be collected for Cottonwood Creek due to dry conditions. The average of the samples that were collected was 269.25 cfu/100ml, well above the water quality standard single sample criteria for contact recreation.

Refer to Figure 10. below for a distribution of each parameter described above and in the following Table, which shows averages of nutrient and sediment samples within the five sections of Salmon Falls Creek drainage. The data separated by each AU is summarized in Appendix B.

Table 21: Average TP, TN, and TSS concentrations in the Salmon Falls Creek Subbasin.

	Average TP (mg/L)	Average TN (mg/L)	Average TSS (mg/L)
Salmon Falls Creek Upper	0.098	—	17.941
Cedar Creek Upper	0.047	—	—
Cottonwood Creek	0.042	—	—
Big Creek	0.080	—	—
Salmon Falls Creek Lower	0.067	1.194	13.077

In Situ measurements for water temperature, conductivity, pH, turbidity, and DO were taken with a calibrated Hydrolab multiparameter sonde. Water chemistry samples analyzed for TP, TN, TSS, and *E. coli* were collected as grab samples.

DO, pH, and temperature depth profiles were conducted during the 2019 sampling season at each of the reservoir sampling sites (Cedar Creek Reservoir and Salmon Falls Creek Reservoir). Departures from the Idaho's water quality criteria for beneficial use of cold water aquatic life (CWAL) were analyzed for DO, pH, and temperature parameters collected from the Hydrolab data during the sampling in 2019. The results are shown below in Table 22No departures for temperature was present. See 'Water Quality Standards' in Appendix A for further information.

Table 22: DO and pH criteria departures in Salmon Falls Creek Reservoir and Cedar Creek Reservoir.

Site	Date	Dissolved Oxygen Departure	pH Departure
SFR1	06/13/2019	X	—
SFR1	07/15/2019	X	—
SFR1	10/07/2019	—	X
CCR1	07/15/2019	X	X
CCR1	08/19/2019	X	—
CCR1	09/09/2019	X	—
CCR1	10/07/2019	—	—
CCR2	07/15/2019	X	X
CCR2	08/19/2019	X	X
CCR2	09/09/2019	X	—
CCR2	10/07/2019	X	X

Note: Dissolved oxygen concentrations were only compared to Idaho's water quality criteria in the epilimnion of each reservoir.

The surface water quality criteria for aquatic life use designations must meet the general criteria for pH within the range of 6.5–9.0. For cold water aquatic life, the DO shall always exceed 6 mg/L, and the water temperature must be 22°C or less with a maximum daily average of no greater than 19°C. For warm water aquatic life, the DO shall always exceed 5 mg/L and temperature must be 33°C or less with a maximum daily average of not greater than 29°C.

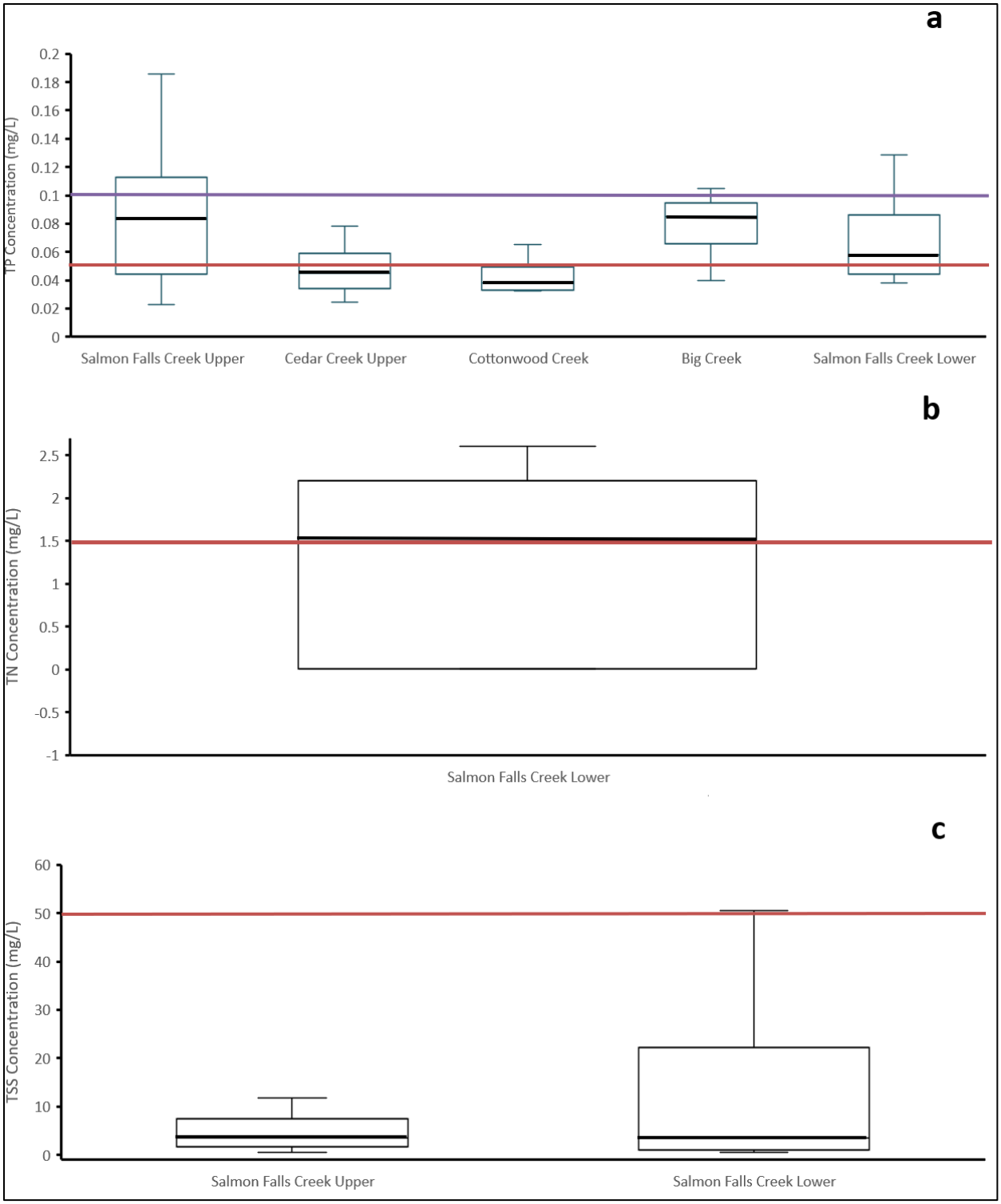


Figure 9: Distribution box plots of pollutants in the Salmon Falls Creek subbasin. (a) Total Phosphorus concentrations for tributaries of the Salmon Falls Drainage. The purple line denotes the TP target of 0.1 mg/L for tributaries below the reservoir and the red line denotes TP target of 0.05 mg/L for tributaries above the reservoir. (b) Total nitrogen concentrations for Salmon Falls Creek drainage system. The red line denotes the TN target of 1.5 mg/L for the lower portion of the drainage system. (c) Total suspended solids concentrations for Salmon Falls Creek drainage system. The red line denotes the TSS target of 50 mg/L for the entire system.

3.3 Assessment Unit Summary

The following sections include summaries data analyses, literature reviews, field investigations and a list of conclusions for AUs included in Category 4a of the 2022 Integrated Report (IR) (DEQ 2022). All AUs evaluated in this document are summarized in Table 23. Sections 3.3.1 and 3.3.2 provide more detailed information.

Assessment units (AUs) are groups of similar streams that have similar land use practices, ownership, or land management. Stream order is the main basis for determining AUs. 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.

Table 23. Existing total maximum daily loads and recommendations for the next Integrated Report.

Assessment Unit Name	Assessment Unit Number	Pollutants	Recommended Change to IR	Justifications
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	sediment	Move to category 3-unassessed	Reported as Dry
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	TN, TP, TSS	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek-Salmon Falls Creek Dam to Devil Creek	ID17040213SK003_06	TN, TP, TSS	Remain in 4A	Nutrient and Sediment Load
Cedar Creek Reservoir	ID17040213SK004_0L	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Monument Canyon-1&2 tribs to Cedar Creek Reservoir	ID17040213SK004_02	TP, sediment	Move to category 3-unassessed	Reported as Dry
House Creek-source to Cedar Reservoir	ID17040213SK005_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK005_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK006_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	Hg, TP, sediment	Remain in 4A	Nutrient and Sediment Load
China, Browns, Corral, Player Creeks	ID17040213SK008_02	TP	Remain in 4A	Excess Nutrient Load
	ID17040213SK008_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls	ID17040213SK009_06	TP, TSS, sediment	Remain in 4A	Nutrient and Sediment Load

Creek				
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	sediment	Remain in 4A	Sediment Load
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	sediment	Move to category 3-unassessed	Reported as Dry
Big Creek-source to mouth	ID17040213SK014_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK014_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Cottonwood Creek-source to mouth	ID17040213SK015_02	TP, sediment, *E. coli*	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK015_03	TP, sediment, *E. coli*	Remain in 4A	Nutrient and Sediment Load
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	sediment	Move to category 3-unassessed	Reported as Dry
	ID17040213SK016_03	sediment	Move to category 3-unassessed	Reported as Dry

Note: TP=total phosphorus; TSS=total suspended solids; TN=total nitrogen; Hg=Mercury

3.3.1 Assessment Units in TMDLs That Are Still Impaired

Refer to DEQ 2021 for listings about temperature TMDLs. *E. coli*, nutrients and sediment are TMDLs examined in this document. The following information is a summary of AUs within the Salmon Falls Creek drainage system.

