

## Executive Summary

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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 §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. §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. Currently this list must be published every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. This document addresses the Assessment Units (AU) in the Salmon Falls Creek Subbasin that have been placed on what is known as the "§303(d) list". This is found in the current integrated report:

[http://www.deq.state.id.us/water/data\\_reports/surface\\_water/monitoring/integrated\\_report.cfm](http://www.deq.state.id.us/water/data_reports/surface_water/monitoring/integrated_report.cfm).

The Salmon Falls Creek Subbasin Assessment describes the physical, biological, and cultural setting; water quality status; pollutant sources; and recent pollution control actions in the Salmon Falls Creek Subbasin (Figure 1), located in south central Idaho.

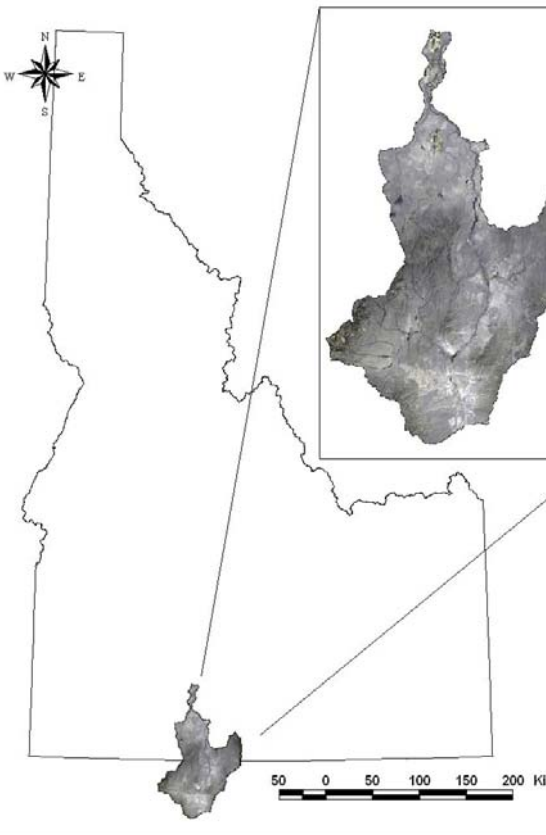
The first part of this document, the SBA, is an important first step in leading to the TMDL. The starting point for this assessment was Idaho's current 2002 integrated report of water quality limited water bodies. Currently 17 Assessment Units (Figure 2) or segments of the Salmon Falls Creek Subbasin are listed. The SBA examines the current status of §303(d) listed waters and defines the extent of impairment and causes of water quality limitation throughout the listed waters of the subbasin. The TMDL loading analysis quantifies pollutant sources and allocates responsibility for load reductions needed to return listed waters to a condition of meeting water quality standards.

This subbasin assessment (SBA) and TMDL analysis has been developed to comply with Idaho's TMDL schedule. The basis for Idaho's TMDL schedule was the 1998 §303(d) list, which included eight stream segments and one reservoir occurring within the region designated as the Salmon Falls Creek Subbasin. These same segments are incorporated in the 2002 integrated report within the respective Assessment Units, although nearly 149 miles of stream systems were added. *The Salmon Falls Creek Subbasin Assessment and Total Maximum Daily Load(s)* (SBA-TMDL) for surface waters of hydrological unit code 17040213 describes those 17 Assessment Units and pollutant combinations that are listed on the 2002 §303(d) list prepared by the state of Idaho. The listed Assessment Units, in some cases, include numerous water bodies that are considered "water quality limited" if one stream system within the Assessment Unit fails to meet water quality standards. The SBA also provides information pertaining to existing and designated beneficial uses. The information in the SBA includes those pollutants and the sources of pollutants that are affecting these beneficial uses in other as-yet-to-be listed water bodies such as Salmon Falls Creek Reservoir. The information was obtained from a variety of sources, including

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monitoring efforts of the Department of Environmental Quality (DEQ) and other agencies and individuals. The public has also been involved in the development of the SBA-TMDL through a variety of venues. Most notably, public meetings were held in conjunction with the Mid Snake Watershed Advisory Group (Mid Snake WAG).

