South Fork Payette River Subbasin Assessment

Final

Department of Environmental Quality

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Subbasin Assessment of the South Fork Payette River

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Water quality and stream discharge data were downloaded from the United States Geological Survey (USGS) Web site. Climate data were downloaded from the Western Regional Climate Center World Wide Web site.

The cover photograph, taken by Cynthia Grafe on August 31, 1998, shows the South Fork Payette River near Lowman, Idaho.

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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

µ Micro, one one-thousandth

§ Section (usually a section of federal or state rules or statutes)

AWS agricultural water supply

C Celsius

cfs cubic feet per second

cm centimeters

CWA Clean Water Act

DWS domestic water supply

F Fahrenheit

HUC6 USGS sixth field (12-digit hydrologic unit code)

IDAPA Abbreviation for Idaho Administrative Procedures Act, refers to citations of Idaho administrative rules

IDWR Idaho Department of Water Resources

NPDES National Pollutant Discharge Elimination System

NTU nephelometric turbidity unit

PCR primary contact recreation

SBA subbasin assessment

SCR secondary contact recreation

TMDL total maximum daily load

TSS total suspended solids

U. S. United States

U.S.C. United States Code

USFS United States Forest Service

USGS United States Geological Survey

WBID water body identification number

WQLS water quality limited segment

WQS water quality standard

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correct double-sided printing.

Executive Summary

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.

This document addresses the water bodies in the South Fork Payette River Subbasin that have been placed on Idaho's current §303(d) list.

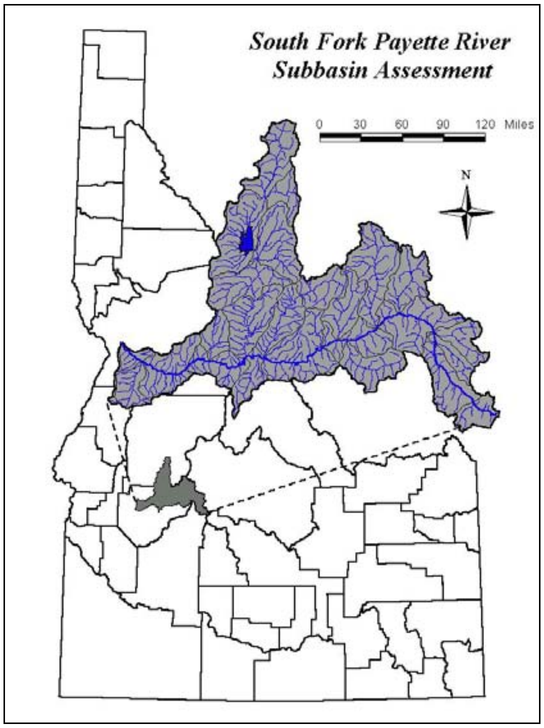
This subbasin assessment (SBA) has been developed to comply with Idaho's TMDL schedule. The assessment describes the physical, biological, and cultural setting; water quality status; pollutant sources; and recent pollution control actions in the South Fork Payette River Subbasin located in southwest Idaho.

The starting point for this assessment was Idaho's current §303(d) list of water quality limited water bodies. The SBA examines the current status of §303(d) listed waters and identifies potential sources of pollutants throughout the subbasin.

Subbasin at a Glance

From the Sawtooth Wilderness Area boundary to the confluence of the Middle Fork Payette River, the South Fork Payette River is listed on the 1998 §303(d) list for fine-grained sediment (Figure A). This listing was based on the 1990 Boise National Forest Management Plan (Boise National Forest 1990), which stated that a goal for the forest was to manage the watershed to reduce sedimentation in the South Fork Payette River. In the plan, beneficial uses, as identified in the Idaho water quality standards (WQS), were not reported as impaired.

The South Fork Payette River Subbasin contains bull trout, a species listed as threatened under the Endangered Species Act. The South Fork Payette River and Deadwood River are key bull trout watersheds in Idaho. Fine-grained sediment is one of the factors identified as limiting bull trout habitat in the subbasin.



South Fork Payette River Basin	
5th Field HUC#:	17050120
Water Body:	SF Payette River
Boundary:	Wilderness Boundary to Payette River
Ecoregion:	Northern Mountains
Pollutants:	Sediment
Beneficial Uses:	Salmonid Spawning, Cold Water Aquatic Life, Primary Contact Recreation
Pollution Sources:	Non-Point Sources
Size:	520,318 acres

Figure A. South Fork Payette River Subbasin at a Glance.

Key Findings

The South Fork Payette River near Lowman, Idaho, has been monitored for water column sediment (suspended sediment concentration), bedload, and discharge. Extensive flow records also exist near Garden Valley, Idaho. Limited biological data are available for the South Fork Payette River. Most biological monitoring has been conducted in the tributaries.

The suspended sediment concentration data for the South Fork Payette River show that during years of normal flow, when mass wasting events are less prevalent, the water column sediment levels are below the 14-day duration suspended sediment target of 80 mg/L. The data also show that during years of high flow, erosion can be exacerbated and the sediment target exceeded. It is DEQ's belief that any excursions above the target at high flows are within the norms of natural variability and are not impairing beneficial uses.

To determine the expected suspended sediment concentration in the river in a typical flow year, a regression analysis was performed—between paired suspended sediment and flow data. The analysis determined that, at an average annual flow of 861 cfs, the suspended sediment concentration in the river would be 8.0 mg/L, well below the 14-day duration suspended sediment target of 80 mg/L. As a result of these analyses, DEQ does not recommend developing a sediment TMDL for the South Fork Payette River and recommends de-listing sediment from the §303(d) list.

While some anthropogenic sources of sediment (primarily from forest roads) exist within the basin and exceed the Boise National Forest desired future conditions during high flow events, DEQ believes this sediment is not currently impairing beneficial uses. However, road management activities within the Boise and Sawtooth National Forests should be prioritized and maximized to reduce erosion. This strategy is outlined in Section 3.0 of the SBA.

As part of the South Fork Payette River Subbasin Assessment, the cold water aquatic life beneficial use support status was also determined at fifty-three (53) Beneficial Use Reconnaissance Program monitoring sites encompassing thirty-five (35) streams. Of the 35 streams, it was determined that cold water aquatic life is not fully supported in four of them. These streams may be recommended for §303(d) listing dependant upon results of 2004 BURP data collection. Further data collection efforts may be undertaken, dependent upon results and funding constraints.

Table A summarizes the outcome of the South Fork Payette River Subbasin Assessment.

Table A. Summary of assessment outcomes

Water Body Segment	Pollutant	TMDL(s) Completed	Recommended Changes to §303(d) List	Recommended Schedule Changes
South Fork Payette River WQLS:5186 AU:SW001_05	Sediment	None	De-list sediment	None
Wash Creek – lower WQLS:xxxx AU:SW001_02	Unknown	None	May list pending 2004 BURP data	May prepare informational TMDL
Horn Creek WQLS:xxxx AU:SW001_02	Unknown	None	May list pending 2004 BURP data	May prepare informational TMDL
Chapman Creek WQLS:xxxx AU:SW001_02	Unknown	None	May list pending 2004 BURP data	May prepare informational TMDL
Smokey Creek WQLS:xxxx AU:SW001_02	Unknown	None	May list pending 2004 BURP data	May prepare informational TMDL

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1. Subbasin Assessment – Watershed Characterization

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. (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.)

This document addresses the South Fork Payette River, which was placed on Idaho's 1998 §303(d) list based primarily on desired future condition goals of the Boise National Forest Plan..

The overall purpose of the subbasin assessment (SBA) is to characterize the South Fork Payette River Subbasin and begin to identify sources of fine-grained sediment. The SBA is partitioned into four major sections: watershed characterization, water quality concerns and status, pollutant source inventory, and a summary of past and present pollution control efforts (Chapters 1 – 4).

1.1 Introduction

In 1972, Congress passed the Federal Water Pollution Control Act, more commonly called the Clean Water Act. The goal of this act was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Water Environment Federation 1987, p. 9). The act and the programs it has generated have changed over the years, as experience and perceptions of water quality have changed.

The CWA has been amended 15 times, most significantly in 1977, 1981, and 1987. One of the goals of the 1977 amendment was protecting and managing waters to insure "swimmable and fishable" conditions. This goal, along with a 1972 goal to restore and maintain chemical, physical, and biological integrity, relates water quality with more than just chemistry.

Background

The federal government, through the U.S. Environmental Protection Agency (EPA), assumed the dominant role in defining and directing water pollution control programs across the country. The Department of Environmental Quality (DEQ) implements the CWA in Idaho, while the EPA oversees Idaho and certifies the fulfillment of CWA requirements and responsibilities.

Section 303 of the CWA requires DEQ to adopt water quality standards and to review those standards every three years (EPA must approve Idaho's water quality standards). Additionally, DEQ must 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. Further, the agency must set appropriate controls to restore water quality and allow the water bodies to meet their designated uses.

These requirements result in a list of impaired waters, called the "§303(d) list." This list describes water bodies not meeting water quality standards. Waters identified on this list require further analysis. An SBA provides a summary of the water quality status for water bodies on the §303(d) list. The *South Fork Payette River Subbasin Assessment* provides this summary for the currently listed waters in the South Fork Payette River Subbasin as well as several others that are not on the §303(d) list.

This SBA includes an evaluation and summary of the most recent and available water quality data, pollutant sources, and control actions in the South Fork Payette River Subbasin. While this assessment is not a requirement of a TMDL, DEQ performs the assessment to ensure impairment listings are up to date and accurate. A TMDL is an estimate of the current pollutant load and an estimate of the maximum pollutant amount that can be present in a water body and still allow that water body to meet water quality standards (Water quality planning and management, 40 Code of Federal Regulations 130). Consequently, a TMDL is water body- and pollutant-specific. A TMDL also includes individual pollutant allocations among various sources discharging the pollutant. The EPA considers certain unnatural conditions, such as flow alteration, a lack of flow, or habitat alteration, that are not the result of the discharge of a specific pollutant as "pollution." A TMDL is not required for water bodies impaired by pollution, but not specific pollutants. 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.

Idaho's Role

Idaho adopts water quality standards to protect public health and welfare, enhance the quality of water, and protect biological integrity. A water quality standard defines the goals of a water body by designating the use or uses for the water, setting criteria necessary to protect those uses, and preventing degradation of water quality through antidegradation provisions.

The state may assign or designate beneficial uses for particular Idaho water bodies to support. These beneficial uses are identified in the Idaho water quality standards and include the following:

- Aquatic life support – cold water, seasonal cold water, warm water, salmonid spawning, modified
- Contact recreation – primary (swimming), secondary (boating)
- Water supply – domestic, agricultural, industrial

- Wildlife habitats
- Aesthetics

The Idaho legislature designates uses for water bodies. Industrial water supply, wildlife habitats, and aesthetics are designated beneficial uses for all water bodies in the state. If a water body is unclassified, then cold water and primary contact recreation are used as additional default designated uses when water bodies are assessed.

An SBA entails analyzing and integrating multiple types of water body data, such as biological, physical/chemical, and landscape data to address several objectives:

- Determine the degree of designated beneficial use support of the water body (i.e., attaining or not attaining water quality standards).
- Determine the degree of achievement of biological integrity.
- Compile descriptive information about the water body, particularly the identity and location of pollutant sources.
- Determine the causes and extent of the impairment when water bodies are not attaining water quality standards.

1.2 Physical and Biological Characteristics

The South Fork Payette River Subbasin is located primarily in Boise County with the upper half of the Deadwood River watershed in Valley County (Figure 1). Based on Idaho Department of Water Resources (IDWR) spatial data, the subbasin contains approximately 813 square miles (IDWR 1990). The South Fork Payette River subbasin is designated as U.S. Geological Survey (USGS) cataloging unit (fourth field) 17050120. The subbasin contains the entire South Fork Payette River from its headwaters in the Sawtooth Mountains to its confluence with the Middle Fork Payette River near Garden Valley, Idaho. The South Fork Payette River subbasin is bounded on the north by the Salmon River Mountains, on the east by the Sawtooth Mountains and on the south by the Boise Mountains. Elevations of the South Fork Payette River range from approximately 8,920 feet at the headwaters (USGS 1992) to 3,000 feet at the confluence with the Middle Fork Payette River (USGS 1982).

Climate

The South Fork Payette River subbasin is dominated by variable mountain weather patterns. Air movement patterns are primarily westerly (Hunt 1974). The annual weather cycle consists of cold winters and warm summers. In winter, the prevailing winds are from the west. These winds bring moderate winter temperatures and moisture from the Pacific Ocean. December and January are typically the coldest and wettest months of the year. Occasionally, the westerly winds give way to Arctic air masses that bring cold continental air temperatures. During the summer, the westerly winds of winter subside and continental climatic conditions prevail. July and August are typically the warmest and driest months of the year. (Abramovich et al. 1998)

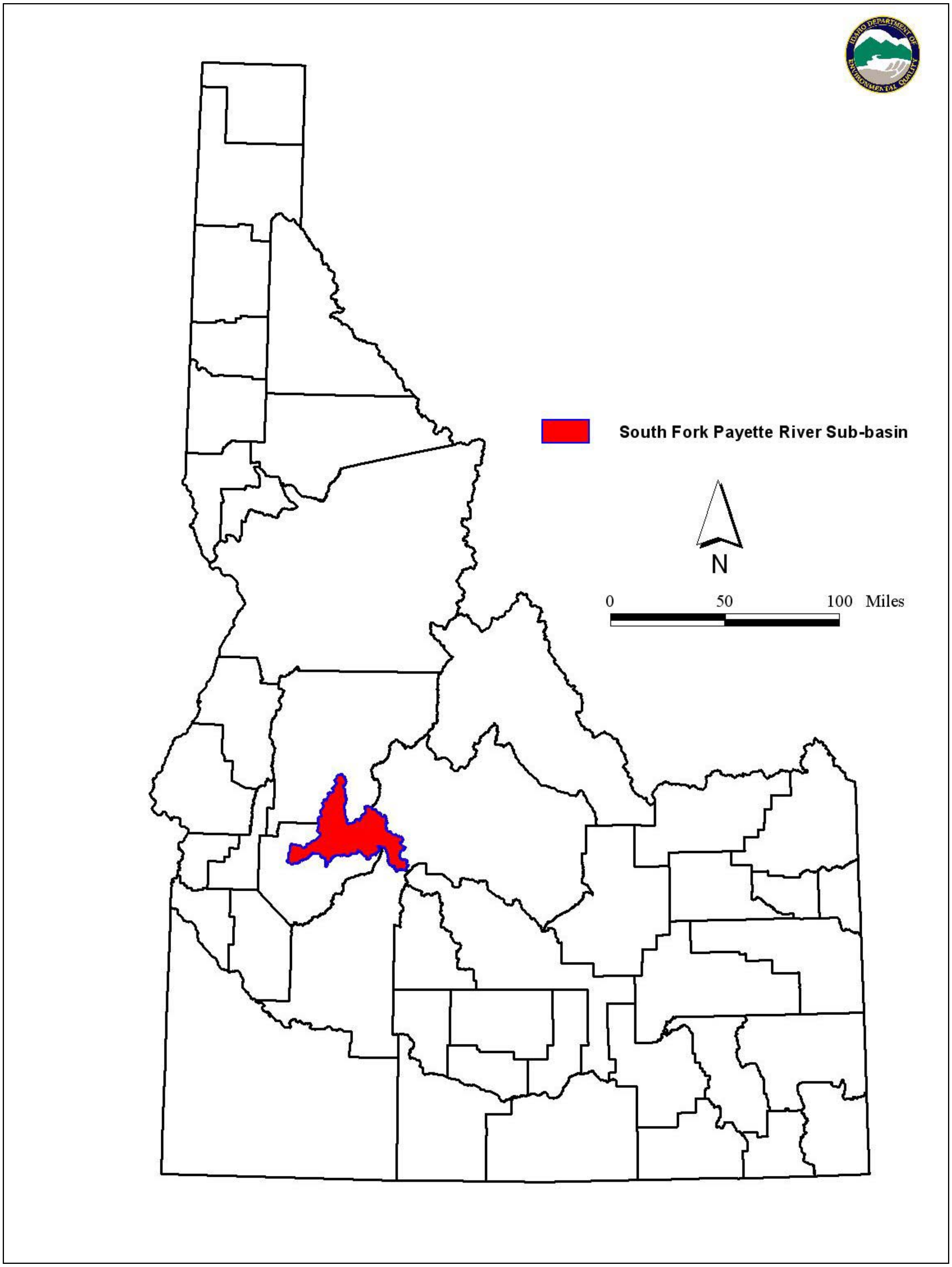

Figure 1. South Fork Payette River Subbasin.

Transitions in the seasons are marked by rapid weather changes. During the winter and early spring months, relatively warm and humid air masses can enter the subbasin causing rapid snowmelt. When rapid snowmelt combines with rainfall, rain-on-snow events occur. These events create saturated soils and high runoff that can trigger landslides. A large rain-on-snow event occurred in 1997 that resulted in numerous landslides and washed out roads in the South Fork Payette River subbasin. These landslides added a great deal of sediment to the existing sediment load in streams of the subbasin.

Climate stations for the South Fork Payette River subbasin are located at Garden Valley, Lowman, and Deadwood Dam. The periods of record, annual maximum air temperatures, annual minimum air temperatures, and annual total precipitation for these stations are summarized in Table 1.

Table 1. Summary of period of record, annual maximum and minimum air temperatures and total annual precipitation for Garden Valley, Lowman and Deadwood Dam climate stations.

Station	Period of Record	Average Annual Maximum Air Temperature (F)	Average Annual Minimum Air Temperature (F)	Average Total Precipitation (inches)
Garden Valley	8/1/1948 – 12/31/2001	62.2	31.8	24.51
Lowman	8/1/1948 – 11/30/2001	59.8	28.1	26.16
Deadwood Dam	12/6/1929 – 6/30/1975	55.1	22.4	32.26

The temperature regime for the subbasin is typical of Northern Hemisphere, mid-latitude mountainous locations. As noted earlier, temperatures peak in July and August and reach minimum levels in December and January (note Figures 2 – 4). Conversely, precipitation is highest in January and December and reaches minimum levels in July and August (Figure 5).

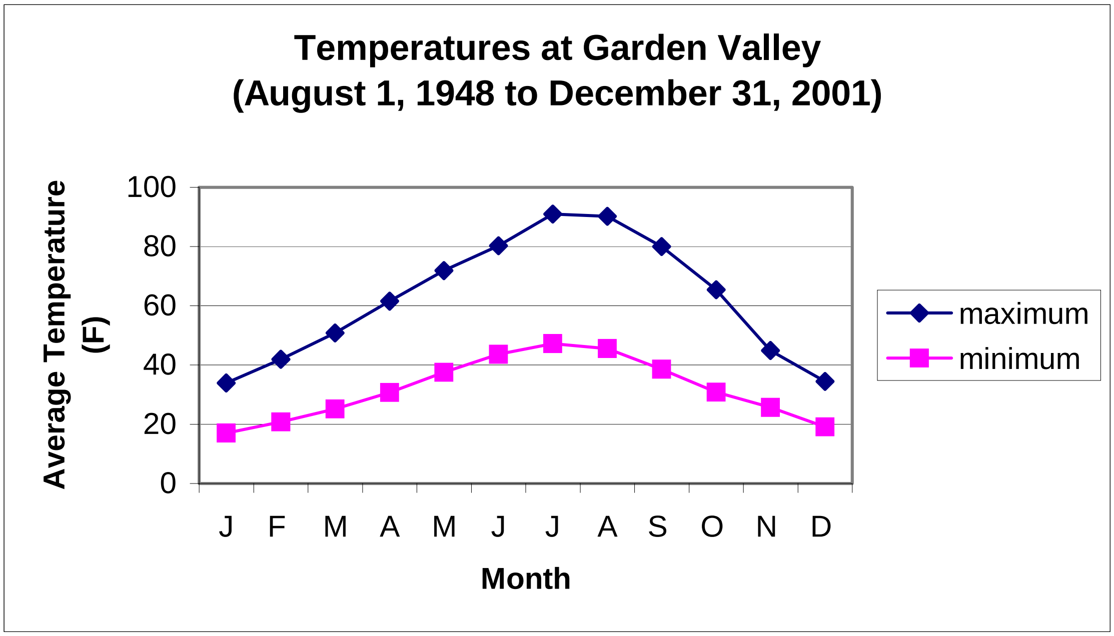

Figure 2. Summary of Mean Monthly Maximum and Minimum Air Temperature at Garden Valley, Idaho.

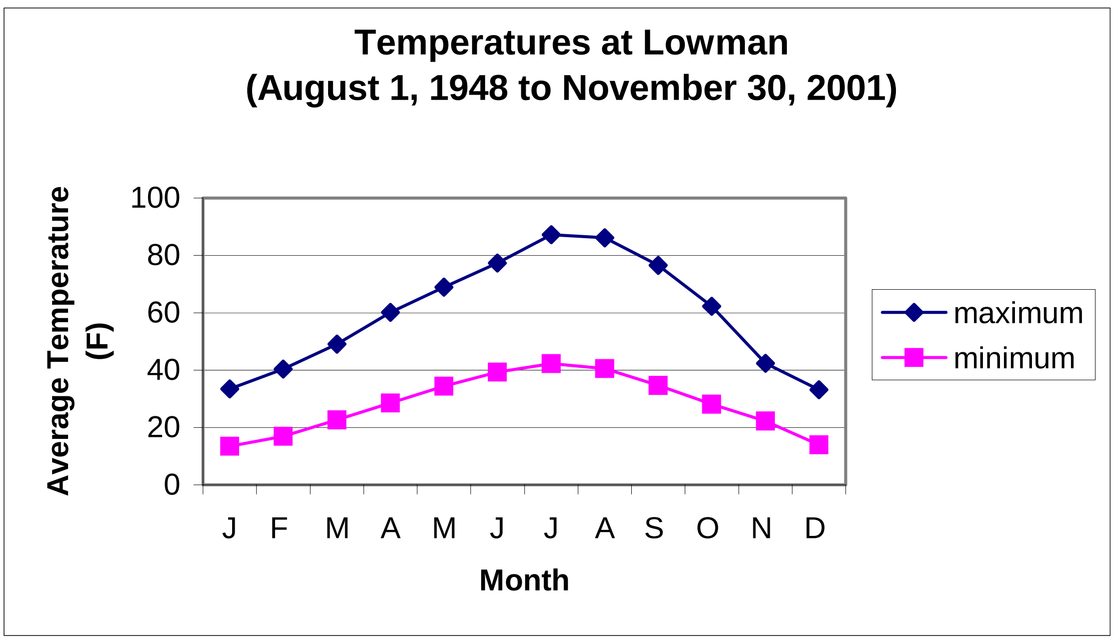

Figure 3. Summary of Mean Monthly Maximum and Minimum Air Temperature at Lowman, Idaho.

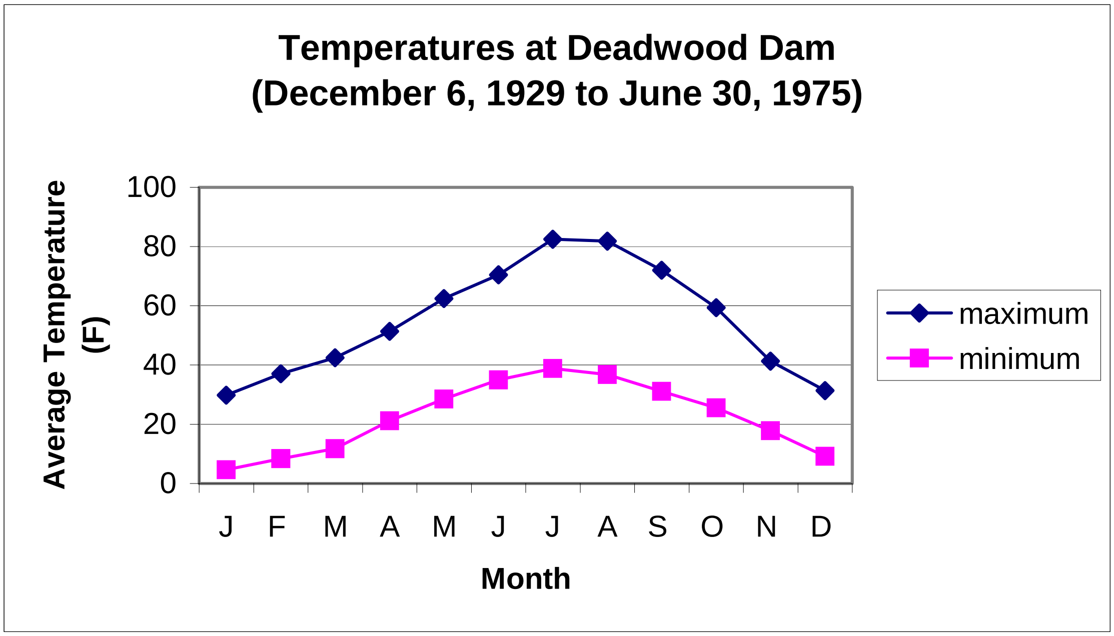

Figure 4. Summary of Mean Monthly Maximum and Minimum Air Temperatures at Deadwood Dam, Idaho.

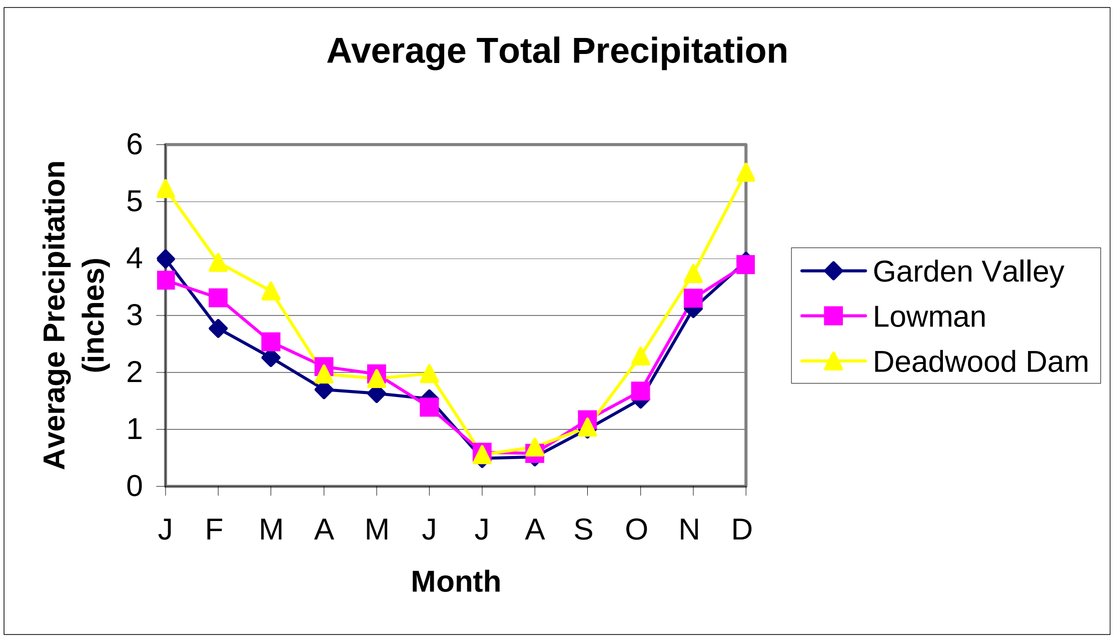

Figure 5. Summary of Average Monthly Total Precipitation at Garden Valley, Lowman and Deadwood Dam, Idaho.

Subbasin Characteristics

The South Fork Payette River flows generally from east to west from its origin in the west slopes of the Sawtooth Mountains to its confluence with the Middle Fork Payette River near Garden Valley, Idaho.

Discharge and Hydrography

Discharge of water in the subbasin typically peaks in May and June, and minimum discharges are typically recorded in December and January (Figure 6). With the completion of Deadwood Dam in 1939, the discharge regime of the Deadwood River was significantly altered. Prior to the dam's construction, peak discharge typically occurred during May. Since completion of the dam, peak discharges now occur irregularly between July and August (Figure 6). Tributaries to the South Fork Payette River generally flow north or south, typically perpendicular to the South Fork Payette River. The tributaries and their watershed boundaries are shown in Figure 7.

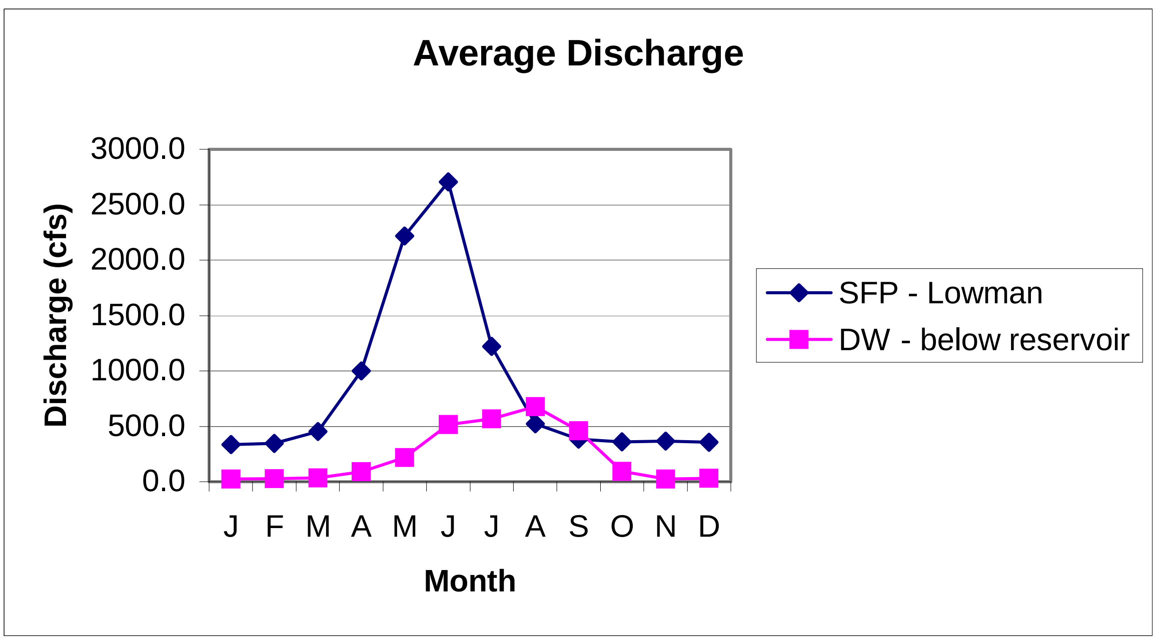

Figure 6. Average Monthly Discharge (cubic feet per second [cfs]) of the South Fork Payette River at Lowman (736 observations, June 1941 through September 2002) and Deadwood River below Dam (912 observations, October 1926 through September 2002).

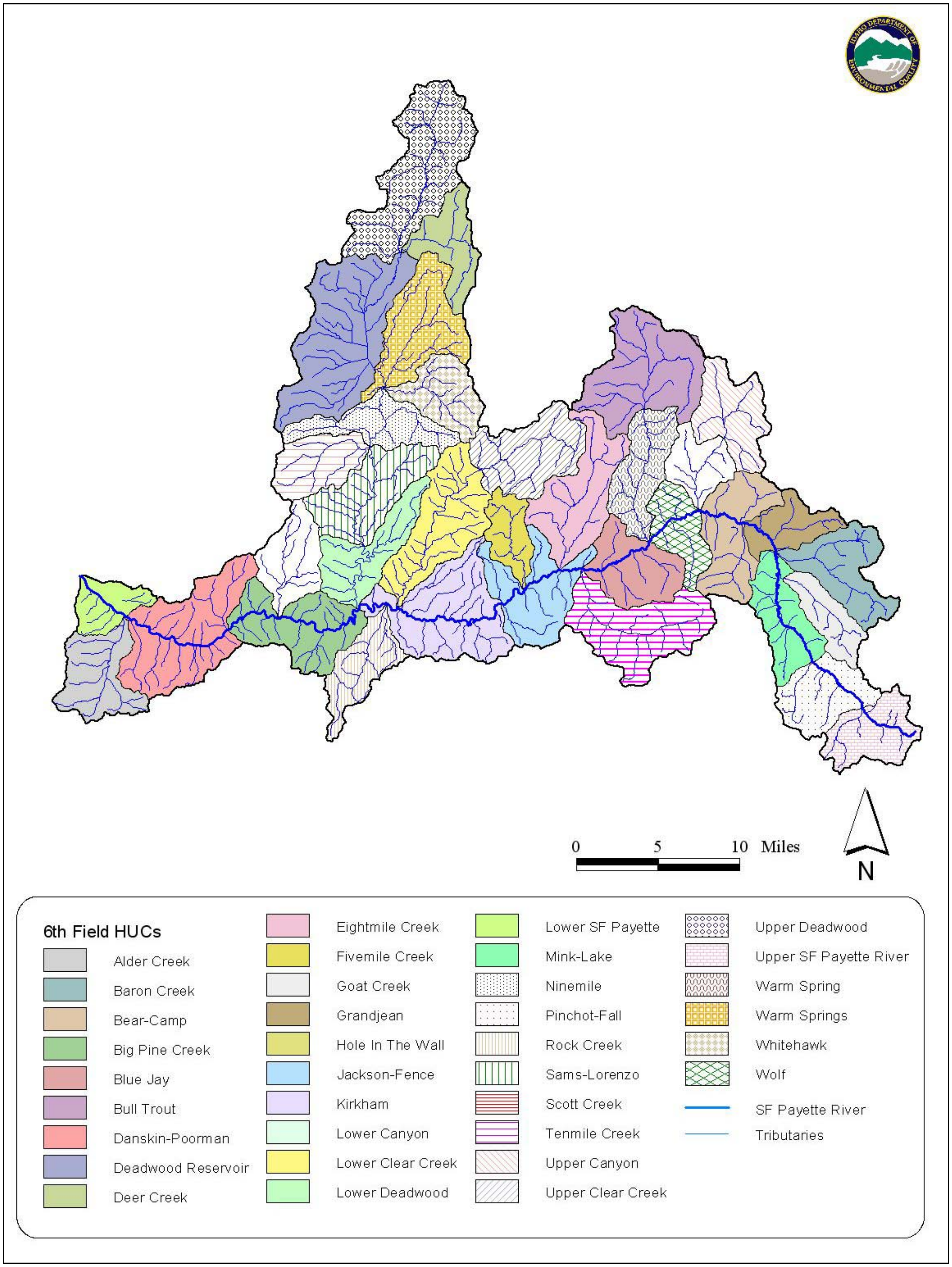

Figure 7. Sixth Field HUCs in the South Fork Payette River Subbasin.

Geology and Soils

The South Fork Payette River Subbasin is contained in the Northern Rocky Mountain geomorphic province (Ross and Savage 1967). The geologic template of the subbasin is shown in Figure 8. The subbasin is situated on the Atlanta Batholith (Alt and Hyndman 1989), the southern portion of the Cretaceous granite formation commonly known as the Idaho Batholith (Hunt 1974). Rock types found in the batholith range from quartz gabbro to granite. The most common rocks are granodiorite and quartz monzonite (U. S. Department of Agriculture 1976). These granitic parent materials weather to form gravelly, coarse to moderately coarse soils.

The soils of the South Fork Payette River Subbasin include the Coski, Danskin, and Koppes soil series (U. S. Department of Agriculture 1976). Coski series soils are well–drained, gravelly, coarse and sandy loams formed in weathered granite. Coski soils have steep to very steep colluvial slopes (typically 40 – 60%) and occur at elevations ranging from approximately 3,937 feet (1,200 meters) to 6,562 feet (2,000 meters). Danskin series soils are well–drained, gravelly, loamy and coarse sands weathered from quartz monzonite on long, smooth side-slopes (typically 50 – 70%). Danskin soils occur at elevations ranging from 3,281 feet (1,000 meters) to 4,921 feet (1,500 meters). Koppes series soils are well-drained, loamy and coarse sands formed from colluvium weathered from granite. Koppes soils have steep and very steep slopes (typically 40 – 60%) and occur at elevations ranging from 3,281 feet (1,000 meters) to 5,906 feet (1,800 meters). Hazards of debris slides cut slope stability and fill slope stability range from low to high in all of these soils. (U. S. Department of Agriculture 1976)

The geology and soils, topography, and hydrology of the South Fork Payette River Subbasin combine to produce moderate to high sedimentation rates. A rough estimate of natural sedimentation rate is 80 (± 20) cubic yards of sediment per square mile per year (Wendt et al. 1973a). These authors estimate the total sedimentation rate to be 200 (± 50) cubic yards of sediment per square mile per year. The accelerated sedimentation rate is attributed to streamside road and cattle grazing activity (Wendt et al. 1973a).

Topography

The terrain of the Northern Rocky Mountain geomorphic province is characterized by large, north-south oriented ridges separated by long, narrow valleys (Idaho Water Resource Board 1999). These characteristics are generally the result of block faulting and subsequent erosion of the granitic Atlanta Batholith. Elevation of the South Fork Payette River Subbasin ranges from approximately 10,810 feet (3,295 meters) at Mount Cramer to 3,000 feet (914 meters) at the confluence with the Middle Fork Payette River. Slopes along the South Fork Payette River are typically greater than 41% (Figure 9).

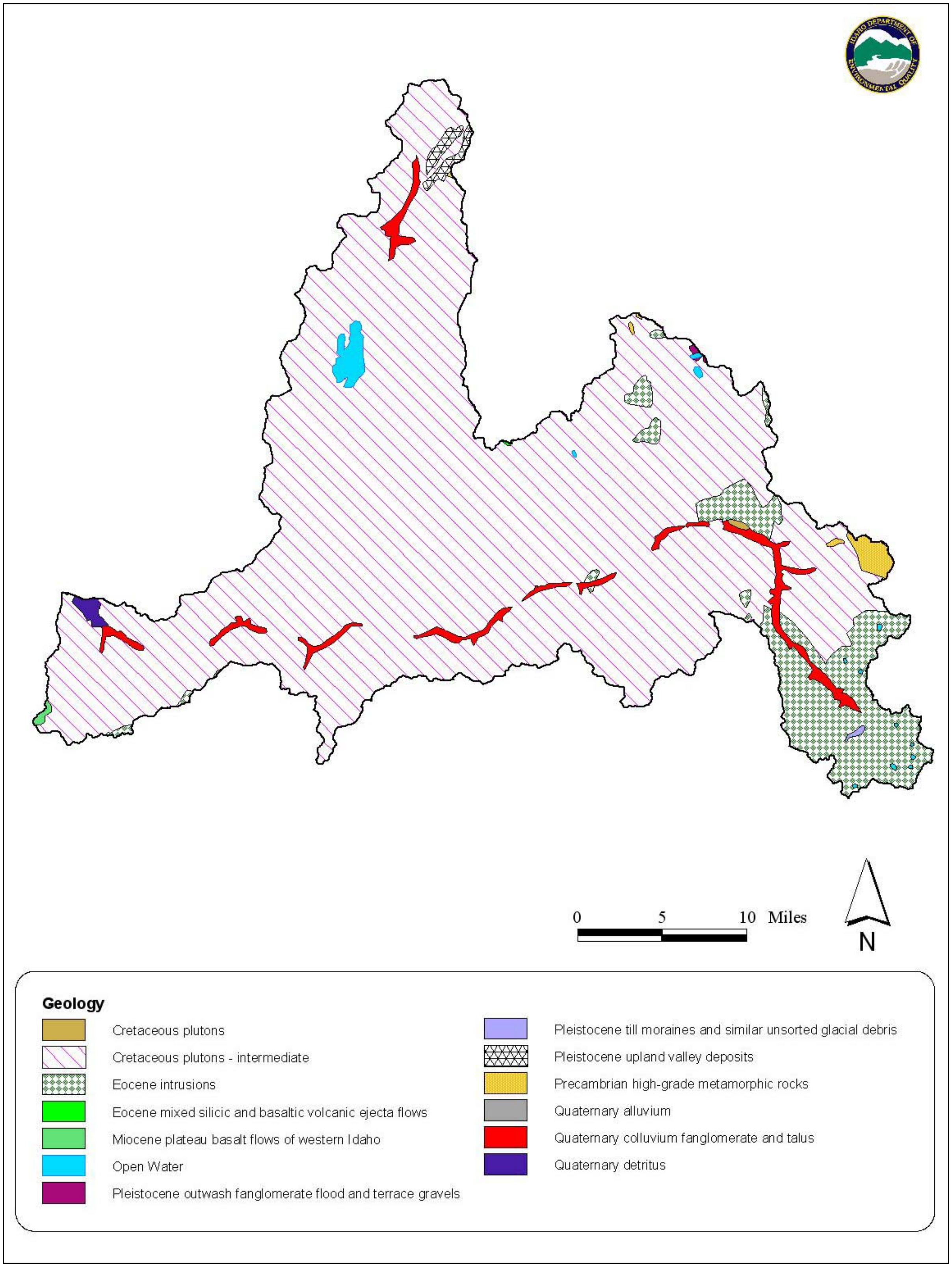

Figure 8. Geology of the South Fork Payette Subbasin.

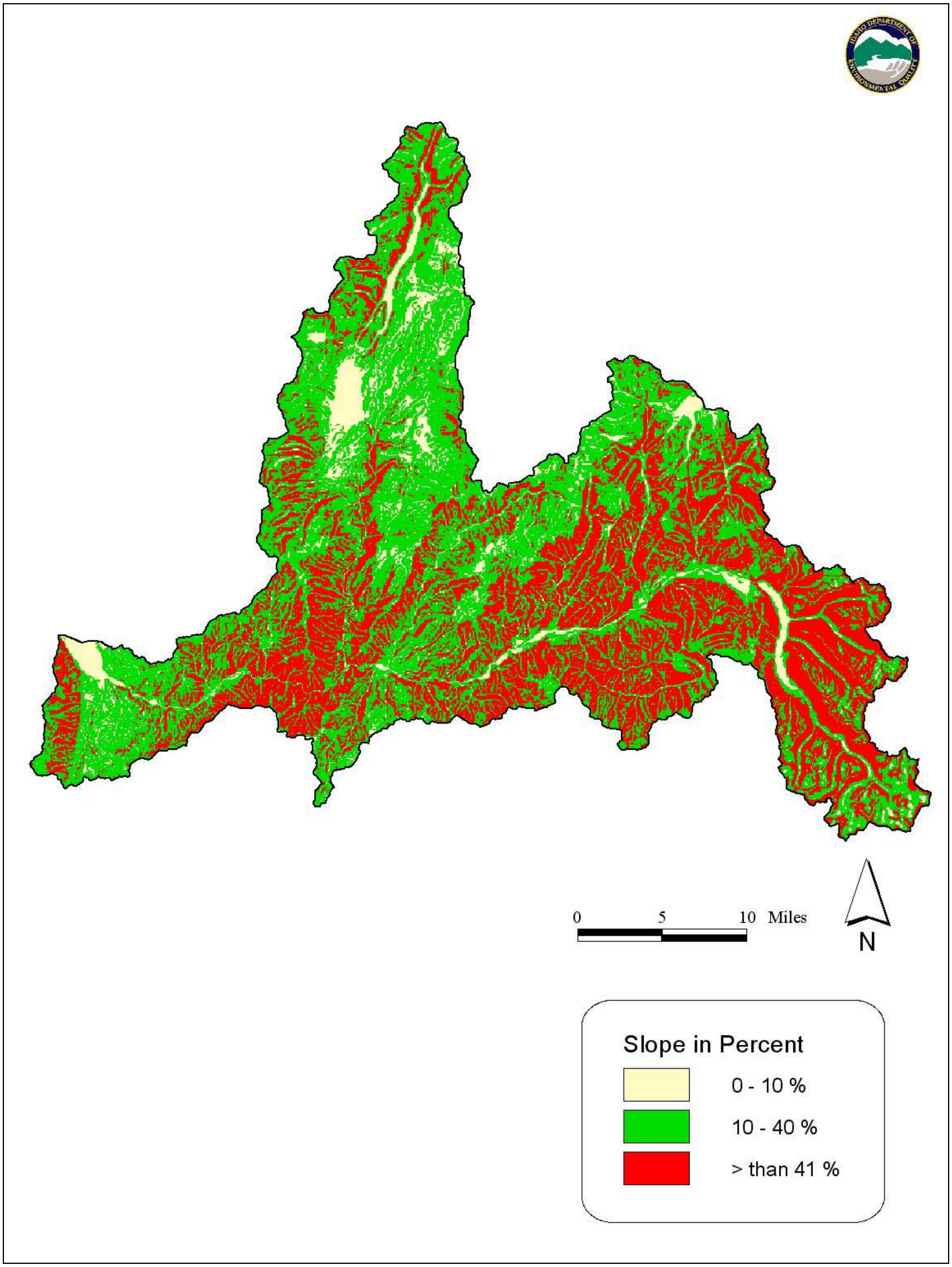

Figure 9. Slope Map of the South Fork Payette River Subbasin.

Land Cover

The land cover of the South Fork Payette River Subbasin is dominated by forest vegetation (Figure 10). This vegetation varies considerably with elevation. Lower elevation areas are dominated by brush and grass communities, along with ponderosa pine and Douglas fir communities. Mid-elevation areas are dominated by Douglas fir and subalpine fir trees. Higher elevation areas are almost entirely covered with subalpine fir trees with some Douglas fir, Engleman spruce trees, and elk sedge (Wendt et al. 1973a).

Land Types

The South Fork Payette River Subbasin is situated on the Boise and Sawtooth National Forests. The United States Forest Service (USFS) has classified the lands in the South Fork Payette Subbasin into land types (Figure 11). These land types are comprised of natural features that have resulted from geomorphic and climatic processes. Natural erosion and stability hazards are described for each land type in Wendt et al. (1973a, 1973b) and Larson and Rahm (1972).

Fisheries

The Black Canyon Dam, built on the Payette River in 1924, blocked the migration of fish that have an anadromous life history in the subbasin. These fish include Chinook salmon, steelhead, and Pacific lamprey, which are now extirpated from the subbasin. The Idaho Department of Fish and Game has stocked rainbow trout, Atlantic salmon, Chinook salmon, Arctic grayling (*Thymallus arcticus*), bull trout, coho salmon (*Oncorhynchus kisutch*), kokanee, westslope cutthroat trout, Bear Lake cutthroat trout, fine spotted cutthroat trout, Henrys Lake cutthroat trout, and steelhead in the subbasin since 1967. Since 2001, stocking has been limited to rainbow trout, steelhead, and kokanee. Fishery management in the South Fork Payette River Subbasin is currently focused on natural production of wild trout (Idaho Department of Fish and Game 2001). Native or introduced fish that were found in the South Fork Payette River Subbasin (IDFG 2003, Zaroban 2003) are listed in Table 2.

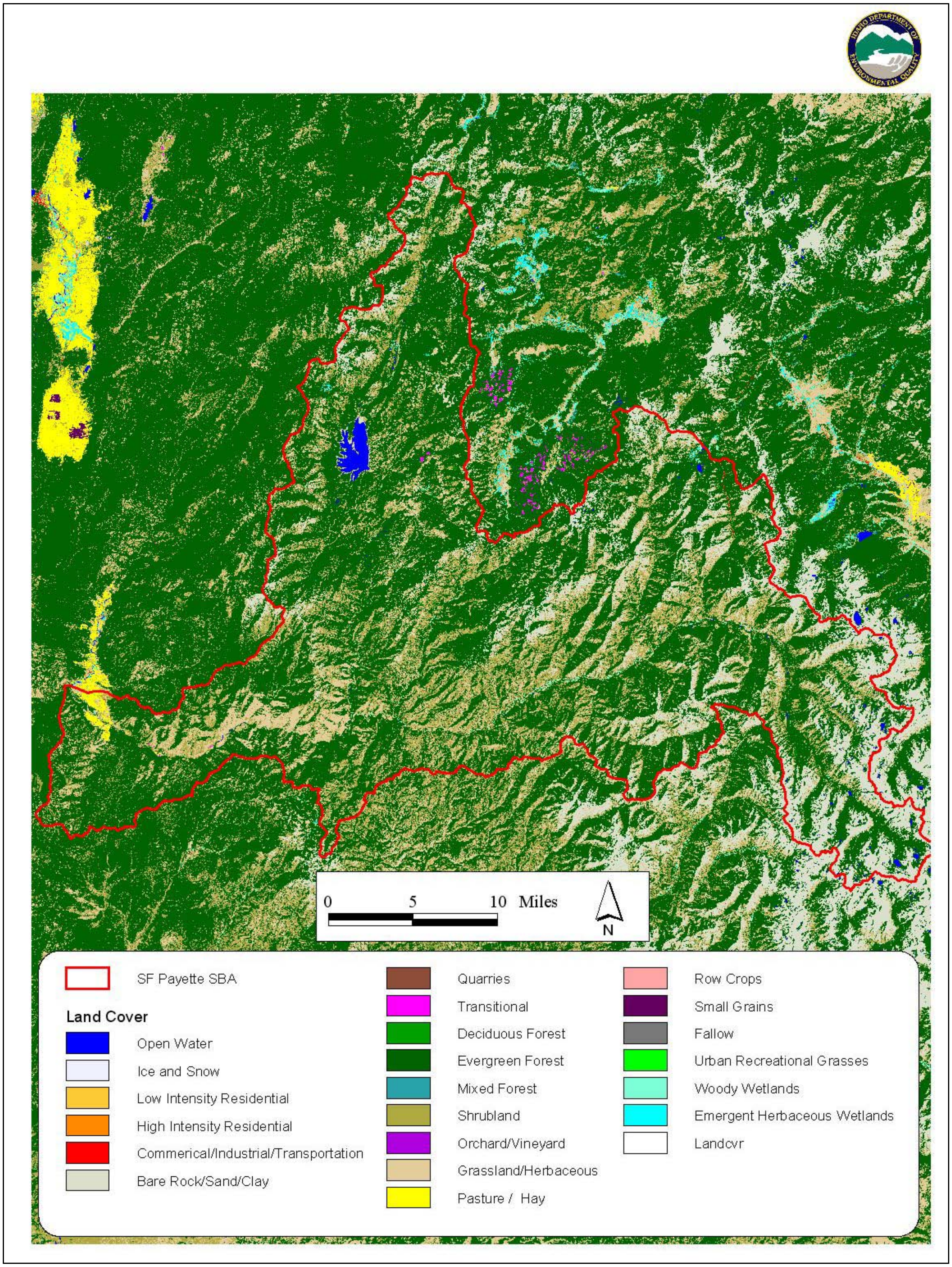

Figure 10. Land Cover in the South Fork Payette River Subbasin.

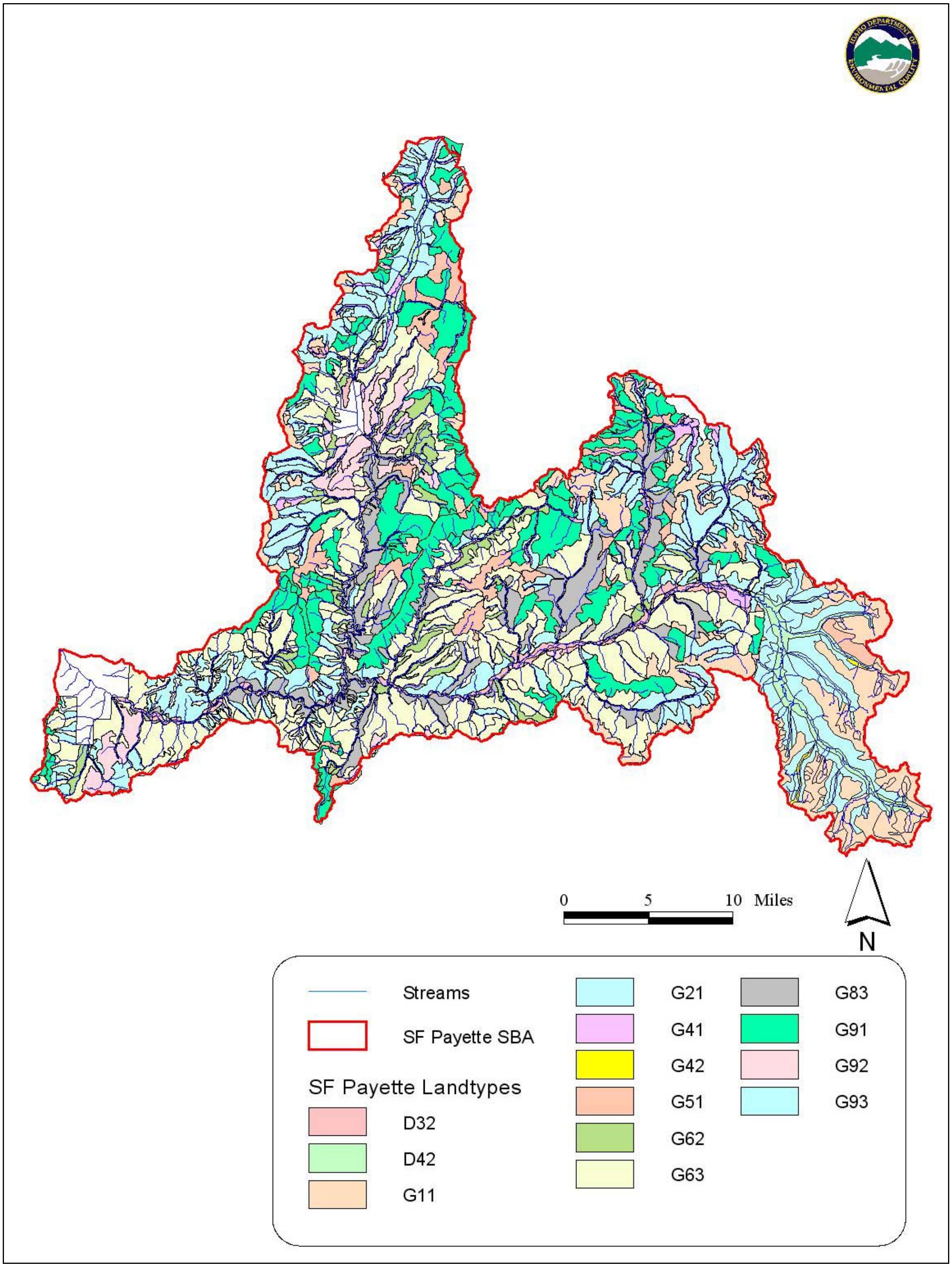

Figure 11. Land Types in the South Fork Payette River Subbasin.

Table 2. Common name, scientific name and status of origin of fish native to or introduced (Zaroban et al. 1999) in the South Fork Payette River subbasin.

