South Fork Salmon River Subbasin TMDL

Five Year Review

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
§	Section (usually a section of federal or state rules or statutes)
AU	assessment unit
BAER	Burn Area Emergency Response
BMP	best management practice
BURP	Beneficial Use Reconnaissance Program
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWAL	cold water aquatic life
DEQ	Department of Environmental Quality
EPA	United States Environmental Protection Agency
GIS	Geographical Information Systems
HUC	Hydrologic Unit Code
I.C.	Idaho Code
IDAPA	Refers to citations of Idaho administrative rules
km^2	square kilometer
m	meter
mi^2	square miles
MOS	margin of safety
NB	natural background
NFS	not fully supporting
SBA	subbasin assessment
SFI	DEQ's Stream Fish Index
SHI	DEQ's Stream Habitat Index
SMI	DEQ's Stream Macroinvertebrate Index
TMDL	total maximum daily load
USFS	United States Forest Service
WAG	Watershed Advisory Group
WQS	water quality standard

Introduction

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

Idaho has been actively developing TMDLs and producing Integrated Reports since 1994. In 2003, the Idaho Legislature passed, and the Governor signed into law, changes to the way TMDLs are drafted, implemented and tracked. Specifically, the updated rule states,

> "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. include the **assessments** required by section 39-3607, Idaho Code, and an **evaluation of the water quality criteria, in stream 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." **(emphasis added)**

This document addresses each of the obligations outlined.

This subbasin assessment (SBA) and TMDL analysis have been developed to comply with Idaho's 5 Year TMDL Review schedule. The assessment describes the physical, biological, and cultural setting; water quality status; pollutant sources; and recent pollution control actions in the SF Salmon River, located in Southwest Central Idaho (Figure A).

Executive Summary

The purpose of this document is to review the 1991 sediment TMDL for the South Fork Salmon River and the South Fork Salmon TMDL Addendum of 2003.

The TMDLs subject to Five Year review are shown in Table A and Figure B. Figure A shows the watershed location and Figure C shows additional waterbodies that are in Section 5 of the Integrated Report. The Subbasin Assessment and Total Maximum Daily Load for the South Fork Salmon River (DEQ 1991 and DEQ 2002) found that excess sediment was delivered to the river through natural processes, activities related to roads, and timber harvest.

The South Fork Salmon River TMDL addendum (DEQ 2003) reviewed the sediment targets for the South Fork Salmon River and concluded that targets had not yet been met, that there was an improving trend for cobble embeddedness and that TMDL targets should remain the same.

This five year review proposes using USFS Watershed Condition Indicators as targets, because those are closer to background conditions in the watershed.

Table A. Existing TMDLs for 5 Year Review

Stream	Pollutant(s)
SF Salmon River ID17060208SL001_06 ID17060208SL010_03 ID17060208SL010_04 ID17060208SL010_05	Sediment

Table B. 2008 303d Listed Streams

Stream	Assessment Unit	Pollutant	Listing Basis
East Fork South Fork Salmon River-3rd Order	ID17060208SL023_03	Combined biota/habitat bioassessments	BURP
East Fork South Fork Salmon River-5th Order	ID17060208SL023_05	Sediment	Carryover from 1998 list
Johnson Creek-4th Order	ID17060208SL025_04	Temperature	Temperature data

Figure A. South Fork Salmon Watershed Location Map

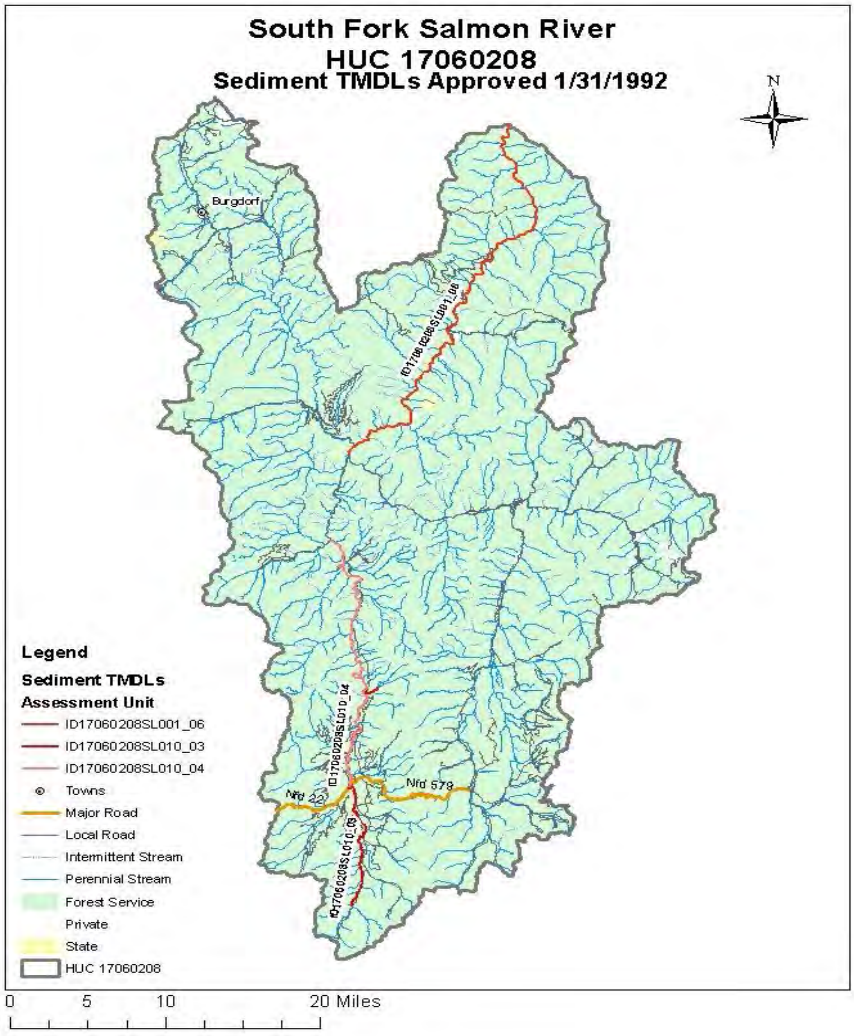

Figure B. South Fork Salmon River Sediment TMDLs

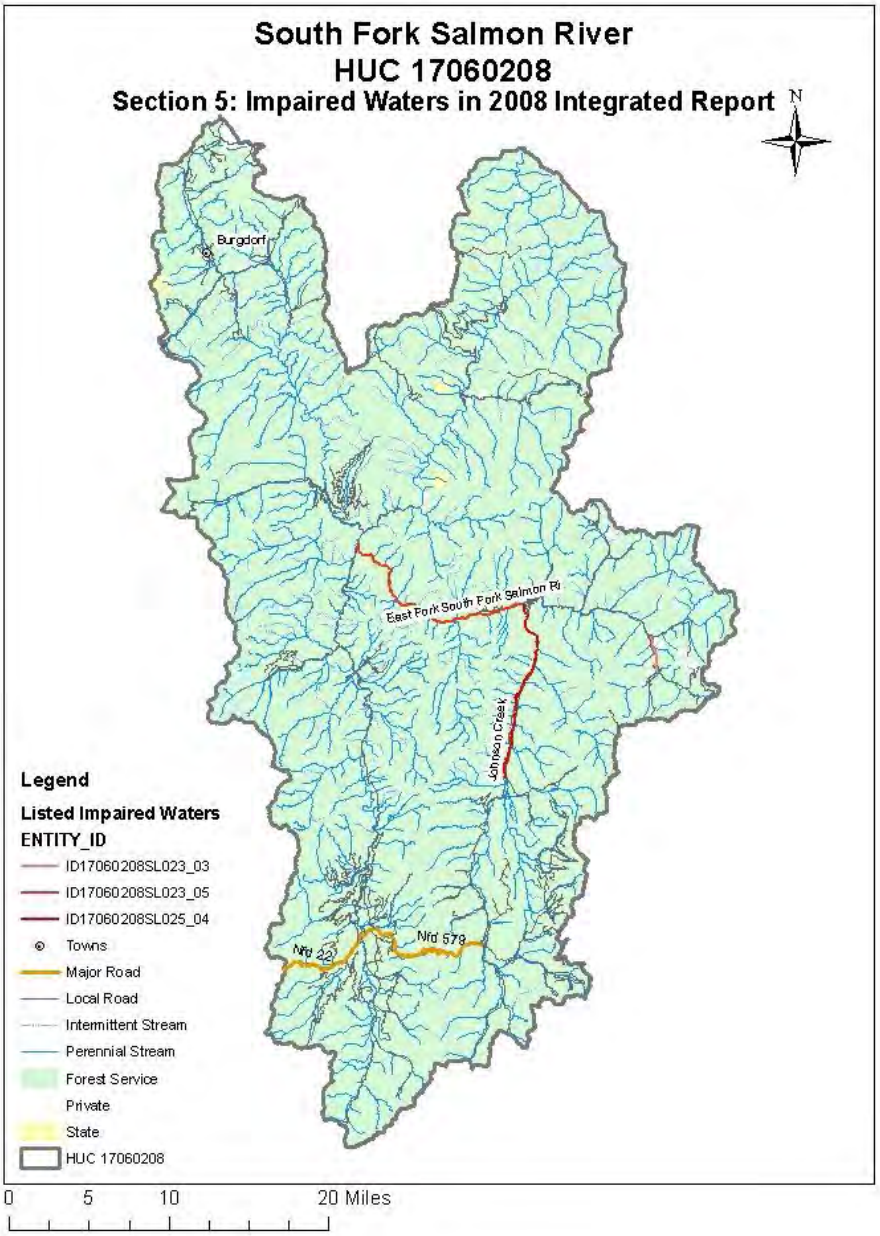

Figure C. South Fork Salmon River Watershed 2008 303(d) Listings

1. Subbasin Assessment – Watershed Characterization

1.1 Introduction

Section 303 of the CWA requires DEQ to monitor waters to identify those not meeting water quality standards. For those waters not meeting standards, DEQ must establish a TMDL for each pollutant impairing the waters. The agency must set appropriate controls to restore water quality and allow the water bodies to meet their beneficial uses. The TMDL contains the allowable pollutant load capacity of the water body, the allowable pollutant loads allocated to permitted point source dischargers and non-point sources within the watershed, and the supporting analyses with explanation of the water quality standard criteria applied and the pollutant concentration target used.