ID17040213SK001_06, Salmon Falls Creek—Devil Creek to Mouth

- Listed for total phosphorus, total nitrogen, and total suspended solids.
- This AU is listed in Category 4a for approved TMDLs for nutrients and sediment.
- Data shows TP average of 0.0785 mg/L, TN at 2.041 mg/L, and TSS at 23.214 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 29% and TSS 1% reductions during peak flows. TN meets requirements during high flows.
- SEI data collection was inaccessible, so bank stability is unknown.

ID17040213SK003_06, Salmon Falls Creek—Salmon Falls Creek Dam to Devil Creek

- Listed for total phosphorus, total nitrogen, and total suspended solids.
- This AU is listed in Category 4a for approved TMDLs for nutrients and sediment.
- Data shows TP average of 0.0548 mg/L, 0.008 TN at mg/L, and TSS at 1.25 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP, TN, and TSS all meet requirements, but more data is needed.

ID17040213SK004_0L, Cedar Creek Reservoir

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for sediment and total phosphorus.

- Data shows TP average of 0.0699 mg/L and TSS at 3.625 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 50% reductions during peak flows. TSS meets requirements during high flows. No data for SEI in this AU so more information is needed for sediment measurements. Possibly add all tributaries into reservoir.

ID17040213SK005_02, House Creek—source to Cedar Reservoir

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for sediment and total phosphorus.
- Data shows TP average of 0.0420 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 56% reductions for SK005_02, combined with SK005_03 during peak flows.
- The streambank cover percent for this AU is 99.0%. SEI current load is 0.104 tons/day, with a load capacity of 2.097 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK005_03, House Creek—source to Cedar Reservoir

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for sediment and total phosphorus.
- Data shows TP average of 0.0549 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 56% reductions for SK005_03, combined with SK005_02 during peak flows.
- The streambank cover percent for this AU is 98.8%. SEI current load is 0.039 tons/day, with a load capacity of 0.634 tons/day. This AU was surveyed during dry conditions, so bank coverage was high and meets target of 80% or higher and appears to meet sediment TMDL.

ID17040213SK006_02, Cedar Creek—source to Cedar Creek Reservoir

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for sediment and total phosphorus.
- Data shows TP average of 0.0427 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 8% reductions during peak flows for SK006_02 and SK006_03 combined.
- The streambank cover percent for this AU is 96.2%. SEI current load is 0.077 tons/day, with a load capacity of 0.403 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK006_03, Cedar Creek—source to Cedar Creek Reservoir

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for sediment and total phosphorus.
- Data shows TP average of 0.0595 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 8% reductions during peak flows for SK006_03 and SK006_02 combined.

- The streambank cover percent for this AU is 99.2%. SEI current load is 0.007 tons/day, with a load capacity of 0.172 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK007L_0L, Salmon Falls Creek Reservoir

- Listed for total phosphorus, mercury, and sediment.
- This AU is listed in Category 4a for approved TMDLs for sediment, mercury, and total phosphorus.
- Data shows TP average of 0.0844 mg/L and TSS at 3.2 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 51% reductions during peak flows. No data available during this review season for mercury concentrations.

ID17040213SK008_02, China, Browns, Corral, Player Creeks

- Listed for total phosphorus.
- This AU is listed in Category 4a for approved TMDLs for total phosphorus.
- Data shows TP average of 0.036 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 46% reductions during peak flows for SK008_02 and SK008_03 combined.

ID17040213SK008_03, China, Browns, Corral, Player Creeks

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for total phosphorus and sediment.
- Data shows TP average of 0.1644 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 46% reductions during peak flows for SK008_03 and SK008_02 combined.
- The streambank cover percent for this AU is 99.1%. SEI current load is 0.017 tons/day, with a load capacity of 0.375 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK009_06, Salmon Falls Creek—Idaho/Nevada Border to Salmon Falls Creek

- Listed for total phosphorus, total suspended solids, and sediment.
- This AU is listed in Category 4a for approved TMDLs for sediment, total nitrogen, and total phosphorus.
- Data shows TP average of 0.0868 mg/L, TN at 0.06 mg/L, and TSS at 54.79 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 15% reductions during peak flow.
- The streambank cover percent for this AU is 85.5%. SEI current load is 3.36 tons/day, with a load capacity of 4.63 tons/day. Bank coverage is good, and AU appears to meet sediment target of 80% and is under load capacity.

ID17040213SK011_04, Shoshone Creek—Hot Creek to Idaho/Nevada Border

- Listed for sediment.
- This AU is listed in Category 4a for an approved TMDL for sediment.

- The streambank cover percent for this AU is 99.0%. SEI current load is 0.024 tons/day, with a load capacity of 0.478 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK014_02, Big Creek—source to mouth

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for total phosphorus and sediment.
- Data shows TP average of 0.0852 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 62% reductions during peak flows for SK014_02 and SK014_03 combined.
- The streambank cover percent for this AU is 97.6%. SEI current load is 0.223 tons/day, with a load capacity of 11.83 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK014_03, Big Creek—source to mouth

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a for approved TMDLs for total phosphorus and sediment.
- Data shows TP average of 0.075 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP requires 62% reductions during peak flows for SK014_03 and SK014_02 combined.
- The streambank cover percent for this AU is 98.8%. SEI current load is 0.008 tons/day, with a load capacity of 0.136 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK015_02, Cottonwood Creek—source to mouth

- Listed for *E. coli*, total phosphorus, and sediment.
- This AU is listed in Category 4a for approved TMDLs for *E. coli*, total phosphorus, and sediment.
- Data shows TP average of 0.0375 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP meets requirements. Only one sample for *E. coli* was collected at 308 cfu/100mg, exceeding requirements. More data is required.
- The streambank cover percent for this AU is 95.8%. SEI current load is 0.45 tons/day, with a load capacity of 2.36 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

ID17040213SK015_03, Cottonwood Creek—source to mouth

- Listed for *E. coli*, total phosphorus, and sediment.
- This AU is listed in Category 4a for approved TMDLs for *E. coli*, total phosphorus, and sediment.
- Data shows TP average of 0.0456 mg/L between April and October. Using high flow measurements with corresponding concentrations, conclusions are TP meets requirements. The average for *E. coli* was at 1529.33 cfu/100mg, exceeding

requirements, and did not include multiple days of samples. More data is required to make further analyses.

- The streambank cover percent for this AU is 98.3%. SEI current load is 0.035 tons/day, with a load capacity of 0.4 tons/day. Bank coverage is high, and AU appears to meet sediment target of 80% and is well under load capacity.

3.3.2 Assessment Units in TMDLs Proposed for Delisting

For purposes of the Integrated Report, DEQ refers to a delisting as any AU-cause combination that is removed from Category 4 or Category 5. Delistings have to be supported by a detailed rationale. The following AUs are being proposed for delisting in the next Integrated Report because they are now meeting their beneficial uses.

ID17040213SK000_04, Cedar Creek—reservoir to Salmon Falls Creek

- Listed for sediment.
- This AU is listed in Category 4a and 4c for approved TMDLs for sediment in 2007.
- The streambank cover percent for this AU is 69.5%. SEI current load is 5.82 tons/day, with a load capacity of 1.76 tons/day. The target for streambank cover is 80% drainage-wide. The current load exceeds the load capacity, which means a load reduction of about 70% is required. SEI performed in dry conditions.
- This stream is listed as intermittent and/or ephemeral and has been reported as dry by multiple surveyors: through our BURP program (in 1996, 2010, and 2018) and by DEQ staff (in 2019) for this five-year review. It is recommended to move to category 3-unassessed because the numeric sediment shouldn't apply to a dry stream.

ID17040213SK0004_02, Monument Canyon—1&2 tributaries to Cedar Creek Reservoir

- Listed for total phosphorus and sediment.
- This AU is listed in Category 4a and 4c for approved TMDLs for phosphorus and sediment in 2007. Due to dry conditions during collection, no TP samples could be obtained on any sampling dates.
- The streambank cover percent for this AU is 99.4%. SEI current load is 0.05 tons/day, with a load capacity of 1.46 tons/day. This AU was surveyed during dry conditions, so bank coverage was high, and appears to meet sediment target of 80% and is well under load capacity.
- This stream is listed as intermittent and/or ephemeral and has been reported as dry by multiple surveyors: through our BURP program (in 2004, 2007, and 2008) and by DEQ staff (in 2019) for this five year review. It is recommended to move to category 3-unassessed because the numeric sediment criteria shouldn't apply to a dry stream.

ID17040213SK013_04, Shoshone Creek—Cottonwood Creek to Hot Creek

- Listed for sediment.
- This AU is listed in Category 4a for an approved TMDL for sediment in 2007.
- The streambank cover percent for this AU is 97.5%. SEI current load is 0.142 tons/day, with a load capacity of 1.14 tons/day. This AU was surveyed during dry conditions, so

bank coverage was high, and appears to meet sediment target of 80% and is well under load capacity.
- This stream is listed as intermittent and/or ephemeral and has been reported as dry by multiple surveyors: through our BURP program (in 2002, 2006, and 2010) and by DEQ staff (in 2019) for this five year review. It is recommended to move to category 3-unassessed because the numeric sediment criteria shouldn't apply to a dry stream.

ID17040213SK016_02, Shoshone Creek—source to Cottonwood Creek

- Listed for sediment.
- This AU is listed in Category 4a for an approved TMDL for sediment in 2007.
- The streambank cover percent for this AU is 97.1%. SEI current load is 0.169 tons/day, with a load capacity of 1.154 tons/day. This AU was surveyed during dry conditions, so bank coverage was high, and appears to meet sediment TMDL target of 80% and is well under load capacity.
- This stream is listed as intermittent and/or ephemeral and has been reported as dry by multiple surveyors: through our BURP program (in 2001, 2002, 2003, 2004, 2005, 2010 and 2014) and by DEQ staff (in 2019) for this five year review. It is recommended to move to category 3-unassessed because the numeric sediment criteria shouldn't apply to a dry stream.