Common Name	Scientific Name	Origin
Atlantic salmon	*Salmo salar*	alien
brook trout	*Salvelinus fontinalis*	alien
bull trout	*Salvelinus confluentus*	native
chinook salmon	*Oncorhynchus tshawytscha*	native
cutthroat trout	*Oncorhynchus clarki*	native
kokanee	*Oncorhynchus nerka*	alien
longnose dace	*Rhinichthys cataractae*	native
mottled sculpin	*Cottus bairdi*	native
mountain whitefish	*Prosopium williamsoni*	native
Pacific lamprey	*Lampetra tridentatus*	native
rainbow trout/steelhead	*Oncorhynchus mykiss*	native
shorthead sculpin	*Cottus confusus*	native
sucker	*Catostomus sp.*	native

The South Fork Payette River Subbasin contains two key watersheds for bull trout (Batt 1996). The Deadwood River key watershed contains the Deadwood River and tributaries above Deadwood Reservoir. The South Fork Payette River key watershed contains the South Fork Payette River and tributaries above the mouth of the Deadwood River, including the Deadwood River and tributaries below Deadwood Reservoir. All life history forms of bull trout are known to occur in both key watersheds (Jimenez and Zaroban 1998).

Subwatershed and Stream Characteristics

The upper-elevation tributaries to the South Fork Payette River are typically contained in V-shaped valleys. The valleys become more shallow (U shaped) at middle and lower elevations of the subbasin. The surface area estimates (acres) of the 35 sixth-field, 12-digit (HUC6) watersheds in the subbasin are summarized in Table 3. Estimates of the minimum stream elevation (feet), maximum stream elevation (feet), segment length (miles), and drop in elevation (feet per mile) for the mainstem stream in each HUC6 are summarized in Table 4.

Table 3. Surface area (acres) of the 35 HUC6 watersheds in the South Fork Payette River subbasin.

HUC6 Name	HUC6 Code	Acres
ALDER CREEK	170501200103	13457
BARON CREEK	170501201102	14478
BEAR CAMP	170501200803	15471
BIG PINE CREEK	170501200202	11306
BLUEJAY	170501200801	13582
BULL TROUT	170501200902	23939
DANSKIN POORMAN	170501200102	25259
DEADWOOD RESERVOIR	170501200501	32232
DEER CREEK	170501200503	10746
EIGHTMILE CREEK	170501200604	18154
FIVEMILE CREEK	170501200603	7303
GOAT CREEK	170501201103	8034
GRANDJEAN	170501200804	8670
HOLE IN THE WALL	170501200201	17710
JACKSON FENCE	170501200602	16218
KIRKHAM	170501200601	24012
LOWER CANYON	170501201001	8385
LOWER CLEAR CREEK	170501200701	19632
LOWER DEADWOOD	170501200301	13280
LOWER SF PAYETTE	170501200101	7139
MINK LAKE	170501201101	12531
NINEMILE	170501200402	12226
PINCHOT FALL	170501201104	12572
ROCK CREEK	170501200605	10868
SAMS LORENZO	170501200302	16623
SCOTT CREEK	170501200401	10884
TENMILE CREEK	170501200805	21100
UPPER CANYON	170501201002	13314
UPPER CLEAR CREEK	170501200702	16913
UPPER DEADWOOD	170501200502	26806
UPPER SF PAYETTE RIVER	170501201105	11921
WARM SPRING	170501200901	12967
WARM SPRINGS	170501200403	17922
WHITEHAWK	170501200404	10988
WOLF	170501200802	9322

Table 4. Estimates of the minimum stream elevation (feet), maximum stream elevation (feet), segment length (miles) and drop in elevation (feet per mile) for the mainstem stream.

HUC6 Name	HUC6 Code	Min Elev.	Max Elev.	Length	Ft/Mi
ALDER CREEK	170501200103	3117	5118	7.58	263.9842
BARON CREEK	170501201102	5151	9023	9.03	428.7929
BEAR CAMP	170501200803	4839	5004	3.48	47.41379
BIG PINE CREEK	170501200202	3400	7040	8.53	426.7292
BLUEJAY	170501200801	4360	4593	5.23	44.55067
BULL TROUT	170501200902	5676	8038	6.72	351.4881
DANSKIN POORMAN	170501200102	3117	3210	7.71	12.06226
DEADWOOD RESERVOIR	170501200501	5250	5510	9.02	28.82483
DEER CREEK	170501200503	5510	7218	10.22	167.1233
EIGHTMILE CREEK	170501200604	4320	8210	12.4	313.7097
FIVEMILE CREEK	170501200603	4225	7546	7.87	421.9822
GOAT CREEK	170501201103	5250	8941	8.1	455.679
GRANDJEAN	170501200804	5004	5151	3.29	44.68085
HOLE IN THE WALL	170501200201	3210	3720	12.1	42.14876
JACKSON FENCE	170501200602	4120	4360	6.87	34.9345
KIRKHAM	170501200601	3720	4120	12.89	31.03181
LOWER CANYON	170501201001	4839	5824	5.49	179.4171
LOWER CLEAR CREEK	170501200701	3800	5510	12.43	137.5704
LOWER DEADWOOD	170501200301	3720	4240	7.82	66.49616
LOWER SF PAYETTE	170501200101	2953	3117	4.08	40.19608
MINK LAKE	170501201101	5151	6152	9.23	108.4507
NINEMILE	170501200402	4760	5086	4.6	70.86957
PINCHOT FALL	170501201104	6152	7087	4.43	211.0609
ROCK CREEK	170501200605	3759	7481	10.51	354.1389
SAMS LORENZO	170501200302	4240	4760	8.65	60.11561
SCOTT CREEK	170501200401	4760	7382	7.55	347.2848
TENMILE CREEK	170501200805	4360	7907	11.37	311.9613
UPPER CANYON	170501201002	5824	7054	5.07	242.6036
UPPER CLEAR CREEK	170501200702	5510	7620	9.52	221.6387
UPPER DEADWOOD	170501200502	5510	6808	14.24	91.15169
UPPER SF PAYETTE RIVER	170501201105	7087	8531	4.37	330.4348
WARM SPRING	170501200901	4593	5676	9.42	114.9682
WARM SPRINGS	170501200403	5086	6808	12.13	141.9621
WHITEHAWK	170501200404	5086	7464	7.7	308.8312
WOLF	170501200802	4593	4839	4.11	59.85401

1.3 Cultural Characteristics

The South Fork Payette River Subbasin is sparsely populated and contains the unincorporated communities of Garden Valley and Lowman. Demographic data are unavailable for these two communities.

Land Use

The land use of the South Fork Payette River Subbasin is dominated by forest (Figure 12). Based on acreage estimates from IDWR spatial data, forest land uses make up 99.8% of the subbasin (IDWR 1990). The remaining 0.2% of land is gravity and sprinkler irrigation land, range, urban, and water.

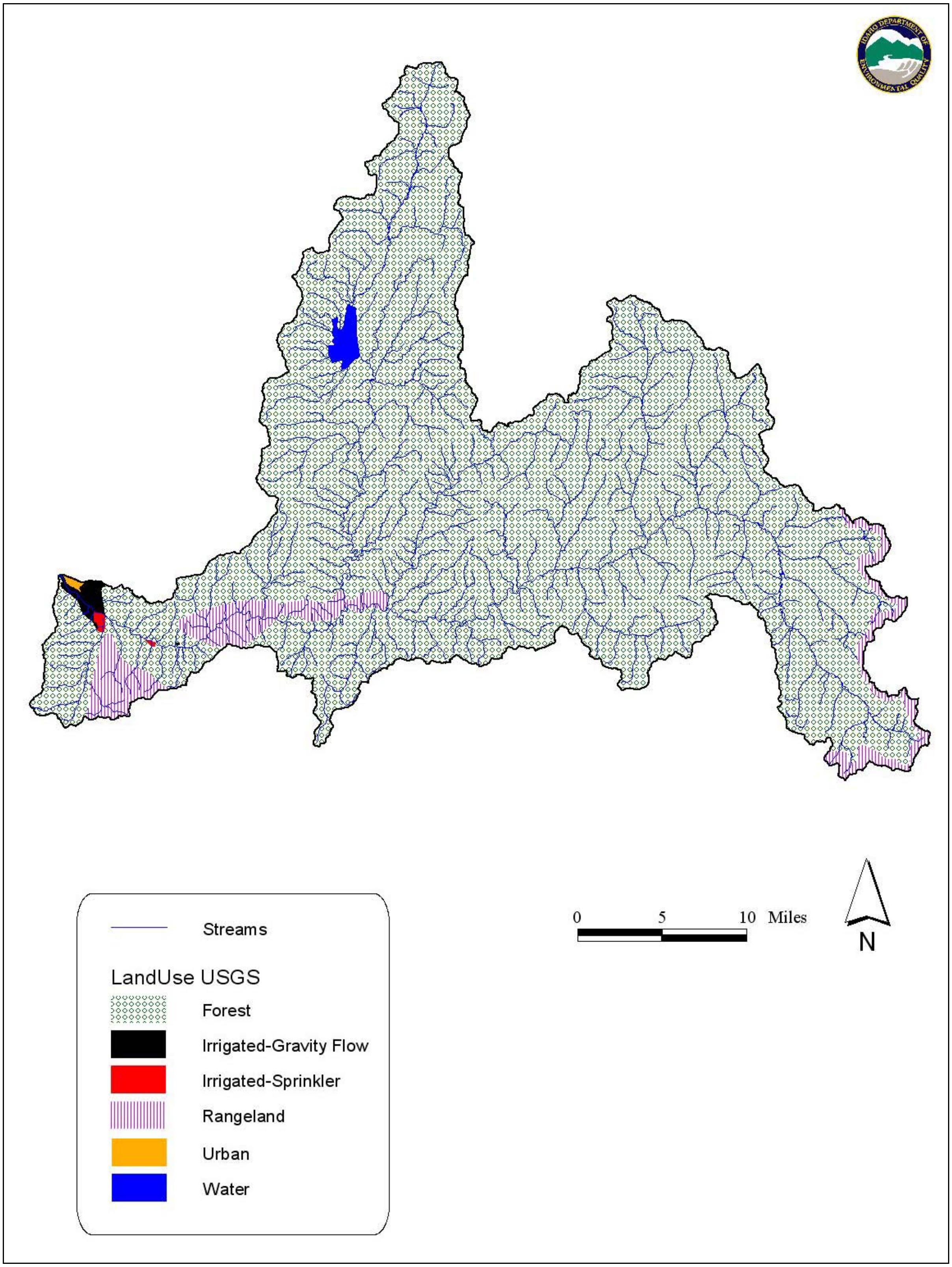

Figure 12. Land Use of the South Fork Payette River Subbasin.

Land Ownership, Cultural Features, and Population

Public land dominates the South Fork Payette River Subbasin, with the USFS as the primary land management agency for the Boise National Forest (Figure 13). Based on acreage estimates from IDWR spatial data (IDWR 1992), public ownership makes up 99.9% of the subbasin. The U.S. Bureau of Land Management, open water, and private and state ownership account for the remaining 0.1% of the land.

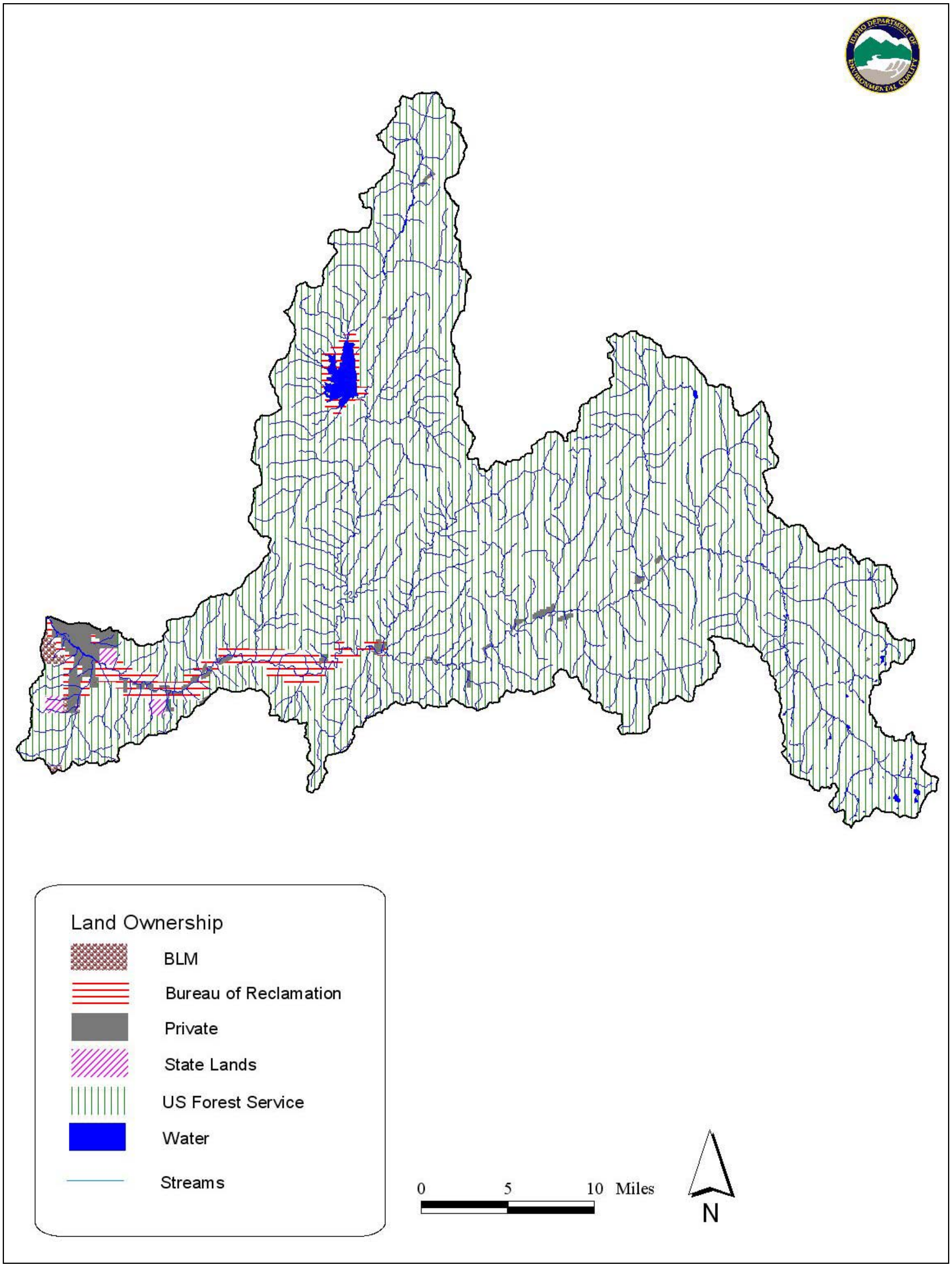

Figure 13. Land Ownership in the South Fork Payette River Subbasin.

History and Economics

First Nations

Central Idaho was home to the tukudeka or “mountain sheep eater” Native Americans (Osgood 2001). The U.S. government referred to these people as the Weiser Indians. The Weiser Indians were primarily the Shoshoni and Bannock Tribes, with some bands of Northern Paiute and Nez Perce Tribes represented in the population. It is estimated that people living a semi-nomadic life style entered what is now known as Idaho approximately 13,000 years ago (Smith 1983). There is evidence of Northern Shoshoni residence in the subbasin for 8,000 years or more (Ames 1982, Smith 1983). Archaeological evidence suggests Native Americans camped at Big Falls portage where they captured Chinook salmon and steelhead two thousand years ago. Native Americans camped at Deadwood campground and fished for Chinook salmon and steelhead fifteen hundred years ago. Occupation of the South Fork Payette River subbasin by Native Americans continued at least through August 1876, when Charles Jones (a local newspaper editor) encountered a group of Weiser Indians and their horses in the mountains above Garden Valley.

European Occupation

The first people of European descent to inhabit the South Fork Payette River Subbasin were trappers and fur traders who arrived in the early 1800s. In 1818, the Hudson Bay Company named the Payette River in honor of fur trapper Francois Payette. From 1820 to 1845, British, Canadian, and American fur companies competed for beaver pelts in Oregon Country, which included present day Idaho. Britain relinquished its claim to the Oregon territory in 1846 as the fur trade was in decline due to over-trapping (deliberate creation of “fur deserts” to discourage American encroachment) and changes in garment fashions. In the 1860s, placer mining was conducted in the South Fork Payette. There was low gold production in the South Fork subbasin. (Smith 1983, Osgood 2001)

With the discovery of gold in the Boise River basin in 1862, some miners moved to the South Fork Payette to hunt, fish, and farm to supply Boise River miners with meat (including immense quantities of fish from fish traps), produce, and dairy products. Along with the remaining trappers, these immigrants became the first European settlers of the South Fork Payette River Subbasin. Some of the most notable settlers and occupants included Nathaniel Lowman, Emile Grandjean, William Crouch, and Merle Banks (Osgood 2001).

Dredge and placer mining had significant impacts on the South Fork Payette River even though the South Fork never yielded much gold. In 1904, an earthen dam and powerhouse were constructed at Grimes Pass to provide power to commercial dredges in the Boise River. This initial dam washed out before power lines could be completed. The earthen dam was replaced by a wooden structure, Grimes Pass Dam, in 1907. Grimes Pass Dam washed out in 1943 and was never replaced. In 1905, miners blasted a 0.25 mile long tunnel, measuring ten feet high and 20 feet wide, at the South Fork Payette River oxbow. The entire flow of the South Fork was diverted to allow mining of the river bed. The South Fork yielded an average of $0.37 worth of gold per day according to one miner. In 1906, plans to develop a hydroelectric plant at the oxbow site were announced. The USFS did not permit this development, amid allegations the gold had been seeded in the river the previous year to support exaggerated claims of the plant's potential (Osgood 2001).

Timber harvesting activities began to support the trappers, miners, and settlers. The lumber produced was used for cabins, flumes, sluice boxes, as well as other uses. Early commercial logging in the South Fork Payette River Subbasin was done with teams of oxen. The logs were driven down the river during high water to the Horseshoe Bend sawmill. Management of the timber harvesting began soon after the Sawtooth Forest Reserve was established in 1905 (Smith 1983).

Domestic livestock grazing began soon after mining activity began in 1862. Herds of sheep being trailed from Oregon to Nebraska passed through the area in the 1870s. This sheep herding stopped in 1898 when Wyoming passed a quarantine law. As a result of the quarantine law, sheep producers spent more time in southern Idaho. Unrestricted grazing ended shortly after the forest reserve was established in 1905.

Recreational uses received little attention from the 1860s to 1925. Civilian Conservation Corps labor became available in 1933 and was used to construct recreational facilities (primarily campgrounds) in the South Fork Payette River Subbasin between 1933 and 1940. Since the 1940s, backpacking, cross-country skiing, river floating, summer home, and off-road vehicle uses have all increased dramatically.

Boise National Forest

The national forest system was created in 1891 with the passage of the Forest Reserve Act. President Theodore Roosevelt established the Sawtooth Forest Reserve in 1905. The Sawtooth Forest Reserve eventually was divided into the Boise, Payette, and Sawtooth National Forests in 1908.

Roads

The South Fork Payette River road was completed to Lowman in 1914. The Scott Mountain road into Deadwood Reservoir was completed in 1931. The Clear Creek-to-Stanley road was in existence by 1922. State Highway 21 (Boise to Stanley) opened as a through route in 1965 and was completed to highway standards in 1975. Construction on the Banks-Lowman road was completed in the mid-1990s. In the deeper canyon sections of the river, this road actually acts as a sediment and rock collector and prevents some sedimentation.

Numerous roads have been constructed for resource extraction and are subsequently used for back-country access and recreation. The watersheds in the Sawtooth Wilderness Area of the upper subbasin are roadless (Figure 14).

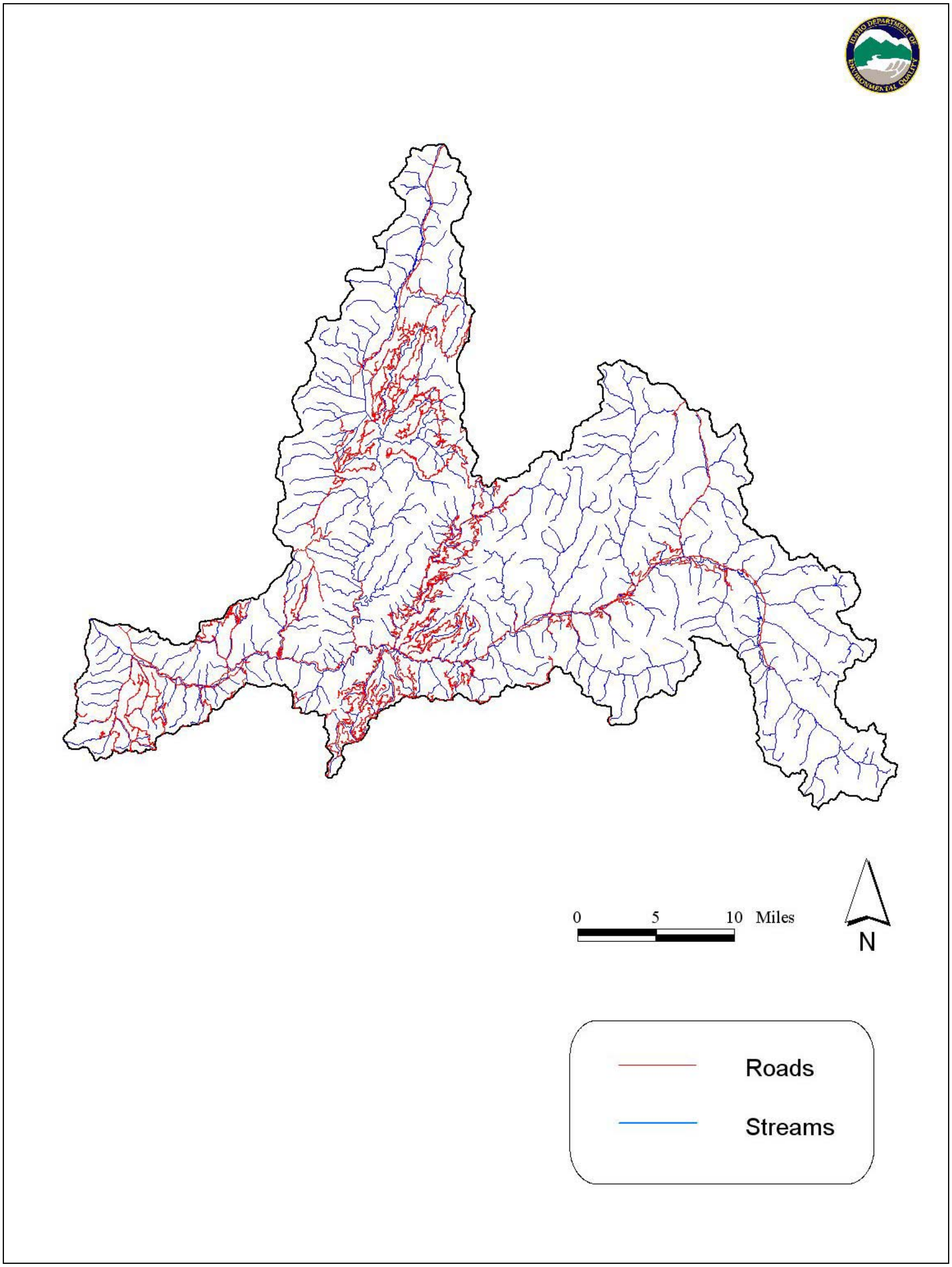

Figure 14. Road Density within the South Fork Payette River Subbasin.

Dams

Two dams, Grimes Pass dam and the Deadwood Dam, have been constructed in the South Fork Payette River Subbasin. . The Grimes Pass dam was first constructed in 1904 and was washed out in 1943. The Grimes Pass Dam was never rebuilt. The Deadwood Dam was completed in 1931. The Deadwood dam impounds 3,055 acre Deadwood Reservoir, which extends 3.5 miles upstream (Smith 1983).

Recreation

The Idaho State-designated Ponderosa Pine Scenic Byway lies partly within this management area. The South Fork Payette River corridor features river-oriented recreation, with rafting, kayaking and fishing as the major uses. There are also four developed campgrounds in the corridor, one in the Clear Creek drainage, and one at Bull Trout Lake. Dispersed recreation in the rest of the management area includes hiking, hunting, camping, fishing, ATV use, snowmobiling and horseback riding. Trails in the Tenmile/Black Warrior and Red Mountain recommended wilderness areas feature non-motorized recreation in a semi-primitive setting. Much of the use in this area comes from the Treasure Valley, although recreationists come from around the country and world to raft and kayak the South Fork Payette River. A recreation fee for parking along the South Fork Payette River is now charged river users. This area is in Idaho Fish and Game Management Units 33 and 35. Recreation special uses include several river-running outfitter and guide operations and recreation residence tracts (Long Creek, Camp Creek, Bear Creek, and Wapiti Creek) found in the South Fork Payette River corridor and along Clear Creek.

2. Subbasin Assessment – Water Quality Concerns and Status

This section of the assessment contains the following information:
1. water bodies listed as water quality limited
2. water quality standards that are applicable to the subbasin
3. designated and existing beneficial uses
4. summary of existing water quality data
5. data gaps identified during development of the assessment

2.1 Water Quality Limited Segments Identified in the Subbasin

The South Fork Payette River contains one segment that is listed on the 1998 §303(d) list as not fully supporting beneficial uses (Table 5). This segment is the South Fork of the Payette River from the wilderness boundary (latitude 44.140194º N and longitude 115.148994º W) to the confluence with the Payette River (Figure 15). Additionally, four other water bodies were identified as not supporting beneficial uses, but these are not identified on the 1998 §303(d) list. The status of the beneficial uses was determined by Beneficial Use Reconnaissance Program (BURP) data collected in 1997. These water bodies are identified in Table 5 and in Figure 15.

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

Table 5. Water Quality Limited Segments in the South Fork Payette River subbasin.

Water Body Name	Assessment Unit ID Number	1998 §303(d)[1] Boundaries	Pollutants	Listing Basis
South Fork Payette River	5186 SW001_05	Wilderness Boundary to Payette River	sediment	Boise National Forest Plan
Wash Creek	SW001_02	Headwaters to SF Payette River	unknown	Not listed BURP Data
Smokey Creek	SW001_02	Headwaters to SF Payette River	unknown	Not listed BURP Data
Horn Creek	SW001_02	Headwaters to SF Payette River	unknown	Not listed BURP Data
Chapman Creek	SW001_02	Headwaters to SF Payette River	unknown	Not listed BURP Data

[1]Refers to a list created in 1998 of water bodies in Idaho that did not fully support at least one beneficial use. This list is required under section 303 (d) of the Clean Water Act.

2.2 Applicable Water Quality Standards

The water quality standards for the state of Idaho are legally enforceable rules that consist of water use designations, numeric or narrative criteria established to protect the water uses, and an anti-degradation policy. The water quality criteria include narrative or “free from” criteria applicable to all waters of the state (IDAPA 58.01.02.200) and numeric criteria, which vary according to water use (IDAPA 58.01.02.250, 251, and 252). Typical numeric criteria include bacteriological criteria for recreational uses, physical and chemical criteria for aquatic life uses (e.g. pH, temperature, dissolved oxygen, ammonia, toxins, etc.), and turbidity and toxics criteria for water supply uses. The water quality standards for Idaho are published in the state’s rules at IDAPA 58.01.02 and are officially titled *Water Quality Standards and Wastewater Treatment Requirements*.

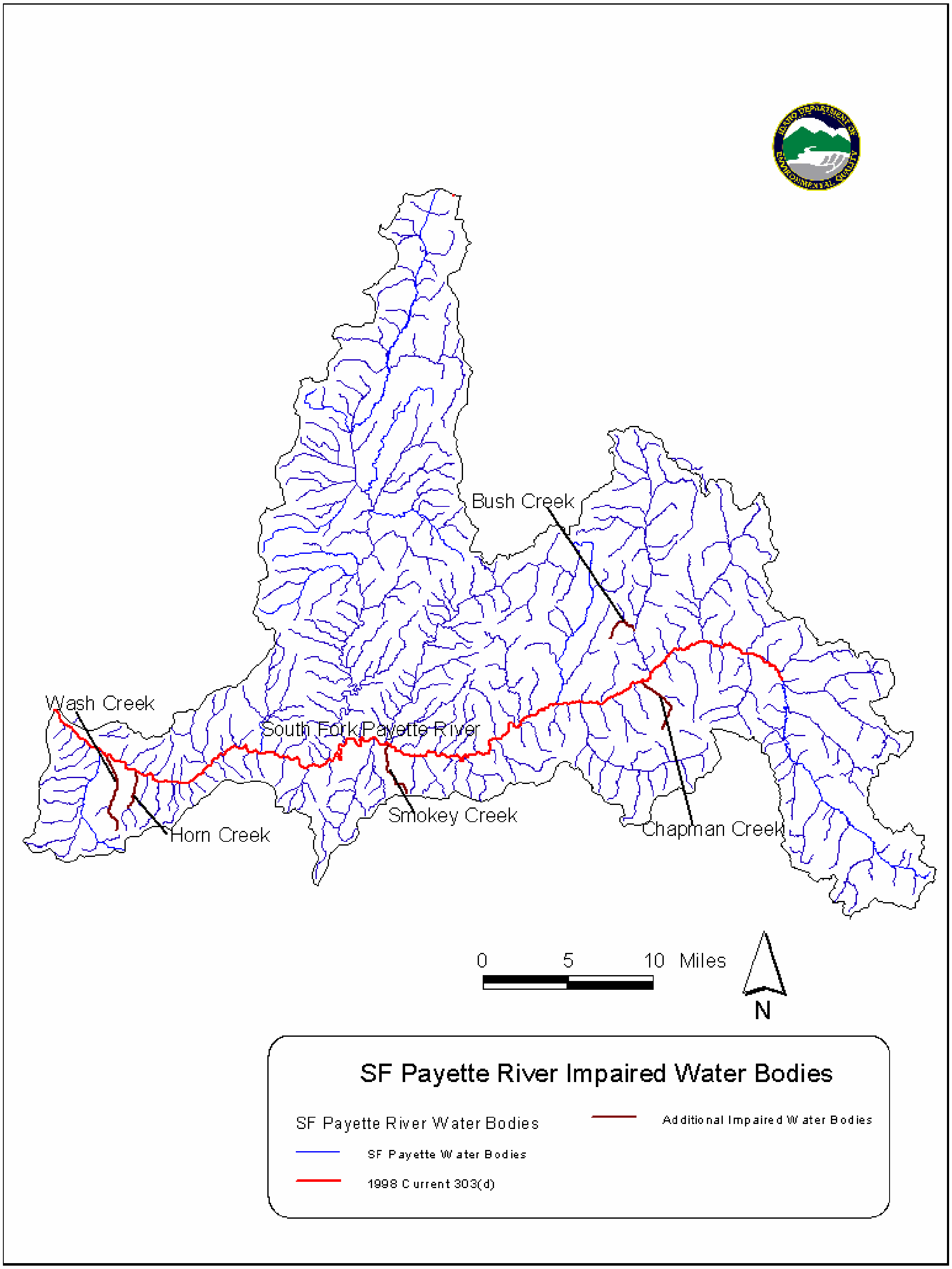

Figure 15. Water Quality Limited Segments within the South Fork Payette River Subbasin.

Beneficial Uses

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

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 actually occurring, whether or not 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 a stream 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 6. South Fork Payette River subbasin designated beneficial uses.

Water Body (WBID)	Designated Uses[1]	1998 §303(d) List[2]
South Fork Payette River (1, 5)	CW, SS, PCR, DWS, SRW	X
Deadwood River (14, 19)	CW, SS, PCR, DWS, SRW	
Deadwood Reservoir (18)	CW, SS, PCR, DWS, SRW	

[1]CW – Cold Water, SS – Salmonid Spawning, PCR – Primary Contact Recreation, SCR – Secondary Contact Recreation, AWS – Agricultural Water Supply, DWS – Domestic Water Supply
[2]Refers to a list created in 1998 of water bodies in Idaho that did not fully support at least one beneficial use. This list is required under section 303 (d) of the Clean Water Act.

Presumed Uses

In Idaho, most water bodies listed in the tables of designated uses in the water quality standards do not yet have specific use designations. These undesignated uses are to be designated. In the interim, and absent information on existing uses, DEQ presumes that most waters in the state will support cold water aquatic life and either primary or secondary contact recreation (IDAPA 58.01.02.101.01). To protect these so-called “presumed uses,” DEQ will apply the numeric cold water criteria and primary or secondary contact recreation criteria to undesignated waters. If in addition to these presumed uses, an additional existing use, (e.g., salmonid spawning) exists, because of the requirement to protect levels of water quality for existing uses, then the additional numeric criteria for salmonid spawning would additionally apply (e.g., intergravel dissolved oxygen, temperature). However, if for example, cold water aquatic life is not found to be an existing use, an 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).

Table 7. South Fork Payette River subbasin existing beneficial uses.

Water Body	Existing/Presumed Uses[1]
Rock Creek	CW, SS, SCR
Tenmile Creek	CW, SCR
Wapiti Creek	CW, SS, SCR
Canyon Creek	CW, SS, SCR
Warm Spring Creek	CW, SS, SCR
Eightmile Creek	CW, SS, SCR
Fivemile Creek	CW, SS, SCR
Clear Creek	CW, SS, SCR
Whitehawk Creek	CW, SCR
Wilson Creek	CW, SCR
Scott Creek	CW, SS, SCR
Big Pine Creek	CW, SS, SCR
Smokey Creek[3]	CW, SS, SCR
Horn Creek[3]	CW, SS, SCR
Chapman Creek[3]	CW, SS, SCR
Wash Creek[3]	CW, SS, SCR
Bush Creek[3]	CW, SS, SCR

[1]CW – Cold Water, SS – Salmonid Spawning, SCR – Secondary Contact Recreation [2]Refers to a list created in 1998 of water bodies in Idaho that did not fully support at least one beneficial use. This list is required under section 303 (d) of the Clean Water Act. [3] Water Bodies not on 1998 303(d) list

Pollutant Relationships to Uses – Target Identification

Both suspended and bedload sediment (sediment particles too large or heavy to be suspended, but still transported by flowing water) can have negative effects on aquatic life communities. Many fish and aquatic insect species can tolerate elevated suspended sediment levels for short periods of time, such as during natural spring runoff, but longer durations of exposure are detrimental. Elevated suspended sediment levels can interfere with fish feeding behavior (difficulty finding food due to visual impairment), damage gills, reduce growth rates, smother eggs and fry in the substrate, damage habitat, and in extreme cases eventually lead to death. Eggs, fry, and juveniles are especially sensitive to suspended sediment.

Newcombe and Jensen (1996) reported the effects of suspended sediment on fish, summarizing 80 published reports on suspended sediments in streams and estuaries. For rainbow trout, physiological stress, which includes reduced feeding rate, is evident at concentrations of 50 to 100 mg/L suspended sediment concentrations (SSC) when those concentrations are maintained for 14 to 60 days. Similar effects are observed for other species, although the data set is less reliable. Adverse effects on habitat, especially spawning and rearing habitat, were noted at similar concentrations. Using the Newcombe and Jensen work as a reference, Miller (1998) developed suspended sediment water column targets for the protection of salmonid spawning. These targets are also protective of cold water aquatic life in general. The targets developed by Miller (1998) are ***a geometric mean of 50 mg/L SSC for no longer than 60 days and a geometric mean of 80 mg/L SSC for no longer than 14 days. These targets will be applied to the South Fork Payette River to assess water column sediment levels as it relates to aquatic life beneficial use support status.*** The two-tiered durational nature of the targets allows for the acute slugs of elevated sediment often associated with short-term precipitation events.

Bedload sediment also adversely affects aquatic species, although the direct effects of bedload are difficult to gauge because bedload is largely a function of stream power, which is in most cases not a manageable condition. As sand and silt wash downstream, they can cover spawning gravels, increasing embeddedness in the streambed. If this occurs during incubation periods or while small fry are using the spawning gravels to develop, it may eliminate those areas and result in death. Bedload can also reduce intergravel DO levels by decreasing the critical re-oxygenating flow through the intergravel matrix. Unlike the nearby Middle Fork Payette River, the South Fork Payette River does not indicate impairment due to sediment, suspended or bedload. Due to the river's gradient, the South Fork Payette River is typified by high point velocities. This can be illustrated by evaluating the sediment transporting capability of the South Fork Payette River through an examination of the water velocities recorded at the U. S. Geological stream gage at Lowman. Between May 26, 1941 and April 21, 2003, 587 discharge measurements were collected. Stream velocity ranged between 0.84 feet per second (0.57 miles per hour) to 9.0 feet per second (6.14 miles per hour) with an average velocity of 3.05 feet per second (2.07 miles per hour). Hunt (1974) reported that sediment up to thumb-sized (gravel) could be transported in stream velocities as little as 2 miles per hour. With a 62-year average stream velocity over 2.07 miles per hour, the South Fork Payette River easily transports fine-grained sediment. Furthermore, it is unlikely that investigators would be able to detect reductions of fine-grained sediment in the

South Fork Payette River resulting from management changes and TMDL mandated sediment reduction treatments. By comparison, the Middle Fork Payette River near Lightning Creek is typified by point velocities of near .40 feet per second (.30 miles per hour). As such, sediment deposition in the Middle Fork Payette River readily occurs and is readily quantifiable. Thus, a TMDL was prepared in 1998 (DEQ 1998).

As mentioned above, bedload is largely a function of stream power, which is driven by stream velocity. In smaller order water bodies, higher velocities are short duration events based on snow melt or storm events. Directly related to the size of the watershed, peaks in the hydrographs and base flow conditions can occur within a week of each other in smaller watersheds, with peak flows occur during a few days. While in the larger watersheds, peak flows and baseline flows may occur months apart, with peak flows lasting for weeks.

These short duration high velocity flows may not offer the opportunity for complete removal of either the larger sediment particles or the smaller particles which may have entered the water body due to land use practice and/or natural erosion. The other consideration is the presence of fish that prefer slower velocities for refugia and spawning activity. Cold water species such as trout prefer smaller tributaries for spawning, incubation and fry development, with rearing occurring in the larger water bodies.

Many studies have been conducted to determine the affects of sediments, both bedload and suspended, on cold water species. Suspended sediments or suspended solids usually affect sight-feeding capability, clogging of gills or related stress as mentioned above. Bedload sediment, especially fine sediment of less than 6 millimeters (mm) in diameter, can cause impairment of uses in a variety of ways. Bedload sediment can fill in gravels associated with salmonid spawning gravels, cover redds reducing intergravel dissolved oxygen levels, encase fry, fill in interstitial spaces required for fry development and salmonid food sources, reduce pool volume required for salmonid refugia areas, and cover substrate required for primary food (periphyton) production areas.

Surface fines can impair benthic species and fisheries by limiting the interstitial space for protection and suitable substrate for nest or redd construction. Certain primary food sources for fish (Ephemeroptera, Plecoptera, and Tricoptera species [EPT]) respond positively to a gravel to cobble substrate (Waters 1995). Substrate surface fine targets are difficult to establish. However, as described by Relyea, Minshall, and Danehy (2000), macroinvertebrate (Plecoptera) intolerant to sediment are mostly found where substrate fines (<6mm) is less than 30%. More sediment tolerant macroinvertebrates are found where the substrate cover (<6mm) is greater than 30%

Most studies have focused on smaller streams, A, B, and C channel types (Rosgen 1996). Studies conducted on Rock Creek (Twin Falls County, Idaho) and Bear Valley Creek (Valley County, Idaho) found percent fines above 30% begin to impair embryo survival (Idaho DEQ 1990). Overton et al. (1995) found natural accumulation of percent fines were about 34% in C channel types. Most C channel types exhibit similar gradient as F channel types, <2.0% (Rosgen 1996).

2.3 Summary and Analysis of Existing Water Quality Data

Water quality and biological data from the Boise National Forest, USGS and the DEQ are summarized in this section. This summary focuses on available parameters pertinent to fine-grained sediment, the pollutant of concern in the listed segment.

South Fork Payette River

The USGS has monitored surface water quantity and quality over an extended period of time in the South Fork Payette River. Table 8 shows the location of each station and the period of record for which data exists.

Table 8. USGS surface water quality and quantity monitoring locations in the South Fork Payette River Subbasin.

Site No.	Water Body	Location	Events	First	Last
13235000	SF Payette River	At Lowman	299	01-Mar-42	24-Sep-02
13237500	SF Payette River	At Garden Valley	11498	15-May-21	30-Sep-60

Flow Data

Since 1942 the USGS has collected daily flow data from the South Fork Payette River at Lowman. These data provide valuable insight into the annual hydrograph for the listed segment of the river. Figure 16 shows the annual average flow at Lowman for each year since 1942. Also shown on the figure is the average flow for the period of record. This value is 861 cfs. The year 2002 is not included in this figure because data for the entire year are not yet available. The data show that the average annual flow in the river can remain relatively static for years at a time or can fluctuate dramatically from one year to the next. This relative infrequency in flow consistency makes the determination of a “typical” flow year difficult. Therefore, the average flow for the period of record is considered a typical flow for purposes of this subbasin assessment.

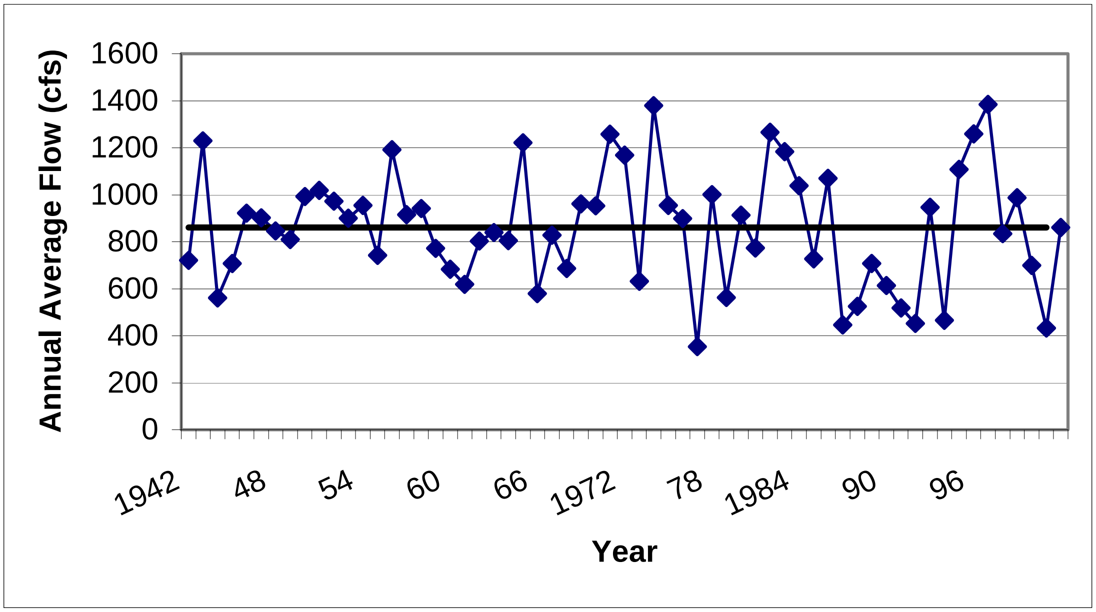

Figure 16. Annual Average Discharge at Lowman, Idaho since 1942 as Compared to Period of Record Average Discharge of 861 cfs.

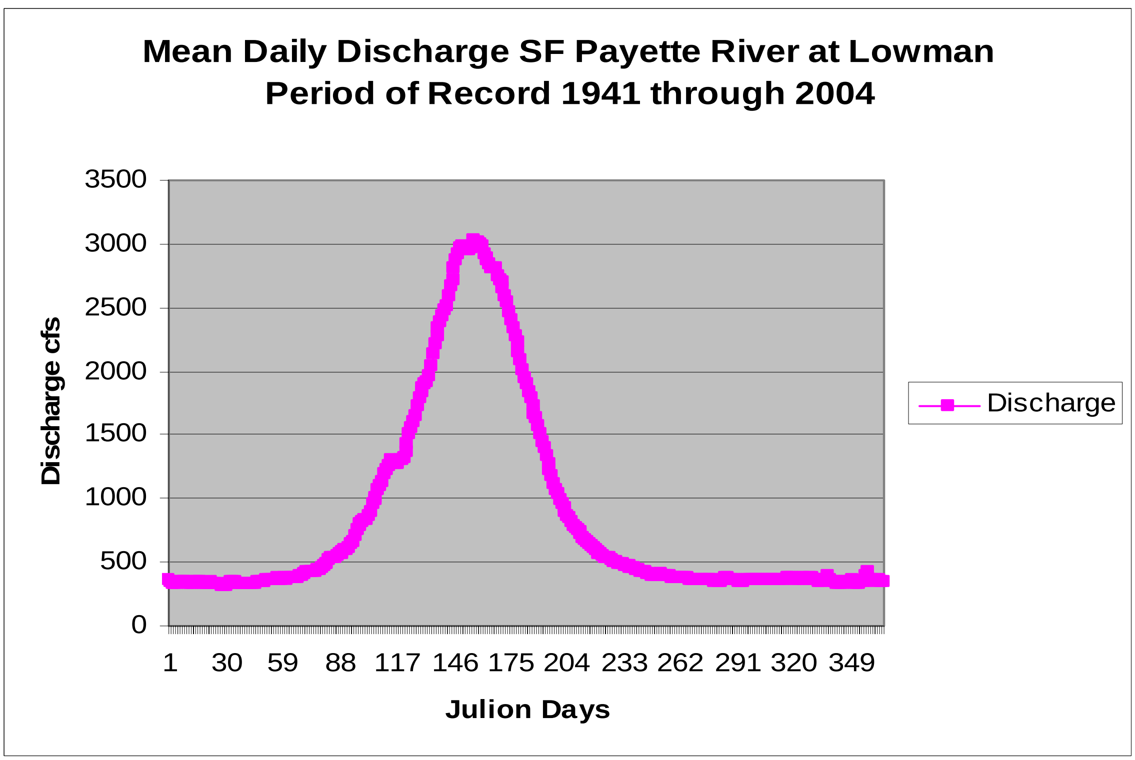

Figure 17. Mean Daily Discharge SF Payette River at Lowman, 1941 through 2004

Water Column Data – Suspended Sediment Concentration (SSC)

The South Fork Payette River at Lowman site is the only surface water quality station for which sufficient amounts of suspended sediment data are available. Data are primarily available during the late spring and early summer (April –June) for the years 1994 and 1995. Additional data are available in the years 1992, 1998 and 2001, but the data are far less robust. Investigators completed analyses for 85 parameters at various times during the period of record from this station. Out of these parameters, discharge (parameter code 00061) and suspended sediment concentration (parameter code 80154) best apply to an assessment of fine-grained sediment, the pollutant of concern in the South Fork Payette River.

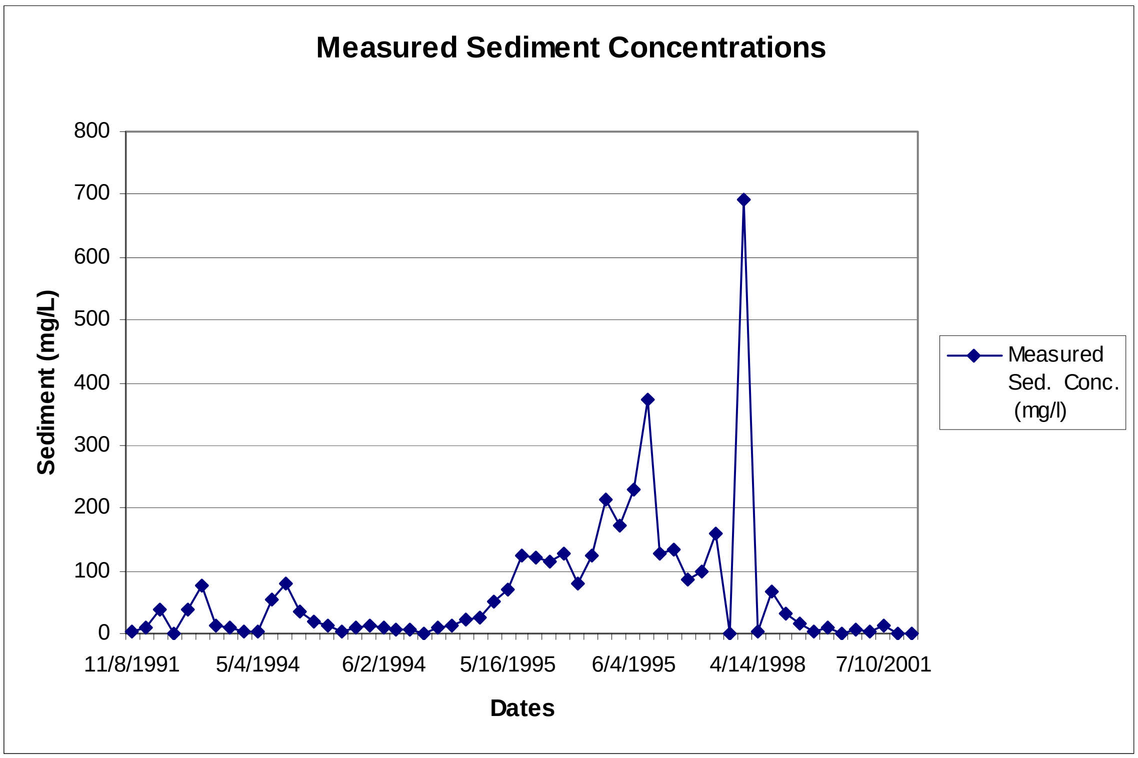

Figure 18. Measured Sediment Concentrations, 1991 through 2001

Six years of suspended sediment concentration (SSC) data, measured by USGS at the Lowman Gage Site (USCS 13235000), are available (Table 9). It should be noted that for years 1991 and 1997 there is only one data point for each of those years.

Table 9. Suspended Sediment Concentration Results for South Fork Payette at Lowman 1991, 1992, 1994, 1995, 1997, 1998 and 2001.

	Measured Discharge (cfs)	Measured SSC Concentration (mg/L)	Measured SSC Load (lbs/day)	Measured SSC Load (tons/day)
Average	1842	66	612118	306
Maximum	6390	692	10816612	5408
Minimum	160	1	391	0
Standard Deviation	1390	111	1568481	784
Count	57	57	57	57

With the data available for the years shown in Table 9, a sediment rating curve was developed to evaluate year round SSC loads and concentrations based on the function of discharge. Suspended sediment data and discharge data were "normalized" into natural log values. The regression analysis for the measured SSC load and discharge are seen in Figure 19.

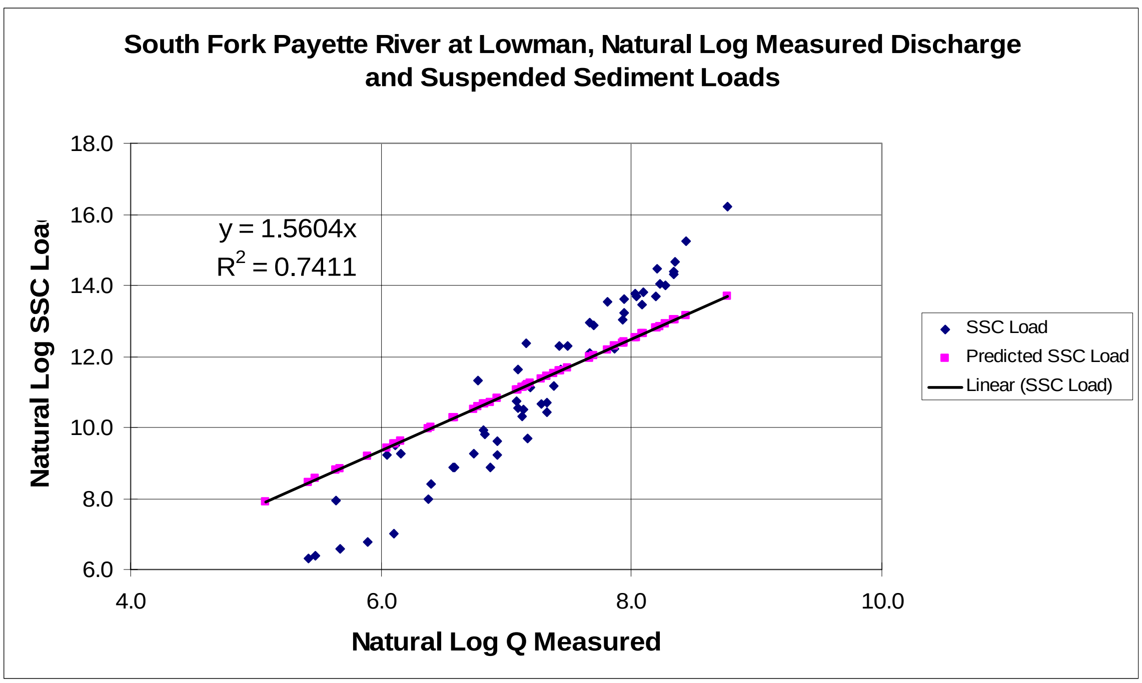

Figure 19. South Fork Payette River at Lowman, Natural Log Suspended Sediment Load as a Function of Discharge.

The first step in the analysis was to calculate the sediment load based on the discharge and SSC for the date samples were collected (Appendix A). Using the average daily discharge for the dates used in the regression analysis, the estimated daily discharge value was then applied to the sediment rating curve developed for the USGS Gage at Lowman (USGS 13235000).

$\ln(y) = 1.5604\ln(x)$

$r^2 = 0.74$

The value obtained as the estimated suspended sediment for that day's normal (average) discharge is shown as *y*. The variable *ln (x)* is the natural log value for the average (normal) discharge for that date. So, the estimated suspended sediment load would appear as:

SS Load $\ln(y) = 1.5604\ln(x)$ or

SS Load $(y) = \exp(1.5604\ln(x))$

As an example, for the date July 16, 1998, the following natural log values were obtained:

Measured SSC = 16 mg/L

Natural Log Measured Discharge = 7.0817 (1190 cfs)

Natural Log Measured SSC Load = 10.7488 (23.3 tons/day)

For July 26, the estimated discharge, TSS load, and concentration would be:

Natural Log Average Daily Discharge = 7.0220 (1121 cfs)

Estimated Average SSC Load (for July 16) = 28.7 tons/day

Estimated Average SSC (for July 16) = 21 mg/L

The values presented in Table 10 show the statistical analysis for the dates when actual monitoring was conducted and the results for sediment rating curve when applied to the normalized discharges for the same dates. The results from the modeling effort may underestimate high yield "slugs" of SSC associated with the rising hydrograph and/or storm events. The sediment curve rating may equally overestimate long- and short-term SSC averages.