Idaho Statute 39-3611(7) established a five year cyclic review process for Idaho TMDLs. Reviews are to include the assessment of beneficial uses, applicability of water quality criteria, TMDL pollutant targets and allocations and consultation with the Watershed Advisory Group for the watershed. Measures to assess beneficial uses include water quality criteria in conjunction with biological or aquatic habitat measures.

This report is intended to meet the intent and purpose of Idaho Statue 39-3611. The report documents the review process of an established Idaho TMDL and provides recommendations for continued implementation of the TMDL after consideration of the most current and applicable information available, appropriateness of the TMDL to current watershed conditions and consultation with the Watershed Advisory Group. An evaluation of the recommendations presented is provided. Recommendations considered applicable, achievable and appropriate are identified and will be proposed for scheduled completion with the Department's next strategic plan and budget. Final decisions for TMDL modifications will be decided by the Department's Director. Approval of TMDL modifications will be decided by the US EPA with consultation by the Department.

The South Fork Salmon River TMDL (DEQ 1991) addressed general watershed characteristics and described water quality impairment due to sediment. An update of the TMDL and subbasin assessment, The South Fork Salmon River Subbasin Assessment (DEQ 2002) and South Fork Salmon River Subbasin Assessment Addendum (DEQ 2003) included newer data and a more comprehensive review of subbasin characteristics. The TMDL targets remained the same in those documents.

The South Fork Salmon River (SF Salmon) is a tributary to the Salmon River in central Idaho. Located east of Cascade, ID and McCall, ID, the SF Salmon joins the main Salmon River downstream of the confluence with the Middle Fork Salmon River, a predominately unmanaged subbasin which drains the Frank Church - River of No Return (FC-RNR) Wilderness The northeast portion of the SF Salmon

Subbasin is located within the boundaries of the FC-RNR Wilderness. Current land uses include recreation, timber harvest, mining, and grazing although grazing and timber harvest are minimal. Prior to 1831, land use in the sub-basin was by the Nez Perce and Shoshone Bannock tribes for hunting, gathering, fishing and spiritual activities.

The SF Salmon River system plays a key role for Chinook salmon, steelhead, Bull Trout and westslope cutthroat trout, which are all Threatened, Endangered or Sensitive (TES) species.

2. Subbasin Assessment – Water Quality Concerns and Status

2.1 Watershed Changes

This section summarizes changes in the watershed that had the potential to affect water quality.

Recent Fires

In 2003, a relatively small wildfire, the South Fork Fire, burned several thousand acres in the upper SFSR near Warm Lake, and in 2006, about 50,000 acres of the upper SFSR watershed burned, but these fires in 2006 were very patchy with some canopy fire but mainly low-intensity ground fire. No BAER (Burned Area Emergency Response) treatments other than repairs to damaged road features were prescribed.

In the summer of 2006, fires comprising about 34,000 acres burned in the upper SFSR, but primarily under relatively cool temperatures and little wind. The result was that much of the area burned at relatively low intensity and there were few concerns related to damage to fish habitat from increased water yield and destabilized slopes (R.L. Nelson, personal observation as fisheries specialist for Burned Area Emergency Response [BAER] analysis).

These fires are summarized by burn intensity for the upper SFSR in Table 2.1, by "pure" watershed (*i.e.*, not standard hydrologic units), except for 'other', which is a grouping of other small watersheds. Approximately 800 acres on the west side of the river also burned with moderate-high intensity but are not shown in Table 2.1.

Table 2.1.—2006 Extent of burn intensities by Upper SFSR sub watershed

Watershed	Total Acres	Burn Intensity Class					
		Moderate		High		Both	
		Acres	%	Acres	%	Acres	%
Goat Creek	4291	1446	34	1161	27	2607	61
Sister Creek	1563	292	19	357	23	649	42
Twin Creek	657	224	34	321	49	545	83
Snowslide Creek	670	238	35.5	187	27.9	425	63
Bearhill Creek	265	132	50	12	4	144	54
Silver Creek	651	227	35	22	3	249	38
Other	985	299	30.3	101	10.2	400	41
Total	9082	2858	31	2161	24	5019	55

based on BARC reflectance imagery (rounded to nearest whole acre), arranged from south to north (except for "other"), upper SFSR

Post fire stream cross-sections compared to pre-fire conditions indicate that so far the stream cross sections have not changed significantly in the Boise National Forest (personal communication with Gary Harris 3/2009).

In 2007, considerably more wildfire occurred in the upper SFSR. Included in this area was the Poverty Fire Timber Salvage area that was responsible for much of the spawning area damage following the 1964-65 flood events. In the fall of 2007, extensive slope stabilization efforts, including mulching and aerial application of straw, were undertaken to help stabilize these exposed areas to help reduce the likelihood of excess sediment transport from the legacy road system and plantation contour trenches in the Poverty Flats area into the SFSR.

In 2007, fire burned in the SFSR upstream of the mouth of the Secesh River. Fitsum Creek, Buckhorn Creek, Phoebe Creek and Krassel Creek tributary subwatersheds all burned. Burn intensities in these subwatersheds varied but overall, burn intensities were low as estimated by Burned Area Reflectance Classification. A total of 573,882 acres burned as part of the Loon-Zena and Monumental fires.

Table 2.2 2007 Burn Intensities in South Fork Salmon River Watershed

BARC Class	Upper SFSR acres burned (%)	Secesh acres burned (%)	Lower SFSR acres burned (%)	EFSFSR acres burned (%)
None	75,186 (59%)	111,297 (72.5)	126,562 (71)	79,346 (69)
Low	26,801 (21)	16,827 (11)	23,382 (16)	13,585 (11.8)
Moderate	18,743 (15)	18,284 (12)	19,716 (11)	13,434 (11.7)
High	6,684 (5)	6,971 (4.5)	3,412 (2)	8,654 (7.5)
TOTAL	127,414 (100)	153,378 (100)	178,071 (100)	115,019 (100)

2008 Mudslides

The 2008 spring and summer season brought about many mudslides, mostly impacting the East Fork South Fork Salmon River.

On July 22, 2008 an isolated thunder storm tracked across the South Fork Salmon River Basin in the area of the 2007 Cascade Complex and East Zone Fire Complex. Mud and debris flows occurred in approximately 2 dozen small tributaries to the East Fork South Fork Salmon River (EFSFSR). About 10 drainages cross the EFSFSR Road, which provides access to the community of Yellow Pine from McCall. 6 culverts were plugged making the EFSFSR road impassable. The East Fork of Parks Creek was severely scoured from the head of the drainage to the confluence with the EFSFSR. A large open bottom culvert was completed plugged with an alluvial fan spreading over 1000 feet up and down the road. Mud and debris at Parks Creek was reported at about 7 feet deep.

Figure 2.1 shows the major sediment deposition to the SFSR from tributaries along the EFSFSR road as well as notes on the anticipated mitigation measures. By the following spring, the river removed most of the deposited sediment (Rodger Nelson, USFS, personal communication 2010).

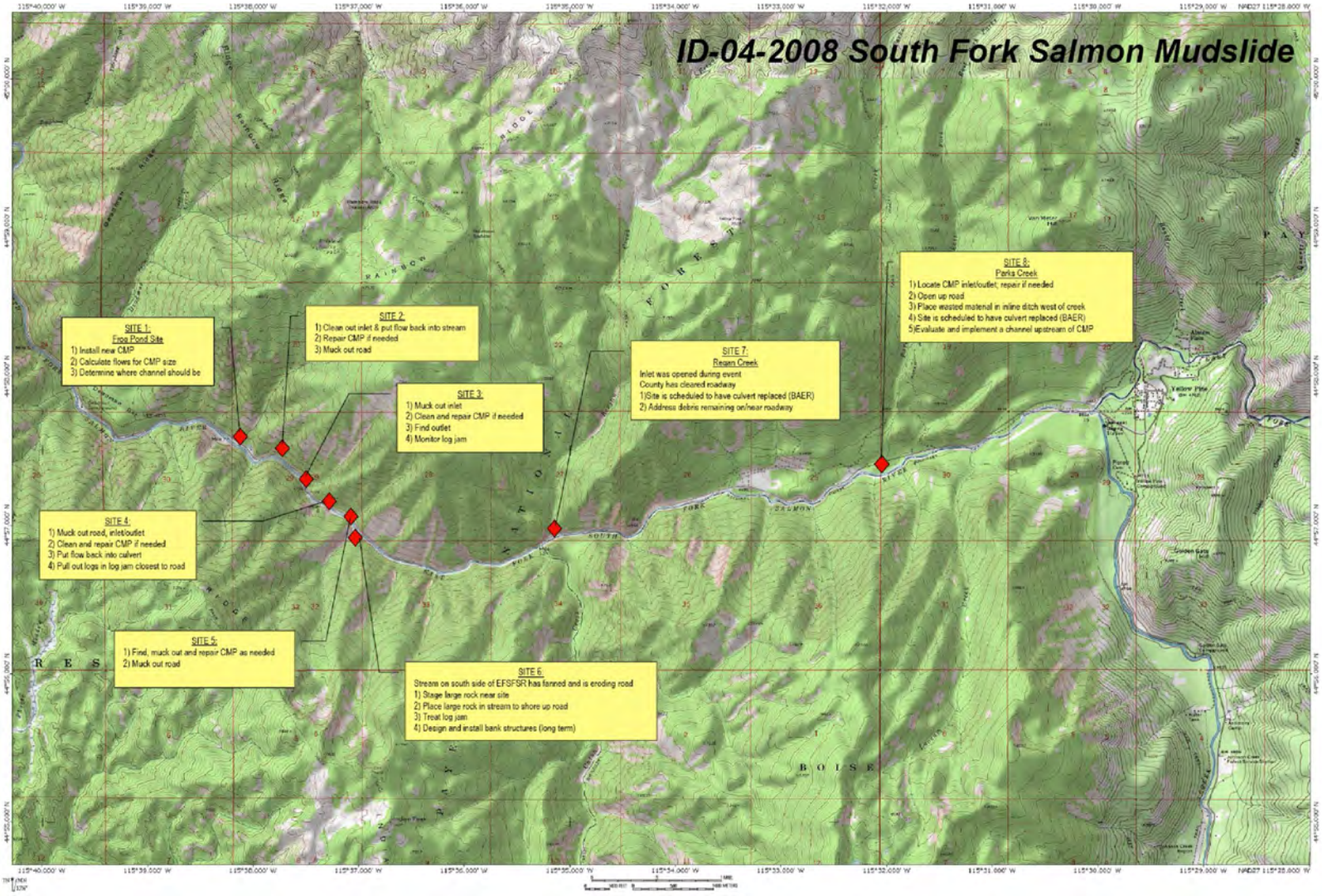

Figure 2.1 EFSR Road Damage Location

Figure 2.2 shows the EFSFSR road and the damage that occurred during the 2008 mudslide.