### Subbasin at a Glance



<i>Hydrologic Unit Code</i>	17040213
<i>Subbasin Drainage size</i>	2,234 km <sup>2</sup> in Idaho 5,393 km <sup>2</sup> Total
<i>Total stream km</i>	4,085 km
<i>Listed stream km</i>	349 km
<i>Applicable Water Quality Standards</i>	<ul style="list-style-type: none"> <li>▪ IDAPA 58.01.02.200-General Surface Water Quality Criteria</li> <li>▪ IDAPA 58.01.02.250-Surface Water Quality Criteria for Aquatic Life Use Designations</li> </ul>
<i>Beneficial Uses Affected</i>	<ul style="list-style-type: none"> <li>▪ Cold water aquatic life</li> <li>▪ Salmonid spawning</li> <li>▪ Secondary Contact Recreation</li> </ul>
<i>Listed Pollutants of Concern</i>	<ul style="list-style-type: none"> <li>▪ Sediment Siltation</li> <li>▪ Thermal Modification</li> <li>▪ Flow Alteration</li> <li>▪ Excess Nutrients</li> <li>▪ Bacterial Contamination</li> </ul>
<i>Affected Communities</i>	Castleford, Rogerson, Hollister, Three Creek, Jackpot, and Twin Falls

**Figure 1. Salmon Falls Creek Subbasin and vital statistics.**

Salmon Falls Creek Subbasin Assessment and TMDL

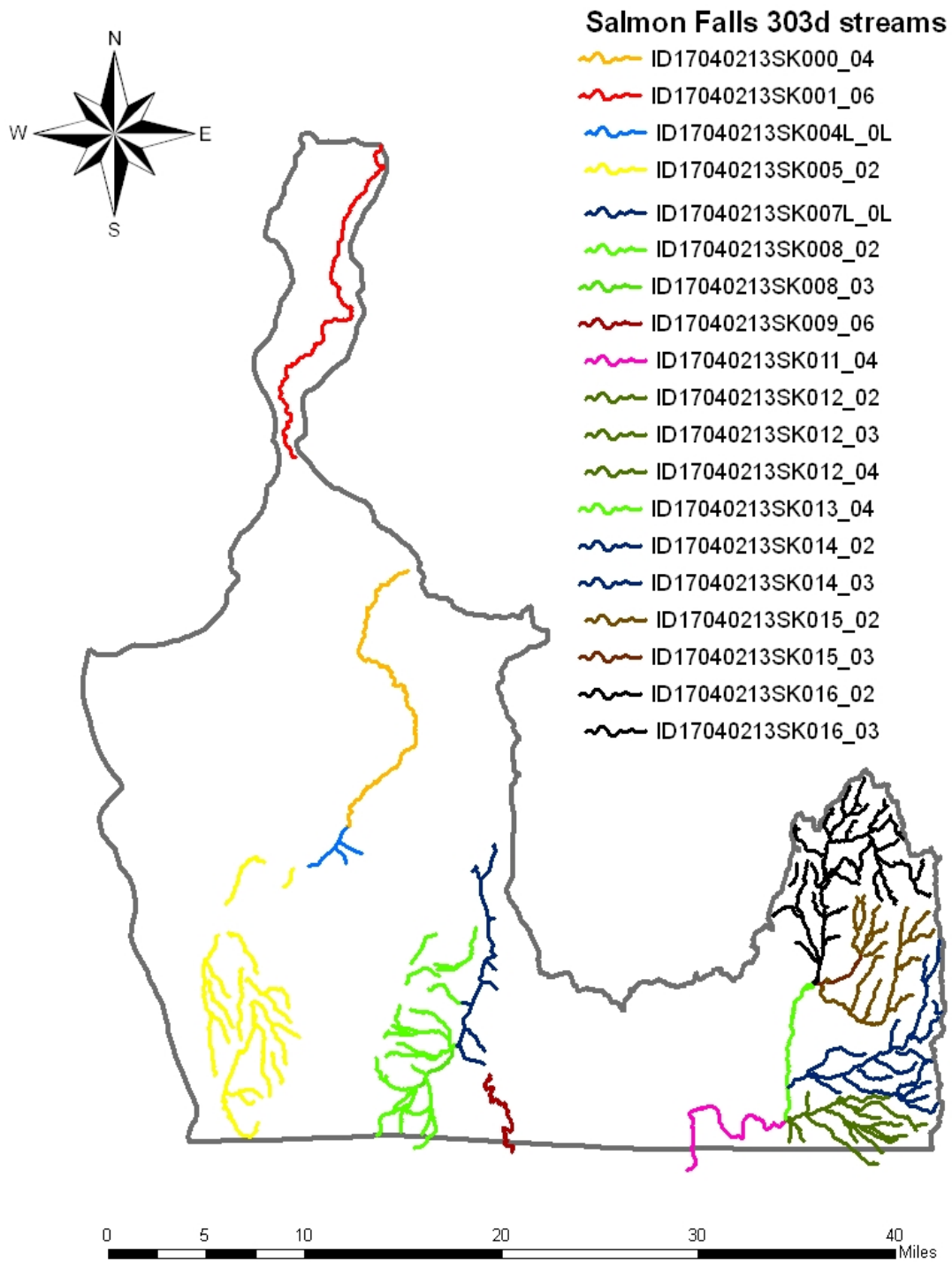


Figure 2. 2002 §303(d) Listed Assessment Units of the Salmon Falls Creek Subbasin.

**Salmon Falls Creek Subbasin Assessment and TMDL**

**Table 1. Assessment Unit descriptions and water quality impaired segments.**

<b>Assessment Unit</b>	<b>Assessment Unit name</b>	<b>Assessment Unit description</b>	<b>Water quality limited water body description</b>
ID17040213SK000-04	UNCLASSIFIED WATERS	4th order segments of Cedar Creek	Cedar Creek from Cedar Creek Reservoir to Salmon Falls Creek