Table 10. Measured and Estimated Discharge, Suspended Sediment Loads, Suspended Sediment Concentration, and Error Bias for South Fork Payette at Lowman.

	Measured Discharge (cfs)	Measured SSC Concentration (mg/L)	Measured SSC Load (tons/day)	Average Daily Discharge (cfs)	Estimated SSC Concentration (mg/L)	Estimated SSC Load (tons/day)
Average	1842	66	306	1866	27	70
Maximum	6390	692	5408	3025	36	135
Minimum	160	1	0	352	11	5
Standard Deviation	1390	111	784	900	8	45
Count	57	57	57	57	57	57
Square Root Error 1.79 % Difference Measure 16.2% % Difference Estimated 24.9%						

The application of the sediment rating curves offers numerous advantages over calculating the overall sediment load with measured data. The use of the rating curve "smooths" out the variables that could be associated with the monitoring conducted on any given date. This could include abnormal discharge for the date, catastrophic disturbance occurring upstream (fires, road blow-outs) or abnormal temporal or spatial climatic events.

Table 11 shows the results the for the sediment rating curve, using normalized discharge data for the South Fork Payette at Lowman.

Table 11. Normalized Discharge and Estimated Average Suspended Sediment Concentration and Loads for South Fork Payette at Lowman.

	Normalized Discharge (cfs)	Estimated SSC Concentration (mg/L)	Estimated SSC Load (lbs/day)	Estimated SSC Load (tons/day)
Average	852	16	50037	25
Maximum	3025	36	269975	135
Minimum	313	10	7835	4
Standard Deviation	800	8	72994	36
Count	366	366	366	366

Since applying a sediment rating curve for obtaining a normalized concentration and loads has a certain amount of bias, applying the standard error to the overall results is appropriate. In the case of the South Fork Payette River, the error bias has been determined to be 24.9%

(Table 10) of the results from the regression analysis. Table 12 shows the results if the bias is applied to the estimated values presented in Table 11.

Table 12. Application of Bias to Normalized Discharge and Estimated Average Suspended Sediment Concentration and Loads for South Fork Payette at Lowman.

	Normalized Discharge (cfs)	Estimated SSC Concentration (mg/L)	Estimated SSC Load (lbs/day)	Estimated SSC Load (tons/day)	Estimated SSC Concentration +24.9% (mg/L)	Estimated SSC Load +24.9% (tons/day)
Average	852	16	50037	25	21	31
Maximum	3025	36	269975	135	46	169
Minimum	313	10	7835	4	13	5
Standard Deviation	800	8	72994	36	10	46
Count	366	366	366	366	366	366

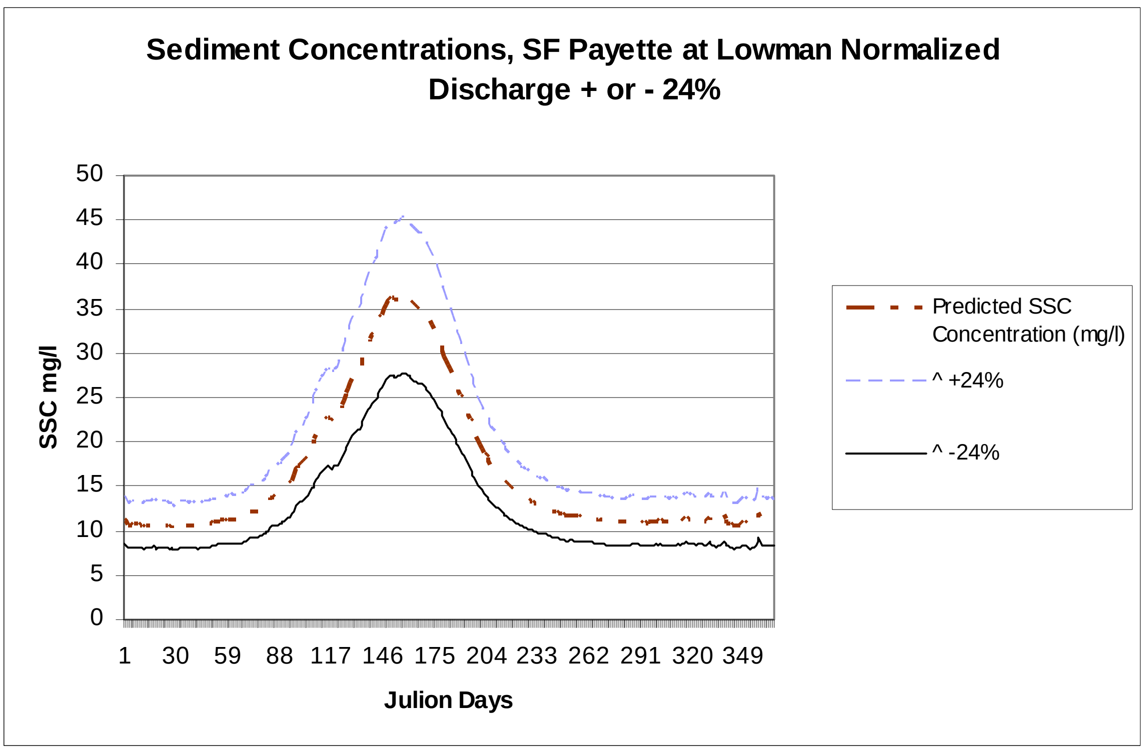

Figure 20. Sediment Concentrations, SF Payette River at Lowman Normalized Discharge + or – 24%

Appendix E. contains the statistical analysis used to calculate the normalized flow.

Department of Fish & Game
Stream Snorkel Surveys
South Fork Payette River

Snorkeling was used to identify and count fish species and numbers in the South Fork Payette River (SFPR) during August. Surveys were conducted between Lowman and Grandjean over a two day period. Two snorkelers were used, traveling in an upstream direction at all sites. Snorkel sections were measured (length and minimum of four widths) using a hand-held laser range finder (Leica model LRF 800) to calculate area surveyed, and water temperature was recorded at each snorkel site. GPS coordinates (NAD27 Conus, in UTM's) were collected at all snorkel sites using a Garmin Rino model 120 handheld GPS receiver.

A total of fourteen sites were snorkeled on the SFPR between Lowman and Grandjean on August 18-19. Redband trout, and mountain whitefish were observed at all sites (no trout were observed at Sacajawea Hot Springs site). No hatchery rainbow trout were observed. Other species observed included mountain sucker *Catostomus platyrhynchus*, and one westslope cutthroat trout *O. clarki lewisii*.

Overall, 64% (9/14) of the sites snorkeled had redband trout densities lower in 2003 than in 1996 (Allen et al. 1999**)**, and 36% (5/14) had densities higher. Total redband densities have declined since 1989 for all size classes (Table 2). Densities by section ranged from 0.10 to 2.82 redband trout/100 m^2 (Table 3). Very few redband trout >300 mm were observed. The areas with the highest observed densities corresponded with two general locations, Grandjean and Lowman (Table 3). Both areas are adjacent to river reaches with very difficult angler access.

Densities of mountain whitefish ranged from 0.13 to 1.01 fish/100 m^2, lower than measured between 1988-1990, but have increased since 1996 (Table 3).

Approximately thirteen thousand catchables per year were stocked in the SFPR between 1990-1999 (Table 4). The highest densities of hatchery rainbow trout documented while snorkeling occurred in 1988 and 1989 (0.23 and 0.5 fish/100 m^2, respectively), both were drought years in which a total of 31,000 catchables were stocked (Table 2). Between 1990 and 1997, densities of hatchery rainbow trout observed while snorkeling ranged from 0.02 to 0.05 fish/100 m^2. Stocking of the SFPR was eliminated in 1999 following the construction of two put-and-take catchable ponds near the Ten-Mile Bridge above Lowman.

Personal Communication
Jeff Dillon, Idaho Department of Fish & Game

Another, perhaps more significant limitation (to the fishery), is the basic productivity of the drainage. The granitic batholith watersheds in Idaho all have relatively low fish densities and fish growth rates compared to more productive drainages farther south. The loss of marine nutrients with extirpation of anadromous fish has almost certainly reduced productivity from historic levels, but the basic geology plays a role also.

River BURP Site 98RBOIP003
Periphyton (RDI)

>50% *Achnanthes minutissima* indicates this site has been subject to moderate stress / disturbance, either natural or man made. Stress may be physical (fast current, scour), biological (grazing), or chemical (heavy metals). Diatom flora indicates low nutrient levels and little sedimentation; cool water.

Mountain streams with fast currents, cold waters, and low nutrient levels sometimes produce diatom assemblages with low diversities and large percentages of *Achnanthes minutissima* (Bahls 1993).

Table 13. Values of diatom association metrics for Idaho rivers in 1998

River	Taxa Counted	Diversity Index	Pollution Index	Dominant Taxon	Siltation Index	Disturbance Index	% Abnormal Valves
SF Payette	38	2.41	2.56	54.2	7.9	54.2	0

The RDI score for this site is 40. As seen below, the category rating for the site is "3".

Table 14. Macroinvertebrates (RMI)

River	#Taxa	% Dominance	Total EPT Taxa	% Elmidae Taxa	% Predator Taxa
SF Payette	35	13.36	15	0.98	3.54

The RMI score for this site is 19. As seen below, the category rating for the site is "3".

In accordance with the Water Body Assessment Guidance (WBAG II, DEQ 2002), the site is considered to be fully supporting beneficial uses. This is based on two indices with an average score of greater than "2".

Excerpt from the Water Body Assessment Guidance, DEQ 2002

6.4.2. River Index Scoring
6.4.2.1. Biological and Physicochemical Indexes
DEQ uses BURP-compatible data to calculate the River Macroinvertebrate Index (RMI), River Fish Index (RFI), and River Diatom Index (RDI). The results from these indexes are used to evaluate support use of cold water aquatic life in rivers.

The RMI, RFI, and RDI are direct biological measures of cold water aquatic life.
Scoring methods used for the river biological indexes differ according to the techniques used to develop the indexes. The RMI and RFI used reference condition approaches similar to those methods used in the development of the SMI and SFI. The developers of the RMI and RDI did not adjust index scores to a 100-point scale. Therefore, the maximum score of these indexes are the highest scores of the individual metrics comprising the indexes.

Both the RMI and RFI base condition categories on the 25th percentile of reference condition, which is considered adequately conservative in identifying sites in good condition (Jessup and Gerritsen 2000). For the RMI, Royer and Minshall (1996) recommended the minimum score of the reference condition to distinguish additional condition categories. DEQ evaluated the range in each condition category of the RMI and then linearly extended the range to identify a minimum threshold.

The development of the RDI scores were based upon the distribution of the entire data set rather than just reference sites, due to the limited number of reference sites. Fore and Grafe (2000) recommend scores assigned to the different index categories based on the 75th, 50th, and 25th percentiles. Fore and Grafe (2000) did not have supporting analysis to recommend a minimum threshold.

Similar to the stream cold water aquatic life approach, each condition category is assigned a rating of 1, 2, or 3. This rating assignment allows DEQ to effectively integrate multiple index results into one score. The final score derived from these multiple data sets is then used to determine use support. Table 14a summarizes the scoring and rating categories for the RMI, RDI, RFI, and RPI.

Table 14a. RMI, RDI, RFI, and RPI Scoring and Rating Categories.

Index	Minimum Threshold	1	2	3
RMI	<11	11 – 13	14 – 16	>16
RDI	NA[1]	<22	22 – 33	>34
RFI	<54	54-69	70-75	>75
RPI	<40	40 – 70	70 – 80	>80

1 Fore and Grafe (2000) did not identify a minimum threshold category.

Table 15. USGS Monitoring South Fork Payette River @ Lowman[1]

Sample Date	Site Type	Reach Length (m)	Stream Depth (m)	Stream Width (m)
8/31/1998	Forest	465	0.15	55
Discharge (cfs)	**Stream Velocity (f/s)**	**Spec Cond (µS/cm)**	**% Open Canopy**	**% Substrate Fines**
460	1.96	85	41	0
% Embeddedness	**Stream Gradient**	**DO (mg/L)**	**DO % Saturation**	**pH (SU)**
15	0.83	9	102	7.8
Max water temp (96-98)	**Habitat Quality Index**			
19.3	67			

Table 16. Macroinvertebrate metrics and invertebrate river index (IRI)[1]

Richest targeted habitat (RTH)

Total Abundance (individuals /m^2)	No. Cold Water Taxa	% Cold Water Taxa	% Dominant Taxa	Total No. of Taxa
4340	6	5.23	27.81	45
EPT Taxa	**% Elmidae**	**% Predators**	**IRI Score**	
25	2.7	7.43	23	

[1] Evaluation of Macroinvertebrate Assemblages in Idaho Rivers Using Multimetric and Mutivariate Techniques, 1996-98, Water Resources Investigations Report 01-4145, Terry R. Maret, Dorene E. MacCoy, Kenneth D. Skinner,Susan E. Moore and Ivalou O'Dell, US Geological Survey, Boise, Idaho 2001.

Status of Beneficial Uses

The analysis indicates that during *normal- and low-flow years*, the suspended sediment concentrations in the South Fork Payette River are not expected to exceed the durational targets of 50 mg/L for 60 days and 80 mg/L for 14 days. Consequently, DEQ does not recommend preparing an explicit sediment TMDL for the South Fork Payette River. However, the data do show that, in high flow, high run-off, years, the SSC concentrations exceed the targets. The South Fork Payette River Subbasin is almost entirely forested and the land uses in the subbasin are almost entirely forest activities. In areas of forest activities, roads are the primary human-induced source of stream sediment (Megahan and Kidd 1972, Bauer et al. 1985, Harvey et al. 1989, Hoelscher et al. 1993, Zaroban et al. 1997). As such, roads should be managed to prevent or reduce sediment loss. More details are given in section 3.0 of this subbasin assessment.

Fine-grained sediment from timber harvest, rangeland, agriculture, recreation, and urban sources are not considered major in this subbasin assessment given their relatively small contribution when compared to roads, natural background, and landslides.
Table 17 summarizes the beneficial use support status in the South Fork Payette River as it relates to the pollutant of concern (sediment) in the river.

Table 17. Status of beneficial uses for the South Fork Payette River.

Stream / Segment	Beneficial Uses Support Status	Impaired Use[1]	Comments
South Fork Payette River - Wilderness Boundary to Payette River	Not Impaired	None	Targets not exceeded in normal flow years. Targets exceeded in high flow years. Forest roads should be managed to prevent sediment loss in high run-off years.

[1] Cold Water Aquatic Life

Other Water Bodies

Through DEQ's Beneficial Use Reconnaissance Program (BURP), data have been collected since 1993 for wadeable streams in the South Fork Payette River Subbasin. This data was used to evaluate waters other than the mainstem South Fork Payette River. The BURP program is aimed at determining the physical, chemical, and biological integrity of water bodies by collecting and analyzing reconnaissance-level data. The intent of the program is not to identify an impairing pollutant. Rather, the intent is to determine whether impairment exists. If impairment exists, additional evaluations must be performed to determine the pollutant(s) of concern.

Using the fish, macroinvertebrate (aquatic insect), and habitat data from the BURP sites, a conclusion can be reached regarding the cold water aquatic life beneficial use support status of each stream. This support status is determined following the methods outlined in the DEQ Water Body Assessment Guidance document (Grafe et al. 2002). The assessment method essentially applies multimetric indexes to the habitat, macroinvertebrate, and habitat data to gage the overall health of the stream ecosystem. Using the results from each index, a support status for the stream is generated. Table 18 shows the results of the multimetric analyses for the available BURP data in the subbasin.

Table 18. BURP results for wadeable streams in the South Fork Payette River basin.

BURP ID	Stream Name	Cold Water Aquatic Life Support Status	Metrics on which the support status is based
1993SBOIA023	DEADWOOD RIVER BELOW MINE	Impaired[1]	Habitat, Macroinvertebrates
1993SBOIA024	DEADWOOD RIVER ABOVE MINE	Not impaired	Habitat, Macroinvertebrates
1996SBOIB042	EIGHTMILE CREEK (LOWER)	Impaired[2]	Habitat, Macroinvertebrates
1996SBOIB043	BIG PINE CREEK	Not impaired	Habitat, Macroinvertebrates
1996SBOIB044	SCOTT CREEK (UPPER)	Not impaired	Habitat, Macroinvertebrates
1996SBOIB045	SCOTT CREEK (LOWER)	Not impaired	Habitat, Macroinvertebrates
1996SBOIB046	EAST FORK BIG PINE CREEK	Not impaired	Habitat, Macroinvertebrates
1996SBOIB047	MIDDLE FORK BIG PINE CREEK	Not impaired	Habitat, Macroinvertebrates
1996SBOIB049	WEST FORK ALDER CREEK	Not impaired	Habitat, Macroinvertebrates
1996SBOIB050	ALDER CREEK	Not impaired	Habitat, Macroinvertebrates
1996SBOIB051	NINEMILE CREEK (LOWER)	Not impaired	Habitat, Macroinvertebrates
1996SBOIB052	NINEMILE CREEK (UPPER)	Not impaired	Habitat, Macroinvertebrates
1996SBOIB053	WILSON CREEK (LOWER)	Not impaired	Habitat, Macroinvertebrates
1996SBOIB054	BASIN CREEK	Not impaired	Habitat, Macroinvertebrates
1996SBOIB055	WILSON CREEK (UPPER)	Not impaired	Habitat, Macroinvertebrates
1996SBOIB056	WHITEHAWK CREEK	Not impaired	Habitat, Macroinvertebrates
1997SBOIB038	DANSKIN CREEK(LOWER)	Not impaired	Habitat, Macroinvertebrates
1997SBOIB039	HORN CREEK	Impaired	Habitat, Macroinvertebrates
1997SBOIB040	WASH CREEK(LOWER)	Impaired	Habitat, Macroinvertebrates
1997SBOIB041	WASH CREEK(UPPER)	Not impaired	Habitat, Macroinvertebrates
1997SBOIC025	BEAR CREEK	Not impaired	Habitat, Macroinvertebrates
1997SBOIC026	CAMP CREEK	Not impaired	Habitat, Macroinvertebrates
1997SBOIC027	CANYON CREEK(UPPER)	Not Impaired	Habitat, Macroinvertebrates
1997SBOIC028	FOX CREEK	Not impaired	Habitat, Macroinvertebrates
1997SBOIC029	CHAPMAN CREEK	Impaired	Habitat, Macroinvertebrates
1997SBOIC030	MACDONALD CREEK	Not impaired	Habitat, Macroinvertebrates
1997SBOIC031	KETTLE CREEK	Not impaired	Habitat, Macroinvertebrates
1997SBOIC032	TENMILE CREEK(LOWER)	Not impaired	Habitat, Macroinvertebrates
1997SBOIC033	TENMILE CREEK(UPPER)	Not impaired	Habitat, Macroinvertebrates
1997SBOIC039	ROCK CREEK(LOWER)	Not impaired	Habitat, Macroinvertebrates
1997SBOIC040	ROCK CREEK(UPPER)	Not impaired	Habitat, Macroinvertebrates
1997SBOIC042	SMOKEY CREEK(UPPER)	Not impaired	Habitat, Macroinvertebrates
1997SBOIC043	SMOKEY CREEK(LOWER)	Impaired	Habitat, Macroinvertebrates

Table 18 (Cont.). BURP results for wadeable streams in the South Fork Payette River basin.

2001SBOIV001	MIDDLE FORK BIG PINE CREEK	Not impaired	Habitat, Macroinvertebrates
2001SBOIA006	MILLER CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA046	ALDER CREEK	Not Impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA047	MIDDLE FORK BIG PINE CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA048	ROCK CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA049	EIGHTMILE CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA050	CLEAR CREEK	Not Impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA055	WAPITI CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA056	SOUTH FORK PAYETTE RIVER	Not Impaired	Habitat, Macroinvertebrates
2001SBOIA057	GOAT CREEK	Not Impaired	Habitat, Macroinvertebrates
2001SBOIA058	BARON CREEK	Not Impaired	Habitat, Macroinvertebrates
2001SBOIA060	NORTH FORK CANYON CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA061	WARM SPRING CREEK	Not Impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA062	FIVEMILE CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA063	SCOTT CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2001SBOIA064	CLEAR CREEK (UPPER)	Not impaired	Habitat, Macroinvertebrates, Fish
2002SBOIA037	MIDDLE FORK BIG PINE CREEK	Not impaired	Habitat, Macroinvertebrates, Fish
2002SBOIA049	WARM SPRINGS CREEK	Not Impaired	Habitat, Macroinvertebrates
2002SBOIA050	DEADWOOD RIVER	Not Impaired	Habitat, Macroinvertebrates
2002SBOIV003	MIDDLE FORK BIG PINE CREEK	Not Impaired	Habitat, Macroinvertebrates

[1] 2002 BURP monitoring indicates that this site is no longer impaired.
[2] 2001 BURP monitoring indicates that this site is no longer impaired.

Of the three variables (fish, habitat, and macroinvertebrates) used to assess the beneficial use support status in streams, fish represents the variable that offers the most economic benefit to local stakeholders. In 2001, DEQ collected reconnaissance-level fish data in the South Fork Payette River Subbasin. These data are summarized in Table 19. Abbreviations used in the column headings are defined as follows:

- WBID = DEQ water body index number
- RBT = rainbow trout
- BLT = bull trout
- SUK = sucker (genus Catostomus)
- SHS = shorthead sculpin
- LND = longnose dace.

The numbers given under the columns of fish taxa indicate the number of age class estimated to be present. The lower case “j” indicates one of the age classes represented juvenile fish. Blank cells in the table indicate no data were available for this assessment.

Table 19. Summary of DEQ reconnaissance fish data collected in 2001.

WBID	Water Body	Description	RBT	BLT	SUK	SHS	LND
1	SF Payette River	Trail Creek to mouth	2/j		1		
2	Rock Creek	source to mouth	3/j			2	
4	Wapiti Creek	source to mouth	3/j			3/j	
9	Canyon Creek	source to mouth		1/j			
10	Warm Spring Creek	source to mouth	1/j			3/j	1
11	Eightmile Creek	source to mouth	3/j			2	
12	Fivemile Creek	source to mouth	3/j				
13	Clear Creek	source to mouth	2/j	2/j		2	
20	Scott Creek	source to mouth	1	3			
21	Big Pine Creek	source to mouth	4/j				

Table 19 shows that multiple age classes of salmonids, including juveniles, are present in most streams where BURP data are available. The presence of juvenile fish is an indicator that the species is spawning in the stream. Note that juvenile bull trout were located in Canyon Creek and Clear Creek.

Bull trout are the most sensitive fish species known to occur in the South Fork Payette River Subbasin. Governor Philip E. Batt issued a bull trout conservation plan for Idaho (Batt 1996) that identified the South Fork Payette River and the Deadwood River as key bull trout watersheds. A problem assessment was prepared for these two watersheds (Jimenez and Zaroban 1998) in which fine-grained sediment was identified as a factor reducing the functional condition of bull trout habitat.

Chapman Creek

As shown in Table 20, BURP monitoring conducted in 1997 indicated Chapman Creek is not supporting beneficial uses. This determination was based on condition ratings found in the Water Body Assessment Guidance II (WBAGII) (DEQ, 2002).

Biological and Other Data

At least two indices are required to determine support status. If two indices are not available, the water body is classified as not assessed. The Stream Macroinvertebrate Index (SMI) and Stream Habitat Index (SHI) were used for Chapman Creek. Table 21 and 22 shows the metric results used to determine the final SMI and SHI index scores used for Chapman Creek. The final condition rating is shown in Table 22. Further information and data used to determine final metric and index scores are available in Appendix C.

Additional periphyton were collected in 1997. However, at this time, an assessment method for the periphyton metrics has not been developed to assist in determining the support status for wadeable streams. Periphyton along with macroinvertebrate data may be used to indicate stress in the watershed.

Table 20. Stream Macroinvertebrate Metrics and Results for Final SMI Score for Chapman Creek.

Metric	Metric Result	SMI[a] Metric Score
Number of Taxa	15	
Number Ephemeroptera Taxa	5	
Number Plecoptera Taxa	3	
Number Tricoptera Taxa	2	
Percent Plecoptera	7.3%	
HBI[b]	5.4	
Percent 5 Dominant Taxa	79.3%	
Scraper Taxa	5	
Clinger Taxa	9	
Total SMI Index Score		40.62
Condition Rating		1

[a] Stream Macroinvertebrate Index, [b] Hilsenoff Biotic Index

Table 21. Stream Habitat Metrics and Results for Final SHI Score for Chapman Creek.

Metric	Metric Result	SHI[a] Metric Score
Stream Cover	4	4
Embeddedness	6	6
Disruptive Pressure	2	2
Zone of Influence	2	2
Percent Fines	10	10
Bank Cover	0	0
Canopy Score	1	1
Channel Shape	1	1
Wolman Count	7	7
Large Organic Debris	0	0
Total SHI Index Score		33
Condition Rating		1

[a] Stream Habitat Index

Table 22. Final Condition Rating for Chapman Creek.

Site/BURP ID	SMI[a] Score	SMI[b] Condition Rating	SFI[c] Score	SFI[d] Condition Rating	SHI[e] Score	SHI[f] Condition Rating	Condition Rating[g]
Chapman Creek 1997SBOIC029	40.62	1	NA	NA	33	1	1

[a] Stream Macroinvertebrate Index; [b] ≥ 59 Condition Rating = 3, 49-58 Condition Rating = 2, 31-50 Condition Rating = 1, < 33 Condition Rating = Below Minimum Threshold; [c] Stream Fish Index; d ≥ 81 Condition Rating = 3, 67-80 Condition Rating = 2, 34-66 Condition Rating = 1, < 34 = Condition Rating = Below Minimum Threshold; [e] Stream Habitat Index f ≥ 63 Condition Rating = 3, 50-62 Condition Rating = 2, < 50 Condition Rating = 1. [g] Average Index Score, two indices required, Below Minimum Threshold if any of the Metric is below

Discharge (Flow) Data

The only available discharge data is from a one-time monitoring event conducted in 1997 during the BURP monitoring. The flow measured 10 cfs on September 17, 1997. Further analysis through hydrologic modeling can be conducted if needed. However, at this time, it appears Chapman Creek would meet the physical criteria to support cold water aquatic life and/or primary contact recreation (DEQ 2001).

In late December 1996 and early January 1997, a rain-on-snow event triggered record discharge events on many watersheds in southwest Idaho. During these events, mid-elevation (4000-6000 foot) snow pack melted rapidly, creating flashfloods on both small and large watersheds. It is well documented that these events were responsible for the “blow-out” of many streams and rivers throughout southwest Idaho. The 1997 BURP habitat data documented that Chapman Creek was impacted (stream morphology) by a high discharge event. Since the 1997 BURP habitat data is being used to assess the status of beneficial uses in Chapman Creek, the above mentioned hydrologic event should be considered.

Figures 21 and 22 shows the 1997 Chapman Creek BURP site. Figures 23 and 24 show the same site in 2004. As demonstrated in the photos, Chapman Creek has been greatly influenced by hydrologic events, which resulted in the movement of large amounts of bedload sediment. It appears the riparian vegetation is improving. However, the process will be slowed by the lack of fine sediment and organic material.

Figure 25 shows the 1997-1998 10-meter LANDSAT imagery of the Chapman Creek watershed. In the northern section of the watershed, a large area of mass wasting has occurred. It is unclear if this can be contributed to the 1997 rain-on-snow event, but it appears to be a recent event as dated by the imagery. Since the Chapman Creek watershed is mostly roadless (Figure 26) and there is no indication of recent catastrophic fire activity, this mass wasting could be classified as a naturally occurring event. In all likelihood, the unstable hydrological condition in the Chapman Creek watershed will continue until the mass wasting stabilizes.

Figure 21. Chapman Creek 1997

Figure 22. Chapman Creek 1997

Figure 23. Chapman Creek 2004

Figure 24. Chapman Creek 2004

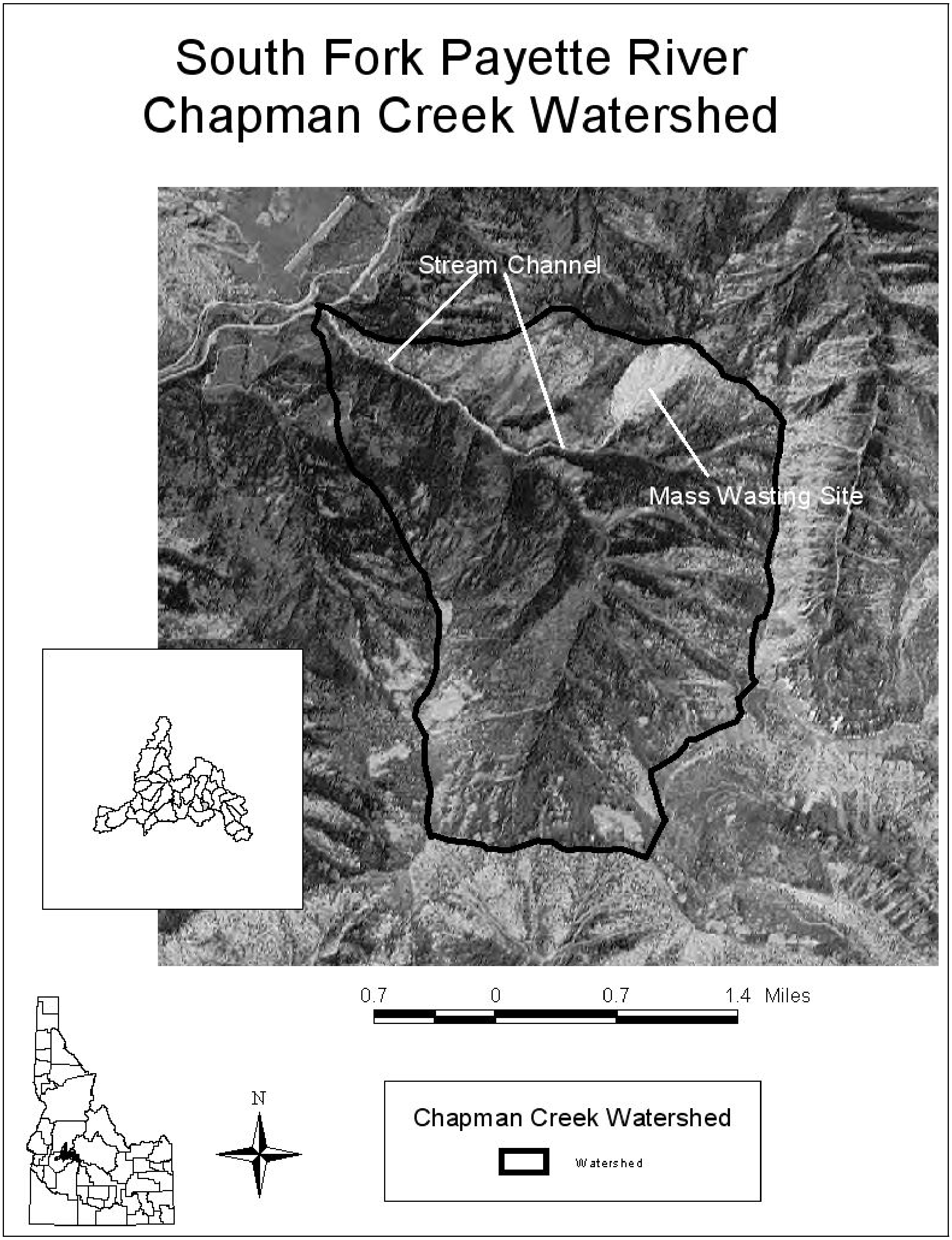

Figure 25. Chapman Creek Watershed. 10 Meter LANDSAT Imagery.

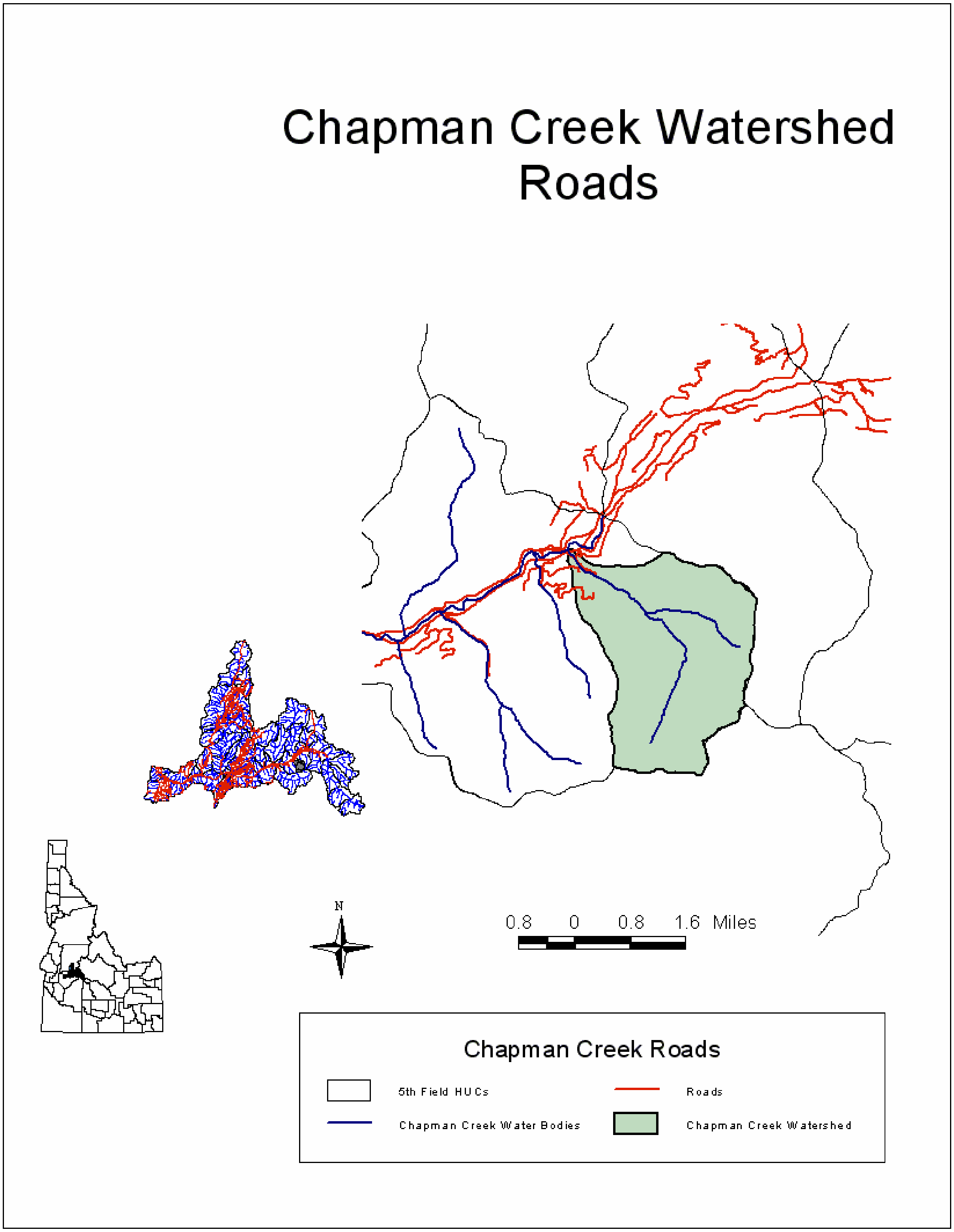

Figure 26. Chapman Creek Watershed. Roads.

Sediment/Substrate Analysis

There is no data available to assess a suspended sediment or bedload sediment load for Chapman Creek. During baseflow periods, there is usually little energy to transport and/or suspend sediment. Therefore, monitoring for these parameters during baseflow would provide little information for sediment loading analysis.

As discussed previously, bedload sediment can impair beneficial uses. Percent fines is a measurement of substrate that consists of material less than 6.0 mm in size. When percent fines exceeds 30%, impairment associated with indicator species is noted (Relyea, Minshall, and Danehy 2000 and DEQ 1990). In 1997, Wolman pebble counts were conducted as part of the BURP monitoring. In 2004, Wolman pebble counts were again collected. The results from the substrate assessments are shown in Tables 23 and 24.

Table 23. 1997 Percent Fines ≤ 6mm. BURP Site 1997SBOIC029, Chapman Creek.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SBOIC029	2.3%	46.0%	32.6%

Table 24. 2004 Percent Fines ≤ 6mm. BURP Site 1997SBOIC029, Chapman Creek.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SBOIC029	5.1%	14.5%	8.6%

Status of Beneficial Uses

Although 1997 BURP data indicated beneficial uses are not fully supported, further examination of natural occurring conditions would indicate that this is a short duration situation. Until the additional recruitment of organic material (vegetation) occurs, Chapman Creek's biological community will remain relatively sterile, and this may continue until the mass wasting seen in Figure 25 stabilizes.

BURP monitoring was conducted in the summer of 2004; however, this information is not yet available. The biological communities and habitat will in all likelihood show little change from what was found in 1997. Further evaluation and tracking of the biological and habitat indicators may provide benchmark or reference conditions. Table 25 shows the final status call for Chapman Creek.

Table 25. Status of beneficial uses in the South Fork Payette River basin.

Stream / Segment	Beneficial Uses Support Status	Impaired Use[1]	Comments
Chapman Creek	Not Fully Supported	CWAL	Impairment due to natural conditions

[1] Cold Water Aquatic Life

Smokey Creek

As shown in Table 18, BURP monitoring conducted in 1997 indicated Smokey Creek is not supporting beneficial uses. This determination was based on condition ratings found in the WBAGII (DEQ, 2002).

Biological and Other Data

At least two indices are required to determine support status. If only one of the indices is available, the water body is classified as not assessed. Two indices, SMI (macroinvertebrates) and SHI (habitat), were used to determine support status of the beneficial uses in Smokey Creek. Additional periphyton were collected in 1997. However, at this time, an assessment method for periphyton has not been developed to assist in determining the support status for wadeable streams.

Tables 26 through 29 show the individual metric results used to determine the final SMI and SHI scores for Smokey Creek. The final condition rating is shown in Table 30. Further information and data used to determine final metric and index scores are available in Appendix C.

Table 26. Stream Macroinvertebrate Metrics and Results for Final SMI Score for Smokey Creek Upper.

Metric	Metric Result	SMI[a] Metric Score
Number of Taxa	**29**	
Number Ephemeroptera Taxa	**9**	
Number Plecoptera Taxa	**7**	
Number Tricoptera Taxa	**3**	
Percent Plecoptera	**17.61%**	
HBI[b]	**5.40**	
Percent 5 Dominant Taxa	**79.27%**	
Scraper Taxa	**9**	
Clinger Taxa	**20**	
Total SMI Index Score		**70.11**
Condition Rating		**3**

[a] Stream Macroinvertebrate Index, [b] Hilsenoff Biotic Index

Table 27. Stream Habitat Metrics and Results for Final SHI Score for Smokey Upper Creek.

Metric	Metric Result	SHI[a] Metric Score
Stream Cover	2	
Embeddedness	8	
Disruptive Pressure	2	
Zone of Influence	1	
Percent Fines	7	
Bank Cover	0	
Canopy Score	0	
Channel Shape	3	
Wolman Count	7	
Large Organic Debris	5	
Total SHI Index Score		35
Condition Rating		1

[a] Stream Habitat Index

Table 28. Stream Macroinvertebrate Metrics and Results for Final SMI Score for Lower Smokey Creek.

Metric	Metric Result	SMI[a] Metric Score
Number of Taxa	24	
Number Ephemeroptera Taxa	8	
Number Plecoptera Taxa	6	
Number Tricoptera Taxa	5	
Percent Plecoptera	3.60%	
HBI[b]	6.64	
Percent 5 Dominant Taxa	39.57%	
Scraper Taxa	3	
Clinger Taxa	15	
Total SMI Index Score		47.31
Condition Rating		Below Minimum Threshold

a Stream Macroinvertebrate Index, b Hilsenoff Biotic Index

Table 29. Stream Habitat Metrics and Results for Final SHI Score for Lower Smokey Creek.

Metric	Metric Result	SHI[a] Metric Score
Stream Cover	2	
Embeddedness	6	
Disruptive Pressure	2	
Zone of Influence	1	
Percent Fines	3	
Bank Cover	0	
Canopy Score	1	
Channel Shape	3	
Wolman Count	9	
Large Organic Debris	1	
Total SHI Index Score		28
Condition Rating		1

[a] Stream Habitat Index

Table 30. Final Condition Rating for Smokey Creek.

Site/BURP ID	SMI[a] Score	SMI[b] Condition Rating	SFI[c] Score	SFI[d] Condition Rating	SHI[e] Score	SHI[f] Condition Rating	Condition Rating[g]
Smokey Creek (Upper) 1997SBOIB041	70.11	3	NA	NA	35	1	2
Smokey Creek (Lower) 1997SBOIB040	47.31	Below Minimum Threshold	NA	NA	28	1	Below Minimum Threshold

a Stream Macroinvertebrate Index; b ≥ 59 Condition Rating = 3, 49-58 Condition Rating = 2, 31-50 Condition Rating = 1, < 33 Condition Rating = Below Minimum Threshold; c Stream Fish Index; d ≥ 81 Condition Rating = 3, 67-80 Condition Rating = 2, 34-66 Condition Rating = 1, < 34 = Condition Rating = Below Minimum Threshold; e Stream Habitat Index; f ≥ 63 Condition Rating = 3, 50-62 Condition Rating = 2, < 50 Condition Rating = 1. g Average Index Score, two indices required

Discharge (Flow) Data

The only available discharge data is from a one-time monitoring event conducted on September 25, 1997 during the BURP monitoring. The flow measured 0.2 cfs at the upper Smokey Creek site and 1.1 cfs at the lower site. Further analysis through hydrologic modeling can be conducted if needed. However, at this time, it appears lower Smokey Creek would only meet the physical criteria to support cold water aquatic life. The lower site appears to maintain adequate discharge for cold water aquatic life and secondary contact recreation (DEQ 2001).

In late December 1996 and early January 1997, a rain-on-snow event triggered record discharge events on many watersheds in southwest Idaho. During these events, mid-elevation (4000-6000 foot) snow pack melted rapidly, creating flashfloods on smaller and larger watersheds. The 1997 BURP data documented that Smokey Creek was impacted by this high-discharge event. The hydrologic event in 1997 must be taken into account when assessing the 1997 BURP habitat data in Smokey Creek.

Figure 27 shows the 1997-1998 LANSAT imagery for the Smokey Creek watershed. Two items that can be noted in the imagery are the lack of vegetation in the upper portions of the watershed and the indication of a hydrologic event at both BURP sites. The lack of vegetation is associated with the 1989 Lowman Complex Fires. The hydrologic events are probably associated with the 1997 rain-on-snow climatic condition earlier in the year and the lack of vegetation due to the 1989 fires.

During the 1997 floods, State Highway 21 was affected with mudslides and blowouts. Figures 28 through 32 show the BURP sites in 2004. Unfortunately, photos taken in 1997 could not be located. It is suspected the 1997 rain-on-snow event overwhelmed both culverts located on Smokey Creek, causing water to back up until it spilled over the highway. This then caused the erosion of road fill on the downslope side of the highway, which led to the complete blow-out of the highway at the switchbacks. Continued head cutting upstream would have continued until a hydrologic equilibrium was reached. As evident in Figure 32, this head cutting along with some lateral cutting directly affect the area associated with the road fill. Figure 33 shows the location of Highway 21 in the watershed.

Since 1997, Highway 21 has been reconstructed at the switchbacks associated with Smokey Creek. Metal culverts have been replaced with larger concrete structures. Additionally, metal grates have been installed over the openings of the metal culverts to prevent large debris from clogging the structures.

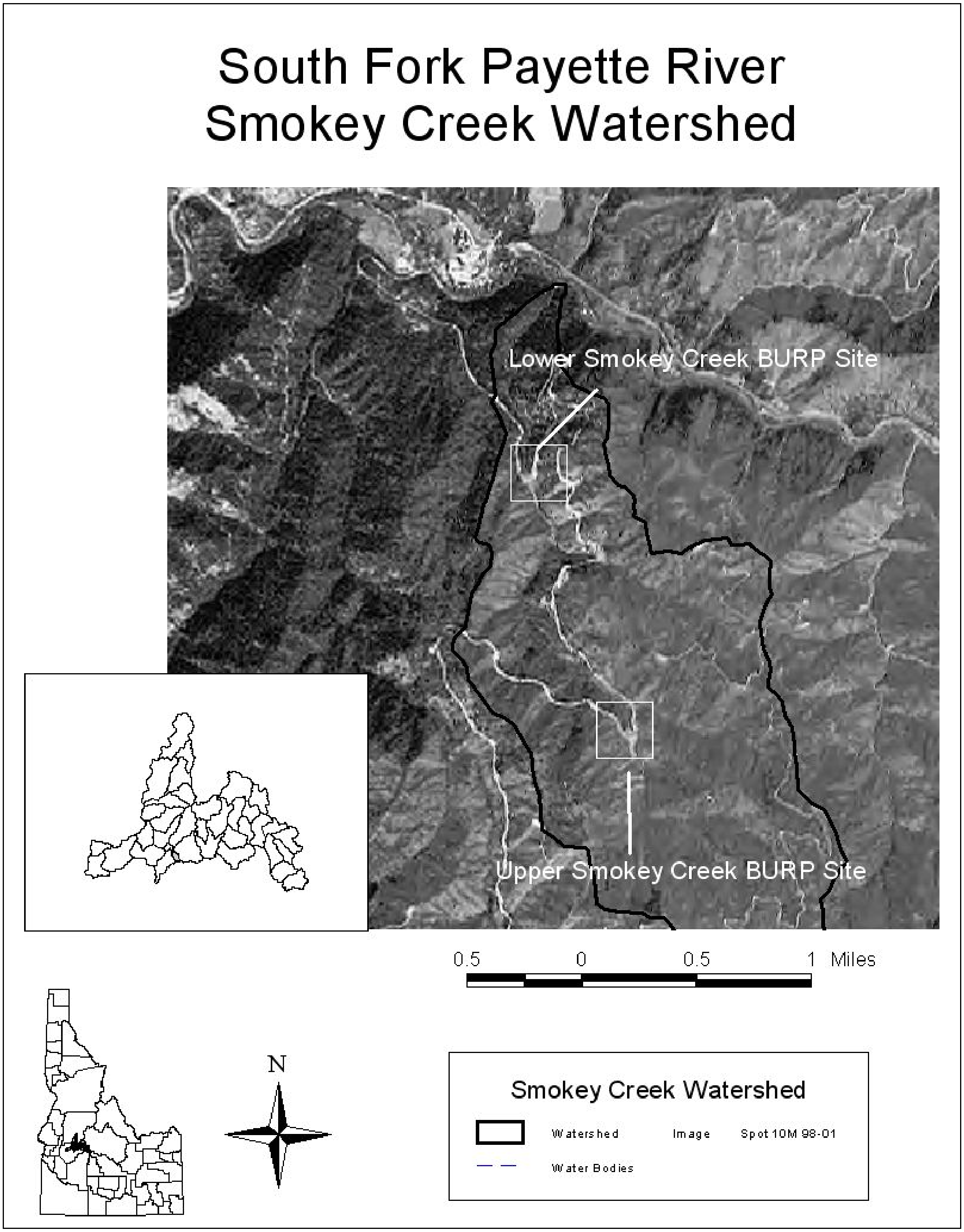

Figure 27. Smokey Creek. 1997-98 LANDSAT Imagery.

Figure 28. Smokey Creek Lower 2004

Figure 29. Smokey Creek 2004

Figure 30. Smokey Creek 2004

Figure 31. Smokey Creek 2004.

Figure 32. Smokey Creek (Upper) 2004

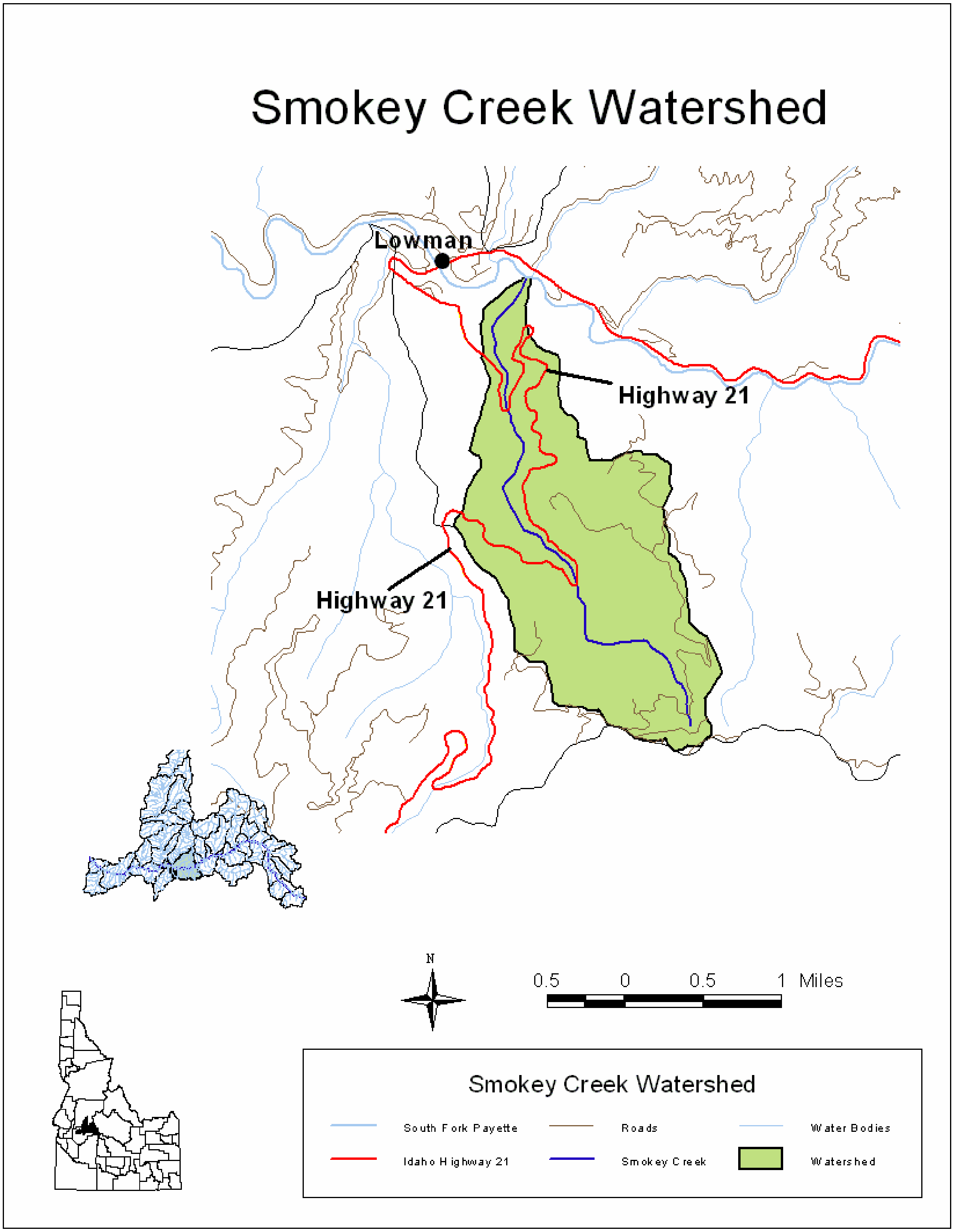

Figure 33. Road System in the Smokey Creek Watershed.

Sediment/Substrate Analysis

There is no data available to assess a suspended sediment or bedload sediment load for Smokey Creek. During baseflow periods, there is usually little energy to transport and/or suspend sediment. Therefore, monitoring for these parameters during baseflow would provide little information for sediment loading analysis.

As discussed previously, bedload sediment can impair beneficial uses. Percent fines is a measurement of substrate that consists of material less than 6.0 mm in size. When percent fines exceeds 30%, impairment associated with indicator species is noted (Relyea, Minshall, and Danehy 2000 and DEQ 1990). In 1997, Wolman pebble counts were conducted as part of the BURP monitoring. In 2004, Wolman pebble counts were again collected on the lower Smokey Creek site. The results from the substrate assessments are shown in Tables 31 through 33.

As discussed previously, sediment can impair beneficial uses in suspension and in stream substrate. Percent fines is a measurement of substrate consisting of material less than 6.0 mm in size. It has been demonstrated when percent fines exceed 30%, impairment associated with indicator species is noted (Relyea, Minshall, and Danehy 2000 and DEQ 1990). In 1997 Wolman pebble counts were conducted as part of the BURP monitoring. In 2004, Wolman pebble counts were reassessed. The results from the substrate assessments are shown in Tables 31 through Table 33.

Table 31. 1997 Percent Fines ≤ 6mm. BURP Site 1997SWIROB41, Upper Smokey Creek.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997WIROC42	30.8%	49.1%	36.0%

Table 32. 1997 Percent Fines ≤ 6mm. BURP Site 1997SWIROB40, Lower Smokey Creek.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SWIROC43	21.4%	76.0%	42.7%

Table 33. 2004 Percent Fines ≤ 6mm. BURP Site 1997SWIROB40, Lower Smokey Creek.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SWIROC43	28.8%	63.0%	37.3%

Status of Beneficial Uses

The 1997 BURP data indicate that Smokey Creek is not supporting its beneficial uses. In all likelihood, two catastrophic events, the rain-on-snow event in 1996-1997 and the Lowman Complex Fires in 1989, are significant factors in this finding.

Figures 28-32 show improvement in stream habitat. Young woody species have been reestablished, and bank stability has improved. Streamside vegetation has reintroduced nutrients and shade to the system. During reconstruction of Highway 21 Best Management Practices (BMPs) appear to have been successfully implemented at both Smokey Creek BURP sites and this will assist in controlling future events.

Smokey Creek was monitored again in 2004 through the BURP process; however, this data is not yet available. Table 34 shows the final assessment for Smokey Creek.

Table 34. Status of beneficial uses in Smokey Creek.

Stream / Segment	Beneficial Uses Support Status	Impaired Use[1]	Comments
Smokey Creek	Not Fully Supported	CWAL	Impairment due to natural conditions

[1] Cold Water Aquatic Life

Horn Creek

As shown in Table 18, BURP monitoring conducted in 1997 indicated that Horn Creek is not supporting beneficial uses. This determination was based on condition ratings found in the WBAGII (DEQ, 2002).

Biological and Other Data

At least two indices are required to determine support status. If two metrics are not available, the water body is classified as not assessed. The Stream Macroinvertebrate Index (SMI) and Stream Habitat Index (SHI) were used for Horn Creek. Tables 35 and 36 show the metric results used to determine the final SMI and SHI index scores used. The final condition rating is shown in Table 37. Further information and data used to determine final metric and index scores are available in Appendix C.