Figure 2.2 EFSR Mudslide Damage

2010 Rain Events

In 2010, heavy precipitation triggered high flows in Buckhorn Creek taking out about 700 feet of the South Fork Salmon Road (J. Sisson, Nez Perce Tribe, personal communication 2010). Although damage occurred farther downstream at Fitsum Creek, the road prism in the Fitsum Creek area stayed intact and the fill slope was stabilized.

2.2 TMDL Summary

The targets established for the 1991 TMDL are shown in Table 2.3 below. The proposed revised targets based on the Watershed Condition Indicators used in the SFSR watershed by the USFS are shown in Table 2.4 for moderate quality of gravel and interstitial sediments. As part of the Southwest Idaho Land and Resource Management Plan (LRMP) revision effort, the National Marine Fisheries Service (NMFS) biological opinion Term and Condition 3.B.1.required the Payette National Forest (PNF) and Boise National Forest (BNF) to revise the default sediment watershed condition indicator (WCI) values to something more appropriate for the South Fork Salmon River (SFSR). These revised indicators are shown in Table 2.4.

Table 2.3 Applicable SFSR TMDLs

Waterbody	Pollutant	Target
ID17060208SL001_06	Sediment	Five year depth fines mean of 27% or less with no individual year > 29% Cobble Embeddedness five year mean of 32% with no single year over 37% OR Acceptable improved trends in other monitored water quality parameters directly related to salmonid spawning and coldwater aquatic life
ID17060208SL010_03	Sediment	
ID17060208SL010_04	Sediment	
ID17060208SL010_05	Sediment	

Table 2.4 Proposed SFSR TMDL Targets

WCI Sediment Target	WCI Sediment Target
Interstitial Sediment Deposition (tributary SFSR target)	Any single mean free matrix count between 17% and 27% OR A 5-year mean free matrix count of 11%-17%
Intragravel Quality (mainstem SFSR target)	5 year mean fines < 6.3 mm concentrations at depth 28% to 36% with no more than two years > 36%

The original SF Salmon River TMDL targets were not reflective of natural conditions. These targets are being replaced with the WCI Payette Forest Indicators for moderate quality intragravel and interstitial conditions as shown in Table 2.3 The USFS has moved from cobble embeddedness sampling towards more routinely collecting free matrix data and thus, the interstitial targets are focused on free matrix criteria. Free matrix criteria are tributary targets whereas core sampling results (depth fines) are mainstem targets.

The TMDL allocations shown in Table 2.5 are based upon sediment modeling efforts made in 1991. The load allocation is based on sediment delivery to the South Fork Salmon watershed at 10% over natural background conditions to account for natural perturbations. Table 2.6 shows the sediment sources identified in the SFSR TMDL. No current sediment modeling data is available.

Table 2.5 TMDL Load Allocations and Load Capacity

Water Body	Pollutant	Point Sources	Nonpoint Sources	Natural Background	Load Capacity	Load Allocation
South Fork Salmon River	Sediment	0	1590 tons/year	15,900 tons/year	17,490 tons/year	1590 tons/year

Table 2.6 SFSR Sediment Sources from the SFSR TMDL

Sediment Source	Load	Percent of Total
SFSR Road (Warm Lake Road to EF SFSR)	500 tons/year	2.7%
SFSR Road (Warm Lake Road to Cup Cr.)	50 tons/year	0.3%
Other open roads/closed roads/logging roads	2,000 tons/year	10.8%
Grazing	0 tons/year	0%
Poverty Burn Benches	100 tons/year	0.5%
Natural Sources	15,900 tons/ year	85.7%

Control/Monitoring Points

The SF Salmon TMDL stated that

> "monitoring of implementation, pollutant source and transport and beneficial use status will demonstrate the value of the implemented recovery plan projects. The effectiveness in lowering the sediment load to improve the limited beneficial uses in the SFSR will be assessed. If Chinook, steelhead and resident trout spawning capabilities increases to acceptable limits by 2001 with an estimated 25% reduction of sediment yield from human activities, the level of effort expended to achieve the reduction would be maintained. If spawning capabilities does not increase, additional recovery projects and/or an analysis of the level of beneficial use attainability will be initiated".

In 2001, the spawning capabilities of salmonid fish had not increased to acceptable limits. At that time, it was decided that the targets would remain the same and due to a positive trend in the TMDL target data, no additional implementation measures beyond what had originally been proposed in the TMDL and then in a 2000 USFS Subbasin Review (USFS 2000).

In 2005, the revised WCI were put into effect by the Boise and Payette National Forests. Because the WCI's are more representative of natural conditions in the watershed, the moderate intragravel quality indicators will be adopted as new TMDL targets to ensure beneficial use support.

Effectiveness of the goal of 25% reduction in sediment yield from human activities is ascertained through depth fines, cobble embeddedness and photopoint monitoring. This monitoring includes tributary sediment monitoring near projects and photo-points to assess stabilization. The status of the beneficial use (salmon and steelhead spawning habitat capability) is monitored at five important spawning sites.

Monitoring areas for sediment monitoring are located in important Chinook and steelhead spawning areas of the SFSR at Stolle Meadows (UTM 11T, 604,270N, 4,938,290E 5), immediately upstream of the mouth of Dollar Creek (UTM 11T, 603,486E 4,952,650N), Poverty Flat (UTM 11T, 60,2467E 4,964,162N), immediately upstream of the Oxbow breach (UTM 11T, 615,600E 4,971,562N), and immediately downstream of the Glory Hole near Krassel Guard Station (UTM 11T, 60,2467E 4,978,865N); the Johnson Creek site is at the spawning area located in the vicinity of the Ice Hole Campground (UTM 11T, 618,379E 4,971,040N). In addition, free matrix monitoring sites in tributaries were added to assess implementation efficacy. These sites are in Blackmare Creek, Four Mile Creek, Buckhorn Creek, Fitsum Creek and Cabin Creek.

2.3 Other Water Quality Limited Assessment Units Occurring in the Subbasin (IDEQ 2008 303d List)

Table 2.7 lists the streams that are considered to be water quality limited based on the 2008 Integrated Report.

Table 2.7 Water Quality Limited Assessment Units in the SFSR Subbasin

Stream	Assessment Unit	Listing
East Fork South Fork Salmon River-3rd Order	ID17060208SL023_03	Combined biota/habitat bioassessments
East Fork South Fork Salmon River-5th Order	ID17060208SL023_05	Sediment
Johnson Creek-4th Order	ID17060208SL025_04	Temperature

3. Beneficial Use Status

Idaho water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing uses, designated uses, and presumed uses. The Water Body Assessment Guidance, second edition (Grafe et al. 2002) gives a detailed description of beneficial use identification for use assessment purposes. Table 3.1 lists the designated beneficial uses for the South Fork Salmon River reaches that have sediment TMDLs.

Table 3.1 South Fork Salmon River Subbasin beneficial uses.

Water Body	Uses[a]	Type of Use
South Fork Salmon River (AU ID17060208SL010_03)	COLD SS PCR DWS SRW	designated
South Fork Salmon River (AU ID17060208SL010_04)	COLD SS PCR DWS SRW	designated
South Fork Salmon River (AU ID17060208SL010_05)	COLD SS PCR DWS SRW	designated
South Fork Salmon River (AU ID17060208SL001_06)	COLD SS PCR DWS SRW	designated

a COLD (Coldwater aquatic life), SS (Salmonid Spawning), PCR (primary contact recreation), DWS (domestic water supply), SRW (special resource water)

Summary and Analysis of Existing Water Quality Data

This section contains new data for the TMDL as well as DEQ BURP data (Table 3.2) for all streams in the watershed. Additional fisheries data is not included in this analysis because the variables affecting anadramous fish populations are numerous and also potentially from conditions outside the subbasin.

Watershed BURP Data

IDEQ evaluates beneficial use support using indices for stream habitat, fisheries and insects calculated from macroinvertebrate, fish, and habitat data collected through the Beneficial Use Reconnaissance Project (BURP). The data are arranged in indices (Table 3.2) and scored to determine if the water body in question is supporting its beneficial uses. Three indices are considered when making a beneficial use support status determination. These indices are stream macroinvertebrate index, stream fish index, and stream habitat index. The indices are classified using data collected during standardized sampling in accordance with

BURP protocol. Beneficial use support status determination is evaluated from comparison with reference conditions measured in similar bioregions. Index values are assigned based on the percentile range of the particular score in relation to the reference condition. Biological data available for examination include macroinvertebrate, fish, and habitat data collected through BURP. The data are arranged in indices and scored to determine if the water body in question is supporting its beneficial uses. Three indices, defined below, are considered when making a beneficial use support status determination.

The first index is the Stream Macroinvertebrate Index (SMI). By recording the abundance of macroinvertebrates known to live only in specific temperature conditions, the index is used as a direct biological measure of cold water aquatic life (Grafe et al. 2002).

The second index is the Stream Fish Index (SFI). This index is also considered a direct biological measure of cold water aquatic life and is used to determine how close the stream is to achieving the Clean Water Act "fishable" goal. Fish counts are taken in each watershed and the index relates data found to known index, or reference sites.

The last index considered when determining beneficial use support is the Stream Habitat Index (SHI). The habitat index considers ten habitat metrics such as: instream cover, substrate composition, bank and canopy cover and zone of influence. SHI is not considered to be a direct biological measure; therefore it is recommended that it always be used in conjunction with at least one other index. Metrics tailored to forested areas were used for the SHI.

Each index uses a scale of one to three. The values resulting from each index are averaged to determine the support status of each waterbody as described in IDEQ's Water Body Assessment Guidance, Second Edition (Grafe et al. 2002). A score of three indicates the stream is most likely to fully support beneficial uses. Average values of two or greater indicate a water body that is in full support of its beneficial uses, however, the condition significantly varies from reference conditions and assessors can examine additional information, if available, to determine support status of the water body. Scores of less than two indicate that a water body is not supporting its beneficial uses. Scores from at least two indices are required to make a support status determination.

Overall, with the exception of the 3rd order AU of the EFSF Salmon River (SL023_03), beneficial use support was determined to be Full Support in all other Aus unless temperature data indicated that the federal bull trout temperature standard was exceeded.