ID17040213SK001-06	Salmon Falls Creek and Tributaries	6th order segments of Salmon Falls Creek	Salmon Falls Creek Devil Creek to Snake River
ID17040213SK004-L	Cedar Creek Reservoir	Cedar Creek Reservoir	Cedar Creek Reservoir
ID17040213SK005-02	House Creek	2nd order segments of House Creek	House Creek to Cedar Creek Reservoir
ID17040213SK007-L	Salmon Falls Creek Reservoir	Salmon Falls Creek Reservoir	Salmon Falls Creek Reservoir
ID17040213SK008-02	China Creek and Tributaries	2nd order segments of China Creek	China Creek, Player Creek, Browns Creek, Whiskey Slough, and Corral Creek
ID17040213SK008-03	China Creek and Tributaries	3rd order segments of China Creek	China Creek to Salmon Falls Creek Reservoir
ID17040213SK009-06	Salmon Falls Creek and Tributaries	6th order segments of Salmon Falls Creek	Salmon Falls Creek Idaho/Nevada border to Salmon Falls Creek Reservoir
ID17040213SK011-04	Shoshone Creek and Tributaries	4th order segments of Shoshone Creek	Shoshone Creek from Hot Creek to Idaho/Nevada Border
ID17040213SK012-02	Hot Creek and Tributaries	2nd order segments of Hot Creek	Hot Creek Idaho/Nevada Border to Shoshone Creek
ID17040213SK012-03	Hot Creek and Tributaries	3rd order segments of Hot Creek	Hot Creek to Shoshone Creek
ID17040213SK013-04	Shoshone Creek and Tributaries	4th order segments of Shoshone Creek	Shoshone Creek from Cottonwood Creek to Hot Creek
ID17040213SK014-02	Big Creek and Tributaries	2nd order segments of Big Creek	Big Creek Headwaters to
ID17040213SK014-03	Big Creek and Tributaries	3rd order segments of Big Creek	Big Creek to Shoshone Creek