Additional periphyton were collected in 1997. However, at this time, an assessment method for the periphyton metrics has not been developed to assist in determining the support status for wadable streams. Periphyton along with macroinvertebrate data may be used to indicate stress in the watershed.

Table 35. Stream Macroinvertebrate Metrics and Results for Final SMI Score for Horn Creek.

Metric	Metric Result	SMI[a] Metric Score
Number of Taxa	14	
Number Ephemeroptera Taxa	2	
Number Plecoptera Taxa	3	
Number Tricoptera Taxa	4	
Percent Plecoptera	1.43	
HBI[b]	4.65	
Percent 5 Dominant Taxa	60.0	
Scraper Taxa	6	
Clinger Taxa	9	
Total SMI Index Score		30.44
Condition Rating		Below Minimum Threshold

[a] Stream Macroinvertebrate Index, [b] Hilsenoff Biotic Index

Table 36. Stream Habitat Metrics and Results for Final SHI Score for Horn Creek.

Metric	Metric Result	SHI[a] Metric Score
Stream Cover	4	
Embeddedness	2	
Disruptive Pressure	6	
Zone of Influence	6	
Percent Fines	10	
Bank Cover	0	
Canopy Score	2	
Channel Shape	3	
Wolman Count	8	
Large Organic Debris	7	
Total SHI Index Score		48
Condition Rating		1

[a] Stream Habitat Index

Table 37. Final Condition Rating for Horn Creek.

Site/BURP ID	SMI[a] Score	SMI[b] Condition Rating	SFI[c] Score	SFI[d] Condition Rating	SHI[e] Score	SHI[f] Condition Rating	Condition Rating[g]
Horn Creek 1997SBOIB039	30.44	Below Minimum Threshold	NA	NA	48	1	Below Minimum Threshold

a Stream Macroinvertebrate Index; b ≥ 59 Condition Rating = 3, 49-58 Condition Rating = 2, 31-50 Condition Rating = 1, < 33 Condition Rating = Below Minimum Threshold; c Stream Fish Index; d ≥ 81 Condition Rating = 3, 67-80 Condition Rating = 2, 34-66 Condition Rating = 1, < 34 = Condition Rating = Below Minimum Threshold; e Stream Habitat Index f ≥ 63 Condition Rating = 3, 50-62 Condition Rating = 2, < 50 Condition Rating = 1. g Average Index Score, two indices required

Discharge (Flow) Data

The only available discharge data is from a one-time monitoring event conducted in 1997 during the BURP monitoring. The flow measured 0.4 cfs on July 16, 1997. Further analysis through hydrologic modeling can be conducted if needed. However, at this time, it appears that Horn Creek would not meet any of the physical criteria to support cold water aquatic life and/or primary contact recreation (DEQ 2001).

In late December 1996 and early January 1997, a rain-on-snow event triggered record discharge events on many watersheds in southwest Idaho. During these events, mid-elevation (4000-6000 foot) snow pack melted rapidly, creating flashfloods on smaller and larger watersheds. It is well documented that these events were responsible for the blow-out of many streams and rivers throughout southwest Idaho. The 1997 BURP data documented that Horn Creek was impacted by this high-discharge event. Since the 1997 BURP habitat data is being used to assess the status of beneficial uses in Horn Creek, the above mentioned hydrologic event that occurred earlier should be considered.

As with Chapman Creek and Smokey Creek, a major hydrologic event occurred in the Horn Creek watershed. This occurrence was probably related to the January 1997 rain-on-snow event. The 1997 BURP habitat data indicated that the stream bank conditions were almost 100% uncovered and unstable.

Figures 34, 35, and 36 show the current physical condition of Horn Creek. Unfortunately, photos from the 1997 BURP monitoring cannot be located. Photographs taken in 2004 show the remnants of what appears to be the movement of a large amount of sediments. The valley bottom provides no access to an adequate floodplain to disperse the energy associated with a flashflood event. These physical attributes would force high flows to scour the streambed and contribute to the movement of large amount of sediments.

The vegetation in 2004 appears be made up of mostly young alders and willows. Stream bank conditions appear stable and well vegetated with young woody species.

Figure 34. Horn Creek 2004

Figure 35. Horn Creek 2004

Figure 36. Horn Creek 2004

Sediment/Substrate Analysis

There is no data available to assess a suspended sediment or bedload sediment load for Horn Creek. During baseflow periods, there is usually little energy to transport and/or suspend sediment. Therefore, monitoring for these parameters during baseflow would provide little information for sediment loading analysis.

As discussed previously, bedload sediment can impair beneficial uses. Percent fines is a measurement of substrate that consists of material less than 6.0 mm in size. When percent fines exceeds 30%, impairment associated with indicator species is noted (Relyea, Minshall, and Danehy 2000 and DEQ 1990). In 1997, Wolman pebble counts were conducted as part of the BURP monitoring. In 2004, Wolman pebble counts were again collected. The results from the substrate assessments are shown in Tables 38 and 39.

Table 38. 1997 Percent Fines ≤ 6mm. BURP Site 1997SWIROB391, Horn Creek.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SWIROB39	0.0%	86.8%	74.2%

Table 39. 2004 Percent Fines ≤ 6mm. BURP Site 1997SWIROB39, Horn Creek.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SWIROB39	35.8%	87.1%	58.2%

Status of Beneficial Uses

The 1997 BURP data indicate that Horn Creek is not supporting its beneficial uses. In all likelihood, the rain-on-snow event in 1996-1997 is a significant factor in the stream's status as not fully supporting beneficial uses. This event moved a large volume of sediment and removed most of the vegetation along the stream corridor.

Photos taken in 2004 indicate the water body's physical attributes are improving. Young woody species have been reestablished and bank stability has improved. Streamside vegetation has reintroduced nutrients and shade to the system.

Horn Creek was monitored again in 2004 through the BURP process; however, this data is not yet available. Table 40 shows the final assessment for Horn Creek.

Table 40. Status of beneficial uses in Horn Creek.

Stream / Segment	Beneficial Uses Support Status	Impaired Use[1]	Comments
Horn Creek	Not Fully Supported	CWAL	Impairment due to natural conditions

[1] Cold Water Aquatic Life

Wash Creek

As shown in Table 18, BURP monitoring conducted in 1997 indicated that Wash Creek is not supporting beneficial uses. This determination was based on condition ratings found in the WBAGII (DEQ, 2002).

Biological and Other Data

At least two indices are required to determine support status. If two indices are not available, the water body is classified as not assessed. The Stream Macroinvertebrate Index (SMI) and Stream Habitat Index (SHI) were used for Wash Creek. Tables 41 through 44 shows the metric results used to determine the final SMI and SHI index scores used for Wash Creek. The final condition rating is shown in Table 41. Further information and data used to determine final metric and index scores are available in Appendix C.

Additional periphyton were collected in 1997. However, at this time, an assessment method for the periphyton metrics has not been developed to assist in determining the support status for wadable streams. Periphyton along with macroinvertebrate data may be used to indicate stress in the watershed.

Table 41. Stream Macroinvertebrate Metrics and Results for Final SMI Score for Upper Wash Creek.

Metric	Metric Result	SMI[a] Metric Score
Number of Taxa	27	
Number Ephemeroptera Taxa	5	
Number Plecoptera Taxa	5	
Number Tricoptera Taxa	6	
Percent Plecoptera	39.69%	
HBI[b]	5.67	
Percent 5 Dominant Taxa	74.48%	
Scraper Taxa	9	
Clinger Taxa	20	
Total SMI Index Score		71.63
Condition Rating		3

[a] Stream Macroinvertebrate Index, [b] Hilsenoff Biotic Index

Table 42. Stream Habitat Metrics and Results for Final SHI Score for Upper Wash Creek.

Metric	Metric Result	SHI[a] Metric Score
Stream Cover	6	
Embeddedness	2	
Disruptive Pressure	6	
Zone of Influence	7	
Percent Fines	7	
Bank Cover	6	
Canopy Score	5	
Channel Shape	3	
Wolman Count	10	
Large Organic Debris	5	
Total SHI Index Score		57
Condition Rating		2

[a] Stream Habitat Index

Table 43. Stream Macroinvertebrate Metrics and Results for Final SMI Score for Lower Wash Creek.

Metric	Metric Result	SMI[a] Metric Score
Number of Taxa	21	
Number Ephemeroptera Taxa	5	
Number Plecoptera Taxa	2	
Number Tricoptera Taxa	4	
Percent Plecoptera	34.34%	
HBI[b]	5.78	
Percent 5 Dominant Taxa	85.35	
Scraper Taxa	6	
Clinger Taxa	17	
Total SMI Index Score		55.75
Condition Rating		2

[a] Stream Macroinvertebrate Index, [b] Hilsenoff Biotic Index

Table 44. Stream Habitat Metrics and Results for Final SHI Score for Lower Wash Creek.

Metric	Metric Result	SHI[a] Metric Score
Stream Cover	5	
Embeddedness	3	
Disruptive Pressure	3	
Zone of Influence	2	
Percent Fines	8	
Bank Cover	5	
Canopy Score	1	
Channel Shape	3	
Wolman Count	9	
Large Organic Debris	8	
Total SHI Index Score		47
Condition Rating		1

[a] Stream Habitat Index

Table 45. Final Condition Rating for Wash Creek.

Site/BURP ID	SMI[a] Score	SMI[b] Condition Rating	SFI[c] Score	SFI[d] Condition Rating	SHI[e] Score	SHI[f] Condition Rating	Condition Rating[g]
Wash Creek (Upper) 1997SBOIB041	71.63	3	NA	NA	57	2	2.5
Wash Creek (Lower) 1997SBOIB040	55.75	2	NA	NA	47	1	1.5

a Stream Macroinvertebrate Index; b ≥ 59 Condition Rating = 3, 49-58 Condition Rating = 2, 31-50 Condition Rating = 1, < 33 Condition Rating = Below Minimum Threshold; c Stream Fish Index; d ≥ 81 Condition Rating = 3, 67-80 Condition Rating = 2, 34-66 Condition Rating = 1, < 34 = Condition Rating = Below Minimum Threshold; e Stream Habitat Index f ≥ 63 Condition Rating = 3, 50-62 Condition Rating = 2, < 50 Condition Rating = 1. g Average Index Score, two indices required

Discharge (Flow) Data

The only available discharge data is from a one-time monitoring event conducted in 1997 during the BURP monitoring. The flow measured 0.2 cfs at the upper site and 0.23 cfs at the lower site on July 17, 1997. Further analysis through hydrologic modeling can be conducted if needed. However, at this time, it appears Wash Creek would not meet any of the physical criteria to support cold water aquatic life and/or primary contact recreation (DEQ 2001).

In late December 1996 and early January 1997, a rain-on-snow event triggered record discharge events on many watersheds in southwest Idaho. During these events, mid-elevation (4000-6000 foot) snow pack melted rapidly creating flashfloods in the watershed. It is well documented that these events were responsible for the blow-out of many streams and rivers throughout southwest Idaho. The 1997 BURP data documented that Wash Creek was impacted by this high discharge event. Since the 1997 BURP habitat data is being used to assess the status of beneficial uses in Wash Creek, the above mentioned hydrologic event that occurred earlier should be considered.

As with Chapman Creek, Smokey Creek, and Horn Creek, a major hydrologic event occurred in the Wash Creek watershed. This occurrence was probably related to the January 1997 rain-on-snow event. The 1997 BURP habitat data indicated the stream bank conditions were almost 100% uncovered and unstable.

Figures 37, 38, and 40 show the physical attributes of Wash Creek in 1997. Figures 39 and 41 show Wash Creek in 2004. The valley bottom provides no access to an adequate floodplain to disperse the energy associated with a flashflood event. These physical attributes would force high flows to scour the streambed and contribute to the movement of large amount of sediments, which is evident in Figure 40.

The vegetation in 2004 appears be made up of mostly young alders and willows. Stream bank conditions appear stable and well vegetated with young woody species.

Figure 37. Upper Wash Creek 1997

Figure 38. Upper Wash Creek 1997

Figure 39. Upper Wash Creek 2004

Figure 40. Lower Wash Creek 1997

Figure 41. Lower Wash Creek 2004

Sediment/Substrate Analysis

There is no data available to assess a suspended sediment or bedload sediment load for Wash Creek. During baseflow periods, there is usually little energy to transport and/or suspend sediment. Therefore, monitoring for these parameters during baseflow would provide little information for sediment loading analysis.

As discussed previously, bedload sediment can impair beneficial uses. Percent fines is a measurement of substrate that consists of material less than 6.0 mm in size. When percent fines exceeds 30%, impairment associated with indicator species is noted (Relyea, Minshall, and Danehy 2000 and DEQ 1990). In 1997, Wolman pebble counts were conducted as part of the BURP monitoring. In 2004, Wolman pebble counts were again collected. The results from the substrate assessments are shown in Tables 46 through 48.

Table 46. 1997 Percent Fines ≤ 6mm. BURP Site 1997SWIROB41, Wash Creek Upper.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SWIROB41	35.6%	49.6%	45.6%

Table 47. 1997 Percent Fines ≤ 6mm. BURP Site 1997SWIROB40, Wash Creek Lower.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 1997SWIROB40	28.3%	55.0%	46.1%

Table 48. 2004 Percent Fines ≤ 6mm. BURP Site 1997SWIROB40, Wash Creek Lower.

Site	Percent Fines ≤ 6mm Within Wetted	Percent Fines ≤ 6mm Outside Wetted	Percent Fines ≤ 6mm Outside and Within Wetted
BURP Site 2004SBOIA138	8.6%	40.5%	22.8%

Status of Beneficial Uses

The 1997 BURP data indicate Wash Creek is not supporting its beneficial uses at the lower assessment site. In all likelihood, the rain-on-snow event in 1996-1997 is a significant factor in the stream's status as not full support. This event moved a large volume of sediment and removed most of the vegetation along the stream corridor.

Photos taken in 2004 indicate the water body's physical attributes are improving. Young woody species have been reestablished, and bank stability has improved. Streamside vegetation has reintroduced nutrients and shade back to the system.

Wash Creek was monitored in 2004 through the BURP process; however, this data is not yet available. Table 49 shows the final assessment for Wash Creek.

Table 49. Status of beneficial uses in Wash Creek.

Stream / Segment	Beneficial Uses Support Status	Impaired Use[1]	Comments
Wash Creek	Not Fully Supported	CWAL	Impairment due to natural conditions

[1] Cold Water Aquatic Life

Conclusions

The segment of the South Fork Payette River extending from the wilderness boundary to the Payette River will be proposed for sediment delisting during the next §303(d)-listing cycle. Although the biological and habitat indexes for Wash Creek, Chapman Creek, Horn Creek and Smokey Creek showed impairment in 1997, naturally occurring events are in all likelihood the major causes. Table 50 summarizes the outcome of the South Fork Payette River Subbasin assessment.

Table 50. Summary of the South Fork Payette River Subbasin assessment.

Water Body	Boundary	Pollutant	Proposed Action
South Fork Payette River WQLS:5186 AU: SW001_05	Wilderness Boundary to Payette River	Sediment	De-list sediment
Wash Creek - lower WQLS:5186 AU: SW001_02	Headwaters to SF Payette River	Unknown	Use BURP monitoring to track overall stream improvements
Chapman Creek WQLS:5186 AU: SW001_02	Headwaters to SF Payette River	Unknown	Use BURP monitoring to track overall stream improvements
Horn Creek WQLS:5186 AU: SW001_02	Headwaters to SF Payette River	Unknown	Use BURP monitoring to track overall stream improvements
Smokey Creek WQLS:5186 AU:xxxx	Headwaters to SF Payette River	Unknown	Use BURP monitoring to track overall stream improvements

2.4 Data Gaps

The best available data were used to develop the South Fork Payette River Subbasin assessment. However, DEQ acknowledges there are additional data that would be helpful to increase the accuracy of the analyses. The data gaps that have been identified are outlined in Table 51.

Table 51. Data gaps identified during development of the South Fork Payette River Subbasin Assessment.

Pollutant or Other Factor	Data Gap
Flow	Multiple year flow data at locations above Lowman
Sediment	Multiple year suspended sediment concentration (SSC) data at locations above Lowman, from Deadwood River near Lowman and at Garden Valley
Biological (fish, periphyton and macroinvertebrates)	Fish and macroinvertebrate data for all wadable streams in the watershed

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3. Subbasin Assessment – Pollutant Source Inventory

This section of the SBA provides available information concerning potential sediment sources. Sediment sources in the South Fork Payette River Subbasin include natural sediment delivery and sediment delivered to stream channels due to human activities, primarily from forest roads.

3.1 Sources of Pollutants of Concern

Sources of sediment to the South Fork Payette River can be categorized into point sources and nonpoint sources. Point sources are defined as discrete, readily identified points of discharge to receiving waters. Examples of point sources include pipes or other outfall structures from industries and municipalities. Nonpoint sources of pollution are characterized by having diffuse or indistinguishable points of discharge spread across large areas or across entire landscapes.

Point Sources

No National Pollution Discharge Elimination System point sources are known to exist in the South Fork Payette River Subbasin.

Nonpoint Sources

The land use of the South Fork Payette River Subbasin is dominated by forest (Figure 12). Based on acreage estimates from IDWR spatial data, forest land uses make up 99.9% of the subbasin (IDWR 1990). The remaining 0.1% of land is gravity and sprinkler irrigation land, range, urban, and open water. With the subbasin dominated by forest, the primary potential sources of sediment in the subbasin are from natural background, stochastic weather events, and roads for timber harvest and recreation.

Idaho forest practices water quality audits have shown that roads, the most persistent source of forestland disturbances, are a primary source of human-induced sediment in waterbodies (Bauer et al. 1985, Harvey et al. 1989, Hoelscher et al. 1993, Zaroban et al. 1997).

The road cuts along Highway 21 between the Grandjean turnoff and Banner summit are another source of sediment in the subbasin. During stochastic precipitation events, erosion from the road cuts causes high suspended sediment levels in Canyon Creek, which in turn causes the South Fork Payette River to become extremely turbid for two to three days at a time. DEQ intends to work with the Idaho Department of Transportation to explore ways to mitigate these sediment sources.

Horn, Wash, Chapman and Smokey Creeks are the three watersheds that have been found to be impacted by fire and storm events. DEQ will also coordinate with the Boise National Forest and continue to monitor these creeks for improvements in overall stream health.

Pollutant Transport

Flowing water transports sediment by solution, suspension, and bed load (Hunt 1974). The capacity of a stream to transport sediment is affected by velocity, manner of stream flow (laminar flow and turbulent flow), roughness of the streambed, stream energy (stream volume times its fall), and antecedent sediment load (Hunt 1974).

The South Fork Payette River and the smaller tributaries have relatively high stream velocities, considerable amounts of turbulent flow, and high stream energy. These factors combine to make the South Fork Payette River and its tributaries predominantly a sediment transporting stream. Wendt et al. (1973a) reported that the South Fork Payette River and its tributaries are high energy streams capable of flushing sediment through the system rather rapidly.

Estimation and Prioritization of Sediment Sources

The South Fork Payette River Subbasin is almost entirely forested and the land uses in the subbasin are almost entirely forest activities. In areas of forest activities, roads are the primary human-induced source of stream sediment (Megahan and Kidd 1972, Bauer et al. 1985, Harvey et al. 1989, Hoelscher et al. 1993, Zaroban et al. 1997).

Even though SCC target exceedences were not noted during low and normal flow years, exceedences were noted during high flow years. While higher that average SSC levels are to be expected in high flow years, management actions should still be taken to minimize the amount of anthropogenic sediment delivered to the river.

To help facilitate such management actions, the 12-digit (HUC6) watersheds most likely to contribute sediment to the South Fork Payette River were ranked and prioritized according to geomorphic risk. This scheme provides a prioritization mechanism for land managers. The evaluation follows the rationale of Geier and Loggy (1995) and Fitzgerald et al. (1999). Factors considered in the evaluation include the inherent surface erosion hazard of the land types, gradient (overall rate of elevation change in feet per mile) for the mainstem stream, road density (miles per square mile), and percent of the streambed surface covered with fine-grained (0.25 inch diameter or less) sediment. Each of these factors is described below in more detail.

Land Type Erosion Hazard

The USFS has classified and mapped the land they manage into land types. Each land type has received an erosion and stability hazard rating. Erosion and stability hazard ratings for land types contained in the South Fork Payette River Subbasin were obtained from Wendt et al. (1973a, 1973b) and Larson and Rahm (1972). Erosion hazard is rated on a 1 to 5 scale. Rating definitions (Larson and Rahm 1972) are as follows:

- 1—very low, no appreciable hazard of erosion
- 2—low, sufficiently resistant to erosion to permit exposure of bare soil under minimal precautionary restrictions
- 3—moderate, sufficiently resistant to erosion to permit limited and temporary exposure of bare soil during development or use
- 4—high, unprotected bare soil will erode sufficiently to severely damage productive capacity or will yield high volumes of sediment
- 5—very high, unprotected bare soil will erode sufficiently to severely and permanently damage the productive capacity of the soil or will yield excessively high volumes of sediment

Using spatial data, each HUC6 watershed in the South Fork Payette River Subbasin was assigned a weighted erosion hazard rating. The weighting coefficient was the proportion of the HUC6 watershed surface area represented by each land type.

Gradient

The rate of elevation change or gradient (feet per mile) was calculated for the mainstem stream in each HUC6 watershed by dividing the difference between the maximum and minimum elevations by the length of the stream segment. Estimates of the stream segment boundaries and stream segment length were taken from the IDWR (1996) 1:100,000 scale hydrography data layer. The HUC6 watershed boundaries were obtained from the IDWR (2000) watersheds 4^{th}, 5^{th}, and 6^{th} spatial data layer. Gradient ratings were assigned as follows:

- 1—greater than 400 feet per mile
- 2—301-400 feet per mile
- 3—201-300 feet per mile
- 4—100-200 feet per mile
- 5—less than 100 feet per mile

Road Density

The density of roads (miles per square mile) in the South Fork Payette River Subbasin was calculated by dividing the miles of road present in each HUC6 watershed by the area of the HUC6 watershed (square miles). The miles of road present were obtained from the Boise National Forest road data layer (Boise National Forest 1995). Road density ratings were assigned as follows:

- 1—0.5 miles per square mile
- 2—0.51-1.5 miles per square mile
- 3—1.51-2.5 miles per square mile
- 4—2.51-3.5 miles per square mile
- 5—greater than 3.5 miles per square mile

Percent Surface Fines

The percentage of the streambed surface covered by fine sediment (0.25 inch particle size diameter or less) was estimated from Wolman pebble count (Wolman 1954) data collected by the Boise National Forest and DEQ. The average percentage of fine-grained sediment for all samples collected within a given HUC6 watershed was calculated. HUC6 watersheds for which no pebble count data are available were assigned the average of their erosion hazard, fall and road density ratings. Fine sediment ratings for HUC6 watersheds with pebble count data were assigned as follows:

- 1—0-20%
- 2—21-30%
- 3—31-40%
- 4—41-50%
- 5—greater than 50%

The geomorphic risk ratings for each HUC6 watershed are summarized in Table 52. The table is ordered with the overall geomorphic risk scores in descending order. Table 53 summarizes the watershed with impaired water bodies.

Table 52. Summary of erosion hazard, gradient, roads, fine-grained sediment and overall geomorphic risk score for HUC6 watersheds.

HUC6 Name	Erosion	Gradient	Roads	Fines	Erosion Hazard Score	Gradient Score	Road Score	Fine Grained Sediment Score	Risk Score
DEADWOOD RESERVOIR	3.85	29	0.88	53	4	5	2	5	16
BLUEJAY	4.37	45	0.8		5	5	2	4	16
DANSKIN POORMAN	3.51	12	1.81		3	5	3	4	15
HOLE IN THE WALL	3.83	42	0.7		4	5	2	4	15
WARM SPRINGS	3.36	142	2.61	45	2	4	4	4	14
NINEMILE	3.86	71	0.88	31	4	5	2	3	14
ALDER CREEK	3.72	264	1.4	67	3	3	2	5	13
UPPER DEADWOOD	3.59	91	0.3	45	3	5	1	4	13
LOWER DEADWOOD	3.96	66	0.32	40	4	5	1	3	13
LOWER CLEAR CREEK	3.53	138	2.47	36	3	4	3	3	13
ROCK CREEK	3.64	354	4.04	34	3	2	5	3	13
KIRKHAM	3.61	31	2.4	22	3	5	3	2	13
JACKSON FENCE	3.75	35	0.71	27	3	5	2	2	12
BEAR CAMP	3.84	47	0.5	24	4	5	1	2	12
WOLF	3.49	60	1.04		2	5	2	3	12
DEER CREEK	3.41	167	0.97	40	2	4	2	3	11
WHITEHAWK	3.55	309	1.62	33	3	2	3	3	11
LOWER SF PAYETTE	3.58	40	0.35	27	3	5	1	2	11
GRANDJEAN	3.47	45	0.35		2	5	1	3	11
TENMILE CREEK	3.94	312	0.13	33	4	2	1	3	10
BIG PINE CREEK	4.22	427	1.14	30	5	1	2	2	10
SAMS LORENZO	3.48	60	0.15	29	2	5	1	2	10
UPPER CLEAR CREEK	3.61	222	0.73	28	3	3	2	2	10

Table 52 (Cont.). Summary of erosion hazard, gradient, roads, fine-grained sediment and overall geomorphic risk score for HUC6 watersheds.

WARM SPRING	3.62	115	0.07	21	3	4	1	2	10
UPPER CANYON	4.09	243	0.25	18	5	3	1	1	10
EIGHTMILE CREEK	3.96	314	0.04	25	4	2	1	2	9
LOWER CANYON	3.66	179	0.41	10	3	4	1	1	9
SCOTT CREEK	3.56	347	0.43	25	3	2	1	2	8
MINK LAKE	3.38	108	0	15	2	4	1	1	8
BULL TROUT	3.62	351	0.06		3	2	1	2	8
FIVEMILE CREEK	3.57	422	0.14	22	3	1	1	2	7
PINCHOT FALL	2.31	211	0		1	3	1	2	7
BARON CREEK	3.66	429	0	13	3	1	1	1	6
UPPER SF PAYETTE RIVER	2.54	330	0		1	2	1	1	5
GOAT CREEK	3.17	456	0	13	1	1	1	1	4

Table 53. Summary of erosion hazard, gradient, roads, fine-grained sediment and overall geomorphic risk score for Impaired Water Bodies.

HUC6 Water Body Name	Erosion	Gradient	Roads	Fines	Erosion Hazard Score	Gradient Score	Road Score	Fine Grained Sediment Score	Risk Score
BLUEJAY Chapman Creek	4.37	45	0.8		5	5	2	4	16
DANSKIN POORMAN Wash Creek and Horn Creek	3.51	12	1.81		3	5	3	4	15
KIRKHAM Smokey Creek	3.61	31	2.4	22	3	5	3	2	13

Fires and Landslides

The geomorphic risk evaluation described in the previous section is useful for identifying HUC6 watersheds in the South Fork Payette River Subbasin with the greatest likelihood of yielding fine sediment on a long-term basis. However, this evaluation does not account for short-term stochastic events that can produce or contribute to excessive erosion of fine-grained sediment. In the South Fork Payette River Subbasin, fires (Figure 42) and rain-on-snow runoff events have contributed to landslides and debris torrents (Figure 43) that yield large amounts of fine-grained sediment. Two events are particularly noteworthy within the scope of this subbasin assessment: The Lowman fire of 1989 and the rain-on-snow event of late December 1996 and early January 1997 have combined to produce a large number of landslides in the Hole-in-the-Wall, Jackson-Fence, and Kirkham HUC6 watersheds (Figure 47). Additional landslides and debris torrents have occurred subsequent to 1997, but data to describe these events are not yet available.

Comparison of similar watersheds in the Idaho batholith

As discussed previously, fires, rain on snow events and summer thunderstorms have had a significant impact on the South Fork Payette River watershed over the last 15-20 years. These types of impacts are also common in other watersheds with similar geology, elevation and slope. Examples of similar situations exist in the Middle Fork Salmon River watershed where a vast majority of the area is located in wilderness. Figures 42 through 45 illustrate the types of events that can occur in unmanaged watersheds like the Middle Fork Salmon River. Figures 42 and 43 show blowouts from two unburned (in recent time) tributaries. Figures 44 and 45 show the results of a blowout from a burned area. These debris slides are on Idaho batholithic granitic soils and occurred after heavy stochastic rain events similar to those that occur in the South Fork Payette River drainage typically during the summer months, but occasionally in fall or winter.

Figure 42. Jack Creek blowout – Middle Fork Salmon River, September 17, 2002

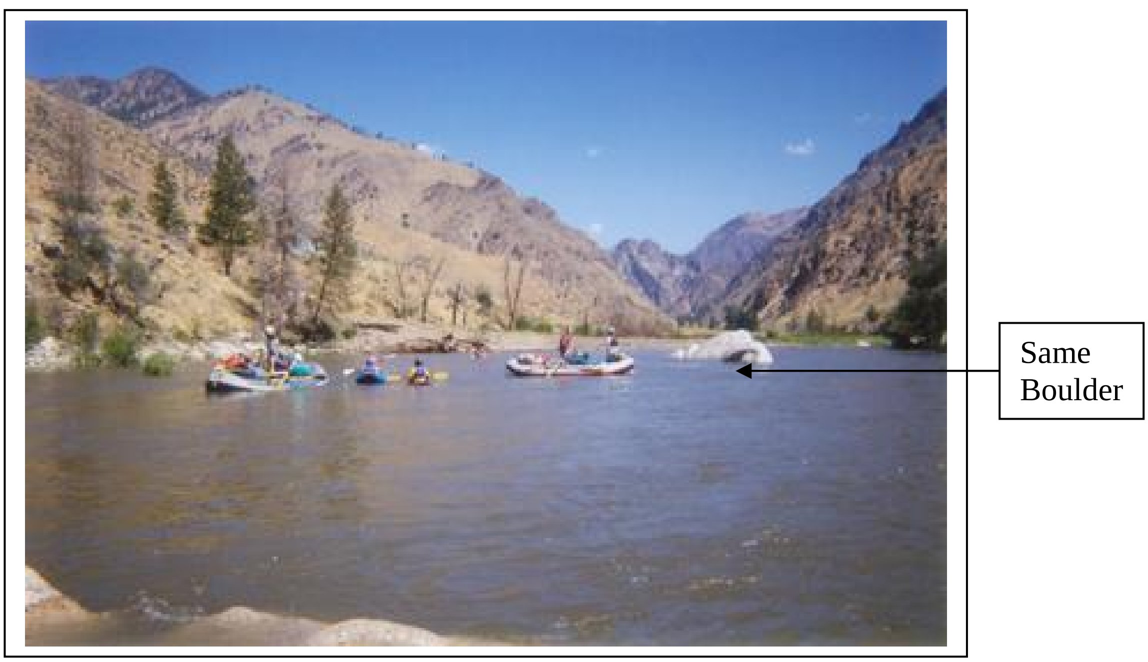
The debris at Jack Creek came from the west side just upstream of Loon Creek from an upland type slope dotted with some sagebrush and grasses and forbs.

Figure 43. Orelano Creek blowout – Middle Fork Salmon River, September 2002

Orelano Creek is a relatively small drainage, very steep, heavily forested.

Figure 44. Haystack Rapid – Middle Fork Salmon River, September 19, 2002 (above)

Figure 45. Haystack Rapid – Middle Fork Salmon River, 2003 (below) after Bernard Creek blowout



Source Summary

Natural background, landslides, and roads are the primary sources of fine-grained sediment to the South Fork Payette River. Forest roads are the primary controllable source. Once in the river, fine-grained sediment is readily transported out of the subbasin due to high stream gradient and velocity.

An estimate of HUC6 watersheds most likely to contribute fine-grained sediment to the South Fork Payette River is given in Table 52. Using this work as a baseline, DEQ recommends further characterizing the sediment loads by determining the relative quantity of fine-grained sediment contributed from natural background, landslides, roads, and any other potential sources. These quantities may be established by the following methods:

- conducting a road inventory
- updating the Boise National Forest road spatial data layer
- accounting for and quantifying the amount of sediment delivered to the river from landslides that have occurred since 1997
- generating a BOISED model (Potyondy et al. 1991) prediction of sediment yield
- surveying the limited non-forest lands and timber harvest in the subbasin to document any sediment yield

Much of this information is already being collected. The Boise National Forest and EPA coordinated a road inventory in the subbasin in 2004. The Boise National Forest is in the process of updating the spatial data layer for roads and assessing landslides.

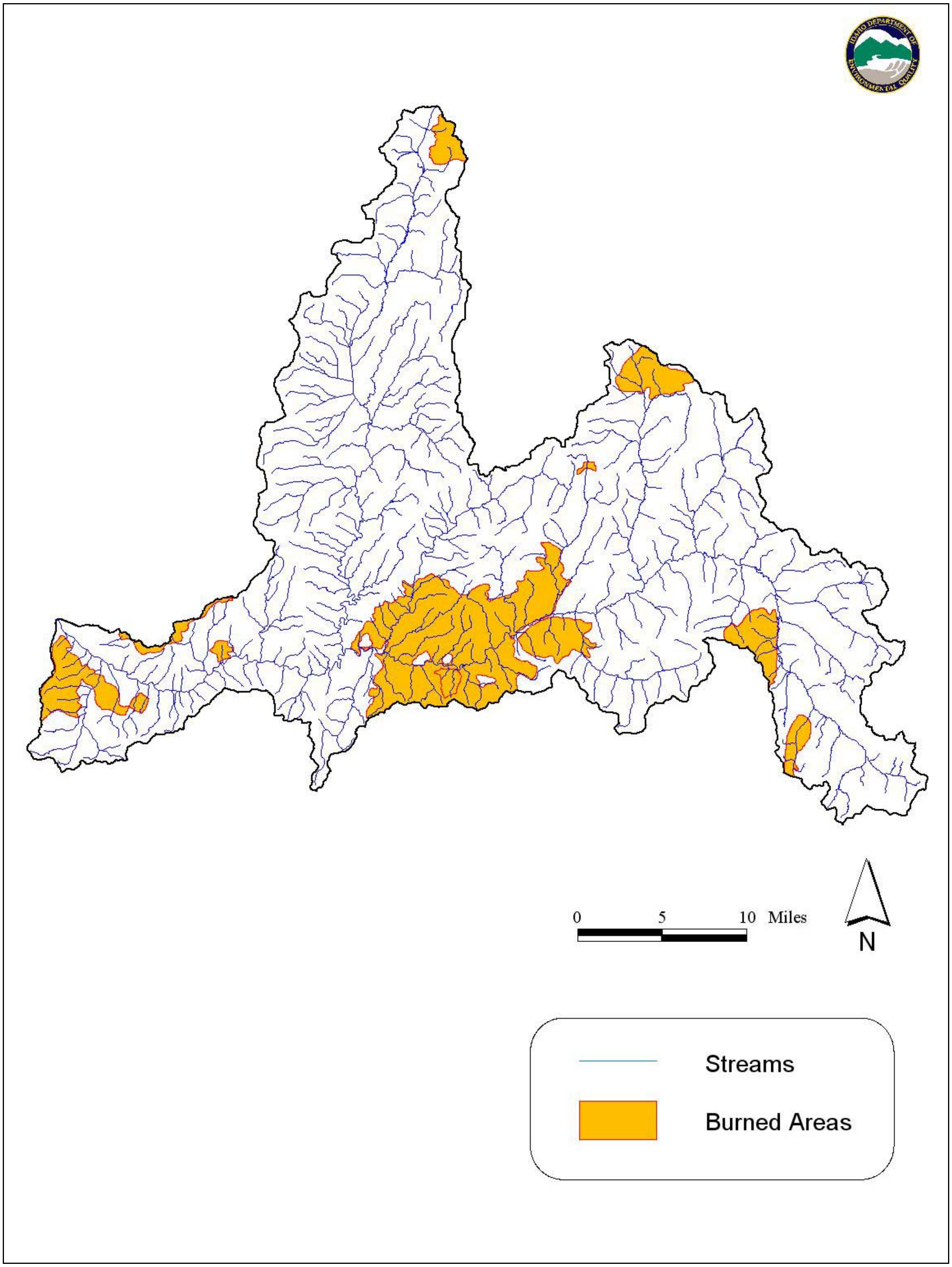


Figure 46. Fifty Year Fire Occurrence in the South Fork Payette River Subbasin.

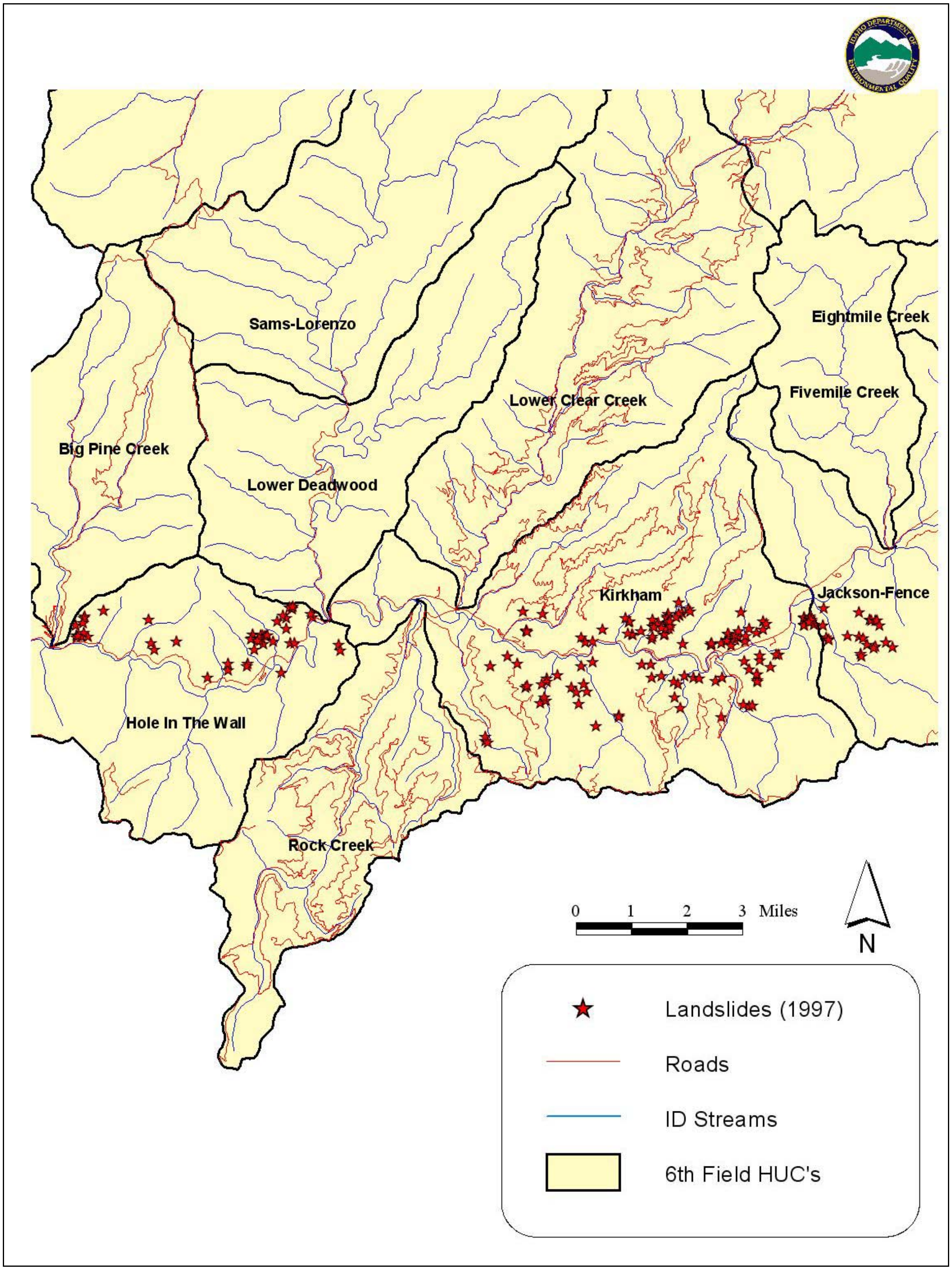


Figure47. Locations of Significant 1995 Landslides in the South Fork Payette River Subbasin.

4. Pollution Control Efforts Subbasin Assessment – Water Quality Concerns and Status

The USFS (Boise National Forest) is the primary land manager in the South Fork Payette River Subbasin, with one exception. The Sawtooth National Recreation Area manages the wilderness portion of the subbasin. Management of the subbasin is guided by the Boise (Boise National Forest 2003) and Sawtooth (Sawtooth National Forest 2003) National Forest Plans. Forest practices are also managed by the Idaho Department of Lands under the authority of the Idaho Forest Practices Act.

Sawtooth Wilderness Area

The Sawtooth Wilderness Area is administered by the Sawtooth National Recreation Area. Goals for the wilderness area are written in the Sawtooth Forest draft plan (Sawtooth National Forest 2003). The wilderness area covers all or a portion of the upper South Fork Payette, Pinchot-Fall, Mink-Lake, Goat Creek, Baron Creek, and Grandjean HUC6 watersheds. In addition to the water quality goals and objectives outlined in the Sawtooth Forest draft plan, the Sawtooth Wilderness Area is managed for primitive, wilderness-oriented recreation. Restrictions guidelines are placed on group-size of users, livestock grazing and other domestic animals (including pets such as dogs), camp site location, campfires, and sanitation. Bicycles, carts, motorized vehicles, and aircraft are not allowed. Livestock grazing is limited to pack and saddle stock. Timber harvest, placer and dredge mining are not allowed. Although the wilderness area is roadless, over 200 miles of trails are maintained. There are no South Fork Payette River stream segments listed on the §303(d) list in the Sawtooth Wilderness Area.

Boise National Forest

Primary water quality goals in the Boise Forest plan (Boise National Forest 2003) are to meet CWA requirements, delist §303(d) listed stream segments, and to meet Idaho water quality standards. The Boise National Forest has set an objective of meeting state water quality standards within five years. The goal of the Boise National Forest concerning roads is to progressively reduce adverse effects. Appendix D contains excerpts from the forest plan and highlights some of the efforts planned for the South Fork Payette River watershed.

Idaho Forest Practices Act

The Idaho Forest Practices Act was passed in 1974 and has been amended eight times. The Idaho Department of Lands administers the Forest Practices Act through IDAPA 20.02.01 Rules Pertaining to the Idaho Forest Practices Act (Idaho Department of Lands 2000). These rules describe minimum standards and administrative procedures for conducting forest practices in Idaho. Forest practices covered by these rules include forestland conversion, timber harvest, treatment of waste materials, cumulative watershed effects, road construction, road maintenance, residual stocking, reforestation, use of chemicals and petroleum products, slash management, and prescribed fire. These rules apply to federal, state and private lands.

Idaho Transportation Department

The road cuts along Highway 21 between the Grandjean turnoff and Banner summit are a source of sediment in the subbasin. During stochastic precipitation events, erosion from the road cuts causes high suspended sediment levels in Canyon Creek, which in turn causes the South Fork Payette River to become extremely turbid for two to three days at a time. DEQ intends to work with the Idaho Department of Transportation to explore ways to mitigate these sediment sources. Figures 48 through 51 show examples of areas that need attention.

Figure 48. Highway 21 road cut

Figure 49. Highway 21 road cut

Figure 50. Highway 21 road cut

Figure 51. Highway 21 road cut

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GIS Coverages:

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Glossary

305(b) Refers to section 305 subsection "b" of the Clean Water Act. 305(b) generally describes a report of each state's water quality, and is the principle means by which the U.S. Environmental Protection Agency, Congress, and the public evaluate whether U.S. waters meet water quality standards, the progress made in maintaining and restoring water quality, and the extent of the remaining problems.

§303(d) Refers to section 303 subsection "d" of the Clean Water Act. Section 303(d) requires states to develop a list of waterbodies 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.

Algae Non-vascular (without water-conducting tissue) aquatic plants that occur as single cells, colonies, or filaments.

Anadromous Fish, such as salmon and sea-run trout, that live part or the majority of their lives in the salt water but return to fresh water to spawn.

Anthropogenic Relating to, or resulting from, the influence of human beings on nature.

Anti-Degradation Refers to the U.S. Environmental Protection Agency's interpretation of the Clean Water Act goal that states and tribes maintain, as well as restore, water quality. This applies to waters that meet or are of higher water quality than required by state standards. State rules provide that the quality of those high quality waters may be lowered only to allow important social or economic development and only after adequate public participation (IDAPA 58.01.02.051). In all cases, the existing beneficial uses must be maintained. State rules further define lowered water quality to be 1) a measurable change, 2) a change adverse to a use, and 3) a change in a pollutant relevant to the water's uses (IDAPA 58.01.02.003.56).

Aquatic Occurring, growing, or living in water.

Aquifer	An underground, water-bearing layer or stratum of permeable rock, sand, or gravel capable of yielding of water to wells or springs.
Assimilative Capacity	The ability to process or dissipate pollutants without ill effect to beneficial uses.
Bedload	Material (generally sand-sized or larger sediment) that is carried along the streambed by rolling or bouncing.
Beneficial Use	Any of the various uses of water, including, but not limited to, aquatic biota, 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 waterbodies in Idaho. BURP protocols address lakes, reservoirs, and wadeable streams and rivers.
Benthic	Pertaining to or living on or in the bottom sediments of a waterbody.
Best Management Practices (BMPs)	Structural, nonstructural, and managerial techniques that are effective and practical means to control nonpoint source pollutants.
Best Professional Judgment	A conclusion and/or interpretation derived by a trained and/or technically competent individual by applying interpretation and synthesizing information.
Biota	The animal and plant life of a given region.
Biotic	A term applied to the living components of an area.
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.
Community	A group of interacting organisms living together in a given place.

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. EPA develops criteria guidance; states establish criteria.
Cubic Feet per Second	A unit of measure for the rate of flow or discharge of water. One cubic foot per second is the rate of flow of a stream with a cross-section of one square foot flowing at a mean velocity of one foot per second. At a steady rate, one cubic foot per second is equal to 448.8 gallons per minute and 10,984 acre-feet per day.
Designated Uses	Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act.
Discharge	The amount of water flowing in the stream channel at the time of measurement. Usually expressed as cubic feet per second (cfs).
Environment	The complete range of external conditions, physical and biological, that affect a particular organism or community.
Erosion	The wearing away of areas of the earth's surface by water, wind, ice, and other forces.
Eutrophic	From Greek for "well nourished," this describes a highly productive body of water in which nutrients do not limit algal growth. It is typified by high algal densities and low clarity.
Exceedance	A violation (according to DEQ policy) of the pollutant levels permitted by water quality criteria.
Existing Beneficial Use or Existing Use	A beneficial use actually attained in waters on or after November 28, 1975, whether or not the use is designated for the waters in Idaho's *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02).
Flow	See Discharge.

Fully Supporting	In compliance with water quality standards and within the range of biological reference conditions for all designated and existing beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Geographical Information Systems (GIS)	A georeferenced database.
Habitat	The living place of an organism or community.
Headwater	The origin or beginning of a stream.
Hydrologic Basin	The area of land drained by a river system, a reach of a river and its tributaries in that reach, a closed basin, or a group of streams forming a drainage area (also see Watershed).
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, and 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. HUC6 used in this assessment refers to the sixth field (12-digit) hydrologic units.
Hydrology	The science dealing with the properties, distribution, and circulation of water.
Impervious	Describes a surface, such as pavement, that water cannot penetrate.
Intergravel Dissolved Oxygen	The concentration of dissolved oxygen within spawning gravel. Consideration for determining spawning gravel includes species, water depth, velocity, and substrate.

Load(ing)	The quantity of a substance entering a receiving stream, usually expressed in pounds or kilograms per day or tons per year. Loading is the product of flow (discharge) and concentration.
Macroinvertebrate	An invertebrate animal (without a backbone) large enough to be seen without magnification and retained by a 500 µm 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.
Mean	Describes the central tendency of a set of numbers. The arithmetic mean (calculated by adding all items in a list, then dividing by the number of items) is the statistic most familiar to most people.
Median	The middle number in a sequence of numbers. If there is an even number of numbers, the median is the average of the two middle numbers. For example, 4 is the median of 1, 2, 4, 14, 16; and 6 is the median of 1, 2, 5, 7, 9, 11.
Milligrams per liter (mg/L)	A unit of measure for concentration in water, essentially equivalent to parts per million (ppm).
Monitoring	A periodic or continuous measurement of the properties or conditions of some medium of interest, such as a waterbody.
Mouth	The location where flowing water enters into a larger waterbody.
National Pollution Discharge Elimination System (NPDES)	A national program established by the Clean Water Act for permitting point sources of pollution. Discharge of pollution from point sources is not allowed without a permit.
Natural Condition	A condition indistinguishable from that without human-caused disruptions.

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 Assessed (NA)	A concept and an assessment category describing waterbodies that have been studied, but are missing critical information needed to complete an assessment.
Not Fully Supporting	Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Parameter	A variable, measurable property whose value is a determinant of the characteristics of a system, For example, temperature, dissolved oxygen, and fish populations are parameters of a stream or lake.
Point Source	A source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable "point" of discharge into a receiving water. Common point sources of pollution are industrial and municipal wastewater.
Pollutant	Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
Population	A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.
Protocol	A series of formal steps for conducting a test or survey.
Qualitative	Descriptive of kind, type, or direction.
Quantitative	Descriptive of size, magnitude, or degree.
Reach	A stream section with fairly homogeneous physical characteristics.

Reconnaissance — An exploratory or preliminary survey of an area.

River — A large, natural, or human-modified stream that flows in a defined course or channel, or 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 create 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.

Species —
1) A reproductively isolated aggregate of interbreeding organisms having common attributes and usually designated by a common name.
2) An organism belonging to such a category.

Spring — Ground water seeping out of the earth where the water table intersects the ground surface.

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.

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

Subbasin — A large watershed of several hundred thousand acres. This is the name commonly given to 4^{th} 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 6^{th} field hydrologic units.

Surface Water All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors that are directly influenced by surface water.

Suspended Sediments Fine material (usually sand size or smaller) that remains suspended by turbulence in the water column until deposited in areas of weaker current. These sediments cause turbidity and, when deposited, reduce living space within streambed gravels and can cover fish eggs or alevins.

Total Maximum Daily Load (TMDL) A TMDL is a waterbody's loading capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual basis. TMDL = Loading Capacity = Load Allocation + Wasteload Allocation + Margin of Safety. 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 waterbodies and/or pollutants within a given watershed.

Tributary A stream feeding into a larger stream or lake.

Turbidity A measure of the extent to which light passing through water is scattered by fine suspended materials. The effect of turbidity depends on the size of the particles (the finer the particles, the greater the effect per unit weight) and the color of the particles.

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

Water Column Water between the interface with the air at the surface and the interface with the sediment layer at the bottom. The idea derives from a vertical series of measurements (oxygen, temperature, phosphorus) used to characterize water.

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 Criteria	Levels of water quality expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, or industrial processes.
Water Quality Limited Segment (WQLS)	Any segment placed on a state's §303(d) list for failure to meet applicable water quality standards, and/or is not expected to meet applicable water quality standards in the period prior to the next list. These segments are also referred to as "§303(d) listed."
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 waterbody.
Waterbody Identification Number (WBID)	A number that uniquely identifies a waterbody in Idaho and that ties into the Idaho Water Quality Standards and GIS information.
Young of the Year	Young fish born the year captured, evidence of spawning activity.

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Appendices

Appendix A. Unit Conversion Chart

Table A1. Metric - English unit conversions.

	Imperial Units	Metric Units	To Convert	Example
Distance	Miles (mi)	Kilometers (km)	1 mi = 1.61 km 1 km = 0.62 mi	3 mi = 4.83 km 3 km = 1.86 mi
Length	Inches (in) Feet (ft)	Centimeters (cm) Meters (m)	1 in = 2.54 cm 1 cm = 0.39 in 1 ft = 0.30 m 1 m = 3.28 ft	3 in = 7.62 cm 3 cm = 1.18 in 3 ft = 0.91 m 3 m = 9.84 ft
Area	Acres (ac) Square Feet (ft^2) Square Miles (mi^2)	Hectares (ha) Square Meters (m^2) Square Kilometers (km^2)	1 ac = 0.40 ha 1 ha = 2.47 ac 1 ft^2 = 0.09 m^2 1 m^2 = 10.76 ft^2 1 mi^2 = 2.59 km^2 1 km^2 = 0.39 mi^2	3 ac = 1.20 ha 3 ha = 7.41 ac 3 ft^2 = 0.28 m^2 3 m^2 = 32.29 ft^2 3 mi^2 = 7.77 km^2 3 km^2 = 1.16 mi^2
Volume	Gallons (g) Cubic Feet (ft^3)	Liters (L) Cubic Meters (m^3)	1 g = 3.78 l 1 l = 0.26 g 1 ft^3 = 0.03 m^3 1 m^3 = 35.32 ft^3	3 g = 11.35 l 3 l = 0.79 g 3 ft^3 = 0.09 m^3 3 m^3 = 105.94 ft^3
Flow Rate	Cubic Feet per Second (ft^3/sec)[1]	Cubic Meters per Second (m^3/sec)	1 ft^3/sec = 0.03 m^3/sec 1 m^3/sec = ft^3/sec	3 ft^3/sec = 0.09 m^3/sec 3 m^3/sec = 105.94 ft^3/sec
Concentration	Parts per Million (ppm)	Milligrams per Liter (mg/L)	1 ppm = 1 mg/L[2]	3 ppm = 3 mg/L

[1] 1 ft^3/sec = 0.65 million gallons per day; 1 million gallons per day is equal to 1.55 ft^3/sec.

[2] The ratio of 1 ppm = 1 mg/L is approximate and is only accurate for water.

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Appendix B. State and Site-Specific Standards and Criteria

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- The *Idaho Water Quality Standards and Wastewater Treatment Requirements* are available on the web at http://www2.state.id.us/adm/adminrules/rules/idapa58/0102.pdf.
- No site specific criteria were used in developing the South Fork Payette River Subbasin Assessment.
- Table B1 outlines the water quality standards used in the South Fork Payette River Subbasin Assessment

Table B1. Idaho water quality standards uses in the South Fork Payette River Subbasin Assessment.