ID17040213SK016_03, Shoshone Creek—source to Cottonwood Creek

- Listed for sediment.
- This AU is listed in Category 4a for an approved TMDL for sediment.
- The streambank cover percent for this AU is 94.2%. SEI current load is 1.482 tons/day, with a load capacity of 2.565 tons/day. This AU was surveyed during dry conditions, so bank coverage was high, and appears to meet sediment TMDL target of 80% bank coverage and is under load capacity.
- This stream is listed as intermittent and/or ephemeral and has been reported as dry by multiple surveyors: through our BURP program (in 2001, 2002, and 2004) and by DEQ staff (in 2019) for this five year review. It is recommended to move to category 3-unassessed because the numeric sediment criteria shouldn't apply to a dry stream.

3.4 Beneficial Use Recommendations

Table 19 indicates the AUs evaluated in this document and whether they are supporting or not supporting the beneficial uses for each AU. Currently, no changes are recommended for updates to support status of supporting or not supporting of beneficial uses.

4 Review of Implementation Plan and Activities

The *Salmon Falls Creek Subbasin Agriculture TMDL Implementation Plan HUC* 17040213 was developed in February 2009 (Dansart et al. 2009). It was created to outline best management practices (BMPs) suggestions and resource management systems (RMS) on agricultural lands to meet requirements of the Salmon Falls Creek TMDLs.

The goal was to implement BMPs for control of agricultural non-point source pollution to improve water quality and reduce the number of pollutants from the agricultural runoff into surface waters of the watershed.

The plan outlines recommendations of certain BMPs for agricultural critical areas and suggests alternatives for reducing surface and groundwater contamination problems. Outlined in four distinct drainage areas, the plan outlined areas of concern using the assessment unit identification numbers in each subwatershed.

For Cedar Creek Reservoir drainage, upper and lower Cedar Creek, Cedar Creek Reservoir, and House Creek are included and focus on pollutants of sediment, temperature, phosphorus, and flow alteration. For Salmon Falls Creek Reservoir drainage, the reservoir, Salmon Falls Creek from the state line to the reservoir, North Fork Salmon Falls Creek, China/Browns/Corral/Whiskey Slough/Players Creeks, and China Creek are all included and focus on pollutants of mercury, sediment, phosphorus, and temperature. Lower Salmon Falls Creek drainage includes Salmon Falls Creek from Devil Creek to the mouth of the Snake River. Shoshone Creek and Tributaries drainage includes Shoshone Creek from Hot Creek to state line and sections from Cottonwood Creek to Hot Creek and Shoshone Creek source to Cottonwood Creek. It also includes separate assessment units within Cottonwood Creek, Big Creek, and Hot Creek.

Due to most of the land within the Salmon Falls Creek drainage being owned by the BLM and private rangeland owners, meadows located along streams may be cut for hay and/or grazed in the summer and fall, adding stress to those streams. Water quality has diminished, and precautionary measures are suggested to delineate any further disruption. BMPs were concentrated in these areas, as well as in agriculture farmlands downstream.

Assessment results showed that over a third of reaches had poor to fair aquatic habitat, with almost half of the assessed reaches indicating severe erosion. IASCD recommended to reduce sediment and nutrient levels on Salmon Falls Creek, BMPs should be installed above and below the dam. Critical areas include unstable and erosive streambanks/riparian areas where livestock have access to streams and nearby areas; upland areas which are overgrazed and show erosion; areas generating irrigation induced erosion by return flows into streams.

The *Salmon Falls Creek Subbasin Agriculture TMDL Implementation Plan HUC* 17040213 outlines Treatment Units distributed by soil composition. 24 miles of unstable and erosive streambank/riparian areas include silt/clay/loam soils and suggest grazing management practice changes. 90,000 acres of rangeland includes cobbly/gravelly/clay/silt soils and areas of rock outcrop may have inadequate stock water supplies which need to be updated to keep

livestock out of streams. 4,637 acres of irrigated cropland includes silt loam and cobbly/sandy/gravelly soils and need updated irrigation distribution systems and Agricultural BMPs to limit soil erosion and impacts on water quality draining into the Salmon Falls Creek drainage. Table 19 (pg. 47 of the Implementation Plan) presents this information designated by priority ranking and which subwatershed receives BMP implementation first.

4.1 Responsible Parties

Various entities are involved in or responsible for implementing the TMDL implementation of BMPs (Table 24) and must continue to reduce nutrient, sediment, and bacteria loads established by the TMDLs.

Table 24. Designated management agencies and their responsibility for implementing the Salmon Falls Creek TMDLs.

Designated Management Agency	Resource Responsibility
Idaho Soil and Water Conservation Commission	Agriculture
Bureau of Land Management	BLM Land, grazing permits
Sawtooth National Forest	USFS Land
Idaho Department of Lands	State endowment lands, timber harvest, and mining

4.2 Accomplished Projects

Since the publication of the TMDL document in 2007, there have been seven federally funded § 319 projects completed to enhance the water quality in the Salmon Falls Creek Subbasin Parties involved in improving water quality in this subbasin include Balanced Rock Soil Conservation District, Twin Falls Soil and Water Conservation District, Idaho Soil and Water Conservation Commission, Western Stockgrowers Association, Twin Falls Canal Company, and Dickinson Living Trust, among others. Partnerships were developed to assist livestock and agricultural farm owners in these projects, as listed in Table 25.

Table 25: §319 funded projects within Salmon Falls Creek Subbasin addressing 2007 TMDL.

Assessment Unit	Begin Date	End Date	Best Management Practice (BMP)	Name	Designated Management Area	Load Reduction Estimates (lbs/yr)		
						Sediment	Total Phosphorus	Total Nitrogen
ID17040213SK001_06	6/15/2003	12/30/2004	Constructed Wetland	Balanced Rock Cedar Draw/F. Coulee	Balanced Rock Soil Conservation District	11,442	45,332	NA
ID17040213SK001_06	7/1/2006	7/1/2008	Sediment Basins	Salmon Falls Pump-back Project	Balanced Rock Soil Conservation District	174	657	NA
ID17040213SK001_06	6/30/2008	6/30/2012	Constructed Wetland	E. Coulee Drain Elimination Project	Balanced Rock Soil Conservation District	1,385,605	1,315	NA
ID17040213SK005_02	7/21/2009	6/13/2011	Stream Bank Restoration	Salmon Falls Creek Ag	Twin Falls Soil and Water	272,712	167	600

				Implementation Project	Conservation District			
ID17040213SK005_03	7/15/2008	11/14/2008	Livestock Watering Facility	Salmon Falls Watershed TMDL-(INL PROJ)	Idaho Soil Conservation Commissions	38,889.5	60	NA
ID17040213SK016_02	2/18/2014	5/1/2014	Riparian Exclusion by off-site water	Western Stockgrowers Association Enhancement	Twin Falls Soil and Water Conservation District	Not Provided		
ID17040213SK016_03	10/20/2007	12/31/2010	Livestock Watering Facility	Shoshone WQ Improvement Project	Twin Falls Soil and Water Conservation District	513,677.07	379	745

Note: Information gathered from ArcGIS shapefile *Section 319 (NPS) and original applications.*

4.3 Implementation Priority

The implementation planning process included assessing impacts to water quality for §303(d) listed streams in the Salmon Falls Creek subbasin and establishing priority areas for installing BMPs to meet objectives outlined in the TMDLs. Water quality monitoring data and field inventory and evaluations were used to establish the critical zones. No time frames for completeness were estimated in the document, rather, priority rankings were assigned to each subwatershed group. The following Table was collected from page 47 of the implementation plan. Estimated costs and possible funding assistance were also described on pages 44-50.

Table 26: Subwatershed Priority for BMP Implementation.

Priority Ranking	***Subwatershed***	***Rationale***
1	Lower Salmon Falls Creek	Significant sediment inputs from irrigation return flows and farmland soil erosion, excessive nutrients (TN and TP) from irrigation return flows; predominant land uses include irrigated cropland and pasture/hay. thermal modification; Twin Falls Nitrate Priority Area
2	Shoshone Creek and its Tributaries	Significant sediment inputs from unstable and erosive streambanks: predominant land use consists of rangeland (cattle impacts); nutrient loading from Big Creek; bacterial contamination in Cottonwood Creek: large solar load reductions required; impacts to T&E species; groundwater Concern Area
3	Salmon Falls Creek Reservoir and its Tributaries	Mercury contamination; Groundwater Concern Area. thermal modification
4	Cedar Creek Reservoir and its Tributaries	Sediment from unstable banks in Lower Cedar Creek; thermal modification

5 Conclusion

Projects have been implemented for water quality improvement since the publication of the TMDL in 2007, as suggested in the *Salmon Falls Creek Subbasin Agricultural TMDL Implementation Plan*, but more time and efforts are still needed.

Some streams, for example Cottonwood Creek, are intermittent streams, or dry during mid to late summer, so only one day of *E. coli* samples were taken and possible. A geomean was not possible. Other sampling locations may not have been accessible on some days that DEQ staff went for sampling. Data analysis of the 2019 sampling season is not showing dramatic results so no changes are recommended until further analyses can be performed. A general and static trend is apparent in TP in all AUs, except for China Creek, which shows a higher value in TP. General observations from SEI data indicates bank stability improvements in some locations, but more information is needed. Overall, TP is above TMDL targets for both upper and lower Salmon Falls Creek. TN is averaging within the target range, but still needs improvement. TSS is well below the target in both upper and lower portions of the drainage system. *E. coli* target of 126 cfu/100 ml is exceeded in Cottonwood Creek.