Table 3.2 DEQ BURP Results

Stream Name	AU	Date	SMI Rating	SHI Rating	SFI Rating	Score
Grouse Creek	17060208SL005_02	2004	3	2	ND[1]	2.5
Lake Creek	17060208SL006_03	2004	3	3	ND	3
Sixmile Creek	17060208SL013_02	2004	3	3	2	2.7
Blackmare Creek	17060208SL014_03	2004	3	3	ND	3
Cabin Creek	17060208SL019_02	2004	3	3	ND	3
Warm Lake Creek	17060208SL019_03	2004	3	3	ND	3
EFSF Salmon River	17060208SL023_02	2004	3	2.67	1	2.67
EFSF Salmon River	17060208SL023_03	2004	3	1	1	1.7
EFSF Salmon River	17060208SL023_04	2004	3	3	ND	3
Johnson Creek	17060208SL025_04	2004	ND	3	1	NA
Buck Creek	17060208SL026_02	2004	3	3	ND	3
Trapper Creek	17060208SL027_02	2004	3	2	ND	2.5
Cinnabar Creek	17060208SL029_02	2004	3	3	1	2.3
Sugar Creek	17060208SL029_03	2004	3	3	1	2.3
MF Elk Creek	17060208SL034_02	2004	3	3	ND	3.0
Curtis Creek	17060208SL017_02	2005	3	3	2	2.7
Rice Creek	17060208SL018_02	2005	3	3	3	3.0
Unnamed Trib to Burnt Log Creek	17060208SL026_02	2005	3	3	2	2.7
K Creek	17060208SL001_02	2006	3	3	ND	3.0
Lake Creek Tribs Average BURP Score (3 sites)	17060208SL006_02	2006	3	2.67	1	2.2
NF Lick Creek	17060208SL009_02	2006	3	3	3	3.0
Goat Creek	17060208SL010_03	2006	3	3	ND	3.0
Curtis Creek	17060208SL017_03	2006	3	3	1	2.3
SF Fourmile Creek	17060208SL021_02	2006	3	3	2	2.7
Fourmile Creek	17060208SL021_03	2006	3	3	2	2.7
Parks Creek	17060208SL023_02	2006	3	3	3	3.0
Reegan Creek	17060208SL024_03	2006	3	3	1	2.3
Johnson Creek Tribs Average BURP Score (3 sites)	17060208SL025_02	2006	2.67	2.67	.67	2
Riordan Creek	17060208SL028_02	2006	3	3	ND	3.0
Riordan Creek	17060208SL028_03	2006	3	3	3	3.0
Pony Creek	17060208SL003_03	2007	2	3	ND	2.50
Ruby Creek	17060208SL005_02	2007	3	3	1	2.33
Secesh River	17060208SL005_03	2007	3	3	1	2.33
Summit Creek	17060208SL007_02	2007	3	3	1	2.33
Loon Creek	17060208SL008_02	2007	3	3	3	3.00
SF Salmon River Tribs Average BURP Score (7 sites)	17060208SL010_02	2007	3	2.43	1.6	2.3
Fitsum Creek	17060208SL011_03	2007	3	3	ND	3.00

Stream Name	AU	Date	SMI Rating	SHI Rating	SFI Rating	Score
Little Buckhorn Ck	17060208SL012_02	2007	ND	3	ND	NA
WFBuckhorn Ck	17060208SL012_04	2007	3	3	ND	3.00
Buckhorn Creek	17060208SL012_05	2007	3	3	ND	3.00
Cougar Creek	17060208SL013_03	2007	3	3	ND	3.00
Dollar Creek (u)	17060208SL015_02	2007	3	3	3	3.00
Dollar Creek (l)	17060208SL015_03	2007	3	3	2	2.67
Six Bit Creek	17060208SL016_02	2007	3	3	ND	3.00
Rice Creek	17060208SL018_02	2007	3	3	ND	3.00
Warm Lake Creek**	17060208SL020_02	2007	3	2	0	1.67**
Camp Creek	17060208SL022_03	2007	3	3	ND	3.00
Johnson Creek	17060208SL025_03	2007	3	3	ND	3.00
Burntlog Creek	17060208SL026_03	2007	3	3	2	2.67
Sugar Creek	17060208SL029_03	2007	3	3	ND	3.00
Profile Creek	17060208SL031_02	2007	3	3	3	3.00
Quartz Creek	17060208SL032_03	2007	3	3	ND	3.00

[1] ND= no data (not electrofished)

*To interpret the aquatic life use support of three or more sites, DEQ averages the results of the multimetric index scores. In cases where there are only two sites, DEQ uses the lower index score to interpret aquatic life use support.

**Site re-assessed using 2007 BURP site. The SMI scored a '3', as did the SHI. Alone, these scores would lead to a 'full support' call. However, the fish index (SFI) scored a '0', based on the capture of a single brook trout. The SFI score is being disregarded for the following reasons:

1) The stream is very steep and choked with branches, making fishing very difficult.
2) The stream burned a week or so before the survey, and the uplands were still smoking.

With block nets and more aggressive shocking techniques, it is highly likely that the fish assemblage would cause a non-zero SFI score.

Sediment Target Monitoring Results

South Fork Salmon River

USFS sediment monitoring results are shown in Tables 3.3-3.6 (USFS 2010). The results for Poverty Flat spawning area exceed the target as shown in Table 3.3 with a five-year mean of 36.9 % large fines. This level of fines would be expected to contribute to very low embryo survival of either Chinook salmon or steelhead if the actual redds had similar concentrations of large fines.

High intragravel quality for Chinook embryo survival and moderate to high quality for steelhead was observed at all other spawning areas). The USFS concludes from their long term sediment monitoring in the SFSR that the major spawning areas are relatively favorable for salmon and steelhead spawning but have not improved as anticipated by implementation of the SFSR Road Reconstruction Project (improvement over large fine sediment five year means from 1986-1990 base period).

Additional data for the Secesh subwatershed are provided in Appendix C.

Table 3.3 Intrabasin Depth Fines Comparison for SFSR Watershed (USFS 2010)

Year	Stolle (B081)	Dollar (B082)	Oxbow (E083)	Poverty (E084)	Glory (E085)	Johnson (B152)
1977	22.2D	29.0C	35.0BA	35.9A	31.8BC	24.4D
1978	19.9D	31.1B	36.4A	33.7BA	31.7B	25.5C
1979	23.0C	28.1B	34.9A	32.4A	32.8A	23.1C
1980	20.7C	27.7BA	32.0A	29.3BA	30.6A	25.4B
1981	22.7D	26.2C	31.4A	30.1BA	27.2BC	25.9DC
1982	17.5C	27.5BA	30.5A	30.4A	24.5B	27.3BA
1983	22.4C	27.8B	36.2A	35.5A	24.5CB	27.9B
1984	25.0CD	26.5CB	33.5A	28.9B	22.1D	27.9CB
1985	22.7D	29.7C	36.6A	36.0BA	28.9C	32.3BC
1986	26.3D	28.7DC	35.6A	34.1BA	22.5E	31.6BC
1987	27.0B	28.6B	35.5A	33.8A	28.8B	27.9B
1988	20.4C	26.8BA	29.7A	30.2A	25.2B	26.1BA
1989	22.7C	30.9A	30.0A	28.3BA	24.1C	25.7BC
1990	25.8BC	30.2A	31.7A	29.8BA	28.6BA	23.7C
1991	26.0B	26.0B	27.0BA	31.0A	23.0C	28.0BA
1992	24.5B	26.4B	28.3BA	31.2A	27.4BA	26.2B
1993	23.4C	29.5B	21.8C	35.1A	22.8C	30.4BA
1994	18.9C	26.0B	33.2A	33.4A	22.5CB	30.7A
1995	26.7C	25.6C	34.0BA	29.8BC	34.9A	33.3BA
1996	32.8BA	27.8B	32.2BA	35.3A	34.3A	28.5B
1997	25.5B	28.9B	36.3A	36.8A	34.2A	27.8B
1998	24.3C	42.7A	29.2B	28.0CB	38.7A	26.9CB
1999	28.6C	26.3C	31.3BC	37.8A	35.2BA	26.9C
2000	26.9BA	30.5A	29.4A	31.5A	30.7A	23.7B
2001	28.9A	29.3A	27.6BA	30.4A	23.1B	30.5A
2002	30.4B	27.8B	29.5B	37.6A	27.7B	30.1B
2003	31.2B	30.2B	33.5BA	37.4A	31.8BA	24.4C
2004	31.3A	29.7A	31.3A	30.5A	30.7A	21.9B
2005	32.8A	32.4A	27.1B	27.7BA	26.2B	25.5B
2006	27.0C	33.6B	.	38.5A	40.0A	22.0D
2007	23.5CD	24.2CD	29.4CB	40.6A	30.5B	19.1D
2008	23.8CB	27.3B	.	41.6A	27.7B	20.9C
2009	24.3B	22.8B	.	35.9A	23.8B	22.0B
Recent	**25.8C**	**28.1CB[c]**	**30.1B**	**36.9A**	**29.8B**	**21.9D**
Overall	**25.1E**	**28.7C**	**31.8B**	**33.3A**	**28.8C**	**26.5D**

[a] Mean values in a row with different letters are significantly different (P<0.10) by Tukey's HSD test.
[b] Annual means in tan shading correspond to data from most recent five years.
[c] FA rating based on declining trend (Table 8).

Table 3.4 Annual Average Free Matrix Results for the Upper SFSR Watershed (USFS 2008)

Year	Blackmare Creek E006	Fourmile Creek E068	Buckhorn Creek E016	Fitsum Creek E023
	Control		Test	
1988	9.5	21.5	7.5	12.6
1989	6.1	33.1	12.6	16.1
1990	9.1	15.7	5.8	12.9
1991	29.4	17.8	16.3	35.6
1992	16.9	18.1	12.3	26.2
1993	17.2	12.0	9.7	24.3
1994	1.3	7.3	7.8	16.0
1995	20.8	28.3	12.5	25.1
1996	14.5	12.4	14.2	16.9
1997	13.8	17.4	7.4	16.3
1998	3.9	6.3	4.9	9.3
1999	11.4	9.7	5.5	15.6
2000	8.9	12.0	2.8	11.5
2001	23.9	12.9	14.0	24.9
2002	8.8	.	25.5	26.0
2003	35.5	22.5	17.9	9.5
2004	6.5	8.8	6.2	19.5
2005	10.0	19.6	8.1	14.1
2006	16.7	16.7	15.8	22.7
2007	21.5	.	15.1	13.7
	Means[b]			
Recent[b]	18.1A	16.1BA	12.6B	16.0BA
Overall	14.3B	16.3B	11.1C	18.5A

[a]Means with different letters are significantly different ($\alpha = 0.10$) by Tukey's Honestly Significant Difference (HSD) test. Note that means are based on total respective sample, not from the data displayed in the table.
[b]Recent = 5-year mean calculated from most recent data (shaded).