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Assessment Unit	Assessment Unit name	Assessment Unit description	Water quality limited water body description
ID17040213SK015-02	Cottonwood Creek and Tributaries	2nd order segments of Cottonwood Creek	Cottonwood Creek Headwaters to Shoshone Creek
ID17040213SK015-03	Cottonwood Creek and Tributaries	3rd order segments of Cottonwood Creek	Cottonwood Creek to Shoshone Creek
ID17040213SK016-02	Shoshone Creek and Tributaries	2nd order segments of Shoshone Creek	Shoshone Creek Headwaters to Cottonwood Creek
ID17040213SK016-03	Shoshone Creek and Tributaries	3rd order segments of Shoshone Creek	Shoshone Creek Headwaters to Cottonwood Creek

### Key Findings

In general, the impacts to the beneficial uses were determined by assessing the biological communities and the water chemistry data available. When these two data sets were in agreement with one another, appropriate actions, such as completing a TMDL or delisting the stream, were undertaken.

The water quality of the Salmon Falls Creek Subbasin, in general, is of good to moderate quality. Sediment, nutrients, and temperature are the most common listed pollutants in the Salmon Falls Creek Subbasin.

However, Salmon Falls Creek Reservoir is one of the few water bodies within the state with mercury contamination identified.

### Phosphorus Findings

In most of the listed assessment units, it was determined that total phosphorus (TP) was a limiting nutrient. However, in the Big Creek and Cottonwood Creek watersheds it was determined that TP was in excess and may be impacting the beneficial uses of Shoshone Creek. While the majority of streams systems appear to have little impact from excess nutrients, the same cannot be said for the two reservoir systems. Both Cedar Creek and Salmon Falls Creek Reservoirs contained excess nutrients that lead to nuisance aquatic vegetation blooms. TMDLs are proposed for the tributary systems that feed these two reservoirs.

In most watersheds, phosphorus compounds were not in excess of EPA “Gold Book” recommendations (*Water Quality Criteria 1986*. (EPA 1986)). Background TP

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concentrations at a Nevada sampling site of Salmon Falls Creek averaged 0.093 milligrams per liter (mg/L) annually, while concentrations near the end of the reach averaged 0.102 mg/L annually. (See Appendix A for unit conversion.) Only nonpoint sources and natural soil-associated phosphorus contribute to this increase in TP concentration, as there are no point sources located within the watershed.

In the Salmon Falls Creek Reservoir, annual TP concentrations averaged 0.114 mg/L while in Cedar Creek Reservoir annual TP concentrations averaged 0.100 mg/L. TP concentrations in the China Creek watershed have averaged 0.185 mg/L annually. Natural background levels in the subbasin were determined to be between 0.02-0.035 mg/L TP.

The EPA Gold Book has set guidelines for TP concentrations in rivers flowing into lakes and reservoirs at 0.05 mg/L. As such, Salmon Falls Creek, China Creek, Cedar Creek and House Creek TP concentration targets are set at 0.05 mg/L.

For lakes and reservoirs, the EPA Gold book has set guidelines for TP concentrations at 0.025 mg/L. As a result, the Salmon Falls and Cedar Creek Reservoir TP concentration targets are set at 0.025 mg/L.

Reductions in TP will be required for nonpoint sources within the four watersheds in order to meet these targets within the Salmon Falls Creek and Cedar Creek Reservoirs. The other listed streams and pollutants in the subbasin, in general, were below the nutrient standard or guideline established for the protection of beneficial uses.

### ***Nitrogen Findings***

In most watersheds, nitrogen compounds were not in excess of Redfield Ratio (i.e.16:1 N to P). The Redfield Ratio provides a measure of the natural balance of nutrients found within plant tissues and thus not considered excessive in the environment. However, in the lower section of Salmon Falls Creek, where ground water plays a significant role in the hydrology of that system, it was determined that nitrogen was, in fact, in excess and could lead to nuisance aquatic vegetation growths.