During the next 5-year review cycle, following monitoring protocols and adding possible sample collection location alternatives might help in the collection and analysis of better data collection. Adding in some BMPs further upstream in grazing ranges might also help the Salmon Falls Creek subbasin to improve to meet the TMDL objectives established in 2007; *E. coli* TMDLs in Cottonwood Creek also are not being met. More focus on BMPs in this area may result in better results during the next 5-year cycle. Sample collection for mercury needs to take place in Salmon Falls Creek Reservoir to monitor mercury uptake in fish to meet the 2007 TMDL. Possible new technologies may assist in this type of monitoring.

Most assessment units are meeting sediment TMDLs from an increase in bank coverage measured during the SEIs. Problems reaching the TP and TN TMDLs are present in less than half AUs. Three AUs are listed as intermittent and/or ephemeral and have been reported as dry by multiple surveyors for many years, by BURP crews and DEQ five-year review staff, so DEQ is recommending changing these streams to *Category 3-unassessed* for this reason. These include Cedar Creek Lower, Monument Canyon, and Shoshone Creek – source to Cottonwood Creek. DEQ recommends the rest of the AUs stay in current category for review in the next five-year review cycle with justifications of excess nutrients and/or sediment loads. Table 27 below summarizes assessment outcomes, including recommended changes to the next Integrated Report and justifications.

Table 27. Existing total maximum daily loads and recommendations for the next Integrated Report.

Assessment Unit Name	Assessment Unit Number	Pollutants	Recommended Change to IR	Justifications
Cedar Creek-reservoir to Salmon Falls Creek	ID17040213SK000_04	sediment	Move to category 3-unassessed	Reported as Dry
Salmon Falls Creek-Devil Creek to mouth	ID17040213SK001_06	TN, TP, TSS	Remain in 4A	Nutrient and
Salmon Falls Creek-Salmon Falls Creek Dam to Devil Creek	ID17040213SK003_06	TN, TP, TSS	Remain in 4A	Nutrient and Sediment Load
Cedar Creek Reservoir	ID17040213SK004_0L	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Monument Canyon (1&2 tribs to Cedar Creek Reservoir)	ID17040213SK004_02	TP, sediment	Move to category 3-unassessed	Reported as Dry
House Creek-source to Cedar Reservoir	ID17040213SK005_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK005_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Cedar Creek-source to Cedar Creek Reservoir	ID17040213SK006_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK006_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek Reservoir	ID17040213SK007L_0L	Hg, TP, sediment	Remain in 4A	Nutrient and Sediment Load
China, Browns, Corral, Player Creeks	ID17040213SK008_02	TP	Remain in 4A	Excess Nutrient Load
	ID17040213SK008_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Salmon Falls Creek-Idaho/Nevada Border to Salmon Falls Creek	ID17040213SK009_06	TP, TSS, sediment	Remain in 4A	Nutrient and Sediment Load
Shoshone Creek-Hot Creek to Idaho/Nevada Border	ID17040213SK011_04	sediment	Remain in 4A	Sediment Load
Shoshone Creek-Cottonwood Creek to Hot Creek	ID17040213SK013_04	sediment	Move to category 3-unassessed	Reported as dry
Big Creek-source to Mouth	ID17040213SK014_02	TP, sediment	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK014_03	TP, sediment	Remain in 4A	Nutrient and Sediment Load
Cottonwood Creek-source to mouth	ID17040213SK015_02	TP, sediment, *E. coli*	Remain in 4A	Nutrient and Sediment Load
	ID17040213SK015_03	TP, sediment, *E. coli*	Remain in 4A	Nutrient and Sediment Load
Shoshone Creek-source to Cottonwood Creek	ID17040213SK016_02	sediment	Move to category 3-unassessed	Reported as Dry
	ID17040213SK016_03	sediment	Move to category 3-unassessed	Reported as Dry

Note: TP=total phosphorus; TSS=total suspended solids; TN=total nitrogen; Hg=Mercury

This document was prepared with input from the public as described in Appendix C.

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GIS Coverages

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USDA – FSA Aerial Photography Field Office - 2013 National Agricultural Imagery Program (NAIP) 0.5m imagery

USDA – FSA Aerial Photography Field Office - 2015 National Agricultural Imagery Program (NAIP) 1.0m imagery

Appendix A. Water Quality Criteria

Table A. 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]		—	—
• Statistical Threshold Value	≤410 *E. coli*/100 mL[b]		—	—
pH	—	—	Between 6.5 and 9.0	Between 6.5 and 9.0
Dissolved oxygen (DO)	—	—	DO exceeds 6.0 milligrams/liter (mg/L)	**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 1-day minimum and exceeds 6.0 mg/L for a 7-day average
Temperature[c]	—	—	22 °C or less daily maximum; 19 °C or less daily average **Seasonal Cold Water**: Between summer solstice and autumn equinox: 26 °C or less daily maximum; 23 °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
Turbidity	—	—	Turbidity shall not exceed background by more than 50 nephelometric turbidity units (NTU) instantaneously or more than 25 NTU for more than 10 consecutive days.	—

[a] During spawning and incubation periods for inhabiting species
[b] *Escherichia coli* per 100 milliliters
[c] 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 7-day average daily maximum air temperature calculated in yearly series over the historic record measured at the nearest weather reporting station.

Appendix B. Water Quality Data

Streambank Erosion Inventory Data

HUC	AU	Date & Time	Site	SEI Percent Erosive Bank %	SEI Current Load Tons/YR	SEI Load Capacity Tons/year	SEI Current Load Tons/day	SEI Load Capacity Tons/day
ID17040213	SK009_06	4/25/2019 10:46	SF1	14.5	1226.7	1689.5	3.360821918	4.628767123
ID17040213	SK009_06	6/26/2019 13:37:57	SF1	14.5	1226.7	1689.5	3.360821918	4.628767123
ID17040213	SK009_06	7/24/2019 12:12:42	SF1	14.5	1226.7	1689.5	3.360821918	4.628767123
ID17040213	SK009_06	8/27/2019 12:53:04	SF1	14.5	1226.7	1689.5	3.360821918	4.628767123
ID17040213	SK009_06	9/18/2019 11:58:39	SF1	14.5	1226.7	1689.5	3.360821918	4.628767123
ID17040213	SK009_06	10/22/2019 13:21:03	SF1	14.5	1226.7	1689.5	3.360821918	4.628767123
ID17040213	SK003_06	—	SF2	—	—	—	—	—
ID17040213	SK003_06	5/28/2019 14:42:47	SF2	—	—	—	—	—
ID17040213	SK003_06	6/26/2019 15:25:17	SF2	—	—	—	—	—
ID17040213	SK003_06	7/24/2019 14:55:08	SF2	—	—	—	—	—
ID17040213	SK003_06	8/27/2019 14:42:03	SF2	—	—	—	—	—
ID17040213	SK003_06	9/19/2019 11:08:22	SF2	—	—	—	—	—
ID17040213	SK003_06	10/21/2019 09:50:28	SF2	—	—	—	—	—
ID17040213	SK001_06	4/25/2019 13:32	SF3	—	—	—	—	—
ID17040213	SK001_06	5/28/2019 16:17:42	SF3	—	—	—	—	—
ID17040213	SK001_06	6/26/2019 16:54:36	SF3	—	—	—	—	—
ID17040213	SK001_06	7/24/2019 16:06:35	SF3	—	—	—	—	—
ID17040213	SK001_06	8/27/2019 16:00:52	SF3	—	—	—	—	—
ID17040213	SK001_06	9/19/2019 12:41:54	SF3	—	—	—	—	—
ID17040213	SK001_06	10/21/2019 10:53:16	SF3	—	—	—	—	—
ID17040213	SK008_02	6/26/2019 11:22:24	CH1	—	—	—	—	—
ID17040213	SK008_02	7/24/2019 10:14:47	CH1	—	—	—	—	—
ID17040213	SK008_02	8/27/2019 10:58:07	CH1	—	—	—	—	—
ID17040213	SK008_02	9/18/2019 09:41:12	CH1	—	—	—	—	—
ID17040213	SK008_02	10/22/2019 10:55:40	CH1	—	—	—	—	—
ID17040213	SK008_03	6/26/2019 09:25:47	CH2	0.9	6.2	136.9	0.016986301	0.375068493
ID17040213	SK008_03	7/24/2019 08:52:38	CH2	0.9	6.2	136.9	0.016986301	0.375068493
ID17040213	SK008_03	8/27/2019 10:08:19	CH2	0.9	6.2	136.9	0.016986301	0.375068493
ID17040213	SK008_03	9/18/2019 08:45:17	CH2	0.9	6.2	136.9	0.016986301	0.375068493
ID17040213	SK008_03	10/22/2019 09:44:38	CH2	0.9	6.2	136.9	0.016986301	0.375068493
ID17040213	SK006_02	7/01/2019 15:03:13	CDR1	3.8	28.2	147.1	0.077260274	0.403013699
ID17040213	SK006_02	8/5/2019 10:45:00 AM	CDR1	3.8	28.2	147.1	0.077260274	0.403013699
ID17040213	SK006_02	9/03/2019 10:39:22	CDR1	3.8	28.2	147.1	0.077260274	0.403013699
ID17040213	SK006_021	10/01/2019 10:50:44	CDR1 ALT	—	—	—	—	—
ID17040213	SK006_02	10/03/2019 15:03:56	CDR1	3.8	28.2	147.1	0.077260274	0.403013699
ID17040213	SK006_03	5/14/2019 11:22	CDR2	0.8	2.6	62.7	0.007123288	0.171780822
ID17040213	SK006_03	6/04/2019 08:49:37	CDR2	0.8	2.6	62.7	0.007123288	0.171780822