Table 3.5 Annual Average Percent Free Matrix at Sediment Monitoring Sites for the SFSR Road and Comparisons among them 1988-2007 (USFS 2008)

Year	Fourmile Creek		Camp Creek		Cabin Creek		
	E068	E067	E129	E130	B127	B126	B125
	Control	Test	Control	Test	Control	Control	Test
1990	15.7	16.2	27.9	12.4	25.1	31.5	13.2
1991	17.8	34.4	14.9	18.8	17.5	33.0	23.7
1992	18.1	19.5	9.4	18.5	23.4	35.0	17.5
1993	12.0	15.2	2.4	11.7	12.0	23.2	13.6
1994	7.3	22.0	1.7	7.2	24.4	40.9	29.0
1995	28.3	24.2	8.2	23.3	27.3	66.9	53.5
1996	12.4	9.7	12.0	10.4	18.1	20.4	.
1997	17.4	7.7	12.6	6.4	24.5	17.8	24.9
1998	6.3	4.0	2.9	4.4	12.4	8.9	7.8
1999	9.7	15.7	5.5	5.5	18.8	6.1	18.2
2000	12.0	4.9	4.4	3.9	24.1	16.1	18.0
2001	12.9	16.5	18.3	16.4	43.3	22.7	27.5
2002	.	.	.	.	.	.	.
2003	22.5	21.0	5.0	3.5	20.9	13.4	13.6
2004	8.8	13.3	9.9	5.2	18.0	18.6	27.7
2005	19.6	17.6	12.2	14.5	21.6	25.8	18.0
2006	16.7	18.4	18.1	13.7	16.9	11.7	15.2
2007	.	17.3	12.8	16.7	46.0	47.4	39.4
	Means[a]						
Recent[b]	16.1CB	17.5B	11.6CD	10.7D	24.7A	23.4A	22.8A
Overall	14.8C	16.3C	10.4D	11.3D	23.2BA	25.8A	22.6B

[a]Means with different letters are significantly different ($\alpha = 0.10$) by Tukey's Honestly Significant Difference (HSD) test. Note that means are based on total respective sample, not from the data displayed in the table.
[c]Recent = 5-year mean calculated from most recent data (shaded).

Table 3.6 Annual Average Percent Free Matrix at Sediment Monitoring Sites in the Lower SFSR Watershed 1988-2007 (USFS 2008)

Year	Sheep Creek E039 Control	Pony Creek E056 Test	Elk Creek E030 Test
1989	22.1	9.0	9.0
1990	10.1	17.8	.
1991	9.0	24.7	35.2
1992	14.2	27.6	2.7
1993	8.3	25.6	10.3
1994	.	17.9	11.9
1995	41.6	40.6	16.2
1996	13.2	10.6	12.9
1997	7.3	13.9	.
1998	2.0	13.4	11.4
1999	12.8	21.9	10.0
2000	6.5	6.6	3.9
2001	9.8	21.6	17.5
2002	5.8	12.5	10.4
2003	10.8	19.1	35.9
2004	12.5	10.9	12.4
2005	10.7	5.0	8.0
2006	30.8	21.9	27.7
2007	22.4	16.9	9.4
Means[b]			
Recent	17.4A	14.7A	18.7A
Overall	13.9B	17.8A	14.4B

[a]Means with different letters are significantly different ($\alpha = 0.10$) by Tukey's Honestly Significant Difference (HSD) test. Note that means are based on total respective sample, not from the data displayed in the table.
[b]Recent = 5-year mean calculated from most recent data.

Temperature

The following AUs shown in Table 3.7 did not meet federal bull trout spawning criteria in the 1991 TMDL based on USFS data and will be addressed in a temperature TMDL that is separate from this document. Many of these streams were suggested for listing in the original TMDL for temperature due to the presence of roads in Riparian Habitat Conservation Areas that were potentially impacting the riparian community. Road decommissioning and current management practices that minimize riparian disturbance have likely improved riparian shading but to what extent was unknown since bull trout spawning criteria are not met even in streams in roadless areas on the national forest and in the Frank Church wilderness area. Thus, PNV investigations were undertaken to determine if natural background conditions were met and/or to determine if conditions could be improved. The results of these studies are presented in a report that is separate from this document (in process) Table 3.8 shows more recent data for those streams.

Table 3.7 Streams that do not meet Bull Trout Spawning Criteria

Water Body Segment/ AU	Pollutant	TMDL(s) Completed	Justification
South Fork Salmon River/SL10_02 SL10-03,SL10_04, SL10_05, SL10_06	Temperature	In process	Federal bull trout temp criteria exceeded
Johnson Creek/SL025_02, SL025_03, SL025_04	Temperature	In process	Federal bull trout temp criteria exceeded
Rice Creek/SL018_02	Temperature	In process	Federal bull trout temp criteria exceeded
Dollar Creek/SL015)02	Temperature	In process	Federal bull trout temp criteria exceeded
Trail Creek/SL017L02	Temperature	In process	Federal bull trout temp criteria exceeded
Trout Creek/SL025_02	Temperature	In process	Federal bull trout temp criteria exceeded
Tyndall Creek/SL010_02	Temperature	In process	Federal bull trout temp criteria exceeded
Sand Creek/SL025_02	Temperature	In process	Federal bull trout temp criteria exceeded
Warm Lake Creek/SL019_02, SL019_03, SL020_02	Temperature	In process	Federal bull trout temp criteria exceeded
Profile Creek/SL031_02, SL031_03	Temperature	In process	Federal bull trout temp criteria exceeded
Buckhorn Creek/SL012_02, SL012_03, SL012_04, SL012_05	Temperature	In process	Federal bull trout temp criteria exceeded
Lick Creek/SL009_02, SL009_03	Temperature	In process	Federal bull trout temp criteria exceeded
Grouse Creek/SL005_02, SL005_03	Temperature	In process	Federal bull trout temp criteria exceeded
Elk Creek/SL034_02, SL034_03, SL034_04	Temperature	In process	Federal bull trout temp criteria exceeded

Temperature Monitoring

Currently, the bull trout temperature criterion effective for CWA purposes is the federally promulgated temperature criterion of 10ºC (7-day average of maximum daily temperatures) for waters specified in 40CFR 131.33 during the months of June, July, August and September. Table 3.8 shows the most recent data for the streams recommended for 303d listing in the South Fork Salmon Subbasin Assessment.

Table 3.8 Exceedances of federal bull trout criteria (June-September monitoring) USFS Data

Stream/AU	Year	MWMT (Celsius)
Grouse Creek	2008	15.81
W. Fk Buckhorn Ck	2004	16.89
Elk Creek	2009	17.33
Little Buckhorn Ck	2001	14.23
Profile (mouth)	2009	13.42
SFSR upstream of Mormon Creek	2008	12.4
SFSR upstream of Rice Creek	2009	15.41
SFSR below IDFG rearing ponds	2008	18.8
SFSR at Glory Hole	2003	21.96
SFSR at Poverty Flat	2004	21.6
SFSR at Indian Point	2009	20.48
SFSR at Badley Bridge	2001	22.23
Sand Creek	2008	16.39
Buckhorn	2003	17.56
Lick Creek	2007	18.19
Dollar Creek	2005	14.10
Tyndall Creek	2009	11.4
Rice Creek	2009	14.13
Trout Creek	2009	11.26

The Nez Perce Tribe monitored sites on Johnson Creek in 2007 (Figure 3.1). Based on water temperature monitoring data from 2007, seven-day, instream maximums occurred at most sites during the months of July and August (Figure 3.2). The highest average 7-day maximum temperature was recorded in late July at the Ice Hole monitoring location. On average, stream temperatures were consistently the

highest at the Rock Creek location and consistently the lowest at the Burnt Log location.

For Chinook salmon, optimal water temperatures range from 12.0º to 14.0ºC. Exposure to water temperatures greater than 21.0ºC for more than 1 week usually is fatal to adult Chinook salmon, while the upper incipient lethal temperature for Chinook salmon is 26.2ºC. Temperatures recorded within key rearing and spawning areas in 2007 were generally within the range of preferred temperatures for summer Chinook salmon and none were determined to inhibit spawning, migration, or rearing.