### ***Flow and Habitat Alteration Findings***

It is EPA policy that flow and habitat alterations are *pollution* and not specific *pollutants*, and TMDLs are not required. However, streams found to be impacted by these forms of pollution will remain on the §303(d) list. Cedar Creek below the Cedar Creek Reservoir falls into this category.

Listed on the Idaho 1998 303d list for temperature pollution were Salmon Falls Creek, Nevada/Idaho border to Salmon Falls; Shoshone Creek, Nevada/Idaho border to Magic Hot Springs; and Shoshone Creek, Cottonwood Creek to Big Creek. The Environmental Protection Agency (EPA) also added streams to Idaho's 1998 303d list of impaired waters

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that exceeded Idaho's temperature criteria. In the Salmon Falls Creek Subbasin, Hot Creek, headwaters to mouth, was among those EPA additions. Additionally, major tributaries to Salmon Falls Creek and Shoshone Creek were added to the analysis as potential sources of heat loading. These tributaries include the South Fork Shoshone Creek, Pole Camp Creek, Cottonwood Creek, Langford Flat Creek, Big Creek, Hannah's Fork, and Horse Creek in the Shoshone Creek drainage. In the Salmon Falls Creek drainage, Devil Creek, Cedar Creek, House Creek, Little House Creek, Whiskey Slough, Browns Creek, China Creek, Player Creek, and the North Fork Salmon Falls Creek were examined. All streams examined require load reductions as a result of lack of shade.

### ***Mercury Findings***

Although not currently listed on the integrated report, Salmon Falls Creek Reservoir was examined due to a fish consumption advisory placed on the water body in 2001. Fish tissues were collected in October of 2006. Mercury concentrations found in fish at that time averaged 0.779 mg/kg, well above DEQ's fish tissue criterion of 0.30 mg/kg. In order to achieve the water quality standard, mercury levels would need to be reduced by 69 percent.

### ***Summaries of Assessments***

Tables 2 and 3 summarize the assessment outcomes for each assessment unit and the proposed TMDLs and reductions to be completed. The tables identify which assessment units will be retained on subsequent §303(d) lists as a result of data gaps or policy issues concerning flow alteration.

**Table 2. Summary of assessment outcomes.**

<b>Water Body Segment/ Assessment Unit</b>	<b>Listed Pollutants</b>	<b>TMDL(s) Completed</b>	<b>Recommended Changes to §303(d) List</b>	<b>Justification</b>
Cedar Creek Lower ID17040213SK000_04	Flow Alteration Temperature Sediment	Yes	Retain for Flow Alteration TMDLs completed move to Section 4A and 4C upon approval	Existing Shade Bank Stability
Salmon Falls Creek Lower ID17040213SK001_06 ID17040213SK003_06	Temperature Nutrients Sediment	Yes	TMDLs completed move to Section 4A upon approval. Delist Bacteria and Dissolved Oxygen (DO)	Existing Shade Excess TP Excess TN Excess TSS
Devil Creek ID17040213SK002_03 ID17040213SK002_04	Temperature	Yes	Add, TMDL Completed move to section 4A upon approval	Existing Shade