Pollutant	Applicable Water Quality Standard
Sediment (58.01.02.200.08)	Sediment shall not exceed quantities specified in general surface water quality criteria (IDAPA 58.01.02.250 or 252) or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses

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Appendix C. Data Sources

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Table C1. Data sources for South Fork Payette River Subbasin Assessment

Location	Data Source[1]	Types of Data	When Collected
South Fork Payette River	USGS	Physical, Chemical	1941-2002
Wadable Streams	DEQ	Physical, Chemical, Biological	1996-2004
6th Field HUCs throughout the basin	USDA Forest Service	Physical	NA

[1]DEQ = Department of Environmental Quality, USGS = United States Geological Survey, USDA = United States Department of Agriculture

Table C2. Data tiers[1] for data used in the South Fork Payette River Subbasin Assessment

Location	Data Source	Data Tier	Outcome
South Fork Payette River – at Lowman and Garden Valley	USGS	1	Sediment proposed for §303(d) de-listing
Wadable Streams throughout the basin – BURP data	DEQ	1	Several streams are being proposed for §303(d) listing based on BURP data
6th Field HUCs throughout the basin	USDA Forest Service	1	Erosion hazards and geomorphic risk profiles developed to identify priority areas

[1]Based on IDEQ Water Body Assessment Guidance definitions of Tier 1-Tier 3 data (Grafe et. al. 2002)

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Appendix D. Excerpts from the Boise National Forest Plan

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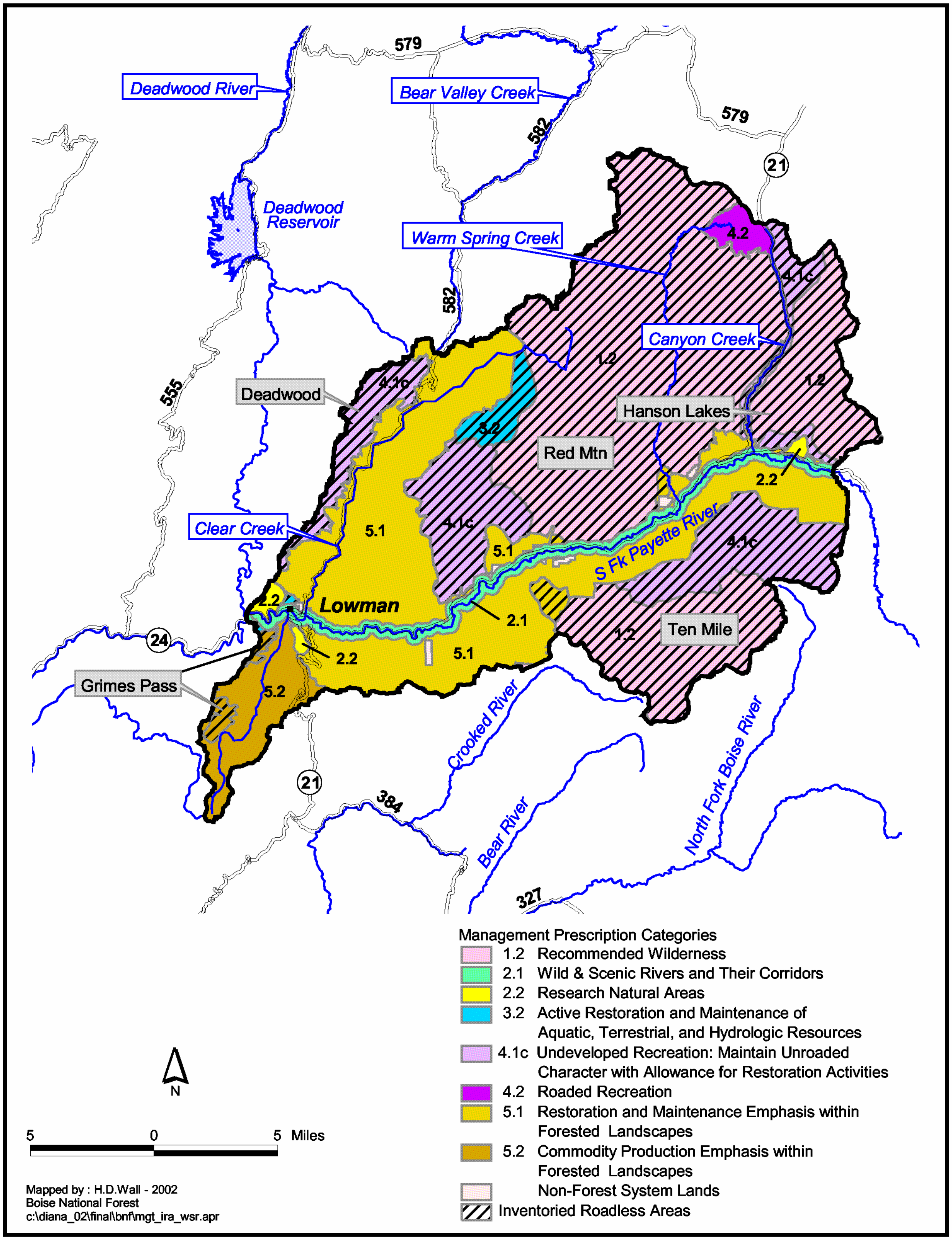
Management Area 10 - Upper South Fork Payette River Location Map



Management Area 10
Upper South Fork Payette River

MANAGEMENT AREA DESCRIPTION

Management Prescriptions - Management Area 1 has the following management prescriptions (see map on preceding page for distribution of prescriptions).

Management Prescription Category (MPC)	Percent of Mgt. Area
1.2 – Recommended Wilderness	45
2.2 – Research Natural Areas	1
3.2 – Active Restoration and Maintenance of Aquatic, Terrestrial, & Hydrologic Resources	2
4.1c – Maintain Unroaded Character with Allowance for Restoration Activities	15
4.2 – Roaded Recreation Emphasis	1
5.1 – Restoration and Maintenance Emphasis within Forested Landscapes	31
5.2 – Commodity Production Emphasis within Forested Landscapes	5

General Location and Description - Management Area 10 is comprised of lands administered by the Boise National Forest within the South Fork Payette River drainage between Lowman and Grandjean, Idaho (see map, opposite page). The area lies in Boise County, and is part of the Lowman Ranger District. The management area is an estimated 232,200 acres, of which the Forest Service administers 99 percent, and 1 percent are privately owned. Most of the private inholdings lie along the South Fork Payette River corridor. The area is bordered by the Boise National Forest to the north, west, and south, and by the Sawtooth National Forest to the east, including the Sawtooth National Recreation Area and Sawtooth Wilderness Area. The primary uses or activities in this management area have been dispersed and developed recreation, timber management, and livestock grazing.

Access - The main access to the area is by paved State Highway 21 from Lowman to Banner Summit. Other access routes include Forest Road 582 up Clear Creek, Forest Road 524 to Grandjean, and Forest Road 594 up Rock Creek. These roads are gravel-surfaced and well-maintained. The density of classified roads in the management area is an estimated 1.3 miles per square mile, and much of the area is roadless. Total road density for area subwatersheds ranges between 0 and 4.1 miles per square mile. The roadless areas have several trails, but large portions are relatively inaccessible.

An estimated 7 miles of the Grandjean Road (Forest Road 524) are scheduled for improvement during the next decade. Planning for this project is still in a very early stage of development so improvement details are not yet known. This road provides access to developed recreation sites in the Grandjean area as well as a major trailhead for the Sawtooth Wilderness.

Special Features – A portion of one eligible Wild and Scenic River, the South Fork Payette River, lies within the management area. The South Fork Payette River has one segment in this area with a Recreational classification, and one with a Scenic classification. The Recreational segment is an estimated 27,4 miles, with a river corridor area of 8,752 acres. The Scenic segment is an estimated 6.5 miles, with a river corridor area of 2,080 acres. The South Fork is considered eligible for Wild and Scenic River status because of its outstandingly remarkable scenic, recreational, geologic, hydrologic, and cultural resource values.

The South Fork Payette River offers high-quality rafting and kayaking opportunities, bald eagle habitat, prehistoric and historic cultural resources, and hot springs. The town of Lowman and several summer home subdivisions lie along the river corridor. Highway 21 is the Ponderosa Pine State Scenic Byway, and a National Forest Scenic Byway. The Banks-to-Lowman Highway is also the Wildlife Canyon State Scenic Byway. This area lies adjacent to the Sawtooth National Recreation Area. An estimated 64 percent of the management area is inventoried as roadless, including portions of the Tenmile/Black Warrior, Red Mountain, Deadwood, Grimes Pass and Hanson Lakes Roadless Areas. The Forest has recommended the Tenmile/Black Warrior, Red Mountain, and Hanson Lakes areas for Wilderness designation.

The Monumental Creek Research Natural Area (678 acres) provides a good example of ponderosa pine/Douglas-fir habitat with bitterbrush understory. The Lowman Research Natural Area (380 acres), located one mile southwest of Lowman, preserves features of a ponderosa pine vegetative cover. The Bear Creek Research Natural Area (387 acres), located 3 miles west of Grandjean, exhibits undisturbed sagebrush-grass vegetative features. The Lowman and Bear Creek areas are also being considered as potential National Natural Landmarks.

Air Quality - This management area lies within Montana/Idaho Airshed ID-15 and in Boise County. Particulate matter is the primary pollutant of concern related to Forest management. There is an ambient air monitor located within the airshed in Garden Valley to obtain current background levels, trends, and seasonal patterns of particulate matter. The Sawtooth Wilderness is the closest Class I area. Visibility monitoring has been expanded for this area.

Between 1995 and 1999, emissions trends in both counties improved for PM 10, while PM 2.5 emissions remained constant. The most common source of particulate matter in the county was fugitive dust, primarily from unpaved roads. In addition to Forest management activities, crop residue and ditch burning may contribute to particulate matter emissions, although the amount of agricultural-related burning was very low within Boise County (less than 100 acres). There were no point sources within the county.

Soil, Water, Riparian, and Aquatic Resources - Elevations range from 3,700 feet on the South Fork Payette River to 8,876 feet at Bull Trout Point. Management Area 10 falls primarily within the South Fork Payette Canyon and Streamcut Lands Subsection. The main geomorphic landforms associated with this subsection are strongly and moderately dissected fluvial lands, canyonlands, and frost-churned slopes and canyonlands. Slope gradients average between 45 to 75 percent in the dissected fluvial lands and canyonlands, and 45 to 65 percent in the frost-churned uplands and canyonlands. The surface geology is predominantly Idaho batholith granitics. Soils generally have moderate to high surface erosion potential, and moderate productivity. Subwatershed vulnerability ratings range from moderate to high, with the majority being high (see table below). Geomorphic Integrity ratings for the subwatersheds vary from high (functioning appropriately) to moderate (functioning at risk) to low (not functioning appropriately), with the majority being high (see table below). This area has naturally unstable slopes and localized impacts from roads, historic livestock grazing, wildfire, and recreation. Natural landslides are common, especially within burned areas. Impacts include accelerated erosion, upland compaction, and stream channel modification.

The management area is in the Lowman, Clear Creek, Warm Springs Creek, Canyon Creek, and Wapiti Watersheds (5^{th}-order hydrologic units) of the South Fork Payette River Subbasin. The major streams in the area are the South Fork Payette River, Clear Creek, Warm Springs Creek, Rock Creek, Eightmile Creek, Canyon Creek, Tenmile Creek, and Wapiti Creek. High mountain lakes include Bull Trout Lake, Zumwaldt Lake, and Red Mountain Lakes. The Grandjean subwatershed is part of a state-regulated public water system for the Sawtooth Lodge.

Water Quality Integrity ratings for the subwatersheds vary from high (functioning appropriately) to moderate (functioning at risk) to low (not functioning appropriately), with the majority being moderate (see table below). Some areas have localized accelerated sediment from roads and recreation use. These impacts are exacerbated by relatively high rates of natural erosion in the area, including recent landslides. Sediment flushes during spring run-off and summer thunderstorms are common. Eight of the 16 subwatersheds in this area were listed in 1998 as having impaired water bodies under Section 303(d) of the Clean Water Act. These subwatersheds are Kirkham, Jackson-Fence, Blue Jay, Wolf, Bear-Camp, Grandjean, Lower Canyon Creek, and Warm Spring. The pollutant of concern for each listed subwatershed is sediment. There are currently no TMDL-assigned watersheds associated with this management area.

Subwatershed Vulnerability			Geomorphic Integrity			Water Quality Integrity			No. 303(d) Subs	No. Subs With TMDLs	No. Public Water System Subs
High	Mod.	Low	High	Mod.	Low	High	Mod.	Low			
11	5	0	10	3	3	3	12	1	8	0	1

Anadromous fish species no longer exist within area streams due to downstream dams that block their migration routes to and from the ocean. The area does, however, have important habitat for threatened bull trout. Bull trout occur throughout this area except for the Rock Creek subwatershed. Strong local populations have been noted in the Upper Clear Creek, Grandjean, Canyon, Tenmile Creek, and Upper Canyon Creek subwatersheds. Fragmented populations of redband trout are also known to occur in this area. Red Mountain Lakes are managed as a high-quality, high-elevation fishery. Aquatic habitat is near proper functioning condition, although some accelerated sediment impacts are occurring from roads, historic livestock grazing, wildfire, and recreation. The Upper Canyon Creek and Lower Canyon Creek subwatersheds have been identified as important to bull trout recovery, and as high-priority areas for restoration.

Vegetation - Vegetation at lower elevations is typically grasslands, shrublands, ponderosa pine, and Douglas-fir on south and west aspects, and Douglas-fir forests on north and east aspects. Mid-elevations are dominated by shrubs and forest communities of Douglas-fir and subalpine fir, with pockets of lodgepole pine and aspen. Cold forest communities of subalpine fir are found in the upper elevations, interspersed with cliffs and talus slopes.

An estimated 21 percent of the management area is comprised of rock, water, or shrubland and grassland vegetation groups, including Mountain Big Sage, Montane Shrub, Perennial Grass Slopes, and Alpine and Dry Meadows. The main forested vegetation groups in the area are Dry Ponderosa Pine/Xeric Douglas-fir (9 percent), Warm Dry Subalpine Fir (18 percent), Cool Dry Douglas-fir (11 percent), Warm Dry Douglas-fir/Moist Ponderosa Pine (18 percent), Cool Moist Douglas-fir (7 percent), High Elevation Subalpine Fir (2 percent), and Persistent Lodgepole Pine (15 percent).

The Mountain Big Sagebrush and Montane Shrub groups are functioning properly, but they are trending toward old age structure, dense canopies, and low levels of herbaceous ground cover due to fire exclusion. Alpine and Dry Meadows are also functioning properly, with minor impacts from dispersed recreation. Perennial Grass Slopes are at moderate risk due to impacts from big game grazing that have altered structure and led to an increase in annual grasses and noxious weeds.

The Cool Dry Douglas-fir, Cool Moist Douglas-fir, Dry Ponderosa Pine/Xeric Douglas-fir, Warm Dry Douglas-fir/Moist Ponderosa Pine groups are not functioning properly in some areas. Large areas recently burned in high intensity wildfires, which removed many of the large trees and converted old and mid-aged stand structure to open and young stages. Stands that recently burned experienced high mortality because decades of fire exclusion resulted in high stand densities and fuel loadings that moved these groups from non-lethal to lethal fire regimes. These high density and fuel conditions still exist in unburned stands, where fire frequency is occurring at less than historic intervals. In these areas, insect and disease infestations have increased tree mortality and the risk of uncharacteristic large wildfire. These areas also lack young structural stages and seral ponderosa pine and aspen.

The Warm Dry Subalpine Fir and Persistent Lodgepole Pine groups are functioning at risk due to fire exclusion that has resulted in old stands without much structural diversity. Late seral subalpine fir is increasing, and seral Douglas-fir, lodgepole pine, and aspen are decreasing. Snags and large woody debris are at low levels in localized areas of the Persistent Lodgepole Pine group due to fuelwood gathering. High Elevation Subalpine Fir is also functioning at risk due to fire exclusion that has allowed natural succession to reach late seral conditions in most areas. Stands are generally old and dense, with increasing subalpine fir and decreasing whitebark pine. Whitebark pine is also being lost to blister rust in many areas.

Riparian vegetation is not functioning properly in some areas due to a number of impacts. Fire exclusion in some areas has resulted in conifer trees replacing broadleaf shrubs and cottonwoods. Large wildfires in other areas have burned the tree component, removing shade, cover, and seed source. Introduced plant species and noxious weeds have increased with increasing roads and recreation use.

Botanical Resources – Region 4 Sensitive species known from this management area include Idaho Douglasia and giant helleborine orchid. Kellogg's bitterroot and pale sedge, proposed Region 4 Sensitive species, occur in the area. Swamp onion and Buxbaum's sedge, Region 4 Watch species, also occurs in this management area. No federally listed or proposed plant species are known to occur in this area, but potential habitat for Ute ladies'-tresses and slender moonwort may exist. Ute ladies'-tresses, a Threatened species, may have moderate to high potential habitat in riparian/wetland areas from 1,000 to 7,000 feet. Slender moonwort, a Candidate species, may occur in moderate to higher elevation grasslands, meadows, and small openings in spruce and lodgepole pine.

Non-native Plants - Dalmatian toadflax, rush skeletonweed, diffuse and spotted knapweed, Canada thistle, St. Johnswort, and tansy ragwort occur in the area, particularly along the main road corridors. An estimated 67 percent of the area is highly susceptible to invasion by noxious weeds and exotic plant species. The main weeds of concern are rush skeletonweed, Dalmatian toadflax, and spotted knapweed, which currently occur in scattered small and large populations.

Subwatersheds in the table below have an inherently high risk of weed establishment and spread from activities identified with a "yes" in the various activity columns. This risk is due to the amount of drainage area that is highly susceptible to noxious weed invasion and the relatively high level of exposure from those identified vectors or carriers of weed seed.

Subwatershed	Road-related Activities	Livestock Use	Timber Harvest	Recreation & Trail Use	ATV Off-Road Use
Kirkham Creek	Yes	No	Yes	No	No
Lower Clear Creek	Yes	No	Yes	No	No
Lick Creek	Yes	No	No	No	No
Jackson-Fence	No	No	Yes	No	No
Rock Creek	No	No	Yes	No	No

Wildlife Resources - Warm ponderosa and Douglas-fir forests along the South Fork Payette River provide habitat for white-headed woodpecker and flammulated owl, wintering habitat for bald eagles, and winter range for deer, elk, and mountain goat. Forests at lower and mid-elevations provide habitat for Region 4 sensitive species, goshawk and great gray owl. Nesting habitat for peregrine falcon and golden eagles occurs in isolated areas with rocky bluffs. High-elevation forests provide habitat for great gray owls, fisher, boreal owls, and many migratory landbirds, as well as summer range for mammals such as deer, elk, black bear, and mountain goat. Wolves likely occur here or will occur in the near future, as this area includes part of the Central Idaho Wolf Recovery Area. Terrestrial habitat is not functioning properly in areas that have been affected by recent large wildfires. Impacts include loss of large trees, old forest structure, hiding and thermal cover, and migration and travel corridors.

Recreation Resources - The Idaho State-designated Ponderosa Pine Scenic Byway lies partly within this management area. The South Fork Payette River corridor features river-oriented recreation, with rafting, kayaking, and fishing as the major uses. There are also four developed campgrounds in the corridor, one in the Clear Creek drainage, and one at Bull Trout Lake. Dispersed recreation in the rest of the management area includes hiking, hunting, camping, fishing, ATV use, snowmobiling, and horseback riding hiking. Trails in the Tenmile/Black

Warrior and Red Mountain recommended wilderness areas feature non-motorized recreation in a semi-primitive setting. Much of the use in this area comes from the Treasure Valley, although recreationists come from around the country and world to raft and kayak the South Fork Payette River. A recreation fee for parking along the South Fork Payette River is now charged river users. This area is in Idaho Fish and Game Management Units 33 and 35. Recreation special uses include several river-running outfitter and guide operations and recreation residence tracts (Long Creek, Camp Creek, Bear Creek, and Wapiti Creek) found in the South Fork Payette River corridor and along Clear Creek.

Cultural Resources - Cultural themes in this area include Prehistoric Archaeology, Mining, Transportation, Forest Service History, Settlement, Timber Industry, and the CCC. This area contains prehistoric sites significant to our understanding of early Indian uses in the South Fork drainage. Salmon fishing was an important seasonal use of the river by groups such as the Northern Paiute and Shoshone. Radiocarbon dates from fire hearths excavated in Deadwood Campground indicate that the area was inhabited as early as two thousand years ago. Miners periodically worked and camped at the mouth of the Deadwood River between 1863 through the 1920s. Between 1900 and 1904, Idaho City miners improved the Clear Creek Road as their favorite route to the Thunder Mountain gold camps. Early ranger and guard stations were built at Lowman (1908) and Warm Springs (1913). Forest officers supervised settlement on South Fork Payette River terraces under the 1906 Forest Homestead Act, and logging in Clear Creek and other tributaries during the 1920s and 1930s. During the 1930s, CCC crews replaced log buildings at Warm Springs Guard Station with new structures, and built campgrounds along the river, including a bathhouse at Kirkham Hot Springs.

Timberland Resources - Of the estimated 156,300 tentatively suited acres in this management area, 43,900 acres have been identified as being suited timberlands, or appropriate for timber production. This represents about 8 percent of the Forest's suited timberland acres. The suited timberland acres are found in MPCs 4.2, 5.1, and 5.2, as shown on the map displaying the MPCs for this management area. Lands within MPC 1.2, 2.2, 3.2, and 4.1c are identified as not suited for timber production. Timber management has been emphasized in the Clear Creek and Rock Creek drainages. No management activities are planned for the three recommended wilderness areas. Past management activities have been relatively high in the Clear Creek and Rock Creek drainages, and low or non-existent elsewhere. Forest products such as fuelwood, posts, poles and Christmas trees are collected in designated areas.

Rangeland Resources - This area has portions of one cattle and four sheep allotments. All five allotments are vacant. Management Area 10 provides an estimated 15,700 acres of capable rangeland. These acres represent about 4 percent of the capable rangeland on the Forest.

Mineral Resources - This area is open for mineral activities and exploration. The potential for locatable minerals is moderate to high, as is the potential for leasable geothermal resources. The potential for other leasable resources or common variety mineral materials is unknown.

Fire Management - Prescribed fire has been used to reduce activity-generated fuels and enhance big game winter range. Large wildfires that have occurred in the last 15 years include the Lowman Complex (1989), Willis Gulch (1988), and County Line (1992). Since 1989, about 20 percent of the management area has been burned by wildfire. Portions of the management area are in the Forest's wildland fire use planning area.

Lowman is a National Fire Plan community, and Clear Creek, Kirkham Creek, Jackson-Fence, Blue Jay Creek, Wolf Creek, Bear Camp, and Grandjean subwatersheds are considered wildland-urban interface areas due to private development adjacent to the Forest. These subwatersheds, along with Upper Clear Creek, are also considered to pose risks to life and property from potential post-fire floods and debris flows. Historical fire regimes for the area are estimated to be: 19 percent lethal, 48 percent mixed1 or 2, and 33 percent non-lethal. An estimated 16 percent of the area regimes have vegetation conditions that are highly departed from their historical range. Most of this change has occurred in the historically non-lethal fire regimes, resulting in conditions where wildfire would likely be much larger and more intense and severe than historically. In addition, 36 percent of the area is in moderately departed conditions. Wildfire in these areas may result in somewhat larger patch sizes of high intensity or severity, but not to the same extent as in the highly departed areas in non-lethal fire regimes.

Lands and Special Uses - Special-use authorizations are issued for two utility corridors to private inholdings. The Jackson Peak and Lowman, Eugene T.V. designated communications sites are located within the area.

MANAGEMENT DIRECTION

In addition to Forest-wide Goals, Objectives, Standards, and Guidelines that provide direction for all management areas, the following direction has been developed specifically for this area.

MPC/Resource Area	Direction	Number	Management Direction Description
MPC 1.2 Recommended Wilderness	General Standard	1001	Management actions, including wildland fire use and prescribed fire, must be designed and implemented in a manner that maintains wilderness values, as defined in the Wilderness Act.
	Vegetation Standard	1002	Mechanical vegetation treatments, including salvage harvest, are prohibited.
	Recreation Standard	1003	No new motorized or mechanical uses will be allowed, except where these uses must be allowed in response to reserved or outstanding rights, statute or treaty.
	Recreation Standard	1004	Existing motorized or mechanical uses are allowed only if they do not lead to long-term adverse changes in wilderness values.
	Road Standard	1005	Road construction or reconstruction may only occur where needed: a) To provide access related to reserved or outstanding rights, or b) To respond to statute or treaty.
	Fire Guideline	1006	The full range of fire suppression strategies may be used to suppress wildfires. Fire suppression tactics should minimize impacts to wilderness values.

MPC/Resource Area	Direction	Number	Management Direction Description
MPC 2.1 Wild and Scenic Rivers	General Standard	1007	Manage the South Fork Payette River eligible river corridor to its assigned classification standards, and preserve its ORVs and free-flowing status until the river undergoes a suitability study and the study finds it suitable for designation by Congress, or releases it from further consideration as a Wild and Scenic River.
	Vegetation Guideline	1008	In Scenic or Recreational corridors, mechanical vegetation treatments, including salvage harvest, may be used as long as Outstandingly Remarkable Values (ORVs) are maintained within the river corridor.
	Fire Guideline	1009	Prescribed fire and wildland fire use may be used as long as ORVs are maintained within the corridor
	Fire Guideline	1010	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize strategies and tactics that minimize the impacts of suppression activities on river classifications and ORVs.
MPC 3.2 Active Restoration and Maintenance of Aquatic, Terrestrial, and Watershed Resources	General Standard	1011	Management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary (up to 3 years) or short-term (3-15 years) time periods, and must be designed to avoid degradation of existing conditions in the long-term (greater than 15 years).
	Vegetation Standard	1012	Vegetation restoration or maintenance treatments—including wildland fire use, mechanical, and prescribed fire—may only occur where they: a) Maintain or restore water quality needed to fully support beneficial uses and habitat for native and desired non-native fish species; or b) Maintain or restore habitat for native and desired non-native wildlife and plant species; or c) Reduce risk of impacts from wildland fire to human life, structures, and investments.
	Road Standard	1013	Road construction or reconstruction may only occur where needed: a) To provide access related to reserved or outstanding rights, or b) To respond to statute or treaty, or c) To support aquatic, terrestrial, and watershed restoration activities, or d) To address immediate response situations where, if the action is not taken, unacceptable impacts to hydrologic, aquatic, riparian or terrestrial resources, or health and safety, would result.
	Fire Guideline	1014	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize suppression strategies and tactics that minimize impacts on aquatic, terrestrial, or watershed resources.
MPC 4.1c Undeveloped Recreation: Maintain Unroaded Character with Allowance for Restoration Activities	General Standard	1015	Management actions—including mechanical vegetation treatments, salvage harvest, wildland fire use, prescribed fire, special use authorizations, and road maintenance—must be designed and implemented in a manner that would be consistent with the unroaded landscape in the temporary, short term, and long term. Exceptions to this standard are actions in the 4.1c road standard, below.
	Road Standard	1016	Road construction or reconstruction may only occur where needed: a) To provide access related to reserved or outstanding rights, or b) To respond to statute or treaty.
	Fire Guideline	1017	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize tactics that minimize impacts of suppression activities on the unroaded landscape in the area.

MPC/Resource Area	Direction	Number	Management Direction Description
MPC 4.2 Roaded Recreation Emphasis	Vegetation Guideline	1018	Vegetation management actions—including wildland fire use, prescribed fire, and mechanical treatments—may be used to maintain or restore desired vegetation and fuel conditions provided they do not prevent achievement of recreation resource objectives.
	Fire Guideline	1019	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize strategies and tactics that minimize impacts to recreation developments and investments.
MPC 5.1 Restoration and Maintenance Emphasis within Forested Landscapes	Road Standard	1020	New roads and landings shall be located outside of RCAs in the MPC 5.1 portions of the Upper Clear Creek, Grandjean and Tenmile subwatersheds unless it can be demonstrated through the project-level NEPA analysis and related Biological Assessment that: a) For resources that are within their range of desired conditions, any new road or landing in an RCA shall not result in degradation to those resources unless outweighed by demonstrable short- or long-term benefits to those resource conditions; and b) For resources that are in a degraded condition, any new road or landing in an RCA shall not further degrade nor retard attainment of desired resource conditions unless outweighed by demonstrable short- or long-term benefits to those resource conditions; and c) Adverse effects to TEPC species or their habitats are avoided unless outweighed by demonstrable short- or long-term benefits to those TEPC species or their habitats. An exception to this standard is where construction of new roads in RCAs is required to respond to reserved or outstanding rights, statute or treaty, or respond to emergency situations (e.g., wildfires threatening life or property, or search and rescue operations).
	Vegetation Guideline	1021	The full range of vegetation treatment activities may be used to restore or maintain desired vegetation and fuel conditions. The available vegetation treatment activities include wildland fire use. Salvage harvest may also occur.
	Fire Guideline	1022	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize strategies and tactics that minimize impacts to habitats, developments, and investments.
	Road Guideline	1023	Road construction or reconstruction may occur where needed: a) To provide access related to reserved or outstanding rights, or b) To respond to statute or treaty, or c) To achieve restoration and maintenance objectives for vegetation, water quality, aquatic habitat, or terrestrial habitat; or d) To support management actions taken to reduce wildfire risks in wildland-urban interface areas; or e) To meet access and travel management objectives.
MPC 5.2 Commodity Production Emphasis within Forested Landscapes	Fire Standard	1024	Wildland fire use is prohibited.
	Fire Guideline	1025	Prescribed fire may be used to: a) Maintain or restore desired vegetative conditions on unsuited timberlands; or b) Maintain or restore desired fuel conditions for all vegetation types; or c) Maintain desired vegetative conditions on suited timberlands within PVGs 2 through 10.

MPC/Resource Area	Direction	Number	Management Direction Description
MPC 5.2	Fire Guideline	1026	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize strategies and tactics that minimize impacts to developments and investments.
Soil, Water, Riparian, and Aquatic Resources	Objective	1027	Initiate restoration of watershed conditions and fish habitat in the Canyon Creek, Tenmile Creek, Clear Creek, Bear Creek, Grand Jean, and Rock Creek subwatersheds to help strengthen listed fish species populations.
	Objective	1028	Maintain or improve migratory bull trout habitat in Clear Creek.
	Objective	1029	Maintain and restore habitat connectivity throughout the upper South Fork Payette drainage for bull trout, redband trout, and other fish species.
	Objective	1030	Work with Idaho State Transportation Department to reduce road-related sediment in order to protect the existing strong local bull trout population in Upper Canyon Creek subwatershed.
	Objective	1031	Evaluate riparian conservation areas within the Lowman burn to determine opportunities to restore the large wood component by planting hardwoods or conifers, or other means.
	Objective	1032	Survey roads and culverts to determine options to reduce sediment and restore fish passage. The highest priority survey areas are in the Clear Creek and Rock Creek drainages.
Vegetation	Objective	1033	Restore and maintain species composition, structural diversity, and ecosystem processes in all vegetation groups at moderate to high hazard to uncharacteristic wildfire to make them more resilient and resistant.
	Objective	1034	Restore whitebark pine in the High Elevation Subalpine Fir vegetation group, as described in Appendix A.
	Objective	1035	Restore the seral aspen component in the forested vegetation groups, as described in Appendix A, to restore wildlife habitat and improve visual quality.
	Objective	1036	Maintain or restore riparian vegetation within selected areas along the South Fork Payette River to improve water quality, wildlife habitat, and the recreational setting. Where vegetation is trending toward climax in riparian areas, restore early seral components to improve regeneration and diversity.
Botanical Resources	Objective	1037	Consider establishing the Bull Trout Lake Fen as a Botanical Special Interest Area due to the presence of unique wetland habitats and plant species of concern.
	Objective	1038	Provide for and interpret sensitive wetland habitats and associated plant species of concern at the Bull Trout Lake Fen.
	Objective	1039	Maintain or restore known populations and occupied habitats of TEPCS plant species, including Idaho douglasia, Kellogg's bitterroot, and pale sedge, to contribute to the long-term viability of these species.
	Standard	1040	Implement the Forest Service approved portions of the conservation strategy for Idaho douglasia to maintain or restore populations and habitat of this species.
Non-native Plants	Objective	1041	Manage designated non-native, invasive weeds in an integrated approach, as specified in the Strategic and Annual Operating Plans established by the Upper Payette River Cooperative Weed Management Area Participants.

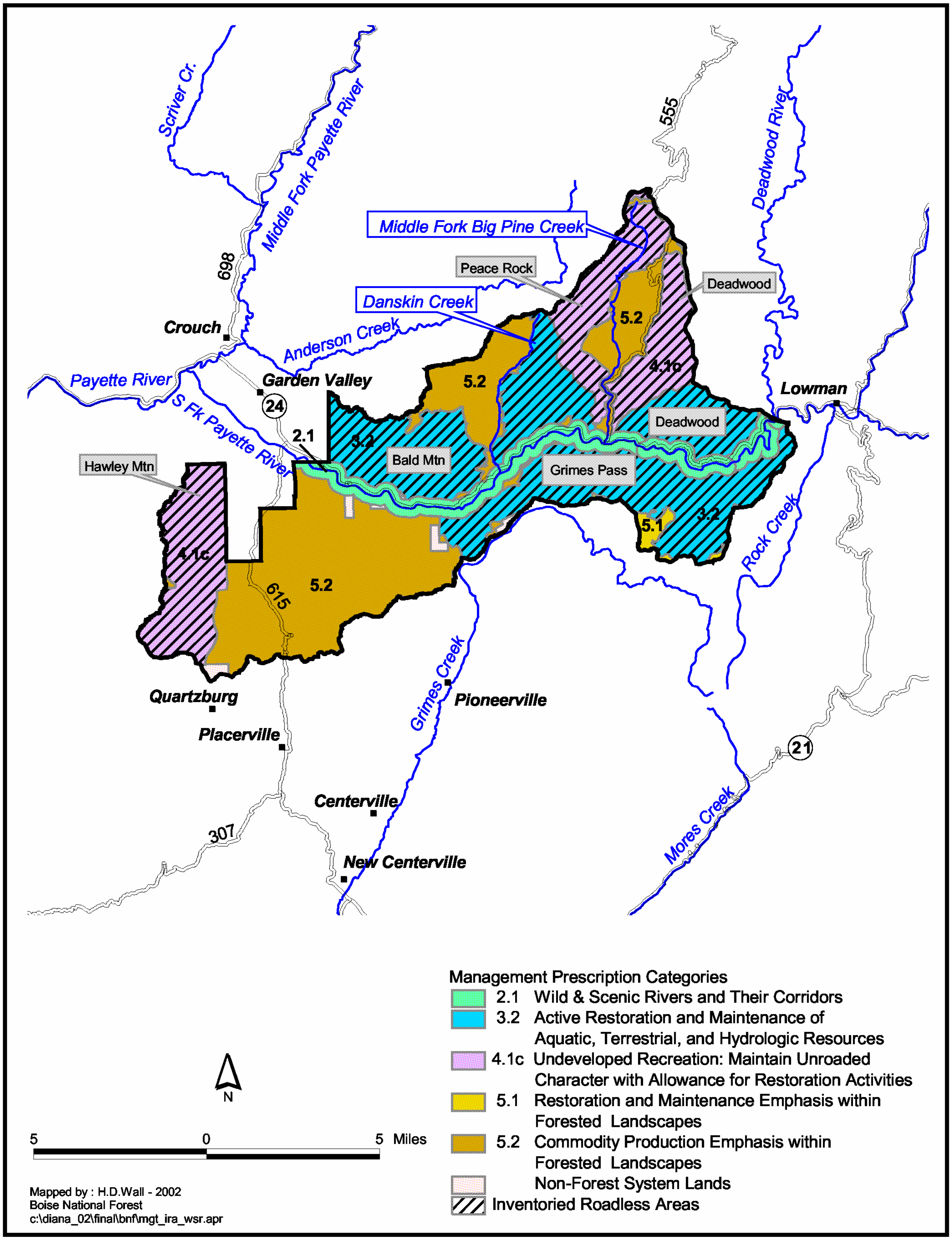
<table>
<tr><th>MPC/Resource Area</th><th>Direction</th><th>Number</th><th>Management Direction Description</th></tr>
<tr><td rowspan="3">Wildlife Resources</td><td>Objective</td><td>1042</td><td>Maintain or restore bald eagle wintering habitat along the South Fork Payette River corridor, with emphasis on retaining or increasing large tree and snag components.</td></tr>
<tr><td>Objective</td><td>1043</td><td>Improve big-game winter range by restoring Mountain Big Sage and Montane Shrub vegetation groups along the South Fork Payette River corridor. Emphasize increasing native plant forage by reducing noxious weeds.</td></tr>
<tr><td>Objective</td><td>1044</td><td>Encourage recovery of conifer species in recently burned areas to restore wildlife habitat diversity and cover.</td></tr>
<tr><td rowspan="12">Recreation Resources</td><td>Objective</td><td>1045</td><td>Increase recreation opportunities for more diverse trail experiences to meet increasing demand for these experiences.</td></tr>
<tr><td>Objective</td><td>1046</td><td>Provide trailhead access and information pertaining to the Sawtooth Wilderness to enhance recreation opportunities.</td></tr>
<tr><td>Objective</td><td>1047</td><td>Where existing recreation facilities and dispersed recreation sites are adversely affecting riparian vegetation, restore or improve vegetation through site hardening or relocation, or other means.</td></tr>
<tr><td>Objective</td><td>1048</td><td>Evaluate dispersed recreation uses in the Bear Creek area, and develop a management plan to reduce resource impacts and improve recreation experiences.</td></tr>
<tr><td>Objective</td><td>1049</td><td>Evaluate and develop plans to create “day-use” picnic sites along the Highway 21 corridor to expand recreation opportunities in this high use corridor.</td></tr>
<tr><td>Objective</td><td>1050</td><td>Continue the dispersed site management along the South Fork Payette River and Highway 21 corridor to maintain a range of recreation opportunities.</td></tr>
<tr><td>Objective</td><td>1051</td><td>Rehabilitate the vegetation around the Tenmile fish pond site to enhance recreation experiences.</td></tr>
<tr><td>Objective</td><td>1052</td><td>Evaluate ATV use in the Wapiti Creek area, and develop a plan to manage ATV use to reduce resource impacts.</td></tr>
<tr><td>Objective</td><td>1053</td><td>Maintain current motorized and mechanized travel routes within the recommended wilderness areas.</td></tr>
<tr><td>Objective</td><td>1054</td><td>Evaluate and develop a plan for a motorized trail extension of the Kirkham Trail that ties into the Deadwood trail system to enhance motorized recreation opportunities.</td></tr>
<tr><td>Objective</td><td>1055</td><td>Continue use by recreation residences within established recreation residence tracts.</td></tr>
<tr><td>Objective</td><td>1056</td><td>Achieve or maintain the following ROS strategy:
<table>
<tr><th rowspan="2">ROS Class</th><th colspan="2">Percent of Mgt. Area</th></tr>
<tr><th>Summer</th><th>Winter</th></tr>
<tr><td>Semi-Primitive Non-Motorized</td><td>41%</td><td>1%</td></tr>
<tr><td>Semi-Primitive Motorized</td><td>21%</td><td>88%</td></tr>
<tr><td>Roaded Natural</td><td>17%</td><td>11%</td></tr>
<tr><td>Roaded Modified</td><td>21%</td><td>0%</td></tr>
</table>
The above numbers reflect current travel regulations. These numbers may change as a result of future travel regulation planning.</td></tr>
</table>

MPC/Resource Area	Direction	Number	Management Direction Description
Recreation Resources	Guideline	1057	Facilitate and participate in the development of a Scenic Byway Corridor Management Plan for the Ponderosa Pine Scenic Byway with local government agencies and other partners.
Cultural Resources	Objective	1058	Maintain the National Register status of eligible properties including the Warm Springs Guard Station, which is on the Forest's cabin rental program. Consider nominating Warm Springs Guard Station to the NRHP.
	Objective	1059	Conduct an inventory to identify historic properties on Canyon and Warm Springs Creeks.
	Objective	1060	Develop a maintenance plan to protect the historic character of Warm Springs Guard Station, and provide interpretation for visitors using the facility.
Timberland Resources	Objective	1061	Evaluate and schedule timber stand improvements within the Lowman Fire areas to maintain desired vegetation structures.
	Objective	1062	Emphasize restoration treatments in the Rock Creek, Clear Creek, and Upper South Fork Payette River drainages, and adjacent to urban/interface areas along Highway 21.
	Objective	1063	Continue to work with Idaho Department of Transportation to treat hazard trees along Highway 21 in the Canyon Creek area.
	Objective	1064	Reduce the opportunity for noxious weed establishment and spread by keeping suitable weed sites to a minimum during timber harvest activities in the Kirkham Creek, Jackson-Fence, Rock Creek, and Lower Clear Creek subwatersheds. Consider such methods as designated skid trails, winter skidding, minimal fire line construction, broadcast burning rather than pile burning, or keeping slash piles small to reduce heat transfer to the soil.
	Guideline	1065	Existing noxious weed infestations should be treated on landings, skid trails, and helibases in the project area before timber harvest activities begin in the Kirkham Creek, Jackson-Fence, Rock Creek, and Lower Clear Creek subwatersheds.
Rangeland Resources	Objective	1066	Initiate and complete procedures to close the existing Bull Trout Sheep and Goat Allotment due to economic considerations.
Fire Management	Objective	1067	Identify areas appropriate for Wildland Fire Use, focusing on the Red Mountain Lakes area, Tenmile Creek, Hanson addition, and upper reaches of Bear and Wapiti Creeks. Use wildland fire in these areas to restore or maintain desired vegetative conditions and to reduce fuels.
	Objective	1068	Use prescribed fire and mechanical treatments within and adjacent to wildland/urban interface areas to reduce wildfire hazards. Develop and prioritize vegetation treatment plans in coordination with local and tribal governments, agencies, and landowners.
	Objective	1069	Coordinate and emphasize fire education and prevention programs with private landowners to help reduce wildfire hazards and risks. Work with landowners to increase defensible space around structures.
	Guideline	1070	Coordinate with the Sawtooth National Forest to develop compatible wildland fire suppression and wildland fire use strategies.

MPC/Resource Area	Direction	Number	Management Direction Description
Facilities and Roads	Objective	1071	Evaluate and incorporate methods to help prevent weed establishment and spread from road management activities in the Kirkham Creek, Lower Clear Creek, and Wolf Creek subwatersheds. Methods to consider include: ➢ When decommissioning roads, treat weeds before roads are made impassable. ➢ Schedule road maintenance activities when weeds are least likely to be viable or spread. Blade from least to most infested sites. ➢ Consult or coordinate with the district noxious weed coordinator when scheduling road maintenance activities. ➢ Periodically inspect road systems and rights of way. Avoid accessing water for dust abatement through weed-infested sites, or utilize mitigation to minimize weed seed transport.
	Objective	1072	Improve substandard facilities at Warm Springs Guard Station to reduce health and safety concerns.
	Guideline	1073	Cooperate with Idaho Department of Transportation to keep Highway 21 open year-round north of Lowman, and to maintain Highway 21 corridor (e.g., waste sites, road maintenance, hazard tree removal, etc.). Continue to cooperate with the Transportation Department for avalanche detection and control within recommended wilderness areas.
Special Features	Objective	1074	Manage hot springs as recreational opportunities, while maintaining their natural integrity.
	Guideline	1075	Activities and developments adjacent to the Sawtooth National Recreation Area that would compromise its scenic and recreational values should be avoided.
Scenic Environment	Standard	1076	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in the table below as viewed from the following areas/corridors:

Sensitive Travel Route Or Use Area	Sensitivity Level	Visual Quality Objective								
		Fg			Mg			Bg		
		Variety Class			Variety Class			Variety Class		
		A	B	C	A	B	C	A	B	C
Ten Mile -Black Warrior Recommended Wilderness	1	P	P	P	P	P	P	P	P	P
Red Mountain Recommended Wilderness	1	P	P	P	P	P	P	P	P	P
Highway 21	1	R	R	PR	PR	PR	PR	R	PR	M
South Fork Payette River	1	R	R	PR	R	PR	PR	R	PR	M
Forest Road 520, 025UB	1	R	R	PR	R	PR	PR	R	PR	M
Deadwood, Mountain View, Helende, Bonneville, Bull Trout Lake Campgrounds	1	R	R	PR	R	PR	PR	R	PR	M
Kirkham and Park Creek Campgrounds	2	PR	PR	M	PR	M	M	PR	M	MM
Forest Trails 144, 145, 147, 149, 016, 018, 142, 143, 146, 148, 151, 157, 159, 160	2	PR	PR	M	PR	M	M	PR	M	MM
Camp Creek, Bear Creek, Long Creek, Wapiti, and Lowman summer homes	1	PR	PR	PR	R	PR	PR	R	PR	M
Jackson Peak Lookout	2	PR	PR	M	PR	M	M	PR	M	MM
Forest Roads 531, 582	2	PR	PR	M	PR	M	M	PR	M	MM

Management Area 11 - Lower South Fork Payette River Location Map



Management Area 11
Lower South Fork Payette River

MANAGEMENT AREA DESCRIPTION

Management Prescriptions - Management Area 11 has the following management prescriptions (see map on preceding page for distribution of prescriptions).

Management Prescription Category (MPC)	Percent of Mgt. Area
3.2 – Active Restoration and Maintenance of Aquatic, Terrestrial, & Hydrologic Resources	39
4.1c – Maintain Unroaded Character with Allowance for Restoration Activities	22
5.1 – Restoration and Maintenance Emphasis within Forested Landscapes	2
5.2 – Commodity Production Emphasis within Forested Landscapes	37

General Location and Description - Management Area 11 is comprised of lands administered by the Boise National Forest in the South Fork Payette River drainage between Garden Valley and Lowman, Idaho (see map, opposite page). The area lies in Boise County, and is part of the Emmett Ranger District. The management area is an estimated 65,900 acres, of which the Forest Service administers 98 percent, and 2 percent are privately owned. Most of the private inholdings lie along the South Fork Payette River corridor. The area is bordered by Boise National Forest to the north, east, and south, and by a mix of private (Garden Valley), BLM, and State lands to the west. The primary uses or activities in this area have been dispersed and developed recreation, timber management, and livestock grazing.

Access - The main access to the area is by paved State Highway 17 from Banks to Lowman along the South Fork Payette River. Other access routes include Forest Road 555 up Big Pine Creek and Forest Road 382 from the South Fork Payette River to Pioneerville. These are well maintained and gravel-surfaced roads. The density of classified roads for the management area is 1.5 miles per square mile, and over half the area is inventoried as roadless. Total road density for area subwatersheds ranges between 0 and 4.1 miles per square mile. There are no major trails in the area.

Special Features – A portion of one eligible Wild and Scenic River, the South Fork Payette River, falls within the management area. The river has one segment in the area with a Recreational classification, and one with a Scenic classification. The Recreational segment is an estimated 16.8 miles, with a river corridor area or 5,390 acres. The Scenic segment is an estimated 3.1 miles, with a river corridor area of 988 acres. The South Fork is considered eligible for Wild and Scenic River status because of its outstandingly remarkable scenic, geologic, and cultural resource values.

The Idaho-designated Wildlife Canyon Scenic Byway lies partly within this management area. The South Fork Payette River offers high quality rafting and kayaking opportunities, winter bald eagle habitat, prehistoric and historic cultural resources, and hot springs. An estimated 59 percent of the management area is inventoried as roadless, including most of the Bald Mountain, Hawley Mountain, and Grimes Pass Roadless Areas, and small portions of the Peace Rock and Deadwood Roadless Areas.

Air Quality - This management area lies within Montana/Idaho Airshed ID-15 and in Boise County. Particulate matter is the primary pollutant of concern related to Forest management. There is an ambient air monitor located within the Airshed in Garden Valley to obtain current background levels, trends, and seasonal patterns of particulate matter. The Sawtooth Wilderness is the closest Class I area. Visibility monitoring has been expanded for this area.

Between 1995 and 1999, emissions trends in both counties improved for PM 10, while PM 2.5 emissions remained constant. The most common source of particulate matter in the county was fugitive dust, primarily from unpaved roads. In addition to Forest management activities, crop residue and ditch burning may contribute to particulate matter emissions, although the amount of agricultural-related burning was very low within Boise County (less than 100 acres). There were no point sources within the county.

Soil, Water, Riparian, and Aquatic Resources - Elevations range from 3,100 feet on the South Fork Payette River to 7,600 feet near Deadwood Lookout. Management Area 11 falls primarily within the South Fork Payette Canyon and Streamcut Lands Subsection. The main geomorphic landforms associated with this subsection are strongly and moderately dissected fluvial lands, canyon lands, and frost-churned slopes and canyonlands. Slope gradients average between 45 to 75 percent in the dissected fluvial lands and canyon lands, and 45 to 65 percent in the frost-churned uplands and canyon lands. The surface geology is predominantly Idaho Batholith granitics. Soils generally have moderate to high surface erosion potential, and moderate productivity. Subwatershed vulnerability ratings range from moderate to high (see table below). Geomorphic Integrity ratings for the subwatersheds vary from moderate (functioning at risk) to low (not functioning appropriately), with the majority being low (see table below). Localized areas have impacts due to roads, timber harvest, livestock grazing, and recreation uses that have generated accelerated erosion, stream channel modification, and streambank degradation.

The management area is in the Garden Valley and Big Pine Creek Watersheds in the lower portion of the South Fork Payette River Subbasin. The major streams in the area are the South Fork Payette River, Big Pine Creek, Alder Creek, and Horn Creek. There are no lakes or reservoirs in this management area. The Lower South Fork Payette River subwatershed is part of a state-regulated public water system for the community of Horseshoe Bend. Water Quality Integrity ratings for the subwatersheds vary from high (functioning appropriately) to moderate (functioning at risk) to low (not functioning appropriately) (see table below). Localized areas have impacts from roads, timber harvest, livestock grazing, and recreation that have increased sedimentation and nutrient levels. Two of the five subwatersheds in this area were listed in 1998 as having impaired water bodies under Section 303(d) of the Clean Water Act. These subwatersheds are Danskin-Poorman and Hole-In-The-Wall. Sediment was the pollutant of concern for both subwatersheds. There are currently no TMDL-assigned watersheds associated with this area.

Subwatershed Vulnerability			Geomorphic Integrity			Water Quality Integrity			No. 303(d) Subs	No. Subs With TMDLs	No. Public Water System Subs
High	Mod.	Low	High	Mod.	Low	High	Mod.	Low			
2	3	0	0	4	1	1	3	1	2	0	1

Anadromous fish species no longer exist within area streams due to downstream dams that block their migration routes to and from the ocean. The South Fork Payette River serves as an important over-wintering and migratory corridor for the threatened bull trout. Bull trout have been found in the Hole in the Wall subwatershed, redband trout in the Big Pine subwatershed, and both species in the Danskin-Poorman subwatershed. Aquatic habitat is functioning at risk in localized areas due to water quality impacts described above. Native fish populations are at risk due to the presence of non-native species.

Vegetation - Vegetation at lower elevations is typically grasslands, shrublands, ponderosa pine, and Douglas-fir on south and west aspects, and Douglas-fir forests on north and east aspects. Mid and upper elevations are dominated by shrubs and forest communities of Douglas-fir and subalpine fir, with pockets of lodgepole pine and aspen.

An estimated 22 percent of the management area is comprised of rock, water, or shrubland and grassland vegetation groups, including Mountain Big Sage, Montane Shrub, and Perennial Grass Slopes. The main forested vegetation groups in the area are Dry Ponderosa Pine/Xeric Douglas-fir (4 percent), Warm Dry Douglas-fir/Moist Ponderosa Pine (45 percent), Cool Moist Douglas-fir (11 percent), and Cool Dry Douglas-fir (11 percent).

The Mountain Big Sage and Montane Shrub groups are functioning properly, with only minor impacts from past livestock grazing. The Perennial Grass Slopes and Perennial Grass Montane groups are at or near properly functioning condition; however, past grazing impacts and introduced species have altered composition and structure in localized areas. Rush skeletonweed and other noxious weeds are increasing.

The Dry Ponderosa Pine/Xeric Douglas-fir, Cool Moist Douglas-fir, and the Cool Dry Douglas-fir groups are functioning at risk, and the Warm Dry Douglas-fir/Moist Ponderosa Pine group is not functioning properly due primarily to timber harvest and fire exclusion that have altered stand composition and structure. In managed areas, stands are dominantly young and mid-aged, with limited large trees, snags, and large woody debris. In unmanaged and unburned areas, stands have more Douglas-fir and less seral ponderosa pine and aspen than desirable, and moderate to high levels of insect and disease infestations. Large-tree, single-storied stand structure is lacking. Noxious weeds and introduced species are increasing in the understory.

Riparian vegetation is generally functioning properly, but localized impacts have occurred from timber harvest, roads, recreation, and livestock grazing. Noxious weeds and introduced plant species are increasing.

Botanical Resources – Giant helleborine orchid and Idaho douglasia, Region 4 Sensitive species, are known from this management area. Swamp onion, a Region 4 Watch species, also occurs in this management area. No federally listed or proposed plant species are known to occur in this area, but potential habitat for Ute ladies'-tresses and slender moonwort may exist. Ute ladies'-tresses, a Threatened species, may have moderate to high potential habitat in riparian/wetland areas from 1,000 to 7,000 feet. Slender moonwort, a Candidate species, may occur in moderate to higher elevation grasslands, meadows, and small openings in spruce and lodgepole pine.

Non-native Plants - Dalmatian toadflax, spotted knapweed, Canada thistle, rush skeletonweed, and purple loosestrife occur in the area, particularly along the main road corridors. An estimated 67 percent of the management area is highly susceptible to invasion by noxious weeds and exotic plant species. The main weeds of concern are rush skeletonweed and Dalmatian toadflax, which currently occur in scattered populations.

Subwatersheds in the table below have an inherently high risk of weed establishment and spread from activities identified with a "yes" in the various activity columns. This risk is due to the amount of drainage area that is highly susceptible to noxious weed invasion and the relatively high level of exposure from those identified vectors or carriers of weed seed.

Subwatershed	Road-related Activities	Livestock Use	Timber Harvest	Recreation & Trail Use	ATV Off-Road Use
Big Pine Creek	No	No	Yes	No	No
Lower South Fork Payette	Yes	Yes	Yes	No	No
Danskin-Poorman	Yes	Yes	Yes	No	No
Alder Creek	Yes	Yes	No	No	No

Wildlife Resources - The riparian corridor along the South Fork Payette River provides wintering habitat for bald eagles. Warm ponderosa and Douglas-fir forests along the South Fork Payette River provide habitat for white-headed woodpecker and flammulated owl, and extensive winter range for deer and elk. Low- to mid-elevation forests provide habitat for Region 4 sensitive species, goshawk and great gray owl. Nesting habitat for peregrine falcon and golden eagles occurs in isolated areas with rocky bluffs. High-elevation forests provide habitat for fisher and boreal owls, as well as summer range for mammals such as deer, elk, black bear, and mountain lion. Wolves likely occur here or will occur in the near future, as part of this area is in the Central Idaho Wolf Recovery Area. All habitats provide nesting and forage for migratory landbirds. Terrestrial wildlife habitat is functioning at risk due to habitat changes from timber harvest and fire suppression, fragmentation from roads and harvest, and disturbance from recreation uses. Winter range along the south slopes of the South Fork Payette River is in poor condition due to past livestock use and noxious weed infestations.