ID17040213	SK006_03	7/01/2019 09:28:18	CDR2	0.8	2.6	62.7	0.007123288	0.171780822
ID17040213	SK006_03	8/05/2019 13:12:56	CDR2	0.8	2.6	62.7	0.007123288	0.171780822
ID17040213	SK006_03	9/03/2019 12:52:06	CDR2	0.8	2.6	62.7	0.007123288	0.171780822
ID17040213	SK006_03	10/01/2019 14:58:45	CDR2	0.8	2.6	62.7	0.007123288	0.171780822
ID17040213	SK005_02	8/21/2019 11:04:59	HS1	1	38.1	765.5	0.104383562	2.097260274
ID17040213	SK005_03	5/14/2019 13:00	HS2	1.2	14.1	231.4	0.038630137	0.633972603
ID17040213	SK005_03	6/04/2019 10:01:41	HS2	1.2	14.1	231.4	0.038630137	0.633972603
ID17040213	SK005_03	7/01/2019 10:10:48	HS2	1.2	14.1	231.4	0.038630137	0.633972603
ID17040213	SK005_03	8/06/2019 09:54:02	HS2	1.2	14.1	231.4	0.038630137	0.633972603
ID17040213	SK005_03	10/03/2019 12:22:36	HS2	1.2	14.1	231.4	0.038630137	0.633972603
ID17040213	SK005_03	9/12/2019 9:48:00 AM	HS2	1.2	14.1	231.4	0.038630137	0.633972603
ID17040213	SK005_02	5/14/2019 14:04	LHC	1	38.1	765.5	0.104383562	2.097260274
ID17040213	SK005_02	6/04/2019 10:58:27	LHC	1	38.1	765.5	0.104383562	2.097260274
ID17040213	SK005_02	7/01/2019 12:04:56	LHC	1	38.1	765.5	0.104383562	2.097260274
ID17040213	SK005_02	8/05/2019 15:12:20	LHC	1	38.1	765.5	0.104383562	2.097260274
ID17040213	SK005_02	9/03/2019 14:11:49	LHC	1	38.1	765.5	0.104383562	2.097260274
ID17040213	SK005_02	10/03/2019 13:38:22	LHC	1	38.1	765.5	0.104383562	2.097260274
ID17040213	SK007L_0L	6/13/2019 10:42:18	SFR2	—	—	—	—	—
ID17040213	SK007L_0L	7/15/2019 11:14:35	SFR2	—	—	—	—	—
ID17040213	SK007L_0L	8/19/2019 11:11:25	SFR2	—	—	—	—	—
ID17040213	SK007L_0L	9/09/2019 11:31:14	SFR2	—	—	—	—	—
ID17040213	SK007L_0L	10/07/2019 11:04:57	SFR2	—	—	—	—	—
ID17040213	SK007L_0L	6/13/2019 10:10:12	SFR3	—	—	—	—	—
ID17040213	SK007L_0L	7/15/2019 10:45:44	SFR3	—	—	—	—	—
ID17040213	SK007L_0L	8/19/2019 10:31:25	SFR3	—	—	—	—	—
ID17040213	SK007L_0L	9/09/2019 10:53:46	SFR3	—	—	—	—	—
ID17040213	SK007L_0L	10/07/2019 10:32:57	SFR3	—	—	—	—	—
ID17040213	SK007L_0L	6/13/2019 11:17:53	SFR1	—	—	—	—	—
ID17040213	SK007L_0L	7/15/2019 11:35:42	SFR1	—	—	—	—	—
ID17040213	SK007L_0L	8/19/2019 11:48:11	SFR1	—	—	—	—	—
ID17040213	SK007L_0L	9/09/2019 11:52:09	SFR1	—	—	—	—	—
ID17040213	SK007L_0L	10/07/2019 11:22:02	SFR1	—	—	—	—	—
ID17040213	SK004_0L	6/13/2019 12:47:31	CCR1	—	—	—	—	—
ID17040213	SK004_0L	7/15/2019 13:01:36	CCR1	—	—	—	—	—
ID17040213	SK004_0L	8/19/2019 13:27:07	CCR1	—	—	—	—	—
ID17040213	SK004_0L	9/09/2019 13:14:38	CCR1	—	—	—	—	—
ID17040213	SK004_0L	10/07/2019 12:50:32	CCR1	—	—	—	—	—
ID17040213	SK004_0L	6/13/2019 13:04:48	CCR2	—	—	—	—	—
ID17040213	SK004_0L	7/15/2019 13:38:43	CCR2	—	—	—	—	—
ID17040213	SK004_0L	8/19/2019 13:49:25	CCR2	—	—	—	—	—
ID17040213	SK004_0L	9/09/2019 13:35:39	CCR2	—	—	—	—	—
ID17040213	SK004_0L	10/07/2019 13:18:07	CCR2	—	—	—	—	—
ID17040213	SK015_02	6/17/2019	LF1	—	—	—	—	—

ID17040213	SK015_02	7/16/2019 09:26:09	LF1	—	—	—	—	—
ID17040213	SK015_02	7/23/2019 12:45:00 PM	LF1	—	—	—	—	—
ID17040213	SK015_02	7/23/2019 12:45:00 PM	LF1	—	—	—	—	—
ID17040213	SK015_03	5/28/2019 10:05:23	LF2	1.7	12.6	146	0.034520548	0.4
ID17040213	SK015_03	6/17/2019 0:00	LF2	1.7	12.6	146	0.034520548	0.4
ID17040213	SK015_03	7/16/2019 15:43:42	LF2	1.7	12.6	146	0.034520548	0.4
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	1.7	12.6	146	0.034520548	0.4
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—
ID17040213	SK015_02	6/17/2019	CW	4.2	164.3	862.1	0.450136986	2.361917808
ID17040213	SK015_02	7/16/2019 11:33:25	CW	4.2	164.3	862.1	0.450136986	2.361917808
ID17040213	SK015_02	7/23/2019 10:32:02	CW	4.2	164.3	862.1	0.450136986	2.361917808
ID17040213	SK015_02	7/23/2019 10:32:02	CW	4.2	164.3	862.1	0.450136986	2.361917808
ID17040213	SK015_02	8/20/2019 10:52:54	CW	4.2	164.3	862.1	0.450136986	2.361917808
ID17040213	SK015_02	9/16/2019 11:39:10	CW	4.2	164.3	862.1	0.450136986	2.361917808
ID17040213	SK015_02	10/09/2019 11:21:17	CW	4.2	164.3	862.1	0.450136986	2.361917808
ID17040213	SK014_02	6/17/2019	BC1	2.4	81.3	666.7	0.222739726	1.826575342
ID17040213	SK014_02	7/16/2019 13:12:44	BC1	2.4	81.3	666.7	0.222739726	1.826575342
ID17040213	SK014_02	8/20/2019 12:56:46	BC1	2.4	81.3	666.7	0.222739726	1.826575342
ID17040213	SK014_02	9/16/2019 13:01:57	BC1	2.4	81.3	666.7	0.222739726	1.826575342
ID17040213	SK014_02	10/09/2019 12:27:38	BC1	2.4	81.3	666.7	0.222739726	1.826575342
ID17040213	SK014_03	6/17/2019	BC2	1.2	2.9	49.7	0.007945205	0.136164384
ID17040213	SK014_03	7/16/2019 14:36:55	BC2	1.2	2.9	49.7	0.007945205	0.136164384
ID17040213	SK014_03	8/20/2019 14:06:26	BC2	1.2	2.9	49.7	0.007945205	0.136164384
ID17040213	SK014_03	9/16/2019 14:31:21	BC2	1.2	2.9	49.7	0.007945205	0.136164384
ID17040213	SK014_03	10/09/2019 13:56:26	BC2	1.2	2.9	49.7	0.007945205	0.136164384
ID17040213	SK013_04	--	SH2	2.5	51.9	417.4	0.142191781	1.143561644
ID17040213	SK011_04	--	SH4	1	8.9	174.3	0.024383562	0.477534247
ID17040213	SK016_03	--	SH1	5.8	541.1	936.1	1.482465753	2.564657534
ID17040213	SK016_02	--	SFSH	2.9	61.5	421.2	0.168493151	1.153972603
ID17040213	SK004_02	--	MCN	0.6	16.9	531.9	0.04630137	1.457260274
ID17040213	SK000_04	--	CDR3	30.5	2123.7	643.2	5.818356164	1.762191781