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<b>Water Body Segment/ Assessment Unit</b>	<b>Listed Pollutants</b>	<b>TMDL(s) Completed</b>	<b>Recommended Changes to §303(d) List</b>	<b>Justification</b>
Cedar Creek Reservoir ID17040213SK004_L ID17040213SK004	Temperature Sediment Nutrients	Yes	TMDLs completed move to Section 4A upon approval.	Existing Shade Bank Stability Excess TP
House Creek ID17040213SK005	Temperature Sediment Nutrients	Yes	TMDLs completed move to Section 4A upon approval. Delist Bacteria	Existing Shade Bank Stability Excess TP
Cedar Creek Upper ID17040213SK006	Temperature Sediment Nutrients	Yes	TMDLs completed move to Section 4A upon approval.	Existing Shade Bank Stability Excess TP
China Creek, Corral Creek, Whiskey Slough ID17040213SK007_02	Temperature Sediment Nutrients	Yes	TMDLs completed move to Section 4A upon approval	Existing Shade Bank Stability Excess TP
Salmon Falls Creek Reservoir ID17040213SK007_L	Mercury Nutrients	Yes	TMDLs completed move to Section 4A upon approval	Fish Tissue Excess TP
China Creek ID17040213SK008_03	Temperature Sediment Nutrients	Yes	TMDLs completed move to Section 4A upon approval	Existing Shade Bank Stability Excess TP
Salmon Falls Creek ID17040213SK009_06	Temperature Sediment Nutrients	Yes	TMDLs completed move to Section 4A upon approval	Existing Shade Bank Stability Excess TSS Excess TP
North Fork Salmon Falls Creek ID17040213SK010	Temperature	Yes	Add, TMDLs completed move to Section 4A upon approval	Existing Shade
Shoshone Creek ID17040213SK011_04 ID17040213SK013_04 ID17040213SK016_04	Temperature Sediment	Yes	TMDLs completed move to Section 4A upon approval. Delist Bacteria	Existing Shade Bank Stability
Hot Creek ID17040213SK012_03A ID17040213SK012_04	Temperature	Yes	TMDLs completed move to Section 4A upon approval. Delist sediment	Existing Shade
Big Creek ID17040213SK014	Temperature Sediment Nutrients	Yes	TMDLs completed move to Section 4A upon approval	Existing Shade Bank Stability Excess TP

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<b>Water Body Segment/ Assessment Unit</b>	<b>Listed Pollutants</b>	<b>TMDL(s) Completed</b>	<b>Recommended Changes to §303(d) List</b>	<b>Justification</b>
Cottonwood Creek ID17040213SK015	Temperature Sediment Nutrients Bacteria	Yes	TMDLs completed move to Section 4A upon approval. Delist DO	Existing Shade Bank Stability Excess TP Excess <i>E. coli</i> .

**Table 3. Pollutants and Required Reductions.**

<b>Water Body Segment/ Assessment Unit</b>	<b>Pollutants</b>	<b>Required Reductions</b>
Cedar Creek ID17040213SK000_04	Flow Alteration	None
	Temperature	45 percent
	Sediment	56 percent
Salmon Falls Creek Lower ID17040213SK001_06 ID17040213SK003_06	Temperature	20
	Nutrients	TP 54 percent TN 67 percent
	Sediment	TSS 39 percent
Devil Creek ID17040213SK002_03 ID17040213SK002_04	Temperature	33 percent
Cedar Creek Reservoir ID17040213SK004_L ID17040213SK004 ID17040213SK005 ID17040213SK006	Temperature	41 percent
	Sediment	17 percent
	Nutrients	60 percent
China Creek, Corral Creek, Whiskey Slough ID17040213SK007_02	Temperature	36 percent
	Sediment	14 percent
	Nutrients	86 percent
Salmon Falls Creek Reservoir ID17040213SK007_L	Mercury	69 percent
China Creek ID17040213SK008_03	Temperature	47 percent
	Sediment	10 percent
	Nutrients	86 percent
Salmon Falls Creek	Temperature	12 percent

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<b>Water Body Segment/ Assessment Unit</b>	<b>Pollutants</b>	<b>Required Reductions</b>
ID17040213SK009_06	Sediment	TSS 90 Bank Stability 90
	Nutrients	80 percent
North Fork Salmon Falls Creek ID17040213SK010	Temperature	55 percent
Shoshone Creek ID17040213SK011_04 ID17040213SK013_04 ID17040213SK016_04	Temperature	40 percent
	Sediment	65 percent
Hot Creek ID17040213SK012_03A ID17040213SK012_04	Temperature	40 percent
Big Creek/ ID17040213SK014	Temperature	38 percent
	Sediment	64 percent
	Nutrients	65 percent
Cottonwood Creek ID17040213SK015	Temperature	46 percent
	Sediment	86 percent
	Nutrients	77 percent
	Bacteria	88 percent