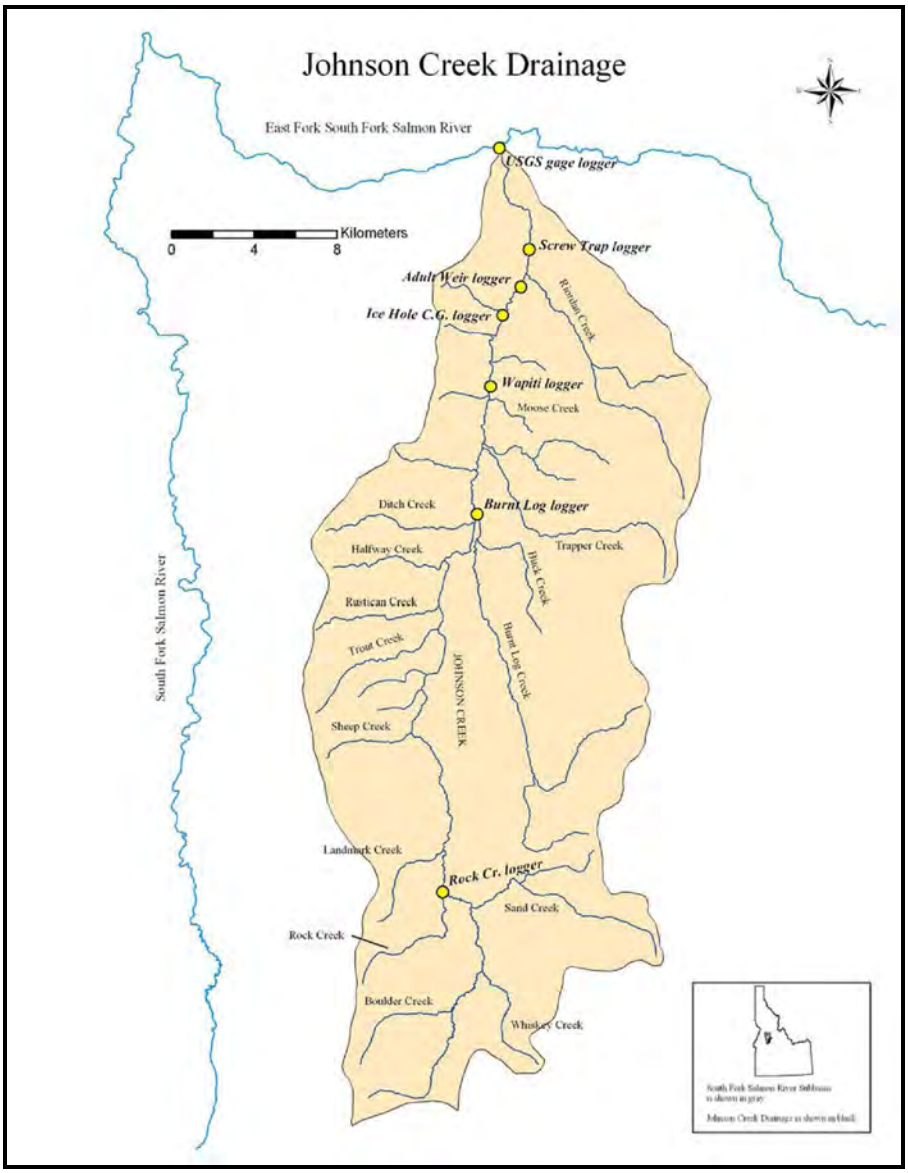

Figure 3.1 Johnson Creek Temperature Monitoring Sites

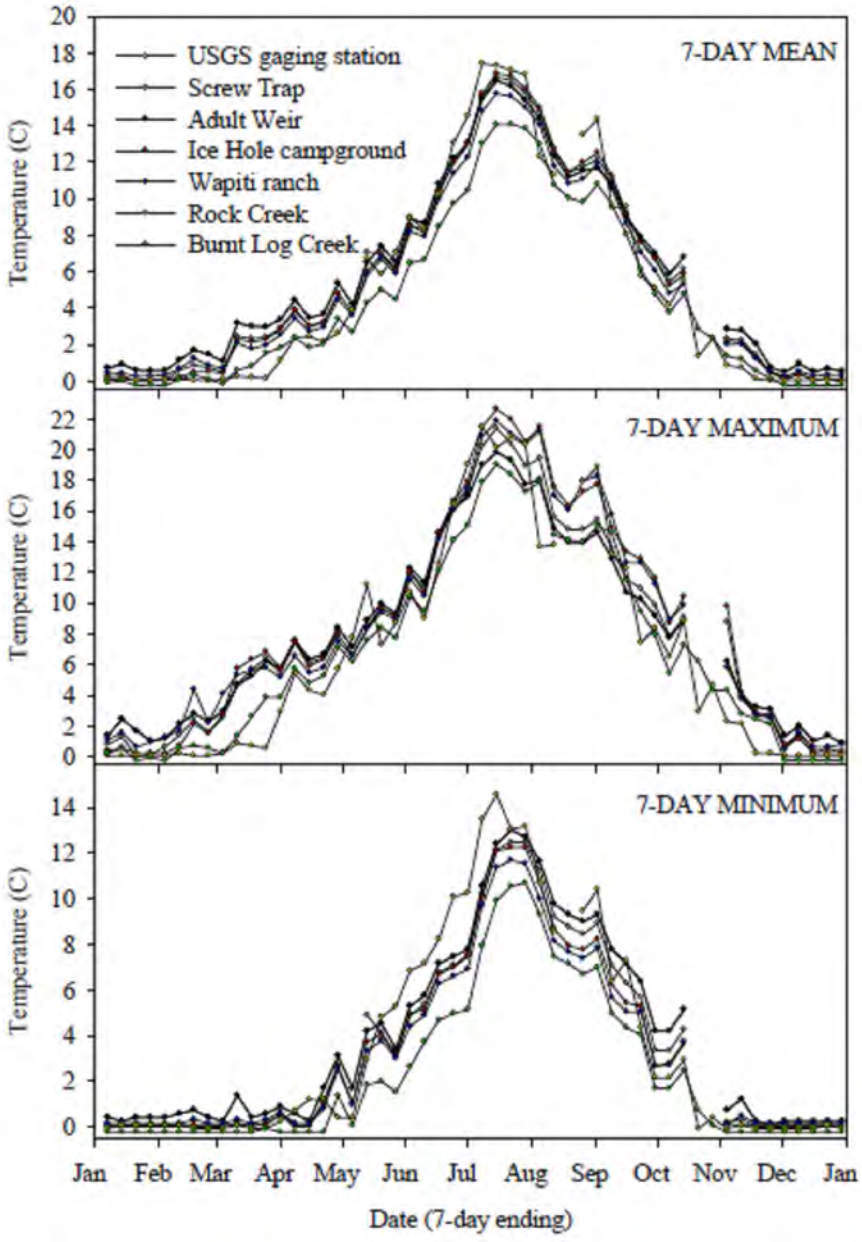

Figure 3.2 Seven-day mean, maximum and minimum instream temperatures summarized from six thermographs in Johnson Creek and one thermograph located in Burnt Log Creek during 2007.

Currently, the bull trout temperature criterion effective for CWA purposes is the federally promulgated temperature criterion of 10ºC (7-day average of maximum daily temperatures) for waters specified in 40CFR 131.33 during the months of June, July, August and September. As shown in Figure 3.2, Johnson Creek exceeds the bull trout spawning criteria. PNV investigations are recommended for AUs SL025_02, SL025_03 and SL025_04.

Other Section 5 Listed AUs

5th Order Section of the East Fork South Fork Salmon River (AUSL023_05)

AUSL023_05 is listed for sediment. Mass wasting events have clearly contributed large amounts of sediment to this AU. Grant funds were sought to study sediment delivery from roads to the East Fork South Fork Salmon River Road to determine anthropogenic sediment contributions. These funds were not obtained and no new data for these reaches is available regarding road sediment delivery. However, the Nez Perce tribe is investigating securing funds for this work in 2012. Additional work on determining sediment sources will be done in Summer 2012. Due to the lack of information, no changes are recommended to the Integrated Report.

3rd Order Section of the East Fork South Fork Salmon River (AUSL023_03)

This AU is listed for an unknown pollutant based on low habitat and fisheries metric stream inventory scores from 2004. The 3rd Order AU of the East Fork South Fork Salmon River is below the Stibnite mine reclamation area and includes the manmade Glory Hole area (Figure 3.1). The reclamation work stabilized historic mine and mill tailings in the Meadow Creek drainage to reduce transport of metals and sediment. Past studies have looked at heavy metal concentrations and not found concentrations that would chronically affect coldwater biota (DEQ 1996).

In 2010 depth fines were measured in two locations in AUSL023_03, one above and one below the Glory Hole. 1% depth fines were found below the Glory Hole (field notes remarked that finding a good sampling site in this section was difficult) and 17% depth fines were found above the Glory Hole. The stream above the Glory Hole has a vigorous riparian area with diverse shrub composition, stable streambanks with the exception of where the stream changes gradient as it enters the Glory Hole area shown in Figure 3.3.

The East Fork South Fork Salmon River is recommended for listing for habitat alteration on the next Integrated Report and for a PNV analysis to be conducted in 2011. Data from 2009 showed a MWMT of 17.35 C at the mouth of the EFSF SR during June-September, exceeding the bull trout spawning criteria.

Figure 3.3 Glory Hole (AUSL023_03)

Status of Beneficial Uses

Using the watershed condition indicators as the new TMDL targets, SFSR sediment TMDL targets are met except at Poverty Flat, which had elevated levels of depth fines.

Tributary sites met the free matrix targets with the exception of Camp Creek in the Upper SFSR watershed. Camp Creek has a network of old logging roads from the early days of logging in the SFSR, which may contribute excess sediment to Camp Creek. This watershed is scheduled for road decommissioning over the next two years.

For AUs SL023_03 and SL023_05, which are in Section 5 of the 2008 Integrated Report, not enough information exists to determine if the status of these AUs should change. DEQ recommends that these AUs remain in Section 5 until more data is collected.

Federal bull trout temperature criteria are not met throughout the watershed. Table 3.7 shows the assessment units for which PNV investigations are being conducted to determine if natural background conditions are met. These are addressed in a separate TMDL document that will be published after this Five Year Review.

Conclusions

Both natural and human caused sources of sediment exist in the SFSR watershed, which can make delineating between impairment caused by excess anthropogenic sediment vs. natural difficult. In general, the South Fork Salmon River is close to meeting its sediment targets and overall is in relatively good condition. The Forest Service has continued to pursue implementation projects to reduce anthropogenic sources of sediment in the watershed and current management strategies minimize human caused disturbance.

To ensure that TMDL targets are conservative, the TMDL targets must be met at all the monitoring stations. Since Poverty Flat and Camp Creek did not meet the TMDL targets, no changes are recommended at this time to the Integrated Report.

Federal bull trout temperature criteria are not met throughout the watershed, particularly in areas where human disturbance has occurred. PNV studies are recommended and in process for these streams.

4. Subbasin Assessment – Summary of Past and Present Pollution Control Efforts

Many water quality improvement projects have occurred throughout the South Fork Salmon River watershed. Table 4.1 recaps the projects that were scheduled for implementation in the original TMDL to meet the sediment reduction goal of a 25% reduction (approximately 649 tons/year). Subsequent sections summarize more recent implementation projects. This section demonstrates the past and current commitment of the USFS and their partners to sediment reduction in the SFSR Watershed.

Table 4.1 SFSR TMDL Implementation

Project	Estimated tons/year sediment reduction	Implementation Completed
SFSR Road Reconstruction	150	1993
Close Miners Peak Road	83	1994
Closure of Buckhorn Road	200	2000
Curtis Creek Drainage Spot Stabilization	40	1994
Two Bit, Six Bit Loop Rd. Stabilization	55	
Upper SFSR Road (Kline Mtn Section) obliteration/spot stabilization	56	2008
NF Dollar Creek Road Obliteration/Stabilization	28	1993
Forest Highway 22 Fill Stabilization	12	
Road closures in Upper SFSR	25	1993
TOTAL	649 tons/year	
Additional Projects	**Acreage Treated**	
Martin Creek Face	60	1992
Poverty Burn	72	1994
Indian Creek Trail	6	1991
Fitsum Creek	10	1992
Cougar Creek	10	1997
Blackmare Cr. Trail	5	1994
White's Gully	2	1994
Fitsum Creek Road	25	1994
Cougar Creek Trail	3	1991
Jakie Creek Road Closure	10	1993
Salmon Point Slide	5	1992
Stibnite Closure on EFSF SR		2000

Current Forestry Implementation

In 2000, the Payette and Boise National Forests prepared a South Fork Salmon River Subbasin Review (USFS 2000) in which they identified opportunities for watershed improvement projects. Table 4.2 summarizes the water quality improvement measures implemented during the last seven years.