Recreation Resources - Recreation in this management area is largely river-oriented, with rafting, kayaking, recreation dredge mining, and fishing as the major uses. A recreation fee for parking along the South Fork Payette River is now charged at designated sites. Big-game hunting is popular in the fall. Developed sites include Hot Springs and Pine Flats Campgrounds, and the Danskin River Access area. Dispersed recreation includes river-running, hunting, fishing, ATV use, and snowmobiling. Much of the use in this area comes from the Treasure Valley, although recreationists come from around the world for the rafting and kayaking experience. The area is in Idaho Fish and Game Management Unit 33. Recreation special uses include several river-running outfitter and guide operations, and trail-ride outfitter and guides.

Cultural Resources - Cultural themes in the area include Prehistoric Archaeology, Mining, Agriculture, Ranching, Timber, Forest Service History, and the CCC. This area contains prehistoric sites significant to our understanding of Indian uses of the Payette River system. In 1993 archaeologists excavated a fishing site at Big Falls Portage. Blood residue analysis from one of the stone points tested positive for trout antiserum that cross reacts with steelhead trout and chinook salmon. Historically, the lower South Fork area was an agricultural and livestock supply center for mining camps in Boise Basin. Commercial export loggers entered the drainage in the early 1900s. They transported timber from the area by driving the logs downstream. Between 1906 and 1943, the Grimes Pass Dam generated power for dredges in Boise Basin. Forest rangers established the Garden Valley Ranger Station in 1908, the Gallagher Flat Ranger Station in 1911, and extended the South Fork Payette River Road from Grimes Pass to Lowman in 1916. The CCC operated a large, year- round camp on Gallagher Flat from 1933 to 1939. They replaced the older structures at the ranger stations, and built a new ranger station where the Garden Valley Work Center is today. They improved the Banks-Lowman Road, and developed the Hot Springs and Pine Flat Campgrounds.

Timberland Resources - Of the estimated 47,100 tentatively suited acres in this management area, 15,800 acres have been identified as being suited timberlands, or appropriate for timber production. This represents about 3 percent of the Forest's suited timberland acres. The suited timberland acres are found in MPCs 5.1 and 6.1, as shown on the map displaying the MPCs for this management area. Lands within MPC 3.2 and 4.1c are identified as not suited for timber production. Timber management has occurred outside of the South Fork Payette River corridor. About half of these acres have received a fairly high level of timber management in the past. Fuelwood, posts, poles, and Christmas trees are collected in designated areas.

Rangeland Resources - This area has portions of two cattle and two sheep allotments. Management Area 11 provides an estimated 6,800 acres of capable rangeland. These acres represent about 2 percent of the capable rangeland on the Forest.

Mineral Resources - This area is open for mineral activities and exploration. The potential for locatable minerals is moderate to high, as is the potential for leasable geothermal resources. The potential for other leasable resources or common variety mineral materials is unknown.

Fire Management - Prescribed fire has been used to reduce activity-generated fuels and enhance big game winter range. This management area is not in the Forest's wildland fire use planning area, so no wildland fire use is anticipated. Large wildfires affecting the area include Charter Mountain (1966), Anderson Creek Complex (1986), and Horn Creek (2000). Garden Valley is a National Fire Plan community, and Danskin-Poorman and Lower South Fork Payette subwatersheds are considered wildland-urban interface areas due to private development adjacent to the Forest. These subwatersheds are also considered to pose risks to life and property from potential post-fire floods and debris flows. Historical fire regimes for the area are estimated to be: 3 percent lethal, 34 percent mixed1 or 2, and 63 percent non-lethal. An estimated 41 percent of the area regimes have vegetation conditions that are highly departed from their historical range. Most of this change has occurred in the historically non-lethal fire regimes, resulting in conditions where wildfire would likely be much larger and more intense and severe than historically. In addition, 29 percent of the area is in moderately departed conditions. Wildfire in these areas may result in somewhat larger patch sizes of high intensity or severity, but not to the same extent as in the highly departed areas in non-lethal fire regimes.

Lands and Special Uses - Special use authorizations include two utility corridors and numerous private water transmission lines.

MANAGEMENT DIRECTION

In addition to Forest-wide Goals, Objectives, Standards, and Guidelines that provide direction for all management areas, the following direction has been developed specifically for this area.

MPC/Resource Area	Direction	Number	Management Direction Description
MPC 2.1 Wild and Scenic Rivers	General Standard	1101	Manage the South Fork Payette River eligible river corridor to its assigned classification standards, and preserve its ORVs and free-flowing status until the river undergoes a suitability study and the study finds it suitable for designation by Congress, or releases it from further consideration as a Wild and Scenic River.
	Vegetation Guideline	1102	In Scenic or Recreational corridors, mechanical vegetation treatments, including salvage harvest, may be used as long as Outstandingly Remarkable Values (ORVs) are maintained within the river corridor.
	Fire Guideline	1103	Prescribed fire may be used in any river corridor as long as ORVs are maintained within the corridor.
	Fire Guideline	1104	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize strategies and tactics that minimize the impacts of suppression activities on river classifications and ORVs.
MPC 3.2 Active Restoration and Maintenance of Aquatic, Terrestrial, and Watershed Resources	General Standard	1105	Management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary (up to 3 years) or short-term (3-15 years) time periods, and must be designed to avoid degradation of existing conditions in the long-term (greater than 15 years).
	Vegetation Standard	1106	Vegetation restoration or maintenance treatments—including mechanical and prescribed fire—may only occur where they: a) Maintain or restore water quality needed to fully support beneficial uses and habitat for native and desired non-native fish species; or b) Maintain or restore habitat for native and desired non-native wildlife and plant species; or c) Reduce risk of impacts from wildland fire to human life, structures, and investments.
	Road Standard	1107	Road construction or reconstruction may only occur where needed: a) To provide access related to reserved or outstanding rights, or b) To respond to statute or treaty, or c) To support aquatic, terrestrial, and watershed restoration activities, or d) To address immediate response situations where, if the action is not taken, unacceptable impacts to hydrologic, aquatic, riparian or terrestrial resources, or health and safety, would result.
	Fire Guideline	1108	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize suppression strategies and tactics that minimize impacts on aquatic, terrestrial, or watershed resources.

MPC/Resource Area	Direction	Number	Management Direction Description
MPC 4.1c Undeveloped Recreation: Maintain Unroaded Character with Allowance for Restoration Activities	General Standard	1109	Management actions—including mechanical vegetation treatments, salvage harvest, prescribed fire, special use authorizations, and road maintenance—must be designed and implemented in a manner that would be consistent with the unroaded landscape in the temporary, short term, and long term. Exceptions to this standard are actions in the 4.1c road standard, below.
	Road Standard	1110	Road construction or reconstruction may only occur where needed: a) To provide access related to reserved or outstanding rights, or b) To respond to statute or treaty.
	Fire Guideline	1111	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize tactics that minimize impacts of suppression activities on the unroaded landscape in the area.
MPC 5.1 Restoration and Maintenance Emphasis within Forested Landscapes	Vegetation Guideline	1112	The full range of treatment activities, except wildland fire use, may be used to restore or maintain desired vegetation and fuel conditions. Salvage harvest may also occur.
	Fire Guideline	1113	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize strategies and tactics that minimize impacts to habitats, developments, and investments.
	Road Guideline	1114	Road construction or reconstruction may occur where needed: a) To provide access related to reserved or outstanding rights, or b) To respond to statute or treaty, or c) To achieve restoration and maintenance objectives for vegetation, water quality, aquatic habitat, or terrestrial habitat; or d) To support management actions taken to reduce wildfire risks in wildland-urban interface areas; or e) To meet access and travel management objectives.
MPC 5.2 Commodity Production Emphasis within Forested Landscapes	Fire Guideline	1115	Prescribed fire may be used to: a) Maintain or restore desired vegetative conditions on unsuited timberlands; or b) Maintain or restore desired fuel conditions for all vegetation types; or c) Maintain desired vegetative conditions on suited timberlands within PVGs 2 through 10.
	Fire Guideline	1116	The full range of fire suppression strategies may be used to suppress wildfires. Emphasize strategies and tactics that minimize impacts to developments and investments.
Soil, Water, Riparian, and Aquatic Resources	Objective	1117	Improve water quality by reducing accelerated sediment from existing roads in the Big Pine Creek (Scott Mountain Road), Danskin Creek, and Alder Creek drainages.
	Objective	1118	Evaluate opportunities to reduce accelerated erosion from natural and human-caused disturbance, initial focus should be in the Danskin area.
	Objective	1119	Work with Boise County to evaluate culvert on Forest Highway 17 at Danskin Creek to determine if there is a fish passage barrier and, if so, identify options for improvement.
	Objective	1120	Restore fish passage from the South Fork Payette River to Danskin Creek to restore connectivity of native fish populations.
	Objective	1121	Maintain the South Fork Payette River as a migratory corridor for bull trout.

MPC/Resource Area	Direction	Number	Management Direction Description
Vegetation	Objective	1122	Restore and maintain species composition, structural diversity and ecosystem processes in all vegetation groups at moderate to high hazard to uncharacteristic wildfire, and/or at high hazard from insect outbreak, to make them more resilient and resistant.
	Objective	1123	Manage vegetation in riparian areas reduce the threat of uncharacteristic wildfire.
Botanical Resources	Objective	1124	Maintain or restore known populations and occupied habitats of TEPCS plant species, including giant helleborine orchid and Idaho douglasia, to contribute to the long-term viability of these species.
Non-native Plants	Objective	1125	Manage designated non-native, invasive weeds in an integrated approach, as specified in the Strategic and Annual Operating Plans established by the Upper Payette River Cooperative Weed Management Area Participants.
Wildlife Resources	Objective	1126	Improve big-game winter range by restoring Mountain Big Sage and Montane Shrub vegetation groups along the South Fork Payette River corridor. Emphasize increasing native plant forage by reducing noxious weeds.
	Objective	1127	Improve wildlife habitat by increasing the aspen component.
	Objective	1128	Maintain or restore bald eagle wintering habitat along the South Fork Payette River corridor, with emphasis on retaining or increasing large tree and snag components.
Recreation Resources	Objective	1129	Manage the South Fork Payette River corridor to provide access for river users.
	Objective	1130	Develop a river corridor management plan that would address issues such as river access, sanitation facilities, effects on adjacent privately owned lands, dispersed recreation use impacts to other resources, and interpretive and educational signing.
	Objective	1131	Facilitate and participate in the development of a Scenic Byway Corridor Management Plan for the Wildlife Canyon Scenic Byway with local government agencies and other partners.
	Objective	1132	Work with outfitters and guides to improve river use ethics.
	Objective	1133	Complete vegetation management plans for developed sites and heavily used dispersed sites.
	Objective	1134	Continue to coordinate with groups, such as the Wildlife Corridor Group and Idaho Fish and Game, to enhance wildlife viewing opportunities and habitat.
	Objective	1135	Assess the Scott Mountain Road for needed improvement to enhance recreational travel.
	Objective	1136	Work with local landowners and groups to resolve conflicts with dispersed camping on the south side of the Payette River.
	Objective	1137	Improve the portage trail around Big Falls to enhance recreation experiences enhance user safety.
	Objective	1138	Develop management plans for the hot springs near Hot Springs Campground and Pine Flat Hot Springs to enhance recreation experiences at these popular sites.
	Objective	1139	Develop trail management plans to guide trail maintenance activities.

MPC/Resource Area	Direction	Number	Management Direction Description
Recreation Resources	Objective	1140	Achieve or maintain the following ROS strategy: (see ROS table below) The above numbers reflect current travel regulations. These numbers may change as a result of future travel regulation planning.
Cultural Resources	Objective	1141	Maintain the National Register status of eligible properties. Monitor the conditions of Big Falls Portage and other National Register eligible properties in the management area.
	Objective	1142	Work with outfitters and guides on the river to increase the public's awareness of and appreciation for cultural resources protection. Provide outfitters and guides with interpretive information about the people and events that shaped the area's history.
	Objective	1143	Conduct a sample inventory to identify historic properties in tributary drainages feeding the South Fork Payette River.
	Objective	1144	Develop a management plan and interpretation for Big Falls Portage to resolve adverse effects to the prehistoric site from erosion, unauthorized artifact collection, and the lack of sanitation facilities.
Timberland Resources	Objective	1145	Manage unsuited timberlands to restore and maintain big-game winter range conditions.
	Objective	1146	Manage suited timberlands to provide tree densities that provide protection from uncharacteristic wildfire and insect epidemics, while contributing wood products and improving growth and vigor.
	Objective	1147	Manage suited timberlands to emphasize stocking control and fuels reduction in older plantations.
	Objective	1148	Reduce the opportunity for noxious weed establishment and spread by keeping suitable weed sites to a minimum during timber harvest activities in the Lower South Fork Payette River, Danskin-Poorman, and Pig Pine Creek subwatersheds. Consider such methods as designated skid trails, winter skidding, minimal fire line construction, broadcast burning rather than pile burning, or keeping slash piles small to reduce heat transfer to the soil.
	Guideline	1149	Existing noxious weed infestations should be treated on landings, skid trails, and helibases in the project area before timber harvest activities begin in the Lower South Fork Payette River, Danskin-Poorman, and Pig Pine Creek subwatersheds.
Rangeland Resources	Objective	1150	Evaluate and incorporate methods to help prevent weed establishment and spread from livestock grazing activities in the Lower South Fork Payette, Danskin-Poorman, and Alder Creek subwatersheds. Consider changes in the timing, intensity, duration, or frequency of livestock use; the location of salting; and restoration of watering sites.
Mineral Resources	Objective	1151	Evaluate the mill site in Big Pine Creek for restoration opportunities.
	Objective	1152	Survey, locate, and evaluate old mining sites for restoration and reclamation opportunities.

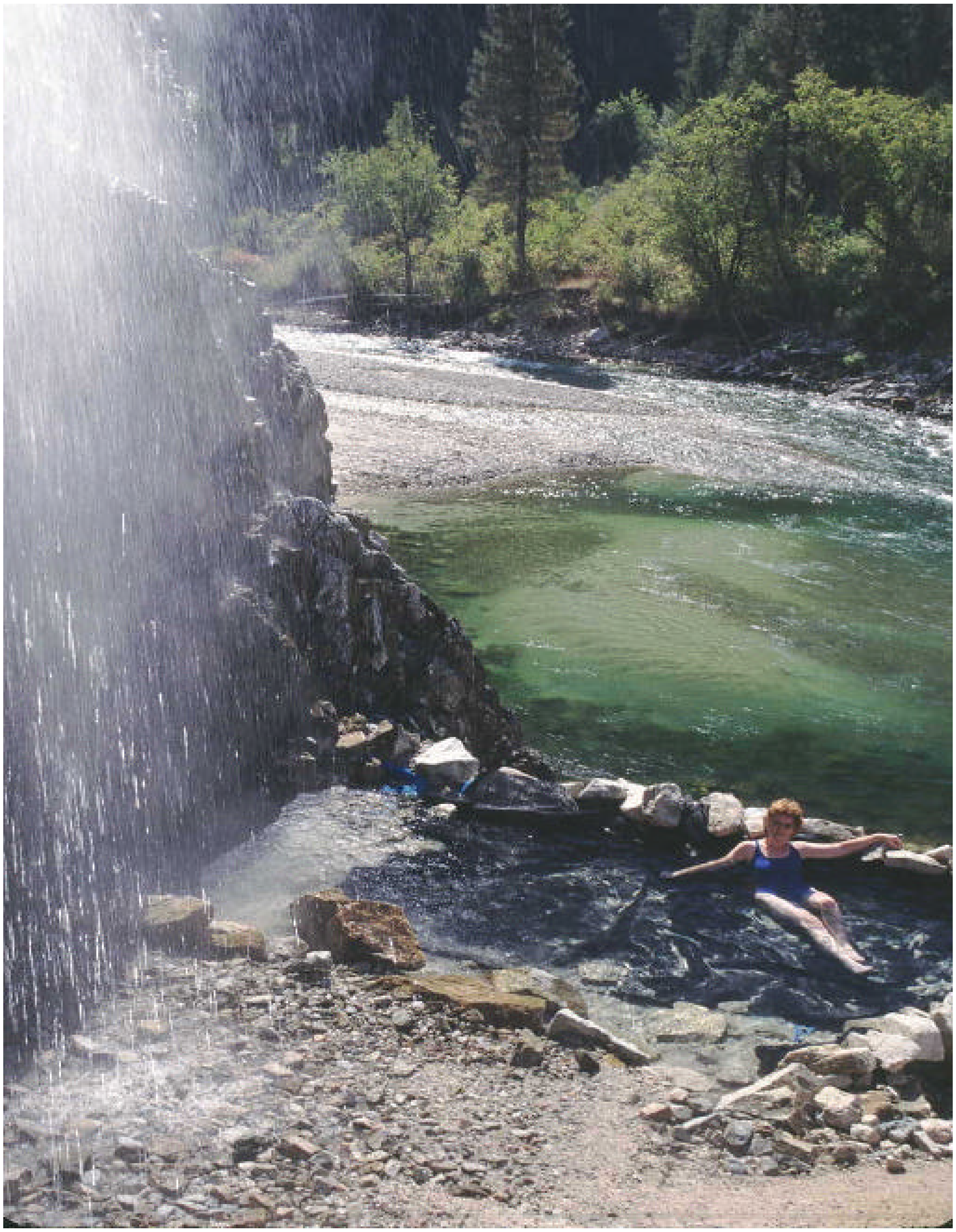
ROS strategy for Objective 1140:

ROS Class	Percent of Mgt. Area	
	Summer	Winter
Semi-Primitive Non-Motorized	13%	24%
Semi-Primitive Motorized	9%	56%
Roaded Natural	27%	20%
Roaded Modified	51%	0%

MPC/Resource Area	Direction	Number	Management Direction Description
Fire Management	Objective	1153	Use prescribed fire and mechanical treatments within and adjacent to wildland/urban interface areas to manage fuel loadings and to reduce wildfire hazards. Develop and prioritize vegetation treatment plans for wildland-urban interface in coordination with local and tribal governments, agencies, and landowners.
	Objective	1154	Coordinate and emphasize fire education and prevention programs with private landowners to help reduce wildfire hazards and risks. Work with landowners to increase defensible space around structures.
Lands and Special Uses	Objective	1155	Develop a plan to reduce the backlog of known trespass cases throughout the management area.
	Objective	1156	Dispose of the dwelling and outbuildings on the former Ford property and rehabilitate the site to reduce public safety hazards.
	Objective	1157	Maintain Bureau of Reclamation electronic sites to monitor Deadwood Dam.
Facilities and Roads	Objective	1158	Bring Garden Valley work center up to standards for public safety. Provide for fire organizational needs during improvement.
	Objective	1159	Evaluate the transportation systems in Danskin and Wash Creek drainages to determine management of ATV use and identify ATV opportunities.
	Objective	1160	Evaluate and incorporate methods to help prevent weed establishment and spread from road management activities in the Lower South Fork Payette, Danskin-Poorman, and Alder Creek subwatersheds. Methods to be considered include: ➢ When decommissioning roads, treat weeds before roads are made impassable. ➢ Schedule road maintenance activities when weeds are least likely to be viable or spread. Blade from least to most infested sites. ➢ Consult or coordinate with the district noxious weed coordinator when scheduling road maintenance activities. ➢ Periodically inspect road systems and rights of way. ➢ Avoid accessing water for dust abatement through weed-infested sites, or utilize mitigation to minimize weed seed transport.
Special Features	Objective	1161	Maintain public access to the firefighters memorial up Danskin Creek.
	Objective	1162	Improve access to hot springs of high interest.
Scenic Environment	Objective	1163	Manage for visual values immediately adjacent to State Highway 17 by increasing the seral tree (ponderosa pine and aspen) component, developing more open stand structure, and increasing the amount of large-trees in the Warm Dry Douglas-fir/Moist Ponderosa Pine potential vegetation group.
	Standard	1164	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in the table below as viewed from the following areas/corridors:

Sensitive Travel Route Or Use Area	Sensitivity Level	Visual Quality Objective								
		Fg			Mg			Bg		
		Variety Class			Variety Class			Variety Class		
		A	B	C	A	B	C	A	B	C
Banks to Lowman Highway	1	R	R	PR	R	PR	PR	R	PR	M
South Fork Payette River	1	R	R	PR	R	PR	PR	R	PR	M
Forest Road 382	2	PR	PR	M	PR	M	M	PR	M	MM
Forest Road 555	1	PR	PR	PR	PR	PR	PR	PR	PR	M
Hot Springs, Pine Flats Campgrounds	1	R	R	PR	R	PR	PR	R	PR	M
Deadwood Lookout	1	R	R	PR	R	PR	PR	R	PR	M
Forest Road 615	2	PR	PR	M	PR	M	M	PR	M	MM
Forest Trails 029, 152	2	PR	PR	M	PR	M	M	PR	M	MM
Forest Road 555EC	2	PR	PR	M	PR	M	M	PR	M	MM

Pine Flats Hot Springs – South Fork Payette River



Appendix E. Statistical Analysis for Normalized Flow Calculations

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Sites in this file include:
USGS 13235000 SF PAYETTE RIVER AT LOWMAN ID
Data heading explainations.
begin_yr_dt ... First complete year of data of daily mean values for this day.
end_yr_dt ... Last complete year of data of daily mean values for this day.
max_mean_va ... Maximum daily mean value for this day of daily mean values for this day.
min_mean_va ... Minimum daily mean value for this day of daily mean values for this day.
count_nu ... Number of daily mean values for this day of daily mean values for this day.
mean_va ... Mean of daily mean values for this day of daily mean values for this day.
p05_va ... 05 percentile of daily mean values for this day.
p10_va ... 10 percentile of daily mean values for this day.
p15_va ... 15 percentile of daily mean values for this day.
p20_va ... 20 percentile of daily mean values for this day.
p25_va ... 25 percentile of daily mean values for this day.
p30_va ... 30 percentile of daily mean values for this day.
p35_va ... 35 percentile of daily mean values for this day.
p40_va ... 40 percentile of daily mean values for this day.
p45_va ... 45 percentile of daily mean values for this day.
p50_va ... 50 percentile (median) of daily mean values for this day.
p55_va ... 55 percentile of daily mean values for this day.
p60_va ... 60 percentile of daily mean values for this day.
p65_va ... 65 percentile of daily mean values for this day.
p70_va ... 70 percentile of daily mean values for this day.
p75_va ... 75 percentile of daily mean values for this day.
p80_va ... 80 percentile of daily mean values for this day.
p85_va ... 85 percentile of daily mean values for this day.
p90_va ... 90 percentile of daily mean values for this day.
p95_va ... 95 percentile of daily mean values for this day.
#
#

agency_cd	site_no	month_nu	day_nu	begin_yr	end_yr	count_nu	count_zero	count_miss	max_va_yr	max_va	min_va_yr	min_va	mean_va	p05_va	p10_va	p15_va	p20_va	p25_va	p30_va	p35_va	p40_va	p45_va	p50_va	p55_va	p60_va	p65_va	p70_va	p75_va	p80_va	p85_va	p90_va	p95_va
5s	15s	3n	3n	6n	6n	8n	8n	8n	5n	12s	5n	12s	Discharge	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s
USGS	13235000	1	1	1941	2004	63	0	0	1997	3240	1995	140	367	195	233	240	250	250	268	273	287	292	306	310	319	330	339	358	372	389	507	614
USGS	13235000	1	2	1941	2004	63	0	0	1997	2470	1995	140	352	179	230	250	254	260	262	268	276	288	300	315	321	333	343	355	369	384	492	585
USGS	13235000	1	3	1941	2004	63	0	0	1997	1610	1995	150	334	186	225	238	249	255	261	270	280	280	287	298	309	323	336	350	374	404	480	560
USGS	13235000	1	4	1941	2004	63	0	0	1997	1280	1995	180	330	193	213	226	246	255	260	270	280	290	300	309	321	335	345	358	375	393	453	546
USGS	13235000	1	5	1941	2004	63	0	0	1997	1140	1979	180	337	202	230	250	257	260	266	281	300	310	312	317	322	330	358	368	383	424	436	623
USGS	13235000	1	6	1941	2004	63	0	0	1997	1090	1979	155	343	220	230	243	250	260	274	280	291	300	307	324	338	344	352	376	400	423	441	607
USGS	13235000	1	7	1941	2004	63	0	0	1997	884	1979	170	340	196	240	250	250	258	263	280	287	298	305	316	336	346	378	384	410	424	449	605
USGS	13235000	1	8	1941	2004	63	0	0	1997	839	1979	185	343	212	230	244	256	270	280	287	298	310	320	333	351	359	377	388	394	422	460	594
USGS	13235000	1	9	1941	2004	63	0	0	1997	777	1987	200	339	212	240	246	263	277	281	289	291	307	320	325	352	362	376	384	398	431	477	515
USGS	13235000	1	10	1941	2004	63	0	0	1997	775	1993	200	338	212	240	250	259	262	284	293	300	312	320	330	345	352	370	390	416	438	469	499
USGS	13235000	1	11	1941	2004	63	0	0	1997	713	1963	190	333	211	243	255	262	275	280	290	295	300	310	322	340	357	364	378	411	427	451	479
USGS	13235000	1	12	1941	2004	63	0	0	1997	669	1963	160	325	221	240	254	259	267	278	287	294	308	315	321	333	347	362	370	390	401	417	451
USGS	13235000	1	13	1941	2004	63	0	0	1997	727	1963	195	336	211	237	260	266	279	285	290	294	300	315	325	337	348	358	375	390	437	476	500
USGS	13235000	1	14	1941	2004	63	0	0	1997	704	1961	220	338	232	250	260	270	278	285	292	302	315	321	331	337	350	358	369	400	412	435	538
USGS	13235000	1	15	1941	2004	63	0	0	1974	856	1961	230	339	236	260	268	278	284	289	296	306	310	324	328	336	349	353	359	364	378	432	519
USGS	13235000	1	16	1941	2004	63	0	0	1974	1600	2002	182	342	212	240	258	269	274	281	288	292	298	311	318	325	338	345	353	370	404	422	538
USGS	13235000	1	17	1941	2004	63	0	0	1974	1800	2001	200	346	230	238	250	260	270	275	280	291	308	310	323	332	334	353	360	374	400	424	506
USGS	13235000	1	18	1941	2004	63	0	0	1974	1500	1943	199	333	210	220	232	246	265	269	272	283	290	301	318	326	344	350	358	364	376	404	606
USGS	13235000	1	19	1941	2004	63	0	0	1974	1250	1990	200	328	210	225	240	240	260	267	272	280	288	300	310	323	339	350	358	361	371	421	591
USGS	13235000	1	20	1941	2004	63	0	0	1974	1060	1990	185	330	212	232	243	252	260	270	280	285	299	310	320	329	339	348	350	361	386	419	615
USGS	13235000	1	21	1941	2004	63	0	0	1974	940	1987	195	337	199	216	242	259	270	280	281	292	297	310	319	324	332	339	364	383	417	459	669
USGS	13235000	1	22	1941	2004	63	0	0	1974	870	1991	195	341	211	222	243	250	260	266	282	297	300	315	323	328	337	350	368	391	436	529	648
USGS	13235000	1	23	1941	2004	63	0	0	1974	820	1979	190	337	216	230	241	251	260	270	282	296	303	319	328	333	339	349	362	399	421	500	590
USGS	13235000	1	24	1941	2004	63	0	0	1974	780	1977	200	336	210	226	240	250	268	275	280	300	310	321	325	333	340	354	363	378	413	461	607
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USGS	13235000	1	26	1941	2004	63	0	0	1974	710	1989	195	326	220	220	248	254	262	280	288	298	305	309	319	332	336	344	353	369	399	431	532
USGS	13235000	1	27	1941	2004	63	0	0	2003	946	1948	190	330	203	222	240	249	263	271	281	287	291	300	312	323	329	340	363	380	402	451	583
USGS	13235000	1	28	1941	2004	63	0	0	2003	787	1979	180	319	198	214	228	234	258	260	269	279	289	300	314	317	326	346	358	365	417	437	561
USGS	13235000	1	29	1941	2004	63	0	0	1974	650	1979	155	313	198	230	231	240	240	256	273	281	298	300	308	316	328	339	349	362	398	418	545
USGS	13235000	1	30	1941	2004	63	0	0	1974	630	1979	165	314	214	230	240	241	254	270	278	280	287	296	305	316	322	330	350	358	382	400	568
USGS	13235000	1	31	1941	2004	63	0	0	2003	814	1979	180	325	212	227	239	252	275	280	287	292	300	300	309	313	315	335	340	354	385	412	653
USGS	13235000	2	1	1941	2004	63	0	0	2003	1110	1994	192	344	218	235	250	262	271	280	281	289	295	300	305	312	322	331	358	380	403	504	682
USGS	13235000	2	2	1941	2004	63	0	0	1995	1240	1988	214	345	221	232	245	252	260	270	286	290	299	305	311	324	328	339	343	368	412	527	635
USGS	13235000	2	3	1941	2004	63	0	0	1963	876	1989	195	337	220	236	244	250	260	269	277	289	297	300	308	311	326	343	355	377	413	521	669
USGS	13235000	2	4	1941	2004	63	0	0	1963	1230	1989	186	338	213	231	242	250	260	269	277	286	300	300	308	312	315	332	358	386	416	499	590

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5s	15s	3n	3n	6n	6n	8n	8n	8n	5n	12s	5n	12s	Discharge	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s
USGS	13235000	2	5	1941	2004	63	0	0	1963	1150	1989	170	332	215	232	242	254	260	274	275	281	289	290	299	311	320	330	374	402	440	477	548
USGS	13235000	2	6	1941	2004	63	0	0	1963	1030	1989	180	332	230	240	242	255	260	268	280	283	290	305	313	315	325	345	374	394	403	461	532
USGS	13235000	2	7	1941	2004	63	0	0	1963	908	1989	190	334	240	240	248	250	273	280	283	297	305	306	310	314	324	339	353	370	413	466	530
USGS	13235000	2	8	1941	2004	63	0	0	1996	934	1989	205	335	233	241	250	257	265	278	285	290	291	300	311	319	333	337	358	375	385	468	564
USGS	13235000	2	9	1941	2004	63	0	0	1996	850	1980	212	332	230	240	246	250	262	275	280	290	299	308	314	320	326	333	355	367	406	462	565
USGS	13235000	2	10	1941	2004	63	0	0	1996	807	1980	220	330	232	240	250	250	260	271	285	292	298	305	306	314	330	343	360	379	385	469	536
USGS	13235000	2	11	1941	2004	63	0	0	1996	738	1955	200	327	230	240	250	253	260	270	282	291	299	301	308	323	336	342	355	372	385	462	537
USGS	13235000	2	12	1941	2004	63	0	0	1996	691	1988	219	330	222	241	250	255	260	272	281	295	302	308	312	320	338	347	368	389	424	450	528
USGS	13235000	2	13	1941	2004	63	0	0	1996	677	1949	220	333	230	246	251	258	270	272	284	295	307	313	315	323	338	360	372	400	433	468	512
USGS	13235000	2	14	1941	2004	63	0	0	1996	689	1990	202	335	224	239	255	264	271	280	284	291	298	306	313	338	351	361	384	393	424	470	534
USGS	13235000	2	15	1941	2004	63	0	0	1982	753	1990	208	339	231	240	250	258	280	286	294	300	305	310	325	342	350	362	363	382	426	457	542
USGS	13235000	2	16	1941	2004	63	0	0	1982	920	1988	228	343	237	250	260	267	275	280	288	298	305	306	317	339	349	358	363	387	408	474	538
USGS	13235000	2	17	1941	2004	63	0	0	1982	784	1993	202	344	241	251	260	265	272	278	284	290	302	306	315	334	348	357	365	387	407	502	670
USGS	13235000	2	18	1941	2004	63	0	0	1996	801	1955	220	344	234	252	264	271	279	284	289	297	306	312	326	331	345	367	376	384	418	487	545
USGS	13235000	2	19	1941	2004	63	0	0	1996	875	1955	210	348	223	250	263	270	273	279	286	292	299	313	318	336	354	362	376	389	446	481	672
USGS	13235000	2	20	1941	2004	63	0	0	1996	848	1990	220	354	226	242	257	265	270	279	288	296	308	317	325	339	356	369	384	398	439	545	699
USGS	13235000	2	21	1941	2004	63	0	0	1982	835	1964	230	354	233	245	257	260	275	286	289	298	302	313	321	347	360	372	395	411	423	516	645
USGS	13235000	2	22	1941	2004	63	0	0	1982	1350	1989	236	363	244	252	261	270	271	285	296	305	310	321	328	349	358	366	384	405	457	509	625
USGS	13235000	2	23	1941	2004	63	0	0	1982	1140	1960	237	364	243	256	268	277	280	291	299	310	314	317	325	343	352	369	379	393	455	511	697
USGS	13235000	2	24	1941	2004	63	0	0	1986	1100	1977	234	366	251	259	262	268	274	284	300	306	312	322	327	343	360	372	387	419	465	521	685
USGS	13235000	2	25	1941	2004	63	0	0	1986	1180	1977	203	370	247	258	264	270	280	284	291	299	310	317	328	346	368	388	393	443	496	557	644
USGS	13235000	2	26	1941	2004	63	0	0	1986	1230	2002	220	367	240	249	260	274	278	280	296	300	309	318	329	343	356	386	410	439	507	521	647
USGS	13235000	2	27	1941	2004	63	0	0	1986	1210	2002	190	364	212	253	260	270	280	285	294	310	320	323	337	343	366	382	418	428	470	515	609
USGS	13235000	2	28	1941	2004	63	0	0	1986	1140	1993	215	365	231	242	259	267	283	292	296	303	312	325	340	357	368	402	421	442	473	519	590
USGS	13235000	2	29	1941	2004	16	0	0	1972	748	1960	243	378		257	267	277	289	296	300	312	326	341	355	370	389	398	436	476	521	613	
USGS	13235000	3	1	1941	2004	63	0	0	1986	1140	1993	210	368	236	252	266	280	293	299	304	309	322	336	349	351	367	389	438	461	473	516	551
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USGS	13235000	3	3	1941	2004	63	0	0	1986	1220	2002	220	370	232	244	259	274	280	292	297	316	334	343	350	360	382	405	420	432	476	522	587
USGS	13235000	3	4	1941	2004	63	0	0	1986	1200	1977	218	369	224	257	267	271	282	287	293	318	330	336	346	360	371	400	410	451	493	518	576
USGS	13235000	3	5	1941	2004	63	0	0	1986	1150	1977	218	369	241	259	274	282	286	290	299	311	330	334	348	357	370	390	418	451	472	507	591
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USGS	13235000	3	7	1941	2004	63	0	0	1986	1240	1977	228	375	251	274	285	293	297	306	318	323	324	336	348	359	386	395	421	438	474	491	549
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USGS	13235000	3	9	1941	2004	63	0	0	1986	1650	2002	240	394	263	271	282	292	298	312	319	334	341	344	351	375	408	426	439	453	483	499	602
USGS	13235000	3	10	1941	2004	63	0	0	1986	1440	1960	230	408	245	272	282	294	300	315	327	330	339	368	375	389	408	422	449	468	512	611	691
USGS	13235000	3	11	1941	2004	63	0	0	1986	1310	1977	213	423	268	272	281	293	302	310	317	331	342	377	379	395	410	442	452	483	552	663	918
USGS	13235000	3	12	1941	2004	63	0	0	1986	1200	1977	245	426	272	276	288	299	308	317	333	345	353	359	375	386	409	435	466	489	538	649	1003
USGS	13235000	3	13	1941	2004	63	0	0	1986	1110	1977	234	426	268	275	290	301	317	336	345	348	354	363	380	390	425	467	488	498	525	632	901
USGS	13235000	3	14	1941	2004	63	0	0	1983	1020	1977	223	425	261	274	293	301	310	316	342	359	363	372	379	403	437	454	485	510	539	591	923
USGS	13235000	3	15	1941	2004	63	0	0	1972	935	1977	198	424	272	281	288	299	306	325	338	343	363	384	414	420	428	446	477	493	536	600	915
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USGS	13235000	3	17	1941	2004	63	0	0	1972	1110	1977	234	437	278	288	297	303	318	331	346	358	373	395	411	424	438	460	497	524	553	718	829
USGS	13235000	3	18	1941	2004	63	0	0	1972	1240	1977	218	444	276	290	295	310	320	330	349	366	374	390	402	415	432	457	485	511	575	747	873
USGS	13235000	3	19	1941	2004	63	0	0	1972	1180	1977	223	454	276	295	306	323	333	345	367	380	388	402	413	433	443	455	473	560	663	740	888
USGS	13235000	3	20	1941	2004	63	0	0	1972	1040	1977	208	465	275	293	311	322	332	353	373	380	382	406	425	436	457	477	531	605	714	803	879
USGS	13235000	3	21	1941	2004	63	0	0	1972	999	1977	228	479	285	291	315	329	342	360	374	385	390	401	419	445	480	530	539	633	758	807	914
USGS	13235000	3	22	1941	2004	63	0	0	1972	1050	1977	228	490	269	291	319	342	349	368	376	391	399	406	430	442	472	567	603	662	738	865	921
USGS	13235000	3	23	1941	2004	63	0	0	1972	1340	1977	245	524	276	305	316	341	359	382	384	397	411	430	434	455	472	568	674	762	876	914	1040
USGS	13235000	3	24	1941	2004	63	0	0	1998	1290	1955	254	533	287	305	324	346	361	381	395	407	419	430	444	467	485	538	680	818	884	948	1104
USGS	13235000	3	25	1941	2004	63	0	0	1956	1190	1977	234	533	282	312	333	352	371	386	397	413	437	442	460	482	499	528	648	754	874	963	1018
USGS	13235000	3	26	1941	2004	63	0	0	1999	1110	1977	228	538	282	312	328	359	371	389	405	419	441	460	488	508	521	556	632	746	870	968	1072
USGS	13235000	3	27	1941	2004	63	0	0	1993	1300	1977	239	550	257	306	352	368	376	390	400	427	448	462	497	523	581	612	673	725	834	910	1168
USGS	13235000	3	28	1941	2004	63	0	0	1978	1470	1977	234	558	269	304	351	365	374	378	407	425	449	481	502	576	611	637	710	748	789	880	1186
USGS	13235000	3	29	1941	2004	63	0	0	1978	1660	1977	223	563	290	321	345	367	374	386	413	426	446	475	523	564	589	621	676	731	793	960	1146
USGS	13235000	3	30	1941	2004	63	0	0	1978	1910	1977	228	576	299	349	354	367	384	396	412	430	464	511	541	555	583	604	659	749	816	902	1122
USGS	13235000	3	31	1941	2004	63	0	0	1978	2060	1977	223	591	305	339	360	370	388	402	441	474	506	515	547	569	585	631	673	734	809	936	1172
USGS	13235000	4	1	1941	2004	63	0	0	1978	2110	1977	228	604	298	345	363	385	398	415	471	504	525	537	555	583	642	658	688	731	795	944	1122
USGS	13235000	4	2	1941	2004	63	0	0	1978	1810	1977	223	618	299	341	383	392	443	465	485	511	561	581	596	615	650	664	736	744	815	1007	1138
USGS	13235000	4	3	1941	2004	63	0	0	1978	1520	1977	218	639	310	342	384	417	466	499	504	541	564	611	625	658	693	724	782	799	849	937	1332
USGS	13235000	4	4	1941	2004	63	0	0	1978	1340	1977	250	665	303	354	402	442	473	515	530	565	614	628	653	670	730	766	842	879	913	1002	1303
USGS	13235000	4	5	1941	2004	63	0	0	1969	1370	1955	264	704	312	371	402	449	488	522	573	609	654	680	694	715	773	809	838	891	1004	1196	1302
USGS	13235000	4	6	1941	2004	63	0	0	1969	1640	1955	288	759	351	376	405	473	520	590	631	646	651	675	729	782	815	876	911	982	1124	1326	1436
USGS	13235000	4	7	1941	2004	63	0	0	1995	1850	1975	293	787	352	396	425	463	569	590	614	627	647	688	748	816	855	904	926	1032	1100	1452	1612
USGS	13235000	4	8	1941	2004	63	0	0	1943	1930	1975	287	799	364	408	438	460	535	566	594	623	657	697	751	785	828	952	989	1030	1106	1444	1692
USGS	13235000	4	9	1941	2004	63	0	0	1996	1910	1975	290	811	367	417	455	503	532	559	604	634	643	690	726	833	883	947	975	1042	1202	1498	1694

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5s	15s	3n	3n	6n	6n	8n	8n	8n	5n	12s	5n	12s	Discharge	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s
USGS	13235000	4	10	1941	2004	63	0	0	1996	2250	1975	288	825	368	417	445	472	518	569	592	636	662	750	782	829	926	992	1030	1052	1204	1442	1680
USGS	13235000	4	11	1941	2004	63	0	0	1996	2030	1975	300	831	370	412	449	469	512	573	597	663	684	756	790	848	925	969	1050	1170	1266	1419	1660
USGS	13235000	4	12	1941	2004	63	0	0	1943	2110	1975	340	869	368	408	432	495	528	609	646	697	728	770	831	895	922	1010	1160	1228	1314	1440	1708
USGS	13235000	4	13	1941	2004	63	0	0	1943	2390	1945	343	894	376	417	421	511	593	619	641	715	775	826	872	934	1030	1092	1170	1212	1326	1504	1656
USGS	13235000	4	14	1941	2004	63	0	0	1943	2580	1945	338	951	383	406	457	539	566	614	712	768	779	909	960	1008	1082	1170	1210	1293	1396	1584	1880
USGS	13235000	4	15	1941	2004	63	0	0	1943	2780	2001	348	988	367	432	475	508	545	673	741	766	878	994	1022	1044	1084	1180	1220	1332	1392	1544	1968
USGS	13235000	4	16	1941	2004	63	0	0	1943	2980	1955	350	1006	404	452	496	545	563	700	768	845	885	941	1042	1100	1112	1194	1260	1344	1402	1692	1910
USGS	13235000	4	17	1941	2004	63	0	0	1943	3110	1955	372	1060	427	468	509	608	671	766	791	886	924	978	1024	1144	1208	1258	1310	1419	1582	1774	1933
USGS	13235000	4	18	1941	2004	63	0	0	1943	3070	1955	402	1099	429	470	538	611	734	765	850	882	920	948	1134	1172	1232	1268	1390	1464	1642	1796	2010
USGS	13235000	4	19	1941	2004	63	0	0	1943	3340	1955	368	1131	434	507	573	631	719	770	843	869	893	963	1142	1168	1216	1280	1530	1666	1714	1840	2176
USGS	13235000	4	20	1941	2004	63	0	0	1943	3230	1955	350	1185	454	509	547	671	750	792	846	897	924	1060	1192	1228	1286	1378	1510	1613	1820	2130	2516
USGS	13235000	4	21	1941	2004	63	0	0	1943	3080	1955	358	1223	447	507	541	686	729	804	858	909	1042	1160	1240	1296	1351	1524	1600	1634	1774	2016	2780
USGS	13235000	4	22	1941	2004	63	0	0	1956	2810	1977	395	1248	445	510	557	665	782	826	854	918	1014	1110	1282	1328	1520	1598	1640	1780	1896	2106	2688
USGS	13235000	4	23	1941	2004	63	0	0	1956	2760	1955	417	1276	445	517	590	649	785	866	885	1016	1078	1120	1283	1334	1540	1568	1690	1772	2006	2270	2572
USGS	13235000	4	24	1941	2004	63	0	0	1974	2900	1955	407	1306	470	541	591	644	764	854	945	962	1008	1180	1308	1454	1518	1600	1680	1854	2086	2412	2606
USGS	13235000	4	25	1941	2004	63	0	0	1974	2700	1955	402	1292	502	558	614	655	736	817	893	1006	1080	1200	1272	1372	1476	1580	1780	1884	2202	2330	2412
USGS	13235000	4	26	1941	2004	63	0	0	1946	2750	1955	417	1269	511	590	628	679	737	807	855	940	1076	1190	1238	1320	1400	1564	1700	1878	2028	2266	2432
USGS	13235000	4	27	1941	2004	63	0	0	1952	3130	1955	397	1264	495	594	639	715	765	813	857	940	1050	1140	1204	1293	1386	1466	1729	1787	2000	2218	2444
USGS	13235000	4	28	1941	2004	63	0	0	1952	3310	1955	382	1300	492	589	679	729	790	845	920	994	1092	1150	1210	1308	1566	1658	1760	1787	1976	2248	2526
USGS	13235000	4	29	1941	2004	63	0	0	1952	2860	1955	402	1307	480	659	736	780	844	905	970	1022	1076	1110	1296	1419	1504	1658	1690	1800	1912	2152	2604
USGS	13235000	4	30	1941	2004	63	0	0	1965	3160	1967	434	1324	505	658	770	860	889	968	1014	1092	1136	1200	1312	1452	1572	1636	1690	1762	1862	2054	2472
USGS	13235000	5	1	1941	2004	63	0	0	1965	3190	1967	420	1371	509	686	798	887	956	982	1048	1148	1256	1270	1364	1464	1580	1700	1800	1818	2012	2090	2388
USGS	13235000	5	2	1941	2004	63	0	0	1981	3070	1967	416	1436	575	698	770	854	967	1046	1126	1190	1228	1270	1392	1550	1656	1756	1840	1968	2150	2440	2552
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USGS	13235000	6	1	1941	2004	64	0	0	1986	6900	1977	620	2953	991	1505	1688	1890	1978	2030	2130	2180	2545	2710	2933	3110	3153	3610	3788	3900	4308	4700	6433
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agency_cd	site_no	month_nu	day_nu	begin_yr	end_yr	count_nu	count_zero	count_miss	max_va_yr	max_va	min_va_yr	min_va	mean_va	p05_va	p10_va	p15_va	p20_va	p25_va	p30_va	p35_va	p40_va	p45_va	p50_va	p55_va	p60_va	p65_va	p70_va	p75_va	p80_va	p85_va	p90_va	p95_va
5s	15s	3n	3n	6n	6n	8n	8n	8n	5n	12s	5n	12s	Discharge	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s
USGS	13235000	6	14	1941	2004	64	0	0	1974	7500	1987	670	2812	817	1335	1573	2000	2113	2150	2263	2480	2555	2700	2720	2819	2885	3120	3503	3740	4103	4480	5265
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USGS	13235000	6	22	1941	2004	64	0	0	1974	6300	1987	504	2536	594	1185	1283	1360	1485	1670	1865	1990	2100	2385	2592	2839	2890	3060	3155	3700	3993	4235	5200
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USGS	13235000	6	25	1941	2004	64	0	0	1974	5950	1987	466	2331	554	1018	1148	1230	1413	1550	1688	1870	1950	2110	2358	2510	2680	2859	3108	3370	3598	3935	4943
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USGS	13235000	7	2	1941	2004	64	0	0	1983	4550	1977	425	1905	465	723	886	1010	1070	1115	1313	1400	1440	1525	1750	1970	2178	2455	2643	2960	3115	3540	4275
USGS	13235000	7	3	1941	2004	64	0	0	1982	4400	1987	426	1839	452	696	851	972	1010	1095	1235	1380	1448	1535	1660	1810	2044	2365	2570	2810	3090	3500	3880
USGS	13235000	7	4	1941	2004	64	0	0	1975	4300	1987	414	1785	452	683	823	951	996	1090	1163	1360	1480	1515	1605	1760	1895	2415	2518	2760	2960	3410	3808
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USGS	13235000	7	31	1941	2004	64	0	0	1943	1310	1977	250	698	314	383	431	451	477	507	525	603	650	685	699	719	757	824	877	964	1001	1085	1268
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USGS	13235000	8	3	1941	2004	64	0	0	1943	1280	1977	239	643	301	338	406	452	463	481	508	550	587	609	635	653	720	758	793	846	905	968	1138
USGS	13235000	8	4	1941	2004	64	0	0	1943	1180	1977	234	627	298	334	399	433	454	470	486	540	572	596	630	647	706	743	786	835	879	934	1098
USGS	13235000	8	5	1941	2004	64	0	0	1943	1100	1977	234	611	290	328	396	428	442	456	472	530	563	576	609	636	690	719	784	817	893	936	1028
USGS	13235000	8	6	1941	2004	64	0	0	1943	1060	1977	234	597	283	337	394	423	430	438	464	520	543	564	595	625	670	711	757	796	861	923	984
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USGS	13235000	8	16	1941	2004	64	0	0	1993	991	1977	213	506	268	317	348	367	377	383	415	446	461	476	489	534	548	600	615	638	697	748	805
USGS	13235000	8	17	1941	2004	64	0	0	1993	939	1977	208	497	258	309	345	368	376	390	419	444	457	473	482	526	556	589	596	631	686	719	768

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5s	15s	3n	3n	6n	6n	8n	8n	8n	5n	12s	5n	12s	Discharge	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s
USGS	13235000	8	18	1941	2004	64	0	0	1993	818	1977	208	490	253	301	340	360	374	403	419	439	453	465	480	515	563	578	600	647	668	693	751
USGS	13235000	8	19	1941	2004	64	0	0	1965	836	1977	208	484	253	297	338	360	372	402	414	435	453	462	473	506	551	569	588	643	660	678	729
USGS	13235000	8	20	1941	2004	64	0	0	1974	810	1977	203	479	252	293	333	349	371	388	418	429	451	461	473	502	536	555	575	633	650	687	743
USGS	13235000	8	21	1941	2004	64	0	0	1965	812	1977	203	472	249	288	327	349	370	380	409	422	447	457	470	489	536	552	570	614	638	654	708
USGS	13235000	8	22	1941	2004	64	0	0	1965	812	1977	203	467	247	287	333	350	365	377	411	422	437	446	456	481	527	546	561	611	629	654	687
USGS	13235000	8	23	1941	2004	64	0	0	1965	780	1977	203	471	249	285	332	343	364	395	412	429	441	450	463	478	525	541	571	607	644	662	726
USGS	13235000	8	24	1941	2004	64	0	0	1975	798	1977	208	463	248	282	332	345	367	387	410	421	429	434	450	472	519	535	549	593	620	653	714
USGS	13235000	8	25	1941	2004	64	0	0	1965	725	2001	238	454	252	288	330	338	358	390	407	413	424	432	448	465	507	524	535	575	597	631	679
USGS	13235000	8	26	1941	2004	64	0	0	1965	710	2001	234	448	249	299	325	338	368	384	393	408	418	423	443	484	510	521	539	566	575	614	637
USGS	13235000	8	27	1941	2004	64	0	0	1965	680	2001	229	439	248	300	326	338	365	381	387	406	411	419	444	449	488	518	522	550	558	593	621
USGS	13235000	8	28	1941	2004	64	0	0	1983	665	2001	225	432	246	284	323	335	359	375	389	395	407	414	427	442	477	502	509	545	563	586	612
USGS	13235000	8	29	1941	2004	64	0	0	1983	660	2001	225	425	243	277	313	324	358	363	383	390	401	406	427	439	470	484	500	534	555	582	602
USGS	13235000	8	30	1941	2004	64	0	0	1983	651	2001	225	422	242	282	312	329	347	360	372	385	391	401	418	440	470	479	500	529	554	582	623
USGS	13235000	8	31	1941	2004	64	0	0	1984	664	2001	223	420	243	295	313	333	346	356	369	378	385	396	429	450	462	472	507	514	555	574	610
USGS	13235000	9	1	1941	2004	64	0	0	1983	635	2001	221	417	241	279	323	341	349	353	370	374	380	392	423	450	465	479	501	518	539	560	597
USGS	13235000	9	2	1941	2004	64	0	0	1983	635	2001	220	412	239	266	326	343	347	350	363	368	385	398	424	440	450	460	484	512	528	550	583
USGS	13235000	9	3	1941	2004	64	0	0	1983	627	2001	218	406	238	263	318	335	343	346	362	366	380	414	422	430	442	446	476	490	516	541	567
USGS	13235000	9	4	1941	2004	64	0	0	1983	603	2001	217	400	240	261	309	330	336	342	355	366	380	398	416	420	434	444	463	494	508	539	563
USGS	13235000	9	5	1941	2004	64	0	0	1983	596	2001	220	396	239	260	305	320	329	347	356	368	374	390	400	417	432	440	473	486	507	523	552
USGS	13235000	9	6	1941	2004	64	0	0	1984	648	1977	228	397	241	273	306	318	335	343	357	362	365	392	400	412	418	438	466	475	508	529	578
USGS	13235000	9	7	1941	2004	64	0	0	1978	652	1977	223	398	240	268	303	324	339	343	352	358	369	388	400	412	426	445	460	471	512	541	578
USGS	13235000	9	8	1941	2004	64	0	0	1985	835	1977	223	401	236	266	298	328	335	341	351	359	374	391	408	412	425	453	458	492	507	515	605
USGS	13235000	9	9	1941	2004	64	0	0	1985	805	1977	218	401	236	263	295	322	330	336	346	352	375	389	400	412	430	447	454	497	507	553	607
USGS	13235000	9	10	1941	2004	64	0	0	1985	760	1977	218	393	233	250	304	319	328	333	342	353	370	384	393	400	422	440	449	483	501	534	566
USGS	13235000	9	11	1941	2004	64	0	0	1985	680	1977	218	393	234	255	304	312	327	337	352	361	373	379	392	400	434	441	461	480	494	509	603
USGS	13235000	9	12	1941	2004	64	0	0	1985	700	1977	213	393	241	257	300	310	319	330	341	362	370	379	392	422	431	435	458	480	492	522	592
USGS	13235000	9	13	1941	2004	64	0	0	1985	620	1977	213	387	243	259	295	304	312	325	340	363	371	378	394	404	428	435	461	475	491	505	570
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USGS	13235000	9	15	1941	2004	64	0	0	1959	602	1977	218	382	240	259	292	304	312	321	335	362	366	377	396	412	419	428	442	452	486	501	539
USGS	13235000	9	16	1941	2004	64	0	0	1965	623	1994	233	382	235	259	292	305	314	318	337	358	372	378	396	412	423	430	437	462	472	484	545
USGS	13235000	9	17	1941	2004	64	0	0	1965	567	1994	232	383	238	269	299	310	317	331	342	352	363	370	398	403	418	423	441	458	470	509	555
USGS	13235000	9	18	1941	2004	64	0	0	1997	570	1994	230	381	238	257	294	312	318	335	343	359	363	375	396	403	410	418	433	456	470	497	542
USGS	13235000	9	19	1941	2004	64	0	0	1997	541	1994	228	381	240	251	294	306	315	324	345	352	371	387	392	402	412	430	449	464	478	501	530
USGS	13235000	9	20	1941	2004	64	0	0	1982	579	1994	222	382	240	259	295	306	312	329	337	353	371	381	393	395	419	429	449	461	486	498	523
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USGS	13235000	9	22	1941	2004	64	0	0	1984	518	1994	223	371	233	257	286	301	312	322	332	345	363	372	384	402	408	424	440	444	453	466	496
USGS	13235000	9	23	1941	2004	64	0	0	1984	504	1994	219	366	232	254	282	296	309	321	333	347	358	365	381	388	408	426	434	437	445	457	485
USGS	13235000	9	24	1941	2004	64	0	0	1984	497	1994	219	364	234	264	287	301	311	321	337	348	358	367	378	380	400	410	428	436	439	451	476
USGS	13235000	9	25	1941	2004	64	0	0	1984	490	1994	218	365	232	264	290	305	314	319	340	349	358	361	368	387	402	414	423	431	444	456	481
USGS	13235000	9	26	1941	2004	64	0	0	1982	546	1994	218	367	235	275	287	305	308	313	335	347	351	359	372	380	396	417	430	438	441	463	515
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USGS	13235000	9	29	1941	2004	64	0	0	1982	514	2001	224	358	240	262	279	293	302	330	333	337	344	350	353	369	391	397	409	426	436	454	486
USGS	13235000	9	30	1941	2004	64	0	0	1986	533	2001	224	358	239	256	281	293	311	327	332	338	343	347	357	380	389	392	407	426	435	448	479
USGS	13235000	10	1	1941	2004	63	0	0	1983	533	2001	221	355	235	252	269	290	313	321	332	338	343	347	352	367	383	393	416	420	437	448	460
USGS	13235000	10	2	1941	2004	63	0	0	1951	689	2001	219	360	234	251	275	290	315	318	323	333	338	349	364	372	383	392	412	415	435	445	496
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USGS	13235000	10	4	1941	2004	63	0	0	1951	560	2001	217	355	233	262	285	290	304	310	318	329	339	355	362	371	380	398	407	420	440	451	476
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USGS	13235000	10	6	1941	2004	63	0	0	1950	501	2001	220	352	237	256	277	284	300	311	321	326	347	356	367	370	382	396	407	415	423	440	470
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USGS	13235000	10	8	1941	2004	63	0	0	1950	482	2001	218	352	231	251	275	288	306	311	325	333	352	362	368	374	389	398	402	407	417	436	472
USGS	13235000	10	9	1941	2004	63	0	0	1959	644	1988	219	352	230	253	272	285	302	311	321	327	347	358	368	374	380	387	393	397	421	458	474
USGS	13235000	10	10	1941	2004	63	0	0	1962	688	1988	216	356	229	250	270	288	305	308	321	327	338	359	363	373	382	387	395	414	424	452	507
USGS	13235000	10	11	1941	2004	63	0	0	1962	680	1988	219	362	235	255	271	293	313	319	329	333	347	353	363	368	379	386	412	440	451	455	527
USGS	13235000	10	12	1941	2004	63	0	0	1962	1100	1988	219	373	235	252	265	296	315	324	328	337	342	358	364	379	397	406	419	430	444	460	505
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USGS	13235000	10	14	1941	2004	63	0	0	1962	1290	1988	220	367	232	256	266	281	306	316	323	330	337	351	363	366	377	382	394	413	434	460	515
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USGS	13235000	10	16	1941	2004	63	0	0	1962	860	1988	223	365	235	246	275	306	311	315	327	334	339	345	352	358	370	377	388	424	435	455	563
USGS	13235000	10	17	1941	2004	63	0	0	1947	773	1988	223	356	236	245	275	293	306	314	321	329	334	336	344	355	362	372	382	418	429	443	534
USGS	13235000	10	18	1941	2004	63	0	0	1962	718	1988	223	350	237	245	265	285	297	313	319	324	330	334	341	352	357	377	396	410	423	453	516
USGS	13235000	10	19	1941	2004	63	0	0	1962	672	1991	227	352	236	242	265	291	301	315	321	326	332	339	347	353	362	387	404	409	428	461	511
USGS	13235000	10	20	1941	2004	63	0	0	1962	637	1988	229	348	231	238	265	290	301	315	319	324	329	337	349	351	359	375	384	406	420	442	494
USGS	13235000	10	21	1941	2004	63	0	0	1962	609	1988	224	349	229	236	266	296	305	313	318	320	325	336	343	351	374	389	401	408	428	450	484