Water Quality Data – Sample Results

HUC	AU	Date & Time	Site	TP Total Phosphorus mg/L	N Nitrate + Nitrite mg/L	TSS Total Suspended Solids (mg/L)	Flow (cubic ft/ second)	*E. coli* (MPN/ 100mL)	Total Coliform count
ID17040213	SK009_06	4/25/2019 10:46	SF1	0.2463	0.06048	234.50	—	—	—
ID17040213	SK009_06	6/26/2019 13:37:57	SF1	0.1048	—	66	—	—	—
ID17040213	SK009_06	7/24/2019 12:12:42	SF1	0.05732	—	11.7500	83.668	—	—
ID17040213	SK009_06	8/27/2019 12:53:04	SF1	0.04432	—	7	17.018	—	—
ID17040213	SK009_06	9/18/2019 11:58:39	SF1	0.0351	—	6	46.031	—	—
ID17040213	SK009_06	10/22/2019 13:21:03	SF1	0.03307	—	3.5	63.144	—	—
ID17040213	SK003_06	—	SF2	0.060415	0.007783	QAO REMOVED	—	—	—
ID17040213	SK003_06	5/28/2019 14:42:47	SF2	0.037817	QAO REMOVED	2.5	29.557	—	—
ID17040213	SK003_06	6/26/2019 15:25:17	SF2	0.050585	QAO REMOVED	1	35.266	—	—
ID17040213	SK003_06	7/24/2019 14:55:08	SF2	0.075005	0.005001	2	53.435	—	—
ID17040213	SK003_06	8/27/2019 14:42:03	SF2	0.06825	0.004419	0.5	42.673	—	—
ID17040213	SK003_06	9/19/2019 11:08:22	SF2	0.04228	0.01108	0.5	32.470	—	—
ID17040213	SK003_06	10/21/2019 09:50:28	SF2	0.04927	0.01156	1	28.500	—	—
ID17040213	SK001_06	4/25/2019 13:32	SF3	0.0974	1.726	41	171.00	—	—
ID17040213	SK001_06	5/28/2019 16:17:42	SF3	0.1286	1.355	50.5	357.00	—	—
ID17040213	SK001_06	6/26/2019 16:54:36	SF3	0.08231	1.7	21.5	75.10	—	—
ID17040213	SK001_06	7/24/2019 16:06:35	SF3	0.05513	2.606	13.5	59.00	—	—
ID17040213	SK001_06	8/27/2019 16:00:52	SF3	0.04191	2.524	3.5	75.50	—	—
ID17040213	SK001_06	9/19/2019 12:41:54	SF3	0.0991	2.158	23	260.00	—	—
ID17040213	SK001_06	10/21/2019 10:53:16	SF3	0.04526	2.216	9.5	283.00	—	—
ID17040213	SK008_02	6/26/2019 11:22:24	CH1	0.03364	—	—	2.060	—	—
ID17040213	SK008_02	7/24/2019 10:14:47	CH1	0.04508	—	—	1.047	—	—
ID17040213	SK008_02	8/27/2019 10:58:07	CH1	0.04346	—	—	1.082	—	—
ID17040213	SK008_02	9/18/2019 09:41:12	CH1	0.03515	—	—	1.170	—	—
ID17040213	SK008_02	10/22/2019 10:55:40	CH1	0.02283	—	—	0.893	—	—
ID17040213	SK008_03	6/26/2019 09:25:47	CH2	0.1126	—	—	4.529	—	—
ID17040213	SK008_03	7/24/2019 08:52:38	CH2	0.1715	—	—	1.538	—	—
ID17040213	SK008_03	8/27/2019 10:08:19	CH2	0.2244	—	—	0.121	—	—
ID17040213	SK008_03	9/18/2019 08:45:17	CH2	0.1859	—	—	0.165	—	—
ID17040213	SK008_03	10/22/2019 09:44:38	CH2	0.1275	—	—	0.651	—	—
ID17040213	SK006_02	7/01/2019 15:03:13	CDR1	0.04876	—	—	8.443	—	—
ID17040213	SK006_02	8/5/2019 10:45:00	CDR1	0.05051	—	—	—	—	—
ID17040213	SK006_02	9/03/2019 10:39:22	CDR1	0.04867	—	—	5.633	—	—
ID17040213	SK006_021	10/01/2019 10:50:44	CDR1 ALT	0.02746	—	—	—	—	—
ID17040213	SK006_02	10/03/2019 15:03:56	CDR1	0.03815	—	—	5.855	—	—
ID17040213	SK006_03	5/14/2019 11:22	CDR2	0.05907	—	—	11.962	—	—
ID17040213	SK006_03	6/04/2019 08:49:37	CDR2	0.07406	—	—	—	—	—

ID17040213	SK006_03	7/01/2019 09:28:18	CDR2	0.06545	—	—	—	—	—
ID17040213	SK006_03	8/05/2019 13:12:56	CDR2	0.05887	—	—	9.709	—	—
ID17040213	SK006_03	9/03/2019 12:52:06	CDR2	0.05943	—	—	7.598	—	—
ID17040213	SK006_03	10/01/2019 14:58:45	CDR2	0.03995	—	—	8.133	—	—
ID17040213	SK005_02	8/21/2019 11:04:59	HS1	0.02645	—	—	4.950	—	—
ID17040213	SK005_03	5/14/2019 13:00	HS2	0.07846	—	—	20.186	—	—
ID17040213	SK005_03	6/04/2019 10:01:41	HS2	0.07591	—	—	48.395	—	—
ID17040213	SK005_03	7/01/2019 10:10:48	HS2	0.04506	—	—	22.637	—	—
ID17040213	SK005_03	8/06/2019 09:54:02	HS2	0.04666	—	—	15.071	—	—
ID17040213	SK005_03	10/03/2019 12:22:36	HS2	0.03946	—	—	4.744	—	—
ID17040213	SK005_03	9/12/2019 9:48:00	HS2	0.044185	—	—	-	—	—
ID17040213	SK005_02	5/14/2019 14:04	LHC	0.03369	—	—	1.063	—	—
ID17040213	SK005_02	6/04/2019 10:58:27	LHC	0.03766	—	—	3.216	—	—
ID17040213	SK005_02	7/01/2019 12:04:56	LHC	0.03585	—	—	0.993	—	—
ID17040213	SK005_02	8/05/2019 15:12:20	LHC	0.03172	—	—	1.101	—	—
ID17040213	SK005_02	9/03/2019 14:11:49	LHC	0.02742	—	—	1.182	—	—
ID17040213	SK005_02	10/03/2019 13:38:22	LHC	0.02446	—	—	1.767	—	—
ID17040213	SK007L_0L	6/13/2019 10:42:18	SFR2	0.099445	—	0.5	—	—	—
ID17040213	SK007L_0L	7/15/2019 11:14:35	SFR2	0.08523	—	2.5	—	—	—
ID17040213	SK007L_0L	8/19/2019 11:11:25	SFR2	0.05521	—	3	—	—	—
ID17040213	SK007L_0L	9/09/2019 11:31:14	SFR2	0.06028	—	1.5	—	—	—
ID17040213	SK007L_0L	10/07/2019 11:04:57	SFR2	0.13	—	5	—	—	—
ID17040213	SK007L_0L	6/13/2019 10:10:12	SFR3	0.07249	—	1	—	—	—
ID17040213	SK007L_0L	7/15/2019 10:45:44	SFR3	0.08097	—	3.5	—	—	—
ID17040213	SK007L_0L	8/19/2019 10:31:25	SFR3	0.04061	—	1.5	—	—	—
ID17040213	SK007L_0L	9/09/2019 10:53:46	SFR3	0.04447	—	2.5	—	—	—
ID17040213	SK007L_0L	10/07/2019 10:32:57	SFR3	0.08344	—	3	—	—	—
ID17040213	SK007L_0L	6/13/2019 11:17:53	SFR1	0.1222	—	1	—	—	—
ID17040213	SK007L_0L	7/15/2019 11:35:42	SFR1	0.09464	—	2	—	—	—
ID17040213	SK007L_0L	8/19/2019 11:48:11	SFR1	0.08564	—	8.5	—	—	—
ID17040213	SK007L_0L	9/09/2019 11:52:09	SFR1	0.10720	—	4.5	—	—	—
ID17040213	SK007L_0L	10/07/2019 11:22:02	SFR1	0.1042	—	8	—	—	—
ID17040213	SK004_0L	6/13/2019 12:47:31	CCR1	0.08052	—	2	—	—	—
ID17040213	SK004_0L	7/15/2019 13:01:36	CCR1	0.05979	—	2	—	—	—
ID17040213	SK004_0L	8/19/2019 13:27:07	CCR1	0.07047	—	5	—	—	—
ID17040213	SK004_0L	9/09/2019 13:14:38	CCR1	0.08733	—	3.5	—	—	—
ID17040213	SK004_0L	10/07/2019 12:50:32	CCR1	0.0685	—	4.5	—	—	—
ID17040213	SK004_0L	6/13/2019 13:04:48	CCR2	0.06939	—	1.5	—	—	—
ID17040213	SK004_0L	7/15/2019 13:38:43	CCR2	0.058	—	1	—	—	—
ID17040213	SK004_0L	8/19/2019 13:49:25	CCR2	0.07011	—	8	—	—	—
ID17040213	SK004_0L	9/09/2019 13:35:39	CCR2	0.06005	—	3	—	—	—
ID17040213	SK004_0L	10/07/2019 13:18:07	CCR2	0.074615	—	5.75	—	—	—
ID17040213	SK015_02	6/17/2019	LF1	0.03597	—	—	1.816	—	—