Table 4. 2 Current Forestry Implementation

Project Name	Project Description	Completion
South Fork Salmon River Fishing Improvements	Improved river access, parking, dispersed camping, and controlled recreation use during the salmon fishing season on Forest Road 474 from Warm Lake Highway to Goat Creek	2004
Kline Mountain Road Improvement Project	Graveled, improved drainage on road 474 from junction with Warm Lake Highway North for 1.7 miles Stabilized two slope failures	2008
South Fork Burn Area Emergency Response (BAER)	Helimulched 350 acres in Cabin Creek drainage Improved drainage along Cabin Creek Road (FR 467) Constructed 80 FlowCheck structures for sediment trapping on 5 acres of highly erodible soil adjacent to Cabin Creek	2003
South Fork Salvage Watershed Improvement	Constructed 3 hardened fords on Cabin Creek tributaries. Graveled 0.5 miles of FR 467, 0.4 miles of FR 488, decommissioned 11.2 miles of road.	2005
Summit Lake Fire Rehabilitation	Closed failed crossing on FR415A1 (0.7 miles)	2006
Summit Lake Fire BAER	Helimulched 100 acres near Summit Lake	2006
Cascade Complex Fire	Helimulched approximately 3000 acres, mainly in the Tyndal-Stolle watershed. Replaced 6 undersized culverts. Rerouted road to replace crossing at Peanut Creek.	2007
Culvert Replacement after Fire on Payette NF	Replaced undersized culverts in Indian Creek, Phoebe Creek, North Fork Long Gulch, Reegan Creek	2008
Road Repairs after June/July 2008 floods	Repaired and improved drainage along 0.5 miles of FR474 south of Lodgepole Creek crossing and armored crossing for overflow channel of Lodgepole Creek Replaced two failed stream crossings on FR483 Restored drainage on road 473 (5 miles)	2008

Project Name	Project Description	Completion
	Restored drainage on FR471 to the failed Camp Creek crossing (2 miles) Built nine log and Flowcheck sediment traps on 2.5 miles of FR478 on the Rice Creek Road	
Zena-Cow-Maverick Creek Road Decommissioning	Decommissioned 22 miles of closed road no longer used for resource management in the Zena, Cow and Maverick Creek watersheds.	
Stolle Meadows	Barrier rocked, ripped and seeded 3 miles of unauthorized routes Closed 7 dispersed recreation sites along the SF Salmon River	2009
Rd. 475	Drainage improvements	2009
Dollar Creek Rd 495	2.3 miles of the Dollar Creek Road 495 converted from an open road to a non-motorized trail.	2009
Dollar Creek	Decommissioned approximately 21 miles of Level 1 (closed year around) road in the Dollar Creek area.	2009
Vulcan Trailhead	Moved across the road away from the SFSR, vault toilet also relocated across the road	2009
Bear Creek	1 dispersed campsite near creek was closed and reseeded. Fish passage barrier removed on Rd 474 crossing	2009
Camp Creek	The Rd 474 crossing over Camp Creek was replaced with crossings designed to provide aquatic organism passage.	2009
Poverty Flat	10 miles of road obliterated around Poverty burn area for BAER treatment, 100 acres aerially mulched, and many miles of road cuts and fills hydromulched.	2009
Salt and Profile Creek (work done by Nez Perce tribe)	Culverts that were fish barriers replaced by bridges	2009
EFSF Road	Gravel EFSF Salmon River Road between Yellowpine and McCall	2010
Zena, Cow and Maverick Creek Road Decommissioning	Krassel Ranger District in partnership with the Nez Perce tribe decommissioned approximately 22 miles of closed roads in the Zena, Cow, and Maverick Creek watersheds. These areas burned in the 2007 East Zone complex fire.	2010
Dollar Creek Trail Bridge	Trail bridge constructed over North Fork Dollar Creek where the culvert was removed as part of the 2007 BAER project.	2010

Project Name	Project Description	Completion
Stolle Meadows non motorized trail	Construction of 6-miles of non-motorized trail in the Stolle Meadows area. This trail will have bridges over Bear Creek and Lodgepole Creek. 6 more miles will be completed next year	2010
Curtis Meadows culverts	Five culverts on Curtis and Trail creeks that were fish barriers have been replaced.	2010
Rd 474 improvement	6 miles of Road 474 south of the Warm Lake Highway to the junction of Rd 478 have been graveled and road drainage improved	2010
Rd 478 improvement	3 miles of Road 478 (the Rice Creek Road) were graveled and drainage improved	2010
South Fork Campground Improvement	Access and campground roads graveled	2010

Future Projects

The following projects are planned for implementation:

1. Complete similar road decommissioning projects in Johnson Creek to the 2009 Stolle Meadows project. 29 miles of closed roads will be decommissioned over the next several years. Dispersed campsites will also be managed to prevent impacts to streams.

2. The condition and sediment delivery on open roads in the Johnson Creek and SFSR drainage (~300 miles) was analyzed using the recently developed GRAIP model. From this project a proposal will be developed to reduce sediment delivery from roads in the two Johnson Creek watersheds.

3. Continue road decommissioning in the Cow and Calf Creek drainages. Decommission roads in the Phoebe/Camp Creek watersheds starting in 2011.

Section 4. Summary of 5 Year Review and WAG Involvement

Agency representatives from the US Forest Service, Idaho Fish and Game, and the Nez Perce Tribe reviewed this document during its development.

The Southwest Basin Advisory Group (BAG) served as the WAG for the initial Subbasin Assessment and TMDL. The BAG reviewed this document as well and discussed it at a meeting on March 14, 2011.

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GIS Coverages

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Glossary

§303(d)	Refers to section 303 subsection "d" of the Clean Water Act. 303(d) requires states to develop a list of water bodies that do not meet water quality standards. This section also requires total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to U.S. Environmental Protection Agency approval.
Aquatic	Occurring, growing, or living in water.
Assessment Unit (AU)	A segment of a water body that is treated as a homogenous unit, meaning that any designated uses, the rating of these uses, and any associated causes and sources must be applied to the entirety of the unit.
Beneficial Use	Any of the various uses of water, including, but not limited to, aquatic life, recreation, water supply, wildlife habitat, and aesthetics, which are recognized in water quality standards.
Beneficial Use Reconnaissance Program (BURP)	A program for conducting systematic biological and physical habitat surveys of water bodies in Idaho. BURP protocols address lakes, reservoirs, and wadeable streams and rivers
Best Management Practices (BMPs)	Structural, nonstructural, and managerial techniques that are effective and practical means to control nonpoint source pollutants.
Clean Water Act (CWA)	The Federal Water Pollution Control Act (commonly known as the Clean Water Act), as last reauthorized by the Water Quality Act of 1987, establishes a process for states to use to develop information on, and control the quality of, the nation's water resources.
Criteria	In the context of water quality, numeric or descriptive factors taken into account in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. The U.S. Environmental Protection Agency develops criteria guidance; states establish criteria.

Erosion	The wearing away of areas of the earth's surface by water, wind, ice, and other forces.
Flow	See *Discharge*.
Fully Supporting	In compliance with water quality standards and within the range of biological reference conditions for all designated and exiting beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Fully Supporting Cold Water	Reliable data indicate functioning, sustainable cold water biological assemblages (e.g., fish, macroinvertebrates, or algae), none of which have been modified significantly beyond the natural range of reference conditions.
Hydrologic Unit	One of a nested series of numbered and named watersheds arising from a national standardization of watershed delineation. The initial 1974 effort (USGS 1987) described four levels (region, subregion, accounting unit, cataloging unit) of watersheds throughout the United States. The fourth level is uniquely identified by an eight-digit code built of two-digit fields for each level in the classification. Originally termed a cataloging unit, fourth field hydrologic units have been more commonly called subbasins. Fifth and sixth field hydrologic units have since been delineated for much of the country and are known as watershed and subwatersheds, respectively.
Hydrologic Unit Code (HUC)	The number assigned to a hydrologic unit. Often used to refer to fourth field hydrologic units.
Hydrology	The science dealing with the properties, distribution, and circulation of water.
Macroinvertebrate	An invertebrate animal (without a backbone) large enough to be seen without magnification and retained by a 500µm mesh (U.S. #30) screen.
Mass Wasting	A general term for the down slope movement of soil and rock material under the direct influence of gravity.

Metric	1) A discrete measure of something, such as an ecological indicator (e.g., number of distinct taxon). 2) The metric system of measurement.
Monitoring	A periodic or continuous measurement of the properties or conditions of some medium of interest, such as monitoring a water body.
Nonpoint Source	A dispersed source of pollutants, generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state. Nonpoint sources are without a discernable point or origin. They include, but are not limited to, irrigated and non-irrigated lands used for grazing, crop production, and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.
Not Fully Supporting	Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Pollutant	Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
Pollution	A very broad concept that encompasses human-caused changes in the environment which alter the functioning of natural processes and produce undesirable environmental and health effects. This includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.
Riparian	Associated with aquatic (stream, river, lake) habitats. Living or located on the bank of a water body.
Riparian Habitat Conservation Area (RHCA)	A U.S. Forest Service description of land within the following number of feet up-slope of each of the banks of streams: ▪ 300 feet from perennial fish-bearing streams ▪ 150 feet from perennial non-fish-bearing streams ▪ 100 feet from intermittent streams, wetlands, and ponds in priority watersheds.

River	A large, natural, or human-modified stream that flows in a defined course or channel or in a series of diverging and converging channels.
Runoff	The portion of rainfall, melted snow, or irrigation water that flows across the surface, through shallow underground zones (interflow), and through ground water to creates streams.
Sediments	Deposits of fragmented materials from weathered rocks and organic material that were suspended in, transported by, and eventually deposited by water or air.
Stream	A natural water course containing flowing water, at least part of the year. Together with dissolved and suspended materials, a stream normally supports communities of plants and animals within the channel and the riparian vegetation zone.
Subbasin	A large watershed of several hundred thousand acres. This is the name commonly given to 4th field hydrologic units (also see Hydrologic Unit).
Subbasin Assessment (SBA)	A watershed-based problem assessment that is the first step in developing a total maximum daily load in Idaho.
Subwatershed	A smaller watershed area delineated within a larger watershed, often for purposes of describing and managing localized conditions. Also proposed for adoption as the formal name for 6th field hydrologic units.
Total Maximum Daily Load (TMDL)	A TMDL is a water body's load capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on annual bases. A TMDL is equal to the load capacity, such that load capacity = margin of safety + natural background + load allocation + wasteload allocation = TMDL. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.