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5s	15s	3n	3n	6n	6n	8n	8n	8n	5n	12s	5n	12s	Discharge	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s
USGS	13235000	10	22	1941	2004	63	0	0	1975	593	1988	223	355	231	241	267	293	310	314	318	322	329	336	348	364	375	389	401	412	441	459	542
USGS	13235000	10	23	1941	2004	63	0	0	1959	612	1988	223	360	231	246	286	301	308	314	316	324	331	336	359	369	382	387	400	414	439	492	562
USGS	13235000	10	24	1941	2004	63	0	0	1985	715	1988	223	361	229	244	277	301	306	310	313	316	327	331	345	365	379	393	412	413	435	469	590
USGS	13235000	10	25	1941	2004	63	0	0	1985	698	1988	223	357	229	249	272	296	305	309	312	318	329	336	346	363	370	384	390	410	430	471	542
USGS	13235000	10	26	1941	2004	63	0	0	1982	701	1988	220	363	233	254	272	296	310	311	314	320	329	337	350	368	370	387	400	416	450	511	619
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USGS	13235000	10	28	1941	2004	63	0	0	1967	779	1988	219	365	232	252	272	301	305	310	316	322	330	336	343	353	369	390	407	415	463	531	580
USGS	13235000	10	29	1941	2004	63	0	0	1950	705	1988	219	361	234	261	284	300	307	310	313	315	321	337	341	352	374	389	409	417	428	519	564
USGS	13235000	10	30	1941	2004	63	0	0	1950	748	1988	217	362	235	263	284	302	306	310	312	316	326	334	340	350	375	386	417	433	462	509	559
USGS	13235000	10	31	1941	2004	63	0	0	1950	665	1988	219	362	242	261	295	306	308	310	313	319	329	337	349	357	371	398	417	430	447	488	542
USGS	13235000	11	1	1941	2004	63	0	0	1950	618	2002	200	361	238	256	294	305	309	315	320	328	334	342	349	366	383	400	406	413	447	477	545
USGS	13235000	11	2	1941	2004	63	0	0	1950	618	2002	200	355	235	261	290	298	306	311	313	317	328	339	346	364	385	398	406	416	436	471	492
USGS	13235000	11	3	1941	2004	63	0	0	1950	589	1991	215	355	228	271	289	299	305	313	317	324	332	336	345	359	367	384	400	417	439	466	518
USGS	13235000	11	4	1941	2004	63	0	0	1941	628	2002	220	360	242	262	283	299	309	311	317	324	330	337	346	369	382	392	400	432	444	464	555
USGS	13235000	11	5	1941	2004	63	0	0	1943	731	2003	217	358	244	272	280	296	303	306	316	321	331	343	357	362	371	383	390	412	426	453	557
USGS	13235000	11	6	1941	2004	63	0	0	1983	570	2003	230	354	254	281	291	295	303	304	310	321	330	348	360	367	372	382	390	401	426	446	524
USGS	13235000	11	7	1941	2004	63	0	0	1983	957	2003	220	364	258	272	286	294	298	303	307	313	320	337	350	365	379	390	395	412	444	467	544
USGS	13235000	11	8	1941	2004	63	0	0	1980	1040	1994	229	367	243	271	287	290	293	301	307	312	320	331	363	369	376	386	400	420	440	466	568
USGS	13235000	11	9	1941	2004	63	0	0	1980	684	1977	226	362	252	266	280	290	296	306	310	316	323	341	356	361	387	393	407	427	461	482	527
USGS	13235000	11	10	1941	2004	63	0	0	1973	806	1987	240	363	255	266	280	283	301	309	312	317	329	348	353	367	386	405	413	420	440	457	546
USGS	13235000	11	11	1941	2004	63	0	0	1973	962	1987	243	367	246	261	275	293	303	310	314	318	325	333	353	368	382	406	407	412	431	463	510
USGS	13235000	11	12	1941	2004	63	0	0	1973	1620	1977	246	384	253	269	289	297	303	312	314	317	325	330	345	355	374	382	403	414	433	470	797
USGS	13235000	11	13	1941	2004	63	0	0	1973	1450	1977	241	377	249	271	281	286	293	308	314	319	325	347	356	371	378	391	406	424	438	454	654
USGS	13235000	11	14	1941	2004	63	0	0	1973	1050	1994	222	374	252	267	278	291	303	310	314	319	332	349	358	362	368	387	412	414	434	478	677
USGS	13235000	11	15	1941	2004	63	0	0	1941	1470	1994	200	379	246	256	271	281	293	301	308	325	336	342	349	360	367	378	400	409	426	537	691
USGS	13235000	11	16	1941	2004	63	0	0	1941	1000	1961	246	366	252	258	264	280	285	298	307	315	329	338	344	358	368	383	398	414	439	515	615
USGS	13235000	11	17	1941	2004	63	0	0	1941	845	1961	237	363	240	257	270	283	295	303	310	318	330	337	339	350	370	380	397	407	444	477	663
USGS	13235000	11	18	1941	2004	63	0	0	1973	736	1987	175	360	203	251	272	284	287	300	305	322	330	337	346	360	380	389	399	408	449	482	652
USGS	13235000	11	19	1941	2004	63	0	0	1996	1520	1977	160	372	212	248	265	275	287	290	301	321	327	332	336	361	377	390	406	426	464	516	658
USGS	13235000	11	20	1941	2004	63	0	0	1996	1420	1979	185	373	220	249	267	280	292	296	301	308	317	328	335	357	377	382	406	437	461	533	618
USGS	13235000	11	21	1941	2004	63	0	0	1996	957	1979	140	364	203	253	258	265	286	291	298	302	318	325	337	367	379	389	406	434	461	528	653
USGS	13235000	11	22	1941	2004	63	0	0	1996	824	1994	160	359	219	261	267	278	285	293	298	308	320	327	350	359	367	382	390	441	475	513	602
USGS	13235000	11	23	1941	2004	63	0	0	1996	740	1994	180	358	236	261	270	280	287	292	297	312	323	338	350	361	372	387	410	425	459	522	550
USGS	13235000	11	24	1941	2004	63	0	0	1970	1090	1992	170	376	224	266	272	291	298	314	325	335	338	347	358	369	381	398	416	452	475	517	622
USGS	13235000	11	25	1941	2004	63	0	0	1970	1830	1992	142	382	232	258	264	275	298	311	320	331	338	353	362	366	379	396	419	445	469	504	553
USGS	13235000	11	26	1941	2004	63	0	0	1970	978	1992	148	365	204	254	270	282	289	299	324	330	338	344	353	364	370	379	396	422	476	512	599
USGS	13235000	11	27	1941	2004	63	0	0	1970	777	1976	193	356	208	237	251	260	274	293	310	321	331	336	351	368	381	391	409	441	471	504	533
USGS	13235000	11	28	1941	2004	63	0	0	1949	739	1976	170	356	209	234	249	258	271	293	310	320	329	338	359	376	386	399	413	425	453	486	557
USGS	13235000	11	29	1941	2004	63	0	0	1970	597	1979	160	344	205	222	244	260	275	288	300	306	318	333	355	368	376	382	406	418	460	474	517
USGS	13235000	11	30	1941	2004	63	0	0	1995	1000	1979	140	351	204	230	247	269	280	288	300	310	318	334	356	369	376	384	399	430	444	471	486
USGS	13235000	12	1	1941	2004	63	0	0	1995	1420	1954	190	362	214	247	270	279	288	292	305	317	324	338	351	364	375	388	396	411	436	480	533
USGS	13235000	12	2	1941	2004	63	0	0	1995	1290	1988	215	366	228	261	271	280	298	303	312	319	328	337	348	361	374	380	382	418	458	502	543
USGS	13235000	12	3	1941	2004	63	0	0	1941	2480	1990	220	393	232	250	268	279	290	299	310	320	327	339	346	361	363	370	404	453	476	492	655
USGS	13235000	12	4	1941	2004	63	0	0	1941	1370	1992	170	366	240	254	273	285	291	307	310	310	320	328	332	350	359	364	401	420	438	472	568
USGS	13235000	12	5	1941	2004	63	0	0	1941	922	1992	158	349	226	244	253	269	285	290	299	316	329	339	344	348	353	370	380	401	429	461	531
USGS	13235000	12	6	1941	2004	63	0	0	1941	882	1992	160	349	212	235	257	273	275	285	304	318	323	341	345	356	363	370	387	411	439	466	515
USGS	13235000	12	7	1941	2004	63	0	0	1941	808	1978	160	345	210	231	259	280	290	295	304	317	327	330	332	342	355	360	363	407	447	482	521
USGS	13235000	12	8	1941	2004	63	0	0	1941	663	1978	155	333	204	247	258	263	275	280	293	304	308	316	323	330	336	343	360	394	441	479	546
USGS	13235000	12	9	1941	2004	63	0	0	1941	651	2002	160	329	204	227	242	258	270	280	292	299	308	318	321	330	339	342	350	370	432	464	551
USGS	13235000	12	10	1941	2004	63	0	0	1941	675	1944	173	333	194	228	259	270	277	279	286	291	303	319	325	334	348	352	373	386	423	467	552
USGS	13235000	12	11	1941	2004	63	0	0	1996	627	1979	160	332	199	216	236	245	260	275	279	292	305	312	330	335	344	350	380	416	444	475	563
USGS	13235000	12	12	1941	2004	63	0	0	1995	989	1979	178	339	204	240	251	257	260	262	272	283	291	306	314	330	334	342	368	400	429	486	586
USGS	13235000	12	13	1941	2004	63	0	0	1995	1390	1944	203	351	212	241	249	268	280	286	293	298	303	306	319	329	339	347	360	396	430	464	618
USGS	13235000	12	14	1941	2004	63	0	0	1995	1050	1992	180	350	219	230	250	274	282	291	297	301	307	317	322	327	337	350	360	393	423	477	611
USGS	13235000	12	15	1941	2004	63	0	0	1977	1290	1988	186	361	206	227	256	264	278	281	292	306	314	319	325	336	347	374	398	413	448	453	817
USGS	13235000	12	16	1941	2004	63	0	0	1995	860	1988	170	346	204	221	244	259	270	278	291	299	306	319	332	340	347	380	389	398	426	478	663
USGS	13235000	12	17	1941	2004	63	0	0	1995	745	1988	190	335	194	224	236	249	270	276	287	303	322	333	338	341	350	358	377	381	399	448	566
USGS	13235000	12	18	1941	2004	63	0	0	1995	690	1992	185	328	212	230	230	250	259	271	288	301	314	323	330	334	347	357	366	381	392	436	509
USGS	13235000	12	19	1941	2004	63	0	0	1995	650	1998	150	331	203	220	238	250	270	280	285	297	309	318	321	333	340	352	381	396	432	477	537
USGS	13235000	12	20	1941	2004	63	0	0	1981	1060	1998	170	340	192	222	240	257	277	284	295	304	309	314	320	326	336	361	374	382	412	482	611
USGS	13235000	12	21	1941	2004	63	0	0	1981	733	1998	157	346	210	238	241	268	280	282	290	296	310	318	330	340	355	372	388	406	449	482	652
USGS	13235000	12	22	1941	2004	63	0	0	1955	2120	1990	170	390	214	232	249	260	270	280	283	290	295	307	319	338	363	389	400	439	472	550	631
USGS	13235000	12	23	1941	2004	63	0	0	1964	3880	1990	180	419	196	217	237	249	260	262	278	291	299	301	322	338	359	365	387	422	458	471	571
USGS	13235000	12	24	1941	2004	63	0	0	1964	2460	2001	150	381	192	230	241	250	253	271	284	292	308	320	323	342	357	369	384	394	418	450	544
USGS	13235000	12	25	1941	2004	63	0	0	1964	1860	2001	140	360	192	218	237	249	260	269	279	290	300	300	324	338	348	361	384	391	432	481	512

agency_cd	site_no	month_nu	day_nu	begin_yr	end_yr	count_nu	count_zero	count_miss	max_va_yr	max_va	min_va_yr	min_va	mean_va	p05_va	p10_va	p15_va	p20_va	p25_va	p30_va	p35_va	p40_va	p45_va	p50_va	p55_va	p60_va	p65_va	p70_va	p75_va	p80_va	p85_va	p90_va	p95_va
5s	15s	3n	3n	6n	6n	8n	8n	8n	5n	12s	5n	12s	Discharge	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s	12s
USGS	13235000	12	26	1941	2004	63	0	0	1964	1500	2001	180	356	202	220	231	239	246	265	275	288	306	315	322	324	331	350	359	378	418	476	1007
USGS	13235000	12	27	1941	2004	63	0	0	1964	1250	1979	178	353	210	230	240	240	246	272	280	290	301	308	311	322	344	361	370	391	421	468	883
USGS	13235000	12	28	1941	2004	63	0	0	1964	1070	1979	140	354	216	230	236	250	260	264	280	290	305	315	325	337	358	379	407	423	438	510	765
USGS	13235000	12	29	1941	2004	63	0	0	1945	1120	1979	160	358	200	220	238	258	265	279	286	291	300	310	315	332	338	374	398	418	472	525	743
USGS	13235000	12	30	1941	2004	63	0	0	1996	879	1994	140	347	201	220	240	259	260	274	280	285	293	300	311	329	346	367	390	406	449	529	664
USGS	13235000	12	31	1941	2004	63	0	0	1996	1300	1994	130	349	202	230	248	255	261	278	288	298	300	306	310	327	347	357	366	404	419	511	662

USGS Gage at Lowman

Source	Station	Date	Time	Lab Code	SSC Conc.
USGS	13235000	11/8/1991	10:40	80154	4
USGS	13235000	3/3/1992	12:35	80154	9
USGS	13235000	5/13/1992	13:00	80154	38
USGS	13235000	9/1/1992	11:50	80154	1
USGS	13235000	4/18/1994	12:30	80154	38
USGS	13235000	4/18/1994	12:45	80154	38
USGS	13235000	4/20/1994	10:26	80154	75
USGS	13235000	4/20/1994	10:50	80154	75
USGS	13235000	4/25/1994	12:00	80154	13
USGS	13235000	4/25/1994	13:40	80154	13
USGS	13235000	4/27/1994	9:45	80154	9
USGS	13235000	4/27/1994	10:13	80154	9
USGS	13235000	5/2/1994	12:18	80154	4
USGS	13235000	5/2/1994	13:18	80154	4
USGS	13235000	5/4/1994	9:30	80154	4
USGS	13235000	5/4/1994	9:48	80154	4
USGS	13235000	5/9/1994	14:28	80154	53
USGS	13235000	5/9/1994	14:30	80154	53
USGS	13235000	5/11/1994	9:35	80154	81
USGS	13235000	5/11/1994	12:15	80154	81
USGS	13235000	5/14/1994	12:40	80154	35
USGS	13235000	5/14/1994	14:45	80154	35
USGS	13235000	5/16/1994	9:40	80154	18
USGS	13235000	5/16/1994	11:40	80154	18
USGS	13235000	5/17/1994	11:45	80154	12
USGS	13235000	5/17/1994	13:40	80154	12
USGS	13235000	5/23/1994	12:45	80154	4
USGS	13235000	5/23/1994	14:15	80154	4
USGS	13235000	5/25/1994	9:10	80154	10
USGS	13235000	5/25/1994	10:30	80154	10
USGS	13235000	5/31/1994	13:58	80154	12
USGS	13235000	5/31/1994	15:50	80154	12
USGS	13235000	6/2/1994	8:50	80154	9
USGS	13235000	6/2/1994	10:30	80154	9
USGS	13235000	6/6/1994	12:55	80154	5
USGS	13235000	6/6/1994	14:45	80154	5
USGS	13235000	6/13/1994	12:30	80154	6
USGS	13235000	6/13/1994	14:00	80154	6
USGS	13235000	11/22/1994	13:10	80154	1
USGS	13235000	3/22/1995	13:40	80154	8
USGS	13235000	5/1/1995	12:20	80154	12
USGS	13235000	5/2/1995	10:55	80154	21
USGS	13235000	5/8/1995	13:00	80154	27
USGS	13235000	5/9/1995	9:12	80154	50
USGS	13235000	5/16/1995	12:25	80154	71
USGS	13235000	5/17/1995	12:25	80154	125
USGS	13235000	5/19/1995	15:10	80154	121
USGS	13235000	5/22/1995	15:00	80154	115
USGS	13235000	5/23/1995	9:30	80154	126

USGS Gage at Lowman

Source	Station	Date	Time	Lab Code	SSC Conc.
USGS	13235000	5/25/1995	13:00	80154	81
USGS	13235000	5/30/1995	12:45	80154	124
USGS	13235000	5/31/1995	11:15	80154	215
USGS	13235000	6/3/1995	19:36	80154	173
USGS	13235000	6/4/1995	19:55	80154	229
USGS	13235000	6/5/1995	14:43	80154	374
USGS	13235000	6/14/1995	14:40	80154	126
USGS	13235000	6/19/1995	17:31	80154	134
USGS	13235000	6/20/1995	15:38	80154	87
USGS	13235000	6/26/1995	17:42	80154	100
USGS	13235000	6/27/1995	15:32	80154	159
USGS	13235000	9/18/1995	16:00	80154	1
USGS	13235000	5/17/1997	17:45	80154	692
USGS	13235000	5/17/1997	18:00	80154	692
USGS	13235000	4/14/1998	11:05	80154	2
USGS	13235000	5/11/1998	13:40	80154	66
USGS	13235000	6/15/1998	11:30	80154	32
USGS	13235000	7/16/1998	12:10	80154	16
USGS	13235000	8/13/1998	10:55	80154	3
USGS	13235000	9/17/1998	10:50	80154	10
USGS	13235000	4/9/2001	13:10	80154	1
USGS	13235000	5/8/2001	16:20	80154	5
USGS	13235000	6/5/2001	14:15	80154	3
USGS	13235000	7/10/2001	15:30	80154	12
USGS	13235000	8/6/2001	16:00	80154	1
USGS	13235000	9/24/2001	13:25	80154	1

Normalized Discharge, SF Payette at Lowman

[exp(1.5604*ln(avg flow))]

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Jan	1	1941	2004	63	367	10044	5.0	11	2.7	13.9	8.5
Jan	2	1941	2004	63	352	9411	4.7	11	2.6	13.5	8.3
Jan	3	1941	2004	63	334	8671	4.3	11	2.5	13.2	8.1
Jan	4	1941	2004	63	330	8509	4.3	11	2.5	13.1	8.0
Jan	5	1941	2004	63	337	8793	4.4	11	2.6	13.2	8.1
Jan	6	1941	2004	63	343	9038	4.5	11	2.6	13.4	8.2
Jan	7	1941	2004	63	340	8915	4.5	11	2.6	13.3	8.1
Jan	8	1941	2004	63	343	9038	4.5	11	2.6	13.4	8.2
Jan	9	1941	2004	63	339	8874	4.4	11	2.6	13.3	8.1
Jan	10	1941	2004	63	338	8833	4.4	11	2.6	13.2	8.1
Jan	11	1941	2004	63	333	8630	4.3	11	2.5	13.1	8.0
Jan	12	1941	2004	63	325	8309	4.2	10	2.5	13.0	7.9
Jan	13	1941	2004	63	336	8752	4.4	11	2.6	13.2	8.1
Jan	14	1941	2004	63	338	8833	4.4	11	2.6	13.2	8.1
Jan	15	1941	2004	63	339	8874	4.4	11	2.6	13.3	8.1
Jan	16	1941	2004	63	342	8997	4.5	11	2.6	13.3	8.2
Jan	17	1941	2004	63	346	9162	4.6	11	2.6	13.4	8.2
Jan	18	1941	2004	63	333	8630	4.3	11	2.5	13.1	8.0
Jan	19	1941	2004	63	328	8429	4.2	11	2.5	13.0	8.0
Jan	20	1941	2004	63	330	8509	4.3	11	2.5	13.1	8.0
Jan	21	1941	2004	63	337	8793	4.4	11	2.6	13.2	8.1
Jan	22	1941	2004	63	341	8956	4.5	11	2.6	13.3	8.2
Jan	23	1941	2004	63	337	8793	4.4	11	2.6	13.2	8.1
Jan	24	1941	2004	63	336	8752	4.4	11	2.6	13.2	8.1
Jan	25	1941	2004	63	334	8671	4.3	11	2.5	13.2	8.1
Jan	26	1941	2004	63	326	8349	4.2	10	2.5	13.0	8.0
Jan	27	1941	2004	63	330	8509	4.3	11	2.5	13.1	8.0
Jan	28	1941	2004	63	319	8071	4.0	10	2.5	12.8	7.9
Jan	29	1941	2004	63	313	7835	3.9	10	2.5	12.7	7.8
Jan	30	1941	2004	63	314	7874	3.9	10	2.5	12.7	7.8
Jan	31	1941	2004	63	325	8309	4.2	10	2.5	13.0	7.9

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Jan	1	372	10258	5.1	11	2.7	14.0	8.6
Jan	2	369	10129	5.1	11	2.7	13.9	8.5
Jan	3	374	10344	5.2	11	2.7	14.0	8.6
Jan	4	375	10388	5.2	11	2.7	14.0	8.6
Jan	5	383	10736	5.4	11	2.7	14.2	8.7
Jan	6	400	11488	5.7	12	2.8	14.6	8.9
Jan	7	410	11940	6.0	12	2.9	14.8	9.0
Jan	8	394	11221	5.6	12	2.8	14.4	8.8
Jan	9	398	11399	5.7	12	2.8	14.5	8.9
Jan	10	416	12213	6.1	12	2.9	14.9	9.1
Jan	11	411	11985	6.0	12	2.9	14.8	9.1
Jan	12	390	11043	5.5	12	2.8	14.3	8.8
Jan	13	390	11043	5.5	12	2.8	14.3	8.8
Jan	14	400	11488	5.7	12	2.8	14.6	8.9
Jan	15	364	9916	5.0	11	2.7	13.8	8.5
Jan	16	370	10172	5.1	11	2.7	13.9	8.5
Jan	17	374	10344	5.2	11	2.7	14.0	8.6
Jan	18	364	9916	5.0	11	2.7	13.8	8.5
Jan	19	361	9789	4.9	11	2.7	13.7	8.4
Jan	20	361	9789	4.9	11	2.7	13.7	8.4
Jan	21	383	10736	5.4	11	2.7	14.2	8.7
Jan	22	391	11087	5.5	12	2.8	14.4	8.8
Jan	23	399	11443	5.7	12	2.8	14.5	8.9
Jan	24	378	10518	5.3	11	2.7	14.1	8.6
Jan	25	379	10561	5.3	11	2.7	14.1	8.7
Jan	26	369	10129	5.1	11	2.7	13.9	8.5
Jan	27	380	10605	5.3	11	2.7	14.1	8.7
Jan	28	365	9959	5.0	11	2.7	13.8	8.5
Jan	29	362	9831	4.9	11	2.7	13.8	8.4
Jan	30	358	9662	4.8	11	2.6	13.7	8.4
Jan	31	354	9494	4.7	11	2.6	13.6	8.3

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Jan	1	3240	300507	150.3	38	9.1	47.0	28.8
Jan	2	2470	196772	98.4	33	7.8	40.4	24.7
Jan	3	1610	100909	50.5	26	6.1	31.8	19.5
Jan	4	1280	70549	35.3	23	5.4	27.9	17.1
Jan	5	1140	58884	29.4	21	5.1	26.2	16.0
Jan	6	1090	54904	27.5	21	4.9	25.5	15.6
Jan	7	884	39595	19.8	18	4.4	22.7	13.9
Jan	8	839	36495	18.2	18	4.3	22.0	13.5
Jan	9	777	32375	16.2	17	4.1	21.1	12.9
Jan	10	775	32245	16.1	17	4.1	21.1	12.9
Jan	11	713	28311	14.2	16	3.9	20.1	12.3
Jan	12	669	25633	12.8	16	3.8	19.4	11.9
Jan	13	727	29184	14.6	16	3.9	20.3	12.5
Jan	14	704	27756	13.9	16	3.9	20.0	12.2
Jan	15	856	37656	18.8	18	4.3	22.3	13.7
Jan	16	1600	99933	50.0	26	6.1	31.7	19.4
Jan	17	1800	120096	60.0	27	6.5	33.8	20.7
Jan	18	1500	90359	45.2	25	5.9	30.5	18.7
Jan	19	1250	67986	34.0	22	5.3	27.6	16.9
Jan	20	1060	52564	26.3	20	4.9	25.1	15.4
Jan	21	940	43578	21.8	19	4.5	23.5	14.4
Jan	22	870	38621	19.3	18	4.4	22.5	13.8
Jan	23	820	35214	17.6	18	4.2	21.8	13.3
Jan	24	780	32570	16.3	17	4.1	21.2	13.0
Jan	25	740	30002	15.0	17	4.0	20.5	12.6
Jan	26	710	28126	14.1	16	3.9	20.1	12.3
Jan	27	946	44013	22.0	19	4.6	23.6	14.5
Jan	28	787	33028	16.5	17	4.1	21.3	13.0
Jan	29	650	24506	12.3	15	3.7	19.1	11.7
Jan	30	630	23339	11.7	15	3.6	18.8	11.5
Jan	31	814	34813	17.4	17	4.2	21.7	13.3

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Feb	1	1941	2004	63	344	9079	4.5	11	2.6	13.4	8.2
Feb	2	1941	2004	63	345	9120	4.6	11	2.6	13.4	8.2
Feb	3	1941	2004	63	337	8793	4.4	11	2.6	13.2	8.1
Feb	4	1941	2004	63	338	8833	4.4	11	2.6	13.2	8.1
Feb	5	1941	2004	63	332	8590	4.3	11	2.5	13.1	8.0
Feb	6	1941	2004	63	332	8590	4.3	11	2.5	13.1	8.0
Feb	7	1941	2004	63	334	8671	4.3	11	2.5	13.2	8.1
Feb	8	1941	2004	63	335	8711	4.4	11	2.6	13.2	8.1
Feb	9	1941	2004	63	332	8590	4.3	11	2.5	13.1	8.0
Feb	10	1941	2004	63	330	8509	4.3	11	2.5	13.1	8.0
Feb	11	1941	2004	63	327	8389	4.2	10	2.5	13.0	8.0
Feb	12	1941	2004	63	330	8509	4.3	11	2.5	13.1	8.0
Feb	13	1941	2004	63	333	8630	4.3	11	2.5	13.1	8.0
Feb	14	1941	2004	63	335	8711	4.4	11	2.6	13.2	8.1
Feb	15	1941	2004	63	339	8874	4.4	11	2.6	13.3	8.1
Feb	16	1941	2004	63	343	9038	4.5	11	2.6	13.4	8.2
Feb	17	1941	2004	63	344	9079	4.5	11	2.6	13.4	8.2
Feb	18	1941	2004	63	344	9079	4.5	11	2.6	13.4	8.2
Feb	19	1941	2004	63	348	9244	4.6	11	2.6	13.5	8.3
Feb	20	1941	2004	63	354	9494	4.7	11	2.6	13.6	8.3
Feb	21	1941	2004	63	354	9494	4.7	11	2.6	13.6	8.3
Feb	22	1941	2004	63	363	9874	4.9	11	2.7	13.8	8.4
Feb	23	1941	2004	63	364	9916	5.0	11	2.7	13.8	8.5
Feb	24	1941	2004	63	366	10001	5.0	11	2.7	13.8	8.5
Feb	25	1941	2004	63	370	10172	5.1	11	2.7	13.9	8.5
Feb	26	1941	2004	63	367	10044	5.0	11	2.7	13.9	8.5
Feb	27	1941	2004	63	364	9916	5.0	11	2.7	13.8	8.5
Feb	28	1941	2004	63	365	9959	5.0	11	2.7	13.8	8.5
Feb	29	1941	2004	16	378	10518	5.3	11	2.7	14.1	8.6

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Feb	1	380	10605	5.3	11	2.7	14.1	8.7
Feb	2	368	10087	5.0	11	2.7	13.9	8.5
Feb	3	377	10474	5.2	11	2.7	14.1	8.6
Feb	4	386	10867	5.4	12	2.8	14.3	8.7
Feb	5	402	11578	5.8	12	2.8	14.6	8.9
Feb	6	394	11221	5.6	12	2.8	14.4	8.8
Feb	7	370	10172	5.1	11	2.7	13.9	8.5
Feb	8	375	10388	5.2	11	2.7	14.0	8.6
Feb	9	367	10044	5.0	11	2.7	13.9	8.5
Feb	10	379	10561	5.3	11	2.7	14.1	8.7
Feb	11	372	10258	5.1	11	2.7	14.0	8.6
Feb	12	389	10999	5.5	12	2.8	14.3	8.8
Feb	13	400	11488	5.7	12	2.8	14.6	8.9
Feb	14	393	11176	5.6	12	2.8	14.4	8.8
Feb	15	382	10692	5.3	11	2.7	14.2	8.7
Feb	16	387	10911	5.5	12	2.8	14.3	8.8
Feb	17	387	10911	5.5	12	2.8	14.3	8.8
Feb	18	384	10779	5.4	11	2.8	14.2	8.7
Feb	19	389	10999	5.5	12	2.8	14.3	8.8
Feb	20	398	11399	5.7	12	2.8	14.5	8.9
Feb	21	411	11985	6.0	12	2.9	14.8	9.1
Feb	22	405	11713	5.9	12	2.8	14.7	9.0
Feb	23	393	11176	5.6	12	2.8	14.4	8.8
Feb	24	419	12351	6.2	12	2.9	14.9	9.2
Feb	25	443	13473	6.7	12	3.0	15.4	9.4
Feb	26	439	13283	6.6	12	3.0	15.3	9.4
Feb	27	428	12767	6.4	12	2.9	15.1	9.3
Feb	28	442	13425	6.7	12	3.0	15.4	9.4
Feb	29	476	15071	7.5	13	3.1	16.0	9.8

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Feb	1	1110	56484	28.2	21	5.0	25.8	15.8
Feb	2	1240	67139	33.6	22	5.3	27.4	16.8
Feb	3	876	39038	19.5	18	4.4	22.6	13.8
Feb	4	1230	66296	33.1	22	5.3	27.3	16.7
Feb	5	1150	59692	29.8	21	5.1	26.3	16.1
Feb	6	1030	50261	25.1	20	4.8	24.7	15.2
Feb	7	908	41285	20.6	19	4.5	23.0	14.1
Feb	8	934	43145	21.6	19	4.5	23.4	14.3
Feb	9	850	37245	18.6	18	4.3	22.2	13.6
Feb	10	807	34347	17.2	17	4.2	21.6	13.2
Feb	11	738	29875	14.9	17	4.0	20.5	12.6
Feb	12	691	26960	13.5	16	3.8	19.8	12.1
Feb	13	677	26113	13.1	16	3.8	19.5	12.0
Feb	14	689	26838	13.4	16	3.8	19.7	12.1
Feb	15	753	30828	15.4	17	4.0	20.7	12.7
Feb	16	920	42140	21.1	19	4.5	23.2	14.2
Feb	17	784	32832	16.4	17	4.1	21.2	13.0
Feb	18	801	33949	17.0	17	4.2	21.5	13.2
Feb	19	875	38968	19.5	18	4.4	22.6	13.8
Feb	20	848	37108	18.6	18	4.3	22.2	13.6
Feb	21	835	36224	18.1	18	4.3	22.0	13.5
Feb	22	1350	76661	38.3	23	5.6	28.8	17.6
Feb	23	1140	58884	29.4	21	5.1	26.2	16.0
Feb	24	1100	55692	27.8	21	5.0	25.7	15.7
Feb	25	1180	62139	31.1	22	5.2	26.7	16.4
Feb	26	1230	66296	33.1	22	5.3	27.3	16.7
Feb	27	1210	64622	32.3	22	5.2	27.1	16.6
Feb	28	1140	58884	29.4	21	5.1	26.2	16.0
Feb	29	748	30510	15.3	17	4.0	20.7	12.7

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^24%	^+ or - 24% ^+24%	^-24%
March	1	1941	2004	63	368	10087	5.0	11	2.7	13.9	8.5
March	2	1941	2004	63	371	10215	5.1	11	2.7	14.0	8.6
March	3	1941	2004	63	370	10172	5.1	11	2.7	13.9	8.5
March	4	1941	2004	63	369	10129	5.1	11	2.7	13.9	8.5
March	5	1941	2004	63	369	10129	5.1	11	2.7	13.9	8.5
March	6	1941	2004	63	371	10215	5.1	11	2.7	14.0	8.6
March	7	1941	2004	63	375	10388	5.2	11	2.7	14.0	8.6
March	8	1941	2004	63	392	11132	5.6	12	2.8	14.4	8.8
March	9	1941	2004	63	394	11221	5.6	12	2.8	14.4	8.8
March	10	1941	2004	63	408	11849	5.9	12	2.8	14.7	9.0
March	11	1941	2004	63	423	12535	6.3	12	2.9	15.0	9.2
March	12	1941	2004	63	426	12674	6.3	12	2.9	15.1	9.2
March	13	1941	2004	63	426	12674	6.3	12	2.9	15.1	9.2
March	14	1941	2004	63	425	12628	6.3	12	2.9	15.1	9.2
March	15	1941	2004	63	424	12582	6.3	12	2.9	15.0	9.2
March	16	1941	2004	63	429	12814	6.4	12	2.9	15.1	9.3
March	17	1941	2004	63	437	13189	6.6	12	3.0	15.3	9.4
March	18	1941	2004	63	444	13520	6.8	12	3.0	15.4	9.5
March	19	1941	2004	63	454	13998	7.0	13	3.0	15.6	9.6
March	20	1941	2004	63	465	14531	7.3	13	3.1	15.8	9.7
March	21	1941	2004	63	479	15219	7.6	13	3.1	16.1	9.9
March	22	1941	2004	63	490	15768	7.9	13	3.2	16.3	10.0
March	23	1941	2004	63	524	17508	8.8	14	3.3	16.9	10.4
March	24	1941	2004	63	533	17980	9.0	14	3.3	17.1	10.5
March	25	1941	2004	63	533	17980	9.0	14	3.3	17.1	10.5
March	26	1941	2004	63	538	18244	9.1	14	3.3	17.2	10.5
March	27	1941	2004	63	550	18883	9.4	14	3.4	17.4	10.7
March	28	1941	2004	63	558	19313	9.7	14	3.4	17.5	10.7
March	29	1941	2004	63	563	19584	9.8	14	3.4	17.6	10.8
March	30	1941	2004	63	576	20294	10.1	14	3.5	17.9	10.9
March	31	1941	2004	63	591	21124	10.6	15	3.5	18.1	11.1

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^24%	^+ or - 24% ^+24%	^-24%
March	1	461	14336	7.2	13	3.1	15.8	9.7
March	2	452	13902	7.0	13	3.0	15.6	9.6
March	3	432	12954	6.5	12	2.9	15.2	9.3
March	4	451	13854	6.9	13	3.0	15.6	9.5
March	5	451	13854	6.9	13	3.0	15.6	9.5
March	6	445	13568	6.8	12	3.0	15.5	9.5
March	7	438	13236	6.6	12	3.0	15.3	9.4
March	8	460	14288	7.1	13	3.0	15.7	9.6
March	9	453	13950	7.0	13	3.0	15.6	9.6
March	10	468	14677	7.3	13	3.1	15.9	9.7
March	11	483	15418	7.7	13	3.1	16.2	9.9
March	12	489	15718	7.9	13	3.2	16.3	10.0
March	13	498	16172	8.1	13	3.2	16.5	10.1
March	14	510	16784	8.4	13	3.2	16.7	10.2
March	15	493	15919	8.0	13	3.2	16.4	10.0
March	16	502	16375	8.2	13	3.2	16.5	10.1
March	17	524	17508	8.8	14	3.3	16.9	10.4
March	18	511	16835	8.4	13	3.2	16.7	10.2
March	19	560	19421	9.7	14	3.4	17.6	10.8
March	20	605	21910	11.0	15	3.6	18.4	11.2
March	21	633	23513	11.8	15	3.6	18.8	11.5
March	22	662	25215	12.6	16	3.7	19.3	11.8
March	23	762	31405	15.7	17	4.0	20.9	12.8
March	24	818	35080	17.5	18	4.2	21.7	13.3
March	25	754	30892	15.4	17	4.0	20.8	12.7
March	26	746	30382	15.2	17	4.0	20.6	12.6
March	27	725	29058	14.5	16	3.9	20.3	12.4
March	28	748	30510	15.3	17	4.0	20.7	12.7
March	29	731	29435	14.7	16	3.9	20.4	12.5
March	30	749	30573	15.3	17	4.0	20.7	12.7
March	31	734	29623	14.8	16	4.0	20.5	12.5

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^24%	^+ or - 24% ^+24%	^-24%
March	1	1140	58884	29.4	21	5.1	26.2	16.0
March	2	1180	62139	31.1	22	5.2	26.7	16.4
March	3	1220	65457	32.7	22	5.3	27.2	16.7
March	4	1200	63790	31.9	22	5.2	26.9	16.5
March	5	1150	59692	29.8	21	5.1	26.3	16.1
March	6	1150	59692	29.8	21	5.1	26.3	16.1
March	7	1240	67139	33.6	22	5.3	27.4	16.8
March	8	1970	138256	69.1	29	6.9	35.6	21.8
March	9	1650	104848	52.4	26	6.2	32.2	19.7
March	10	1440	84783	42.4	24	5.8	29.8	18.3
March	11	1310	73146	36.6	23	5.5	28.3	17.3
March	12	1200	63790	31.9	22	5.2	26.9	16.5
March	13	1110	56484	28.2	21	5.0	25.8	15.8
March	14	1020	49502	24.8	20	4.8	24.6	15.1
March	15	935	43217	21.6	19	4.5	23.4	14.4
March	16	1000	47995	24.0	20	4.7	24.3	14.9
March	17	1110	56484	28.2	21	5.0	25.8	15.8
March	18	1240	67139	33.6	22	5.3	27.4	16.8
March	19	1180	62139	31.1	22	5.2	26.7	16.4
March	20	1040	51025	25.5	20	4.8	24.9	15.2
March	21	999	47921	24.0	20	4.7	24.3	14.9
March	22	1050	51792	25.9	20	4.8	25.0	15.3
March	23	1340	75776	37.9	23	5.5	28.7	17.6
March	24	1290	71411	35.7	23	5.4	28.1	17.2
March	25	1190	62963	31.5	22	5.2	26.8	16.4
March	26	1110	56484	28.2	21	5.0	25.8	15.8
March	27	1300	72277	36.1	23	5.5	28.2	17.3
March	28	1470	87555	43.8	24	5.8	30.2	18.5
March	29	1660	105842	52.9	26	6.3	32.3	19.8
March	30	1910	131742	65.9	28	6.8	35.0	21.4
March	31	2060	148238	74.1	29	7.1	36.5	22.4

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^24%	^+ or - 24% ^+24%	^-24%
Apr	1	1941	2004	63	604	21854	10.9	15	3.5	18.3	11.2
Apr	2	1941	2004	63	618	22649	11.3	15	3.6	18.6	11.4
Apr	3	1941	2004	63	639	23862	11.9	15	3.7	18.9	11.6
Apr	4	1941	2004	63	665	25394	12.7	16	3.7	19.4	11.9
Apr	5	1941	2004	63	704	27756	13.9	16	3.9	20.0	12.2
Apr	6	1941	2004	63	759	31213	15.6	17	4.0	20.8	12.8
Apr	7	1941	2004	63	787	33028	16.5	17	4.1	21.3	13.0
Apr	8	1941	2004	63	799	33817	16.9	17	4.2	21.4	13.1
Apr	9	1941	2004	63	811	34613	17.3	17	4.2	21.6	13.3
Apr	10	1941	2004	63	825	35550	17.8	18	4.2	21.8	13.4
Apr	11	1941	2004	63	831	35954	18.0	18	4.2	21.9	13.4
Apr	12	1941	2004	63	869	38552	19.3	18	4.4	22.5	13.8
Apr	13	1941	2004	63	894	40296	20.1	18	4.4	22.8	14.0
Apr	14	1941	2004	63	951	44376	22.2	19	4.6	23.6	14.5
Apr	15	1941	2004	63	988	47100	23.5	19	4.7	24.2	14.8
Apr	16	1941	2004	63	1006	48446	24.2	20	4.7	24.4	15.0
Apr	17	1941	2004	63	1060	52564	26.3	20	4.9	25.1	15.4
Apr	18	1941	2004	63	1099	55613	27.8	21	5.0	25.6	15.7
Apr	19	1941	2004	63	1131	58160	29.1	21	5.0	26.1	16.0
Apr	20	1941	2004	63	1185	62550	31.3	22	5.2	26.7	16.4
Apr	21	1941	2004	63	1223	65708	32.9	22	5.3	27.2	16.7
Apr	22	1941	2004	63	1248	67816	33.9	22	5.3	27.5	16.9
Apr	23	1941	2004	63	1276	70205	35.1	22	5.4	27.9	17.1
Apr	24	1941	2004	63	1306	72798	36.4	23	5.5	28.2	17.3
Apr	25	1941	2004	63	1292	71584	35.8	23	5.4	28.1	17.2
Apr	26	1941	2004	63	1269	69605	34.8	22	5.4	27.8	17.0
Apr	27	1941	2004	63	1264	69178	34.6	22	5.4	27.7	17.0
Apr	28	1941	2004	63	1300	72277	36.1	23	5.5	28.2	17.3
Apr	29	1941	2004	63	1307	72885	36.4	23	5.5	28.3	17.3

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^24%	^+ or - 24% ^+24%	^-24%
Apr	1	731	29435	14.7	16	3.9	20.4	12.5
Apr	2	744	30255	15.1	17	4.0	20.6	12.6
Apr	3	799	33817	16.9	17	4.2	21.4	13.1
Apr	4	879	39246	19.6	18	4.4	22.6	13.9
Apr	5	891	40086	20.0	18	4.4	22.8	14.0
Apr	6	982	46654	23.3	19	4.7	24.1	14.8
Apr	7	1032	50413	25.2	20	4.8	24.8	15.2
Apr	8	1030	50261	25.1	20	4.8	24.7	15.2
Apr	9	1042	51178	25.6	20	4.8	24.9	15.3
Apr	10	1052	51946	26.0	20	4.8	25.0	15.3
Apr	11	1170	61319	30.7	21	5.1	26.6	16.3
Apr	12	1228	66128	33.1	22	5.3	27.3	16.7
Apr	13	1212	64788	32.4	22	5.2	27.1	16.6
Apr	14	1293	71670	35.8	23	5.4	28.1	17.2
Apr	15	1332	75072	37.5	23	5.5	28.6	17.5
Apr	16	1344	76130	38.1	23	5.6	28.7	17.6
Apr	17	1419	82862	41.4	24	5.7	29.6	18.1
Apr	18	1464	86998	43.5	24	5.8	30.1	18.5
Apr	19	1666	106439	53.2	26	6.3	32.4	19.8
Apr	20	1613	101203	50.6	26	6.2	31.8	19.5
Apr	21	1634	103266	51.6	26	6.2	32.0	19.6
Apr	22	1780	118020	59.0	27	6.5	33.6	20.6
Apr	23	1772	117193	58.6	27	6.5	33.5	20.5
Apr	24	1854	125765	62.9	28	6.7	34.4	21.1
Apr	25	1884	128954	64.5	28	6.7	34.7	21.3
Apr	26	1878	128314	64.2	28	6.7	34.6	21.2
Apr	27	1787	118745	59.4	27	6.5	33.7	20.6
Apr	28	1787	118745	59.4	27	6.5	33.7	20.6
Apr	29	1800	120096	60.0	27	6.5	33.8	20.7

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^24%	^+ or - 24% ^+24%	^-24%
Apr	1	2110	153890	76.9	30	7.2	37.0	22.7
Apr	2	1810	121138	60.6	27	6.6	33.9	20.8
Apr	3	1520	92246	46.1	25	6.0	30.8	18.8
Apr	4	1340	75776	37.9	23	5.5	28.7	17.6
Apr	5	1370	78440	39.2	23	5.6	29.0	17.8
Apr	6	1640	103859	51.9	26	6.2	32.1	19.7
Apr	7	1850	125341	62.7	28	6.6	34.3	21.0
Apr	8	1930	133901	67.0	28	6.8	35.2	21.5
Apr	9	1910	131742	65.9	28	6.8	35.0	21.4
Apr	10	2250	170116	85.1	31	7.4	38.3	23.5
Apr	11	2030	144883	72.4	29	7.0	36.2	22.2
Apr	12	2110	153890	76.9	30	7.2	37.0	22.7
Apr	13	2390	186918	93.5	32	7.7	39.6	24.3
Apr	14	2580	210616	105.3	33	8.0	41.4	25.4
Apr	15	2780	236640	118.3	35	8.3	43.1	26.4
Apr	16	2980	263735	131.9	36	8.7	44.8	27.5
Apr	17	3110	281905	141.0	37	8.9	45.9	28.2
Apr	18	3070	276268	138.1	37	8.8	45.6	28.0
Apr	19	3340	315104	157.6	39	9.3	47.8	29.3
Apr	20	3230	299061	149.5	38	9.1	46.9	28.8
Apr	21	3080	277674	138.8	37	8.8	45.7	28.0
Apr	22	2810	240636	120.3	35	8.4	43.4	26.6
Apr	23	2760	233989	117.0	35	8.3	43.0	26.3
Apr	24	2900	252770	126.4	36	8.5	44.2	27.1
Apr	25	2700	226100	113.0	34	8.2	42.4	26.0
Apr	26	2750	232667	116.3	35	8.3	42.9	26.3
Apr	27	3130	284739	142.4	37	8.9	46.1	28.3
Apr	28	3310	310699	155.3	38	9.2	47.6	29.2
Apr	29	2860	247351	123.7	35	8.5	43.8	26.9

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
May	30	1941	2004	63	1324	74369	37.2	23	5.5	28.5	17.4
May	1	1941	2004	63	1371	78530	39.3	23	5.6	29.0	17.8
May	2	1941	2004	63	1436	84416	42.2	24	5.8	29.8	18.3
May	3	1941	2004	63	1502	90547	45.3	25	5.9	30.5	18.7
May	4	1941	2004	63	1559	95966	48.0	25	6.0	31.2	19.1
May	5	1941	2004	63	1597	99641	49.8	25	6.1	31.6	19.4
May	6	1941	2004	63	1653	105146	52.6	26	6.2	32.2	19.8
May	7	1941	2004	63	1732	113092	56.5	27	6.4	33.1	20.3
May	8	1941	2004	63	1797	119783	59.9	27	6.5	33.8	20.7
May	9	1941	2004	63	1841	124391	62.2	28	6.6	34.2	21.0
May	10	1941	2004	63	1872	127675	63.8	28	6.7	34.6	21.2
May	11	1941	2004	63	1894	130024	65.0	28	6.7	34.8	21.3
May	12	1941	2004	63	1913	132065	66.0	28	6.8	35.0	21.4
May	13	1941	2004	63	1965	137709	68.9	29	6.9	35.5	21.8
May	14	1941	2004	63	2033	145217	72.6	29	7.0	36.2	22.2
May	15	1941	2004	63	2142	157547	78.8	30	7.2	37.3	22.8
May	16	1941	2004	63	2209	165304	82.7	31	7.3	37.9	23.2
May	17	1941	2004	63	2272	172719	86.4	31	7.5	38.5	23.6
May	18	1941	2004	63	2335	180250	90.1	32	7.6	39.1	24.0
May	19	1941	2004	63	2390	186918	93.5	32	7.7	39.6	24.3
May	20	1941	2004	63	2432	192069	96.0	32	7.7	40.0	24.5
May	21	1941	2004	63	2485	198640	99.3	33	7.8	40.5	24.8
May	22	1941	2004	63	2518	202772	101.4	33	7.9	40.8	25.0
May	23	1941	2004	63	2585	211253	105.6	33	8.0	41.4	25.4
May	24	1941	2004	63	2661	221024	110.5	34	8.1	42.1	25.8
May	25	1941	2004	63	2710	227408	113.7	34	8.2	42.5	26.1
May	26	1941	2004	63	2802	239568	119.8	35	8.4	43.3	26.6
May	27	1941	2004	63	2875	249378	124.7	35	8.5	44.0	26.9
May	28	1941	2004	63	2919	255359	127.7	36	8.6	44.3	27.2
May	29	1941	2004	63	2962	261253	130.6	36	8.7	44.7	27.4
May	30	1941	2004	63	2985	264425	132.2	36	8.7	44.9	27.5
May	31	1941	2004	63	2984	264287	132.1	36	8.7	44.9	27.5

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
May	30	1762	116163	58.1	27	6.5	33.4	20.5
May	1	1818	121975	61.0	27	6.6	34.0	20.8
May	2	1968	138037	69.0	29	6.9	35.5	21.8
May	3	2094	152073	76.0	30	7.1	36.8	22.6
May	4	2208	165187	82.6	31	7.3	37.9	23.2
May	5	2130	156172	78.1	30	7.2	37.2	22.8
May	6	2352	182302	91.2	32	7.6	39.3	24.1
May	7	2420	190592	95.3	32	7.7	39.9	24.5
May	8	2542	205796	102.9	33	7.9	41.0	25.1
May	9	2703	226492	113.2	34	8.2	42.5	26.0
May	10	2708	227146	113.6	34	8.2	42.5	26.1
May	11	2778	236374	118.2	35	8.3	43.1	26.4
May	12	2752	232931	116.5	35	8.3	42.9	26.3
May	13	2708	227146	113.6	34	8.2	42.5	26.1
May	14	2652	219859	109.9	34	8.1	42.0	25.7
May	15	2884	250597	125.3	36	8.5	44.0	27.0
May	16	3132	285023	142.5	37	8.9	46.1	28.3
May	17	3254	302536	151.3	38	9.1	47.1	28.9
May	18	3164	289580	144.8	37	9.0	46.4	28.4
May	19	3436	329350	164.7	39	9.4	48.6	29.8
May	20	3236	299928	150.0	38	9.1	47.0	28.8
May	21	3202	295025	147.5	38	9.0	46.7	28.6
May	22	3220	297617	148.8	38	9.1	46.8	28.7
May	23	3280	306316	153.2	38	9.2	47.3	29.0
May	24	3494	338066	169.0	40	9.5	49.0	30.1
May	25	3570	349610	174.8	40	9.6	49.6	30.4
May	26	3820	388554	194.3	42	10.0	51.5	31.6
May	27	4102	434229	217.1	43	10.4	53.6	32.9
May	28	4062	427639	213.8	43	10.3	53.4	32.7
May	29	4028	422067	211.0	43	10.3	53.1	32.5
May	30	3973	413109	206.6	42	10.2	52.7	32.3
May	31	4096	433238	216.6	43	10.4	53.6	32.9