ID17040213	SK015_02	7/16/2019 09:26:09	LF1	0.03333	—	—	0.019	—	—
ID17040213	SK015_02	7/23/2019 12:45:00	LF1	—	—	—	—	435	>2420
ID17040213	SK015_02	7/23/2019 12:45:00	LF1	—	—	—	—	—	—
ID17040213	SK015_03	5/28/2019 10:05:23	LF2	0.06511	—	—	56.527	—	—
ID17040213	SK015_03	6/17/2019 0:00	LF2	0.0533	—	—	4.680	—	—
ID17040213	SK015_03	7/16/2019 15:43:42	LF2	0.04029	—	—	0.046	—	—
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	155	1733
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—	—
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	179	2420
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—	—
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	<1	<1
ID17040213	SK015_03	7/23/2019 11:36:51	LF2	—	—	—	—	—	—
ID17040213	SK015_02	6/17/2019	CW	0.04775	—	—	6.41	—	—
ID17040213	SK015_02	7/16/2019 11:33:25	CW	0.04463	—	—	0.605	—	—
ID17040213	SK015_02	7/23/2019 10:32:02	CW	—	—	—	—	308	1733
ID17040213	SK015_02	7/23/2019 10:32:02	CW	—	—	—	—	—	—
ID17040213	SK015_02	8/20/2019 10:52:54	CW	0.03611	—	—	0.029	—	—
ID17040213	SK015_02	9/16/2019 11:39:10	CW	0.032275	—	—	0.013	—	—
ID17040213	SK015_02	10/09/2019 11:21:17	CW	0.03245	—	—	0.015	—	—
ID17040213	SK014_02	6/17/2019	BC1	0.0683	—	—	6.696	—	—
ID17040213	SK014_02	7/16/2019 13:12:44	BC1	0.0904	—	—	0.974	—	—
ID17040213	SK014_02	8/20/2019 12:56:46	BC1	0.1049	—	—	0.263	—	—
ID17040213	SK014_02	9/16/2019 13:01:57	BC1	0.08073	—	—	0.067	—	—
ID17040213	SK014_02	10/09/2019 12:27:38	BC1	0.08189	—	—	0.107	—	—
ID17040213	SK014_03	6/17/2019	BC2	0.09357	—	—	10.75	—	—
ID17040213	SK014_03	7/16/2019 14:36:55	BC2	0.09692	—	—	3.474	—	—
ID17040213	SK014_03	8/20/2019 14:06:26	BC2	0.05829	—	—	2.044	—	—
ID17040213	SK014_03	9/16/2019 14:31:21	BC2	0.04005	—	—	1.913	—	—
ID17040213	SK014_03	10/09/2019 13:56:26	BC2	0.08776	—	—	2.426	—	—
ID17040213	SK013_04	--	SH2	—	—	—	—	—	—
ID17040213	SK011_04	--	SH4	—	—	—	—	—	—
ID17040213	SK016_03	--	SH1	—	—	—	—	—	—
ID17040213	SK016_02	--	SFSH	—	—	—	—	—	—
ID17040213	SK004_02	--	MCN	—	—	—	—	—	—
ID17040213	SK000_04	--	CDR3	—	—	—	—	—	—

AU Summary—Water Quality Data Averages from 2019

17040213SK001_06 (Salmon Falls Creek-Devil Creek to mouth)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
4/25/2019	SF3	0.0974	1.726	41	—	171.00	8.47	0.38	114.25	10.36	15.06

5/28/2019	SF3	0.1286	1.355	50.5	—	357.00	8.52	0.34	104.50	9.15	16.33
6/26/2019	SF3	0.08231	1.7	21.5	—	75.10	8.40	0.37	129.56	10.29	20.90
7/24/2019	SF3	0.05513	2.606	13.5	—	59.00	8.68	0.43	177.66	13.55	23.54
8/27/2019	SF3	0.04191	2.524	3.5	—	75.50	8.52	0.42	184.33	15.08	19.87
9/19/2019	SF3	0.0991	2.158	23	—	260.00	8.65	0.37	112.09	10.15	14.87
10/21/2019	SF3	0.04526	2.216	9.5	—	283.00	7.94	0.38	113.38	11.81	9.18
Average		**0.07853**	**2.04071**	**23.2100**	—	—	**8.45**	**0.38**	**133.68**	**11.48**	**17.11**
Median		**0.08986**	**2.1580**	**21.5000**	—	—	**8.52**	**0.38**	**114.25**	**10.36**	**16.33**

17040213SK003_06 (Salmon Falls Creek-Lower)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
4/25/2019	SF2	0.060415	0.007783	QAO REMOVED[a]	—	—	8.16	0.14	110.30	9.81	14.78
5/28/2019	SF2	0.037817	QAO REMOVED[a]	2.5	—	29.557	8.78	0.13	124.33	10.83	15.29
6/26/2019	SF2	0.050585	QAO REMOVED[a]	1	—	35.266	8.59	0.13	130.49	10.46	19.16
7/24/2019	SF2	0.075005	0.005001	2	—	53.435	8.49	0.11	145.70	11.35	21.11
8/27/2019	SF2	0.06825	0.004419	0.5	—	42.673	8.41	0.10	146.07	12.03	18.31
9/19/2019	SF2	0.04228	0.01108	0.5	—	32.470	7.69	0.11	107.28	9.87	12.89
10/21/2019	SF2	0.04927	0.01156	1	—	28.500	7.07	0.11	105.50	11.48	6.29
Average		**0.054803**	**0.007969**	**1.25**	—	—	**8.17**	**0.12**	**124.24**	**10.83**	**15.40**
Median		**0.050585**	**0.007783**	**1.00**	—	—	**8.41**	**0.11**	**124.33**	**10.83**	**15.29**

[a]QAO=Quality Assurance Officer; Relative Percent Difference was more than 25%, as stated in the QAPP for QA

17040213SK004_0L (Cedar Creek Reservoir)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/13/2019	CCR1	0.08052	—	2	—	—	7.47	0.057	91.02	7.64	14.50
6/13/2019	CCR2	0.06939	—	1.5	—	—	7.26	0.057	70.65	6.10	12.79
7/15/2019	CCR1	0.05979	—	2	—	—	7.16	0.057	75.00	5.80	18.03
7/15/2019	CCR2	0.058	—	1	—	—	6.77	0.057	42.29	3.37	14.86
8/19/2019	CCR1	0.07047	—	5	—	—	7.47	0.058	88.78	6.66	19.66
8/19/2019	CCR2	0.07011	—	8	—	—	7.23	0.057	64.96	4.86	18.17
9/09/2019	CCR1	0.08733	—	3.5	—	—	7.28	0.050	63.32	4.96	17.66
9/09/2019	CCR2	0.06005	—	3	—	—	7.02	0.050	30.21	2.31	17.93
10/07/2019	CCR1	0.0685	—	4.5	—	—	8.68	0.060	108.43	9.69	11.95
10/07/2019	CCR2	0.07462	—	5.75	—	—	9.01	0.220	53.23	4.77	11.67
Average		**0.07462**	—	—	—	—	—	**0.072**	**68.79**	**5.62**	**15.72**
Median		**0.06975**	—	—	—	—	—	**0.057**	**67.81**	**5.38**	**16.26**

17040213SK005_02 (House Creek-Source to Cedar Creek Reservoir)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
5/14/2019	LHC	0.03369	—	—	—	1.063	7.318	0.030	96.927	8.276	12.620
6/04/2019	LHC	0.03766	—	—	—	3.216	7.193	0.034	98.868	8.618	11.965
7/01/2019	LHC	0.03585	—	—	—	0.993	6.878	0.034	100.849	8.146	15.475
8/05/2019	LHC	0.03172	—	—	—	1.101	6.848	0.030	115.168	9.713	13.488
8/21/2019	HS1	0.02645	—	—	—	4.950	6.900	0.024	113.700	10.386	9.689

9/03/2019	LHC	0.02742	—	—	—	1.182	6.540	0.021	114.361	9.879	12.448
10/03/2019	LHC	0.02446	—	—	—	1.767	7.148	0.028	113.211	9.946	11.320
Average		**0.0421**	—	—	—	—	**6.975**	**0.029**	**107.583**	**9.281**	**12.429**
Median		**0.0377**	—	—	—	—	**6.9**	**0.03**	**113.211**	**9.713**	**12.448**

17040213SK005_03 (House Creek-Source to Cedar Creek Reservoir)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
5/14/2019	HS2	0.07846	—	—	—	20.186	7.345	0.051	101.027	8.196	15.284
6/04/2019	HS2	0.07591	—	—	—	48.395	7.187	0.053	102.082	9.014	11.724
7/01/2019	HS2	0.04506	—	—	—	22.637	6.931	0.037	99.656	8.977	10.831
8/06/2019	HS2	0.04666	—	—	—	15.071	7.051	0.035	107.358	9.264	12.707
9/12/2019	HS2	0.04419	—	—	—	—	—	—	—	—	—
10/03/2019	HS2	0.03946	—	—	—	4.744	6.897	0.053	115.958	11.912	5.253
Average		**0.05496**	—	—	—	—	**7.082**	**0.046**	**105.216**	**9.473**	**11.160**
Median		**0.04586**	—	—	—	—	**7.051**	**0.051**	**102.082**	**9.014**	**11.724**

17040213SK006_02 (Cedar Creek-Source to Cedar Creek Reservoir)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
7/01/2019	CDR1	0.04876	—	—	—	8.443	6.852	0.031	99.68	8.5195	13.37
8/5/2019	CDR1	0.05051	—	—	—	—	—	—	—	—	—
9/03/2019	CDR1	0.04867	—	—	—	5.633	6.8097	0.022	113.256	10.248	11.088
10/01/2019	CDR1 ALT	0.02746	—	—	—	—	6.814	0.024	106.258	10.356	5.851
10/03/2019	CDR1	0.03815	—	—	—	5.855	6.936	0.029	112.842	10.621	9.016
Average		**0.04271**	—	—	—	—	**6.853**	**0.0265**	**108.009**	**9.936**	**9.831**
Median		**0.04867**	—	—	—	**5.855**	**6.833**	**0.0265**	**109.55**	**10.302**	**10.052**

17040213SK006_03 (Cedar Creek-Source to Cedar Creek Reservoir)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
5/14/2019	CDR2	0.05907	—	—	—	11.962	7.657	0.037	109.07	9.636	12.240
6/04/2019	CDR2	0.07406	—	—	—	—	7.433	0.042	98.4	9.141	10.233
7/01/2019	CDR2	0.06545	—	—	—	—	7.267	0.036	97.111	8.603	12.265
8/05/2019	CDR2	0.05887	—	—	—	9.709	7.094	0.033	119.356	9.687	16.301
9/03/2019	CDR2	0.05943	—	—	—	7.598	6.947	0.025	117.261	9.858	14.668
10/01/2019	CDR2	0.03995	—	—	—	8.133	7.232	0.033	114.211	11.281	7.500
Average		**0.0595**	—	—	—	—	**7.272**	**0.034**	**109.235**	**9.701**	**12.201**
Median		**0.05925**	—	—	—	—	**7.2495**	**0.0345**	**111.641**	**9.662**	**12.253**