Water Body	A stream, river, lake, estuary, coastline, or other water feature, or portion thereof.
Water Quality	A term used to describe the biological, chemical, and physical characteristics of water with respect to its suitability for a beneficial use.
Water Quality Standards	State-adopted and U.S. Environmental Protection Agency-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.
Watershed	1) All the land which contributes runoff to a common point in a drainage network, or to a lake outlet. Watersheds are infinitely nested, and any large watershed is composed of smaller "subwatersheds." 2) The whole geographic region which contributes water to a point of interest in a water body.

Appendix A. Data Sources

Table A-1. Data sources for South Fork Salmon River Five Year Review.

Water Body	Data Source	Type of Data	When Collected
South Fork Salmon River and tributaries	USFS	Sediment, temperature	1995-present
South Fork Salmon River Tributaries	DEQ	BURP	2005-present

Appendix B. Distribution List

Southwest Basin Advisory Group

Payette National Forest

Payette National Forest

Boise National Forest

Idaho Fish and Game

Nez Perce Tribe

Appendix C. Additional Data

Table C.1.—Multiple comparisons of mean geometric mean particle diameter among Secesh River spawning areas by year

Year	Corduroy Junction (E034)	Burgdorf (E048)	Threemile Creek (E033)	Secesh Meadows (E096)	Chinook Campground (E046)
1981	48.0BA	39.5B	22.9C	48.9A	40.3BA
1982	47.2A	38.3A	23.0B	38.2A	46.4A
1983	47.7A	41.1A	19.8B	40.7A	40.9A
1984	37.6A	38.0A	17.7B	36.4A	36.8A
1985	32.8A	33.3A	19.7B	36.5A	37.7A
1986					
1987	37.7A	39.1A	19.4B	40.4A	38.5A
1988					
1989	19.0B	22.0BA	17.0C	26.0A	21.0BA
1990	28.6B	39.4A	18.0C	33.7BA	29.6B
1991	25.0C	40.1A	15.8D	32.5B	36.3BA
1992	24.4B	41.5A	13.8C	29.3B	44.5A
1993	26.8C	38.3A	15.8D	30.5BC	35.9BA
1994		37.9A	7.3B	32.8A	34.2A
1995	43.2BA	55.3A	30.7B	43.7BA	50.6A
1996	34.3BA	40.7A	18.9C	25.7BC	37.2A
1997	30.2C	36.1BC	16.1D	47.2A	40.6BA
1998	35.7B	54.1A	18.2C	43.3BA	44.0BA
1999	39.6A	47.4A	20.8B		45.6A
2000	35.0A	40.1A	18.9B	43.3A	43.4A
2001	25.4B	39.1A	18.4B	36.3A	34.9A
2002	28.7B	41.5A	16.2C	29.3B	39.1A
2003	27.7C	42.7A	16.8D	40.2BA	31.7BC
2004	32.6A	37.1A	16.3B	33.8A	34.1A
2005	31.9A	31.0A	14.7B	35.2A	33.5A
2006	30.1C	39.2CB	18.7D	51.1A	40.1B
2007	31.9B	51.0A	19.0C	45.4A	49.1A
2008	32.2B		16.7C	55.1A	40.6B
2009	33.6C	41.0BC	19.6D	55.3A	50.8BA
Recent	**31.9C**	**39.9B**	**17.8D**	**48.1A**	**42.9B**
Overall	**33.4B**	**40.6A**	**18.5C**	**38.7A**	**39.2A**

[a] Mean values in a row with different letters are significantly different (P<0.10) by Tukey's HSD test.
[b] Annual means in tan shading correspond to data from most recent five years.

Table C.2 Multiple comparisons of mean percent large fines among Secesh River spawning areas by year

Year	Corduroy Junction (E034)	Burgdorf (E048)	Threemile Creek (E033)	Secesh Meadows (E096)	Chinook Campground (E046)
1981	16.3CB	19.4B	25.8A	14.2C	15.5C
1982	14.1D	20.4B	24.7A	17.9CB	15.1CD
1983	16.8C	20.8B	28.9A	18.9CB	18.4CB
1984	19.5B	19.2B	28.8A	18.6B	19.8B
1985	22.2B	22.0B	28.0A	21.2B	19.7B
1986	.	.	.	.	.
1987	22.3B	21.6B	29.2A	21.2B	21.2B
1988	.	.	.	.	.
1989	33.1A	29.4BA	32.1A	27.2B	31.1BA
1990	23.7BA	19.6B	27.2A	22.7BA	24.7A
1991	28.2A	20.4B	30.8A	23.0B	20.8B
1992	28.5B	19.8C	34.9A	25.2B	19.4C
1993	26.8B	21.5C	32.6A	24.0CB	21.0C
1994	.	21.0B	57.5A	24.2B	23.2B
1995	17.7BA	14.2B	23.2A	16.8B	18.6BA
1996	21.9DC	16.8D	30.0A	28.0BA	23.1BC
1997	23.9B	18.5CB	35.9A	15.5C	20.5CB
1998	20.9B	16.7B	31.4A	19.3B	20.6B
1999	19.4B	18.5B	28.8A	.	19.2B
2000	23.1B	19.6CB	30.4A	18.0C	19.2CB
2001	26.5B	21.1C	31.9A	20.6C	22.6CB
2002	23.2B	20.2B	34.3A	25.1B	21.6B
2003	25.8B	21.1B	32.3A	20.6B	23.9B
2004	21.6B	21.2B	34.7A	24.2B	22.6B
2005	20.4B	24.1B	35.4A	21.9B	23.3B
2006	25.0B	21.2CB	30.0A	16.2D	20.2CD
2007	21.6B	15.7C	27.8A	18.5CB	16.6C
2008	21.7B	.	31.6A	15.1C	19.3CB
2009	22.8B	18.8CB	30.1A	15.3C	16.1C
Recent	22.3B	20.2CB	31.0A	17.5D	19.1CD
Overall	22.5B	20.1C	30.7A	20.6C	20.6C

[a] Mean values in a row with different letters are significantly different (P<0.10) by Tukey's HSD test.
[b] Annual means in tan shading correspond to data from most recent five years.

Stream	Forest	Listed for Sediment?	Temp Data?	Temp Excds?[2]	Roads Located within RHCA?	Encroachment Found?
Trout	BNF	y	none	unk	y	y
Sand	BNF	n	97	y	y	y
Rice	BNF	y	none	unk	y	y
Trail	BNF	y	96; 99	y	y	y
Warm Lake	BNF	n	none	unk	y	y
Lower Johnson	*BNF*	*y*	*97; 99*	*y*	*y*	*y*
Upper Johnson	*BNF*	*y*	*97; 99*	*y*	*y*	*y*
Upper SF Salmon	*BNF*	*y*	*97; 99*	*y*	*y*	*y*
Tyndall	BNF	y	97	y	y	n

Stream[1]	Forest	Listed for Sediment?	Temp Data?	Temp Exceeds?[2]	Roads Located within RHCA?	Encroachment Found?
Profile	PNF	n	94; 98	y	y	y
Buckhorn Creek	PNF	n	94; 98; 99	y	y	y
Lick Creek	PNF	n	93; 94; 98; 99	y	y	y
Summit Creek	PNF	n	none	unk	y	y
EF SF Salmon River	*PNF*	*y*	*93; 94; 97; 98*	*y*	*y*	*y*
Middle SF Salmon	*PNF*	*y*	*94; 97; 98; 99*	*y*	*y*	*y*
Grouse Creek	PNF	n	98; 99	y	y	n
Elk Creek	PNF	n	98; 99	y	y	m
Pony	PNF	n	98; 99	y	n	n
Sugar Creek	PNF	n	97; 98	y	n	n
Upper Secesh	PNF	n	94; 95; 96	y	n	n
Lake Creek	PNF	n	97; 98; 99	y	n	n

[1]Italic = River, non-italic = Tributary
[2]unk = unknown

Bull Trout Temperature Criteria. Water temperatures for the waters identified under Subsection 250.02.g.i. shall not exceed thirteen degrees Celsius (13C) maximum weekly maximum temperature (MWMT) during June, July and August for juvenile bull trout rearing, and nine degrees Celsius (9C) daily average during September and October for bull trout spawning. For the purposes of measuring these criteria, the values shall be generated from a recording device with a minimum of six (6) evenly spaced measurements in a twenty-four (24) hour period. The MWMT is the mean of daily maximum water temperatures measured over the annual warmest consecutive seven (7) day period occurring during a given year. (3-30-01) i. The bull trout temperature criteria shall apply to all tributary waters, not including fifth order main stem rivers, located within areas above fourteen hundred (1400) meters elevation south of the Salmon River basin-

PHOTOPOINT MONITORING OF SOUTH FORK SALMON RIVER

Photopoint 4 shown in the images below is located downstream of Poverty Flat on the South Fork Salmon River (UTM 11T, 60,24057E 4,969,207N)

TIME SERIES IMAGES

PHOTOPOINT 4 (PP-04)

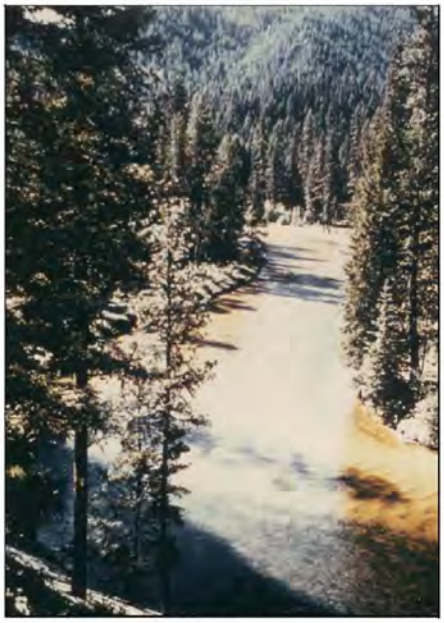

Image 1.—Photopoint 04, 1965 (Photo from Platts 1972).

Image 2.—Photopoint 04, 1972 (Photo from Platts 1972).

Image 6.—Photopoint 04, 1978.

Image 7.—Photopoint 04, 1979.

Image 8.—Photopoint 04, 1981.

Image 9.—Photopoint 04, 1983.

Image 10.—Photopoint 04, 1986.

Image 11.—Photopoint 04, 1987.

Image 16.—Photopoint 04, 1993.

Image 17.—Photopoint 04, 1994.

Image 20.—Photopoint 04, 1998.

Image 21.—Photopoint 04, 1999.

Image 24.—Photopoint 04, 2003.