17040213SK007L_0L (Salmon Falls Creek Reservoir)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/13/2019	SFR1	0.1222	—	1	—	—	7.35	0.0978	46.7	3.897	14.054
6/13/2019	SFR2	0.099445	—	0.5	—	—	7.575	0.1056	68.608	5.961	12.382
6/13/2019	SFR3	0.07249	—	1	—	—	7.905	0.112	93.084	8.141	12.919

7/15/2019	SFR1	0.09464	—	2	—	—	7.552	0.104	72.592	5.584	18.068
7/15/2019	SFR2	0.08523	—	2.5	—	—	7.516	0.102	63.467	5.106	15.056
7/15/2019	SFR3	0.08097	—	3.5	—	—	7.741	0.103	82.818	6.825	15.143
8/19/2019	SFR1	0.08564	—	8.5	—	—	8.316	0.112	111.156	8.328	20.409
8/19/2019	SFR2	0.05521	—	3	—	—	7.717	0.106	55.037	4.191	16.504
8/19/2019	SFR3	0.04061	—	1.5	—	—	8.659	0.102	115.433	8.868	19.123
9/09/2019	SFR1	0.10720	—	4.5	—	—	8.67	0.15	97.37	7.50	18.92
9/09/2019	SFR2	0.06028	—	1.5	—	—	7.415	0.124	36.279	2.820	14.940
9/09/2019	SFR3	0.04447	—	2.5	—	—	8.422	0.093	113.724	8.792	18.802
10/07/2019	SFR1	0.1042	—	8	—	—	8.99	0.12	104.33	9.61	11.06
10/07/2019	SFR2	0.13	—	5	—	—	8.032	0.110	78.312	6.981	12.374
10/07/2019	SFR3	0.08344	—	3	—	—	8.193	0.105	102.175	9.103	12.530
Average		**0.0844**	—	—	—	—	**8.004**	**0.110**	**82.739**	**6.781**	**15.486**
Median		**0.08523**	—	—	—	—	**7.905**	**0.106**	**82.818**	**6.981**	**15.056**

17040213SK008_02 (China, Browns, Corral, Players Creeks)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/26/2019	CH1	0.03364	—	—	—	2.060	7.16	0.05	99.99	8.84	11.40
7/24/2019	CH1	0.04508	—	—	—	1.047	7.29	0.05	112.28	9.43	14.19
8/27/2019	CH1	0.04346	—	—	—	1.082	7.24	0.04	112.63	9.90	12.08
9/18/2019	CH1	0.03515	—	—	—	1.170	7.56	0.04	111.68	10.48	8.88
10/22/2019	CH1	0.02283	—	—	—	0.893	6.89	0.05	110.78	11.03	7.00
Average		**0.036**	—	—	—	**1.25**	**7.228**	**0.046**	**109.472**	**9.936**	**10.71**
Median		**0.03515**	—	—	—	**1.082**	**7.24**	**0.05**	**111.68**	**9.90**	**11.40**

17040213SK008_03 (China, Browns, Corral, Players Creeks)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/26/2019	CH2	0.1126	—	—	—	4.529	7.13	0.07	90.37	7.97	12.52
7/24/2019	CH2	0.1715	—	—	—	1.538	7.19	0.08	96.87	7.88	16.71
8/27/2019	CH2	0.2244	—	—	—	0.121	7.05	0.10	92.73	8.40	11.77
9/18/2019	CH2	0.1859	—-	—	—	0.165	7.39	0.09	95.60	8.99	9.80
10/22/2019	CH2	0.1275	—	—	—	0.651	6.75	0.09	102.27	10.81	5.60
Average		**0.1644**	—	—	—	**1.40**	**7.102**	**0.086**	**95.568**	**8.81**	**11.28**
Median		**0.1715**	—	—	—	**0.651**	**7.13**	**0.09**	**95.60**	**8.40**	**11.77**

17040213SK009_06 (Salmon Falls Creek-ID/NV border to Salmon Falls Creek)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
4/25/2019	SF1	0.2463	0.06048	234.50	—	—	7.38	0.08	87.59	7.75	12.80
6/26/2019	SF1	0.1048	—	66	—	—	7.68	0.12	95.02	7.52	17.43
7/24/2019	SF1	0.05732	—	11.75	—	83.668	8.02	0.14	114.81	8.65	20.36
8/27/2019	SF1	0.04432	—	7	—	17.018	8.04	0.18	123.26	9.65	18.39
9/18/2019	SF1	0.0351	—	6	—	46.031	8.42	0.17	—	—	13.62
10/22/2019	SF1	0.03307	—	3.5	—	63.144	7.26	0.16	114.28	11.31	8.18
Average		**0.0868**	**0.06048**	**54.77**	—	**52.47**	**7.80**	**0.142**	**106.992**	**8.976**	**15.13**
Median		**0.05082**	**0.06048**	**9.38**	—	**54.587**	**7.85**	**0.15**	**114.28**	**8.65**	**17.91**

17040213SK014_02 (Big Creek-Source to Mouth)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/17/2019	BC1	0.06830	—	—	—	6.696	—	—	—	—	—
7/16/2019	BC1	0.0904	—	—	—	0.974	6.932	0.037	98.917	7.988	14.96
8/20/2019	BC1	0.1049	—	—	—	0.263	6.792	0.044	110.6	8.858	15.494
9/16/2019	BC1	0.08073	—	—	—	0.067	7.836	0.0360	105.339	8.869	12.763
10/09/2019	BC1	0.08189	—	—	—	0.107	6.451	0.0490	97.206	10.042	4.500
Average		**0.0852**	—	—	—	**1.62**	**7.00**	**0.042**	**103.016**	**8.895**	**11.929**
Median		**0.08189**	—	—	—	**0.26319**	**6.62**	**0.041**	**102.128**	**8.864**	**13.8615**

17040213SK014_03 (Big Creek-Source to Mouth)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/17/2019	BC2	0.09357	—	—	—	10.75	-	-	-	-	-
7/16/2019	BC2	0.09692	—	—	—	3.474	7.89	0.121	114.206	8.046	22.168
8/20/2019	BC2	0.05829	—	—	—	2.044	7.98	0.152	134.642	9.766	20.854
9/16/2019	BC2	0.04005	—	—	—	1.913	8.55	0.135	43.85	3.460	16.278
10/09/2019	BC2	0.08776	—	—	—	2.426	7.28	0.150	114.037	11.687	5.388
Average		**0.075**	—	—	—	**4.12**	**7.925**	**0.1395**	**101.684**	**8.240**	**16.172**
Median		**0.08776**	—	—	—	**2.426**	**7.935**	**0.1425**	**124.3395**	**8.906**	**18.566**

17040213SK015_02 (Cottonwood Creek-Source to Mouth)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/17/2019	CW	0.04775	—	—	—	6.41	—	—	—	—	—
7/16/2019	CW	0.04463	—	—	—	0.605	7.035	0.035	100.733	8.193	14.804
7/23/2019	CW	—	—	—	308	—	6.953	0.036	106.447	8.571	15.541
8/20/2019	CW	0.03611	—	—	—	0.029	7.140	0.040	79.200	6.617	13.713
9/16/2019	CW	0.032275	—	—	—	0.013	7.472	0.033	76.463	6.342	13.586
10/09/2019	CW	0.03245	—	—	—	0.015	6.556	0.041	69.068	6.904	5.878
Average		**0.0375**	—	—	**308**	**1.27**	**7.031**	**0.037**	**86.382**	**7.325**	**12.704**
Median		**0.03611**	—	—	**308**	**0.029**	**7.035**	**0.036**	**79.200**	**6.617**	**13.586**

17040213SK015_03 (Cottonwood Creek-Source to Mouth/Langford Flat Creek)

Date Collected	Site	TP (mg/L)	TN (mg/L)	TSS (mg/L)	*E. coli* (cfu/100mL)	Flow (ft^3/sec)	Field pH	Field TDS (ppm)	Field DO (%)	Field DO (mg/L)	Field Temp °C
6/17/2019	LF1	0.03597	—	—	—	1.816	—	—	—	—	—
7/16/2019	LF1	0.03333	—	—	—	0.019	7.342	0.036	108.184	9.023	13.716
7/23/2019	LF1	—	—	—	435	—	7.668	0.037	129.505	9.380	20.668
5/28/2019	LF2	0.06511	—	—	—	56.527	7.078	0.032	98.133	9.493	7.450
6/17/2019	LF2	0.0533	—	—	—	4.680	—	—	—	—	—
7/16/2019	LF2	0.04029	—	—	—	0.046	7.072	0.055	83.318	6.346	18.466
7/23/2019	LF2	—	—	—	155	—	6.468	0.060	48.022	3.842	16.154
7/23/2019	LF2	—	—	—	179	—	—	—	—	—	—
Average		**0.0456**	—	—	**256.33**	**12.62**	**7.126**	**0.044**	**93.432**	**7.617**	**15.291**
Median		**0.0403**	—	—	**179**	**1.816**	**7.078**	**0.037**	**98.133**	**9.023**	**16.154**

Appendix C. Public Participation and Public Comments

This 5-year review was developed with participation from the Mid-Snake Watershed Advisory Group (WAG). In 2022, the WAG met with DEQ staff to discuss the initial results of the Salmon Falls Creek subbasin monitoring. In 2022, the WAG discussed the results and provided input on the draft of the Salmon Falls Creek Subbasin Five-Year Review. WAG comments have been incorporated into the final version of this document.