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
May	30	3160	289009	144.5	37	9.0	46.3	28.4
May	1	3190	293302	146.7	38	9.0	46.6	28.6
May	2	3070	276268	138.1	37	8.8	45.6	28.0
May	3	3130	284739	142.4	37	8.9	46.1	28.3
May	4	3370	319532	159.8	39	9.3	48.0	29.4
May	5	3350	316577	158.3	39	9.3	47.9	29.4
May	6	3420	326960	163.5	39	9.4	48.4	29.7
May	7	3660	363459	181.7	41	9.7	50.3	30.8
May	8	4190	448852	224.4	44	10.5	54.3	33.3
May	9	4350	475881	237.9	45	10.7	55.4	34.0
May	10	3560	348083	174.0	40	9.6	49.5	30.4
May	11	3810	386968	193.5	42	10.0	51.5	31.5
May	12	3980	414245	207.1	43	10.2	52.7	32.3
May	13	4460	494791	247.4	45	10.9	56.2	34.5
May	14	4780	551289	275.6	47	11.3	58.4	35.8
May	15	5850	755562	377.8	53	12.7	65.5	40.1
May	16	6100	806545	403.3	54	13.0	67.0	41.1
May	17	6390	867169	433.6	55	13.3	68.8	42.1
May	18	6450	879907	440.0	56	13.4	69.1	42.4
May	19	5760	737502	368.8	52	12.6	64.9	39.8
May	20	5420	670706	335.4	51	12.1	62.7	38.4
May	21	5610	707753	353.9	52	12.4	63.9	39.2
May	22	5720	729526	364.8	52	12.5	64.6	39.6
May	23	6100	806545	403.3	54	13.0	67.0	41.1
May	24	6840	964321	482.2	58	13.8	71.4	43.8
May	25	6590	909890	454.9	56	13.5	70.0	42.9
May	26	6300	848186	424.1	55	13.2	68.2	41.8
May	27	6450	879907	440.0	56	13.4	69.1	42.4
May	28	6000	786008	393.0	54	12.8	66.4	40.7
May	29	6310	850288	425.1	55	13.2	68.3	41.9
May	30	6570	905585	452.8	56	13.5	69.8	42.8
May	31	6500	890574	445.3	56	13.4	69.4	42.6

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Jun	1	1941	2004	64	2953	260015	130.0	36	8.6	44.6	27.3
Jun	2	1941	2004	64	2948	259329	129.7	36	8.6	44.6	27.3
Jun	3	1941	2004	64	2964	261528	130.8	36	8.7	44.7	27.4
Jun	4	1941	2004	64	2980	263735	131.9	36	8.7	44.8	27.5
Jun	5	1941	2004	64	3025	269975	135.0	36	8.8	45.2	27.7
Jun	6	1941	2004	64	3019	269140	134.6	36	8.7	45.2	27.7
Jun	7	1941	2004	64	3015	268584	134.3	36	8.7	45.1	27.7
Jun	8	1941	2004	64	2992	265394	132.7	36	8.7	44.9	27.5
Jun	9	1941	2004	64	2978	263458	131.7	36	8.7	44.8	27.5
Jun	10	1941	2004	64	2915	254813	127.4	36	8.6	44.3	27.2
Jun	11	1941	2004	64	2887	251004	125.5	36	8.5	44.1	27.0
Jun	12	1941	2004	64	2866	248161	124.1	35	8.5	43.9	26.9
Jun	13	1941	2004	64	2839	244523	122.3	35	8.4	43.6	26.8
Jun	14	1941	2004	64	2812	240904	120.5	35	8.4	43.4	26.6
Jun	15	1941	2004	64	2814	241171	120.6	35	8.4	43.4	26.6
Jun	16	1941	2004	64	2812	240904	120.5	35	8.4	43.4	26.6
Jun	17	1941	2004	64	2754	233195	116.6	35	8.3	42.9	26.3
Jun	18	1941	2004	64	2718	228456	114.2	34	8.2	42.6	26.1
Jun	19	1941	2004	64	2697	225708	112.9	34	8.2	42.4	26.0
Jun	20	1941	2004	64	2645	218954	109.5	34	8.1	41.9	25.7
Jun	21	1941	2004	64	2595	212530	106.3	33	8.0	41.5	25.4
Jun	22	1941	2004	64	2536	205038	102.5	33	7.9	41.0	25.1
Jun	23	1941	2004	64	2469	196648	98.3	33	7.8	40.4	24.7
Jun	24	1941	2004	64	2405	188752	94.4	32	7.7	39.8	24.4
Jun	25	1941	2004	64	2331	179768	89.9	32	7.6	39.1	24.0
Jun	26	1941	2004	64	2281	173788	86.9	31	7.5	38.6	23.7
Jun	27	1941	2004	64	2227	167410	83.7	31	7.4	38.1	23.3
Jun	28	1941	2004	64	2147	158121	79.1	30	7.2	37.3	22.9
Jun	29	1941	2004	64	2082	150715	75.4	30	7.1	36.7	22.5
Jun	30	1941	2004	64	2015	143216	71.6	29	7.0	36.0	22.1

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Jun	1	3900	401326	200.7	42	10.1	52.1	32.0
Jun	2	3990	415870	207.9	43	10.2	52.8	32.4
Jun	3	4020	420760	210.4	43	10.3	53.0	32.5
Jun	4	4230	455556	227.8	44	10.6	54.6	33.4
Jun	5	4400	484444	242.2	45	10.8	55.8	34.2
Jun	6	4310	469071	234.5	44	10.7	55.2	33.8
Jun	7	4130	438862	219.4	43	10.4	53.8	33.0
Jun	8	4030	422394	211.2	43	10.3	53.1	32.6
Jun	9	4060	427311	213.7	43	10.3	53.3	32.7
Jun	10	3820	388554	194.3	42	10.0	51.5	31.6
Jun	11	3489	337311	168.7	40	9.5	49.0	30.0
Jun	12	3500	338972	169.5	40	9.5	49.1	30.1
Jun	13	3800	385385	192.7	41	9.9	51.4	31.5
Jun	14	3740	375932	188.0	41	9.9	50.9	31.2
Jun	15	3710	371237	185.6	41	9.8	50.7	31.1
Jun	16	3620	357280	178.6	40	9.7	50.0	30.7
Jun	17	3860	394922	197.5	42	10.0	51.8	31.8
Jun	18	3800	385385	192.7	41	9.9	51.4	31.5
Jun	19	3770	380648	190.3	41	9.9	51.2	31.4
Jun	20	3680	366563	183.3	41	9.8	50.5	30.9
Jun	21	3800	385385	192.7	41	9.9	51.4	31.5
Jun	22	3700	369677	184.8	41	9.8	50.6	31.0
Jun	23	3670	365010	182.5	41	9.8	50.4	30.9
Jun	24	3489	337311	168.7	40	9.5	49.0	30.0
Jun	25	3370	319532	159.8	39	9.3	48.0	29.4
Jun	26	3100	280492	140.2	37	8.9	45.9	28.1
Jun	27	3200	294738	147.4	38	9.0	46.7	28.6
Jun	28	3100	280492	140.2	37	8.9	45.9	28.1
Jun	29	2970	262355	131.2	36	8.7	44.8	27.4
Jun	30	3080	277674	138.8	37	8.8	45.7	28.0

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Jun	1	6900	977553	488.8	58	13.9	71.8	44.0
Jun	2	6920	981978	491.0	58	13.9	71.9	44.1
Jun	3	6520	894854	447.4	56	13.5	69.6	42.6
Jun	4	6120	810675	405.3	54	13.0	67.1	41.1
Jun	5	6000	786008	393.0	54	12.8	66.4	40.7
Jun	6	5950	775812	387.9	53	12.8	66.1	40.5
Jun	7	6240	835615	417.8	55	13.1	67.9	41.6
Jun	8	6590	909890	454.9	56	13.5	70.0	42.9
Jun	9	6630	918522	459.3	57	13.6	70.2	43.0
Jun	10	6920	981978	491.0	58	13.9	71.9	44.1
Jun	11	6800	955536	477.8	57	13.8	71.2	43.6
Jun	12	5800	745509	372.8	53	12.6	65.1	39.9
Jun	13	6300	848186	424.1	55	13.2	68.2	41.8
Jun	14	7500	1113386	556.7	61	14.6	75.2	46.1
Jun	15	8400	1328756	664.4	65	15.5	80.2	49.1
Jun	16	8900	1454213	727.1	67	16.0	82.8	50.7
Jun	17	8600	1378451	689.2	66	15.7	81.2	49.8
Jun	18	8200	1279721	639.9	64	15.3	79.1	48.5
Jun	19	7900	1207417	603.7	62	15.0	77.5	47.5
Jun	20	7500	1113386	556.7	61	14.6	75.2	46.1
Jun	21	6600	912045	456.0	56	13.6	70.0	42.9
Jun	22	6300	848186	424.1	55	13.2	68.2	41.8
Jun	23	6200	827271	413.6	55	13.1	67.6	41.4
Jun	24	6100	806545	403.3	54	13.0	67.0	41.1
Jun	25	5950	775812	387.9	53	12.8	66.1	40.5
Jun	26	5720	729526	364.8	52	12.5	64.6	39.6
Jun	27	5430	672638	336.3	51	12.1	62.8	38.5
Jun	28	5730	731517	365.8	52	12.5	64.7	39.7
Jun	29	5640	713667	356.8	52	12.4	64.1	39.3
Jun	30	4990	589544	294.8	48	11.6	59.9	36.7

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	^24%	Bias Factor ^+ or - 24% ^+24%	^-24%
Jul	1	1941	2004	64	1954	136508	68.3	29	6.9	35.4	21.7
Jul	2	1941	2004	64	1905	131204	65.6	28	6.8	34.9	21.4
Jul	3	1941	2004	64	1839	124180	62.1	28	6.6	34.2	21.0
Jul	4	1941	2004	64	1785	118538	59.3	27	6.5	33.7	20.6
Jul	5	1941	2004	64	1719	111770	55.9	27	6.4	32.9	20.2
Jul	6	1941	2004	64	1665	106340	53.2	26	6.3	32.4	19.8
Jul	7	1941	2004	64	1625	102380	51.2	26	6.2	31.9	19.6
Jul	8	1941	2004	64	1571	97121	48.6	25	6.1	31.3	19.2
Jul	9	1941	2004	64	1506	90924	45.5	25	5.9	30.6	18.8
Jul	10	1941	2004	64	1451	85796	42.9	24	5.8	30.0	18.4
Jul	11	1941	2004	64	1394	80595	40.3	24	5.7	29.3	18.0
Jul	12	1941	2004	64	1329	74808	37.4	23	5.5	28.5	17.5
Jul	13	1941	2004	64	1271	69776	34.9	22	5.4	27.8	17.1
Jul	14	1941	2004	64	1225	65876	32.9	22	5.3	27.3	16.7
Jul	15	1941	2004	64	1176	61811	30.9	21	5.2	26.6	16.3
Jul	16	1941	2004	64	1121	57359	28.7	21	5.0	25.9	15.9
Jul	17	1941	2004	64	1073	53573	26.8	20	4.9	25.3	15.5
Jul	18	1941	2004	64	1033	50490	25.2	20	4.8	24.8	15.2
Jul	19	1941	2004	64	995	47622	23.8	20	4.7	24.3	14.9
Jul	20	1941	2004	64	962	45180	22.6	19	4.6	23.8	14.6
Jul	21	1941	2004	64	927	42641	21.3	19	4.5	23.3	14.3
Jul	22	1941	2004	64	898	40578	20.3	18	4.4	22.9	14.0
Jul	23	1941	2004	64	871	38690	19.3	18	4.4	22.5	13.8
Jul	24	1941	2004	64	841	36631	18.3	18	4.3	22.1	13.5
Jul	25	1941	2004	64	811	34613	17.3	17	4.2	21.6	13.3
Jul	26	1941	2004	64	789	33159	16.6	17	4.1	21.3	13.1
Jul	27	1941	2004	64	769	31857	15.9	17	4.1	21.0	12.9
Jul	28	1941	2004	64	749	30573	15.3	17	4.0	20.7	12.7
Jul	29	1941	2004	64	733	29560	14.8	16	4.0	20.4	12.5
Jul	30	1941	2004	64	717	28560	14.3	16	3.9	20.2	12.4
Jul	31	1941	2004	64	698	27387	13.7	16	3.8	19.9	12.2

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	^24%	Bias Factor ^+ or - 24% ^+24%	^-24%
Jul	1	3100	280492	140.2	37	8.9	45.9	28.1
Jul	2	2960	260978	130.5	36	8.6	44.7	27.4
Jul	3	2810	240636	120.3	35	8.4	43.4	26.6
Jul	4	2760	233989	117.0	35	8.3	43.0	26.3
Jul	5	2600	213169	106.6	34	8.0	41.5	25.5
Jul	6	2570	209344	104.7	33	8.0	41.3	25.3
Jul	7	2460	195531	97.8	32	7.8	40.3	24.7
Jul	8	2540	205543	102.8	33	7.9	41.0	25.1
Jul	9	2320	178446	89.2	31	7.5	39.0	23.9
Jul	10	2270	172482	86.2	31	7.5	38.5	23.6
Jul	11	2230	167763	83.9	31	7.4	38.1	23.4
Jul	12	1990	140453	70.2	29	6.9	35.8	21.9
Jul	13	1800	120096	60.0	27	6.5	33.8	20.7
Jul	14	1770	116987	58.5	27	6.5	33.5	20.5
Jul	15	1739	113806	56.9	27	6.4	33.2	20.3
Jul	16	1680	107838	53.9	26	6.3	32.5	19.9
Jul	17	1570	97025	48.5	25	6.1	31.3	19.2
Jul	18	1490	89421	44.7	25	5.9	30.4	18.6
Jul	19	1419	82862	41.4	24	5.7	29.6	18.1
Jul	20	1360	77549	38.8	23	5.6	28.9	17.7
Jul	21	1300	72277	36.1	23	5.5	28.2	17.3
Jul	22	1240	67139	33.6	22	5.3	27.4	16.8
Jul	23	1200	63790	31.9	22	5.2	26.9	16.5
Jul	24	1140	58884	29.4	21	5.1	26.2	16.0
Jul	25	1100	55692	27.8	21	5.0	25.7	15.7
Jul	26	1070	53340	26.7	20	4.9	25.3	15.5
Jul	27	1040	51025	25.5	20	4.8	24.9	15.2
Jul	28	1010	48746	24.4	20	4.7	24.5	15.0
Jul	29	1000	47995	24.0	20	4.7	24.3	14.9
Jul	30	1000	47995	24.0	20	4.7	24.3	14.9
Jul	31	964	45327	22.7	19	4.6	23.8	14.6

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	^24%	Bias Factor ^+ or - 24% ^+24%	^-24%
Jul	1	4700	536959	268.5	47	11.2	57.9	35.5
Jul	2	4550	510459	255.2	46	11.0	56.9	34.8
Jul	3	4400	484444	242.2	45	10.8	55.8	34.2
Jul	4	4300	467374	233.7	44	10.7	55.1	33.8
Jul	5	4520	505217	252.6	46	11.0	56.6	34.7
Jul	6	4600	519239	259.6	46	11.1	57.2	35.1
Jul	7	4450	493061	246.5	45	10.9	56.1	34.4
Jul	8	4120	437205	218.6	43	10.4	53.8	33.0
Jul	9	3920	404542	202.3	42	10.1	52.3	32.1
Jul	10	3670	365010	182.5	41	9.8	50.4	30.9
Jul	11	3380	321012	160.5	39	9.3	48.1	29.5
Jul	12	3360	318053	159.0	39	9.3	48.0	29.4
Jul	13	3310	310699	155.3	38	9.2	47.6	29.2
Jul	14	3160	289009	144.5	37	9.0	46.3	28.4
Jul	15	2950	259603	129.8	36	8.6	44.6	27.3
Jul	16	2570	209344	104.7	33	8.0	41.3	25.3
Jul	17	2320	178446	89.2	31	7.5	39.0	23.9
Jul	18	2180	161930	81.0	30	7.3	37.6	23.1
Jul	19	2110	153890	76.9	30	7.2	37.0	22.7
Jul	20	2120	155030	77.5	30	7.2	37.1	22.7
Jul	21	2050	147116	73.6	29	7.0	36.4	22.3
Jul	22	2200	164254	82.1	31	7.3	37.8	23.2
Jul	23	2090	151620	75.8	30	7.1	36.8	22.5
Jul	24	1930	133901	67.0	28	6.8	35.2	21.5
Jul	25	1840	124286	62.1	28	6.6	34.2	21.0
Jul	26	1770	116987	58.5	27	6.5	33.5	20.5
Jul	27	1750	114931	57.5	27	6.4	33.3	20.4
Jul	28	1640	103859	51.9	26	6.2	32.1	19.7
Jul	29	1510	91301	45.7	25	5.9	30.6	18.8
Jul	30	1390	80234	40.1	24	5.7	29.3	17.9
Jul	31	1310	73146	36.6	23	5.5	28.3	17.3

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	^24%	Bias Factor ^+ or - 24% ^+24%	^-24%
Aug	1	1941	2004	64	677	26113	13.1	16	3.8	19.5	12.0
Aug	2	1941	2004	64	657	24919	12.5	16	3.7	19.2	11.8
Aug	3	1941	2004	64	643	24095	12.0	15	3.7	19.0	11.6
Aug	4	1941	2004	64	627	23166	11.6	15	3.6	18.7	11.5
Aug	5	1941	2004	64	611	22250	11.1	15	3.6	18.5	11.3
Aug	6	1941	2004	64	597	21460	10.7	15	3.5	18.2	11.2
Aug	7	1941	2004	64	582	20625	10.3	14	3.5	18.0	11.0
Aug	8	1941	2004	64	569	19910	10.0	14	3.4	17.7	10.9
Aug	9	1941	2004	64	560	19421	9.7	14	3.4	17.6	10.8
Aug	10	1941	2004	64	548	18776	9.4	14	3.4	17.4	10.6
Aug	11	1941	2004	64	540	18350	9.2	14	3.3	17.2	10.6
Aug	12	1941	2004	64	534	18032	9.0	14	3.3	17.1	10.5
Aug	13	1941	2004	64	528	17717	8.9	14	3.3	17.0	10.4
Aug	14	1941	2004	64	517	17145	8.6	14	3.3	16.8	10.3
Aug	15	1941	2004	64	508	16681	8.3	13	3.2	16.6	10.2
Aug	16	1941	2004	64	506	16579	8.3	13	3.2	16.6	10.2
Aug	17	1941	2004	64	497	16121	8.1	13	3.2	16.4	10.1
Aug	18	1941	2004	64	490	15768	7.9	13	3.2	16.3	10.0
Aug	19	1941	2004	64	484	15468	7.7	13	3.1	16.2	9.9
Aug	20	1941	2004	64	479	15219	7.6	13	3.1	16.1	9.9
Aug	21	1941	2004	64	472	14874	7.4	13	3.1	16.0	9.8
Aug	22	1941	2004	64	467	14629	7.3	13	3.1	15.9	9.7
Aug	23	1941	2004	64	471	14825	7.4	13	3.1	15.9	9.8
Aug	24	1941	2004	64	463	14434	7.2	13	3.1	15.8	9.7
Aug	25	1941	2004	64	454	13998	7.0	13	3.0	15.6	9.6
Aug	26	1941	2004	64	448	13711	6.9	13	3.0	15.5	9.5
Aug	27	1941	2004	64	439	13283	6.6	12	3.0	15.3	9.4
Aug	28	1941	2004	64	432	12954	6.5	12	2.9	15.2	9.3
Aug	29	1941	2004	64	425	12628	6.3	12	2.9	15.1	9.2
Aug	30	1941	2004	64	422	12489	6.2	12	2.9	15.0	9.2
Aug	31	1941	2004	64	420	12397	6.2	12	2.9	15.0	9.2

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	^24%	Bias Factor ^+ or - 24% ^+24%	^-24%
Aug	1	938	43434	21.7	19	4.5	23.5	14.4
Aug	2	893	40226	20.1	18	4.4	22.8	14.0
Aug	3	846	36972	18.5	18	4.3	22.1	13.6
Aug	4	835	36224	18.1	18	4.3	22.0	13.5
Aug	5	817	35013	17.5	18	4.2	21.7	13.3
Aug	6	796	33619	16.8	17	4.1	21.4	13.1
Aug	7	761	31341	15.7	17	4.0	20.9	12.8
Aug	8	743	30192	15.1	17	4.0	20.6	12.6
Aug	9	722	28871	14.4	16	3.9	20.3	12.4
Aug	10	697	27326	13.7	16	3.8	19.9	12.2
Aug	11	681	26354	13.2	16	3.8	19.6	12.0
Aug	12	681	26354	13.2	16	3.8	19.6	12.0
Aug	13	665	25394	12.7	16	3.7	19.4	11.9
Aug	14	661	25156	12.6	16	3.7	19.3	11.8
Aug	15	660	25097	12.5	16	3.7	19.3	11.8
Aug	16	638	23804	11.9	15	3.7	18.9	11.6
Aug	17	631	23397	11.7	15	3.6	18.8	11.5
Aug	18	647	24330	12.2	15	3.7	19.1	11.7
Aug	19	643	24095	12.0	15	3.7	19.0	11.6
Aug	20	633	23513	11.8	15	3.6	18.8	11.5
Aug	21	614	22421	11.2	15	3.6	18.5	11.3
Aug	22	611	22250	11.1	15	3.6	18.5	11.3
Aug	23	607	22024	11.0	15	3.6	18.4	11.3
Aug	24	593	21236	10.6	15	3.5	18.1	11.1
Aug	25	575	20239	10.1	14	3.5	17.8	10.9
Aug	26	566	19747	9.9	14	3.4	17.7	10.8
Aug	27	550	18883	9.4	14	3.4	17.4	10.7
Aug	28	545	18615	9.3	14	3.4	17.3	10.6
Aug	29	534	18032	9.0	14	3.3	17.1	10.5
Aug	30	529	17770	8.9	14	3.3	17.0	10.4
Aug	31	514	16990	8.5	14	3.2	16.8	10.3

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	^24%	Bias Factor ^+ or - 24% ^+24%	^-24%
Aug	1	1290	71411	35.7	23	5.4	28.1	17.2
Aug	2	1320	74019	37.0	23	5.5	28.4	17.4
Aug	3	1280	70549	35.3	23	5.4	27.9	17.1
Aug	4	1180	62139	31.1	22	5.2	26.7	16.4
Aug	5	1100	55692	27.8	21	5.0	25.7	15.7
Aug	6	1060	52564	26.3	20	4.9	25.1	15.4
Aug	7	1090	54904	27.5	21	4.9	25.5	15.6
Aug	8	1040	51025	25.5	20	4.8	24.9	15.2
Aug	9	970	45768	22.9	19	4.6	23.9	14.7
Aug	10	925	42498	21.2	19	4.5	23.3	14.3
Aug	11	1040	51025	25.5	20	4.8	24.9	15.2
Aug	12	985	46877	23.4	19	4.7	24.1	14.8
Aug	13	1160	60503	30.3	21	5.1	26.4	16.2
Aug	14	985	46877	23.4	19	4.7	24.1	14.8
Aug	15	892	40156	20.1	18	4.4	22.8	14.0
Aug	16	991	47323	23.7	20	4.7	24.2	14.8
Aug	17	939	43506	21.8	19	4.5	23.5	14.4
Aug	18	818	35080	17.5	18	4.2	21.7	13.3
Aug	19	836	36292	18.1	18	4.3	22.0	13.5
Aug	20	810	34546	17.3	17	4.2	21.6	13.2
Aug	21	812	34679	17.3	17	4.2	21.6	13.3
Aug	22	812	34679	17.3	17	4.2	21.6	13.3
Aug	23	780	32570	16.3	17	4.1	21.2	13.0
Aug	24	798	33751	16.9	17	4.1	21.4	13.1
Aug	25	725	29058	14.5	16	3.9	20.3	12.4
Aug	26	710	28126	14.1	16	3.9	20.1	12.3
Aug	27	680	26293	13.1	16	3.8	19.6	12.0
Aug	28	665	25394	12.7	16	3.7	19.4	11.9
Aug	29	660	25097	12.5	16	3.7	19.3	11.8
Aug	30	651	24565	12.3	15	3.7	19.1	11.7
Aug	31	664	25334	12.7	16	3.7	19.3	11.9

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Sep	1	1941	2004	64	417	12259	6.1	12	2.9	14.9	9.1
Sep	2	1941	2004	64	412	12031	6.0	12	2.9	14.8	9.1
Sep	3	1941	2004	64	406	11758	5.9	12	2.8	14.7	9.0
Sep	4	1941	2004	64	400	11488	5.7	12	2.8	14.6	8.9
Sep	5	1941	2004	64	396	11310	5.7	12	2.8	14.5	8.9
Sep	6	1941	2004	64	397	11354	5.7	12	2.8	14.5	8.9
Sep	7	1941	2004	64	398	11399	5.7	12	2.8	14.5	8.9
Sep	8	1941	2004	64	401	11533	5.8	12	2.8	14.6	8.9
Sep	9	1941	2004	64	401	11533	5.8	12	2.8	14.6	8.9
Sep	10	1941	2004	64	393	11176	5.6	12	2.8	14.4	8.8
Sep	11	1941	2004	64	393	11176	5.6	12	2.8	14.4	8.8
Sep	12	1941	2004	64	393	11176	5.6	12	2.8	14.4	8.8
Sep	13	1941	2004	64	387	10911	5.5	12	2.8	14.3	8.8
Sep	14	1941	2004	64	381	10648	5.3	11	2.7	14.2	8.7
Sep	15	1941	2004	64	382	10692	5.3	11	2.7	14.2	8.7
Sep	16	1941	2004	64	382	10692	5.3	11	2.7	14.2	8.7
Sep	17	1941	2004	64	383	10736	5.4	11	2.7	14.2	8.7
Sep	18	1941	2004	64	381	10648	5.3	11	2.7	14.2	8.7
Sep	19	1941	2004	64	381	10648	5.3	11	2.7	14.2	8.7
Sep	20	1941	2004	64	382	10692	5.3	11	2.7	14.2	8.7
Sep	21	1941	2004	64	379	10561	5.3	11	2.7	14.1	8.7
Sep	22	1941	2004	64	371	10215	5.1	11	2.7	14.0	8.6
Sep	23	1941	2004	64	366	10001	5.0	11	2.7	13.8	8.5
Sep	24	1941	2004	64	364	9916	5.0	11	2.7	13.8	8.5
Sep	25	1941	2004	64	365	9959	5.0	11	2.7	13.8	8.5
Sep	26	1941	2004	64	367	10044	5.0	11	2.7	13.9	8.5
Sep	27	1941	2004	64	364	9916	5.0	11	2.7	13.8	8.5
Sep	28	1941	2004	64	359	9704	4.9	11	2.7	13.7	8.4
Sep	29	1941	2004	64	358	9662	4.8	11	2.6	13.7	8.4
Sep	30	1941	2004	64	358	9662	4.8	11	2.6	13.7	8.4

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Sep	1	518	17197	8.6	14	3.3	16.8	10.3
Sep	2	512	16887	8.4	13	3.2	16.7	10.2
Sep	3	490	15768	7.9	13	3.2	16.3	10.0
Sep	4	494	15970	8.0	13	3.2	16.4	10.0
Sep	5	486	15568	7.8	13	3.1	16.2	9.9
Sep	6	475	15021	7.5	13	3.1	16.0	9.8
Sep	7	471	14825	7.4	13	3.1	15.9	9.8
Sep	8	492	15869	7.9	13	3.2	16.3	10.0
Sep	9	497	16121	8.1	13	3.2	16.4	10.1
Sep	10	483	15418	7.7	13	3.1	16.2	9.9
Sep	11	480	15269	7.6	13	3.1	16.1	9.9
Sep	12	480	15269	7.6	13	3.1	16.1	9.9
Sep	13	475	15021	7.5	13	3.1	16.0	9.8
Sep	14	458	14191	7.1	13	3.0	15.7	9.6
Sep	15	452	13902	7.0	13	3.0	15.6	9.6
Sep	16	462	14385	7.2	13	3.1	15.8	9.7
Sep	17	458	14191	7.1	13	3.0	15.7	9.6
Sep	18	456	14094	7.0	13	3.0	15.7	9.6
Sep	19	464	14482	7.2	13	3.1	15.8	9.7
Sep	20	461	14336	7.2	13	3.1	15.8	9.7
Sep	21	457	14143	7.1	13	3.0	15.7	9.6
Sep	22	444	13520	6.8	12	3.0	15.4	9.5
Sep	23	437	13189	6.6	12	3.0	15.3	9.4
Sep	24	436	13142	6.6	12	3.0	15.3	9.4
Sep	25	431	12907	6.5	12	2.9	15.2	9.3
Sep	26	438	13236	6.6	12	3.0	15.3	9.4
Sep	27	430	12861	6.4	12	2.9	15.2	9.3
Sep	28	431	12907	6.5	12	2.9	15.2	9.3
Sep	29	426	12674	6.3	12	2.9	15.1	9.2
Sep	30	426	12674	6.3	12	2.9	15.1	9.2

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Sep	1	635	23629	11.8	15	3.6	18.9	11.6
Sep	2	635	23629	11.8	15	3.6	18.9	11.6
Sep	3	627	23166	11.6	15	3.6	18.7	11.5
Sep	4	603	21798	10.9	15	3.5	18.3	11.2
Sep	5	596	21404	10.7	15	3.5	18.2	11.2
Sep	6	648	24388	12.2	15	3.7	19.1	11.7
Sep	7	652	24624	12.3	15	3.7	19.1	11.7
Sep	8	835	36224	18.1	18	4.3	22.0	13.5
Sep	9	805	34214	17.1	17	4.2	21.5	13.2
Sep	10	760	31277	15.6	17	4.0	20.9	12.8
Sep	11	680	26293	13.1	16	3.8	19.6	12.0
Sep	12	700	27510	13.8	16	3.9	19.9	12.2
Sep	13	620	22764	11.4	15	3.6	18.6	11.4
Sep	14	556	19205	9.6	14	3.4	17.5	10.7
Sep	15	602	21741	10.9	15	3.5	18.3	11.2
Sep	16	623	22936	11.5	15	3.6	18.7	11.4
Sep	17	567	19801	9.9	14	3.4	17.7	10.8
Sep	18	570	19965	10.0	14	3.4	17.7	10.9
Sep	19	541	18403	9.2	14	3.3	17.2	10.6
Sep	20	579	20459	10.2	14	3.5	17.9	11.0
Sep	21	593	21236	10.6	15	3.5	18.1	11.1
Sep	22	518	17197	8.6	14	3.3	16.8	10.3
Sep	23	504	16477	8.2	13	3.2	16.6	10.2
Sep	24	497	16121	8.1	13	3.2	16.4	10.1
Sep	25	490	15768	7.9	13	3.2	16.3	10.0
Sep	26	546	18669	9.3	14	3.4	17.3	10.6
Sep	27	570	19965	10.0	14	3.4	17.7	10.9
Sep	28	526	17613	8.8	14	3.3	17.0	10.4
Sep	29	514	16990	8.5	14	3.2	16.8	10.3
Sep	30	533	17980	9.0	14	3.3	17.1	10.5

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Oct	1	1941	2004	63	355	9536	4.8	11	2.6	13.6	8.3
Oct	2	1941	2004	63	360	9747	4.9	11	2.7	13.7	8.4
Oct	3	1941	2004	63	359	9704	4.9	11	2.7	13.7	8.4
Oct	4	1941	2004	63	355	9536	4.8	11	2.6	13.6	8.3
Oct	5	1941	2004	63	355	9536	4.8	11	2.6	13.6	8.3
Oct	6	1941	2004	63	352	9411	4.7	11	2.6	13.5	8.3
Oct	7	1941	2004	63	354	9494	4.7	11	2.6	13.6	8.3
Oct	8	1941	2004	63	352	9411	4.7	11	2.6	13.5	8.3
Oct	9	1941	2004	63	352	9411	4.7	11	2.6	13.5	8.3
Oct	10	1941	2004	63	356	9578	4.8	11	2.6	13.6	8.4
Oct	11	1941	2004	63	362	9831	4.9	11	2.7	13.8	8.4
Oct	12	1941	2004	63	373	10301	5.2	11	2.7	14.0	8.6
Oct	13	1941	2004	63	371	10215	5.1	11	2.7	14.0	8.6
Oct	14	1941	2004	63	367	10044	5.0	11	2.7	13.9	8.5
Oct	15	1941	2004	63	365	9959	5.0	11	2.7	13.8	8.5
Oct	16	1941	2004	63	365	9959	5.0	11	2.7	13.8	8.5
Oct	17	1941	2004	63	356	9578	4.8	11	2.6	13.6	8.4
Oct	18	1941	2004	63	350	9327	4.7	11	2.6	13.5	8.3
Oct	19	1941	2004	63	352	9411	4.7	11	2.6	13.5	8.3
Oct	20	1941	2004	63	348	9244	4.6	11	2.6	13.5	8.3
Oct	21	1941	2004	63	349	9286	4.6	11	2.6	13.5	8.3
Oct	22	1941	2004	63	355	9536	4.8	11	2.6	13.6	8.3
Oct	23	1941	2004	63	360	9747	4.9	11	2.7	13.7	8.4
Oct	24	1941	2004	63	361	9789	4.9	11	2.7	13.7	8.4
Oct	25	1941	2004	63	357	9620	4.8	11	2.6	13.7	8.4
Oct	26	1941	2004	63	363	9874	4.9	11	2.7	13.8	8.4
Oct	27	1941	2004	63	358	9662	4.8	11	2.6	13.7	8.4
Oct	28	1941	2004	63	365	9959	5.0	11	2.7	13.8	8.5
Oct	29	1941	2004	63	361	9789	4.9	11	2.7	13.7	8.4
Oct	30	1941	2004	63	362	9831	4.9	11	2.7	13.8	8.4
Oct	31	1941	2004	63	362	9831	4.9	11	2.7	13.8	8.4

Month	Day	80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Oct	1	420	12397	6.2	12	2.9	15.0	9.2
Oct	2	415	12168	6.1	12	2.9	14.9	9.1
Oct	3	420	12397	6.2	12	2.9	15.0	9.2
Oct	4	420	12397	6.2	12	2.9	15.0	9.2
Oct	5	424	12582	6.3	12	2.9	15.0	9.2
Oct	6	415	12168	6.1	12	2.9	14.9	9.1
Oct	7	410	11940	6.0	12	2.9	14.8	9.0
Oct	8	407	11804	5.9	12	2.8	14.7	9.0
Oct	9	397	11354	5.7	12	2.8	14.5	8.9
Oct	10	414	12122	6.1	12	2.9	14.8	9.1
Oct	11	440	13330	6.7	12	3.0	15.4	9.4
Oct	12	430	12861	6.4	12	2.9	15.2	9.3
Oct	13	408	11849	5.9	12	2.8	14.7	9.0
Oct	14	413	12076	6.0	12	2.9	14.8	9.1
Oct	15	413	12076	6.0	12	2.9	14.8	9.1
Oct	16	424	12582	6.3	12	2.9	15.0	9.2
Oct	17	418	12305	6.2	12	2.9	14.9	9.1
Oct	18	410	11940	6.0	12	2.9	14.8	9.0
Oct	19	409	11894	5.9	12	2.9	14.7	9.0
Oct	20	406	11758	5.9	12	2.8	14.7	9.0
Oct	21	408	11849	5.9	12	2.8	14.7	9.0
Oct	22	412	12031	6.0	12	2.9	14.8	9.1
Oct	23	414	12122	6.1	12	2.9	14.8	9.1
Oct	24	413	12076	6.0	12	2.9	14.8	9.1
Oct	25	410	11940	6.0	12	2.9	14.8	9.0
Oct	26	416	12213	6.1	12	2.9	14.9	9.1
Oct	27	411	11985	6.0	12	2.9	14.8	9.1
Oct	28	415	12168	6.1	12	2.9	14.9	9.1
Oct	29	417	12259	6.1	12	2.9	14.9	9.1
Oct	30	433	13001	6.5	12	2.9	15.2	9.3
Oct	31	430	12861	6.4	12	2.9	15.2	9.3

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Oct	1	533	17980	9.0	14	3.3	17.1	10.5
Oct	2	689	26838	13.4	16	3.8	19.7	12.1
Oct	3	636	23687	11.8	15	3.7	18.9	11.6
Oct	4	560	19421	9.7	14	3.4	17.6	10.8
Oct	5	520	17300	8.7	14	3.3	16.9	10.3
Oct	6	501	16324	8.2	13	3.2	16.5	10.1
Oct	7	499	16222	8.1	13	3.2	16.5	10.1
Oct	8	482	15368	7.7	13	3.1	16.2	9.9
Oct	9	644	24154	12.1	15	3.7	19.0	11.6
Oct	10	688	26778	13.4	16	3.8	19.7	12.1
Oct	11	680	26293	13.1	16	3.8	19.6	12.0
Oct	12	1100	55692	27.8	21	5.0	25.7	15.7
Oct	13	1290	71411	35.7	23	5.4	28.1	17.2
Oct	14	1290	71411	35.7	23	5.4	28.1	17.2
Oct	15	1050	51792	25.9	20	4.8	25.0	15.3
Oct	16	860	37931	19.0	18	4.3	22.4	13.7
Oct	17	773	32116	16.1	17	4.1	21.1	12.9
Oct	18	718	28622	14.3	16	3.9	20.2	12.4
Oct	19	672	25812	12.9	16	3.8	19.5	11.9
Oct	20	637	23745	11.9	15	3.7	18.9	11.6
Oct	21	609	22137	11.1	15	3.6	18.4	11.3
Oct	22	593	21236	10.6	15	3.5	18.1	11.1
Oct	23	612	22307	11.2	15	3.6	18.5	11.3
Oct	24	715	28435	14.2	16	3.9	20.2	12.4
Oct	25	698	27387	13.7	16	3.8	19.9	12.2
Oct	26	701	27571	13.8	16	3.9	19.9	12.2
Oct	27	676	26052	13.0	16	3.8	19.5	12.0
Oct	28	779	32505	16.3	17	4.1	21.1	13.0
Oct	29	705	27817	13.9	16	3.9	20.0	12.3
Oct	30	748	30510	15.3	17	4.0	20.7	12.7
Oct	31	665	25394	12.7	16	3.7	19.4	11.9

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Nov	1	1941	2004	63	361	9789	4.9	11	2.7	13.7	8.4
Nov	2	1941	2004	63	355	9536	4.8	11	2.6	13.6	8.3
Nov	3	1941	2004	63	355	9536	4.8	11	2.6	13.6	8.3
Nov	4	1941	2004	63	360	9747	4.9	11	2.7	13.7	8.4
Nov	5	1941	2004	63	358	9662	4.8	11	2.6	13.7	8.4
Nov	6	1941	2004	63	354	9494	4.7	11	2.6	13.6	8.3
Nov	7	1941	2004	63	364	9916	5.0	11	2.7	13.8	8.5
Nov	8	1941	2004	63	367	10044	5.0	11	2.7	13.9	8.5
Nov	9	1941	2004	63	362	9831	4.9	11	2.7	13.8	8.4
Nov	10	1941	2004	63	363	9874	4.9	11	2.7	13.8	8.4
Nov	11	1941	2004	63	367	10044	5.0	11	2.7	13.9	8.5
Nov	12	1941	2004	63	384	10779	5.4	11	2.8	14.2	8.7
Nov	13	1941	2004	63	377	10474	5.2	11	2.7	14.1	8.6
Nov	14	1941	2004	63	374	10344	5.2	11	2.7	14.0	8.6
Nov	15	1941	2004	63	379	10561	5.3	11	2.7	14.1	8.7
Nov	16	1941	2004	63	366	10001	5.0	11	2.7	13.8	8.5
Nov	17	1941	2004	63	363	9874	4.9	11	2.7	13.8	8.4
Nov	18	1941	2004	63	360	9747	4.9	11	2.7	13.7	8.4
Nov	19	1941	2004	63	372	10258	5.1	11	2.7	14.0	8.6
Nov	20	1941	2004	63	373	10301	5.2	11	2.7	14.0	8.6
Nov	21	1941	2004	63	364	9916	5.0	11	2.7	13.8	8.5
Nov	22	1941	2004	63	359	9704	4.9	11	2.7	13.7	8.4
Nov	23	1941	2004	63	358	9662	4.8	11	2.6	13.7	8.4
Nov	24	1941	2004	63	376	10431	5.2	11	2.7	14.1	8.6
Nov	25	1941	2004	63	382	10692	5.3	11	2.7	14.2	8.7
Nov	26	1941	2004	63	365	9959	5.0	11	2.7	13.8	8.5
Nov	27	1941	2004	63	356	9578	4.8	11	2.6	13.6	8.4
Nov	28	1941	2004	63	356	9578	4.8	11	2.6	13.6	8.4
Nov	29	1941	2004	63	344	9079	4.5	11	2.6	13.4	8.2
Nov	30	1941	2004	63	351	9369	4.7	11	2.6	13.5	8.3

Month	Day	Discharge 80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Nov	1	413	12076	6.0	12	2.9	14.8	9.1
Nov	2	416	12213	6.1	12	2.9	14.9	9.1
Nov	3	417	12259	6.1	12	2.9	14.9	9.1
Nov	4	432	12954	6.5	12	2.9	15.2	9.3
Nov	5	412	12031	6.0	12	2.9	14.8	9.1
Nov	6	401	11533	5.8	12	2.8	14.6	8.9
Nov	7	412	12031	6.0	12	2.9	14.8	9.1
Nov	8	420	12397	6.2	12	2.9	15.0	9.2
Nov	9	427	12721	6.4	12	2.9	15.1	9.3
Nov	10	420	12397	6.2	12	2.9	15.0	9.2
Nov	11	412	12031	6.0	12	2.9	14.8	9.1
Nov	12	414	12122	6.1	12	2.9	14.8	9.1
Nov	13	424	12582	6.3	12	2.9	15.0	9.2
Nov	14	414	12122	6.1	12	2.9	14.8	9.1
Nov	15	409	11894	5.9	12	2.9	14.7	9.0
Nov	16	414	12122	6.1	12	2.9	14.8	9.1
Nov	17	407	11804	5.9	12	2.8	14.7	9.0
Nov	18	408	11849	5.9	12	2.8	14.7	9.0
Nov	19	426	12674	6.3	12	2.9	15.1	9.2
Nov	20	437	13189	6.6	12	3.0	15.3	9.4
Nov	21	434	13048	6.5	12	2.9	15.2	9.3
Nov	22	441	13378	6.7	12	3.0	15.4	9.4
Nov	23	425	12628	6.3	12	2.9	15.1	9.2
Nov	24	452	13902	7.0	13	3.0	15.6	9.6
Nov	25	445	13568	6.8	12	3.0	15.5	9.5
Nov	26	422	12489	6.2	12	2.9	15.0	9.2
Nov	27	441	13378	6.7	12	3.0	15.4	9.4
Nov	28	425	12628	6.3	12	2.9	15.1	9.2
Nov	29	418	12305	6.2	12	2.9	14.9	9.1
Nov	30	430	12861	6.4	12	2.9	15.2	9.3

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Nov	1	618	22649	11.3	15	3.6	18.6	11.4
Nov	2	618	22649	11.3	15	3.6	18.6	11.4
Nov	3	589	21013	10.5	15	3.5	18.1	11.1
Nov	4	628	23224	11.6	15	3.6	18.7	11.5
Nov	5	731	29435	14.7	16	3.9	20.4	12.5
Nov	6	570	19965	10.0	14	3.4	17.7	10.9
Nov	7	957	44814	22.4	19	4.6	23.7	14.5
Nov	8	1040	51025	25.5	20	4.8	24.9	15.2
Nov	9	684	26535	13.3	16	3.8	19.7	12.0
Nov	10	806	34280	17.1	17	4.2	21.6	13.2
Nov	11	962	45180	22.6	19	4.6	23.8	14.6
Nov	12	1620	101889	50.9	26	6.2	31.9	19.5
Nov	13	1450	85704	42.9	24	5.8	30.0	18.4
Nov	14	1050	51792	25.9	20	4.8	25.0	15.3
Nov	15	1470	87555	43.8	24	5.8	30.2	18.5
Nov	16	1000	47995	24.0	20	4.7	24.3	14.9
Nov	17	845	36903	18.5	18	4.3	22.1	13.6
Nov	18	736	29749	14.9	17	4.0	20.5	12.6
Nov	19	1520	92246	46.1	25	6.0	30.8	18.8
Nov	20	1420	82953	41.5	24	5.7	29.6	18.1
Nov	21	957	44814	22.4	19	4.6	23.7	14.5
Nov	22	824	35482	17.7	18	4.2	21.8	13.4
Nov	23	740	30002	15.0	17	4.0	20.5	12.6
Nov	24	1090	54904	27.5	21	4.9	25.5	15.6
Nov	25	1830	123233	61.6	28	6.6	34.1	20.9
Nov	26	978	46358	23.2	19	4.6	24.0	14.7
Nov	27	777	32375	16.2	17	4.1	21.1	12.9
Nov	28	739	29939	15.0	17	4.0	20.5	12.6
Nov	29	597	21460	10.7	15	3.5	18.2	11.2
Nov	30	1000	47995	24.0	20	4.7	24.3	14.9

Month	Day	Data From	to Year	Numbers of Years	Mean Discharge for Date	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Dec	1	1941	2004	63	362	9831	4.9	11	2.7	13.8	8.4
Dec	2	1941	2004	63	366	10001	5.0	11	2.7	13.8	8.5
Dec	3	1941	2004	63	393	11176	5.6	12	2.8	14.4	8.8
Dec	4	1941	2004	63	366	10001	5.0	11	2.7	13.8	8.5
Dec	5	1941	2004	63	349	9286	4.6	11	2.6	13.5	8.3
Dec	6	1941	2004	63	349	9286	4.6	11	2.6	13.5	8.3
Dec	7	1941	2004	63	345	9120	4.6	11	2.6	13.4	8.2
Dec	8	1941	2004	63	333	8630	4.3	11	2.5	13.1	8.0
Dec	9	1941	2004	63	329	8469	4.2	11	2.5	13.0	8.0
Dec	10	1941	2004	63	333	8630	4.3	11	2.5	13.1	8.0
Dec	11	1941	2004	63	332	8590	4.3	11	2.5	13.1	8.0
Dec	12	1941	2004	63	339	8874	4.4	11	2.6	13.3	8.1
Dec	13	1941	2004	63	351	9369	4.7	11	2.6	13.5	8.3
Dec	14	1941	2004	63	350	9327	4.7	11	2.6	13.5	8.3
Dec	15	1941	2004	63	361	9789	4.9	11	2.7	13.7	8.4
Dec	16	1941	2004	63	346	9162	4.6	11	2.6	13.4	8.2
Dec	17	1941	2004	63	335	8711	4.4	11	2.6	13.2	8.1
Dec	18	1941	2004	63	328	8429	4.2	11	2.5	13.0	8.0
Dec	19	1941	2004	63	331	8549	4.3	11	2.5	13.1	8.0
Dec	20	1941	2004	63	340	8915	4.5	11	2.6	13.3	8.1
Dec	21	1941	2004	63	346	9162	4.6	11	2.6	13.4	8.2
Dec	22	1941	2004	63	390	11043	5.5	12	2.8	14.3	8.8
Dec	23	1941	2004	63	419	12351	6.2	12	2.9	14.9	9.2
Dec	24	1941	2004	63	381	10648	5.3	11	2.7	14.2	8.7
Dec	25	1941	2004	63	360	9747	4.9	11	2.7	13.7	8.4
Dec	26	1941	2004	63	356	9578	4.8	11	2.6	13.6	8.4
Dec	27	1941	2004	63	353	9453	4.7	11	2.6	13.6	8.3
Dec	28	1941	2004	63	354	9494	4.7	11	2.6	13.6	8.3
Dec	29	1941	2004	63	358	9662	4.8	11	2.6	13.7	8.4
Dec	30	1941	2004	63	347	9203	4.6	11	2.6	13.4	8.2
Dec	31	1941	2004	63	349	9286	4.6	11	2.6	13.5	8.3

Month	Day	80th Percentile (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Dec	1	411	11985	6.0	12	2.9	14.8	9.1
Dec	2	418	12305	6.2	12	2.9	14.9	9.1
Dec	3	453	13950	7.0	13	3.0	15.6	9.6
Dec	4	420	12397	6.2	12	2.9	15.0	9.2
Dec	5	401	11533	5.8	12	2.8	14.6	8.9
Dec	6	411	11985	6.0	12	2.9	14.8	9.1
Dec	7	407	11804	5.9	12	2.8	14.7	9.0
Dec	8	394	11221	5.6	12	2.8	14.4	8.8
Dec	9	370	10172	5.1	11	2.7	13.9	8.5
Dec	10	386	10867	5.4	12	2.8	14.3	8.7
Dec	11	416	12213	6.1	12	2.9	14.9	9.1
Dec	12	400	11488	5.7	12	2.8	14.6	8.9
Dec	13	396	11310	5.7	12	2.8	14.5	8.9
Dec	14	393	11176	5.6	12	2.8	14.4	8.8
Dec	15	413	12076	6.0	12	2.9	14.8	9.1
Dec	16	398	11399	5.7	12	2.8	14.5	8.9
Dec	17	381	10648	5.3	11	2.7	14.2	8.7
Dec	18	381	10648	5.3	11	2.7	14.2	8.7
Dec	19	396	11310	5.7	12	2.8	14.5	8.9
Dec	20	382	10692	5.3	11	2.7	14.2	8.7
Dec	21	406	11758	5.9	12	2.8	14.7	9.0
Dec	22	439	13283	6.6	12	3.0	15.3	9.4
Dec	23	422	12489	6.2	12	2.9	15.0	9.2
Dec	24	394	11221	5.6	12	2.8	14.4	8.8
Dec	25	391	11087	5.5	12	2.8	14.4	8.8
Dec	26	378	10518	5.3	11	2.7	14.1	8.6
Dec	27	391	11087	5.5	12	2.8	14.4	8.8
Dec	28	423	12535	6.3	12	2.9	15.0	9.2
Dec	29	418	12305	6.2	12	2.9	14.9	9.1
Dec	30	406	11758	5.9	12	2.8	14.7	9.0
Dec	31	404	11668	5.8	12	2.8	14.6	9.0

Month	Day	Max Peak Discharge cfs	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)	Bias Factor ^+ or - 24% ^24%	^ +24%	^ -24%
Dec	1	1420	82953	41.5	24	5.7	29.6	18.1
Dec	2	1290	71411	35.7	23	5.4	28.1	17.2
Dec	3	2480	198017	99.0	33	7.8	40.5	24.8
Dec	4	1370	78440	39.2	23	5.6	29.0	17.8
Dec	5	922	42283	21.1	19	4.5	23.2	14.2
Dec	6	882	39456	19.7	18	4.4	22.7	13.9
Dec	7	808	34413	17.2	17	4.2	21.6	13.2
Dec	8	663	25275	12.6	16	3.7	19.3	11.8
Dec	9	651	24565	12.3	15	3.7	19.1	11.7
Dec	10	675	25992	13.0	16	3.8	19.5	12.0
Dec	11	627	23166	11.6	15	3.6	18.7	11.5
Dec	12	989	47174	23.6	19	4.7	24.2	14.8
Dec	13	1390	80234	40.1	24	5.7	29.3	17.9
Dec	14	1050	51792	25.9	20	4.8	25.0	15.3
Dec	15	1290	71411	35.7	23	5.4	28.1	17.2
Dec	16	860	37931	19.0	18	4.3	22.4	13.7
Dec	17	745	30319	15.2	17	4.0	20.6	12.6
Dec	18	690	26899	13.4	16	3.8	19.8	12.1
Dec	19	650	24506	12.3	15	3.7	19.1	11.7
Dec	20	1060	52564	26.3	20	4.9	25.1	15.4
Dec	21	733	29560	14.8	16	4.0	20.4	12.5
Dec	22	2120	155030	77.5	30	7.2	37.1	22.7
Dec	23	3880	398119	199.1	42	10.1	52.0	31.9
Dec	24	2460	195531	97.8	32	7.8	40.3	24.7
Dec	25	1860	126400	63.2	28	6.7	34.4	21.1
Dec	26	1500	90359	45.2	25	5.9	30.5	18.7
Dec	27	1250	67986	34.0	22	5.3	27.6	16.9
Dec	28	1070	53340	26.7	20	4.9	25.3	15.5
Dec	29	1120	57280	28.6	21	5.0	25.9	15.9
Dec	30	879	39246	19.6	18	4.4	22.6	13.9
Dec	31	1300	72277	36.1	23	5.5	28.2	17.3

SF Payette at Lowman

Modeled Load [exp(1.5604*ln(avg flow))]

DATE	Avg Discharge for Date (cfs)	USGS Measured Discharge (cfs)	USGS Measured SSC Concentration (mg/l)	Calculated SSC Load (lbs/day)	Calculated SSC Load (tons/day)	DATE	Natural Log Avg Discharge for Date	Natural Log USGS Measured Discharge	Natural Log USGS Measured SSC Concentration	Natural Log Calculated SSC Load	Date	Avg Discharge for Date (cfs)	Predicted SSC Load (lbs/day)	Predicted SSC Load (tons/day)	Predicted SSC Concentration (mg/l)
11/8/1991	352	283	4	2.77E+03	1.4	11/8/1991	5.8636	5.6454	1.3863	7.9263	11/8/1991	352	9.41E+03	4.7	11
3/3/1992	370	472	9	1.04E+04	5.2	3/3/1992	5.9135	6.1570	2.1972	9.2487	3/3/1992	370	1.02E+04	5.1	11
5/13/1992	1965	1200	38	1.12E+05	55.8	5/13/1992	7.5832	7.0901	3.6376	11.6222	5/13/1992	1965	1.38E+05	68.9	29
9/1/1992	417	239	1	5.85E+02	0.3	9/1/1992	6.0331	5.4765	0.0000	6.3710	9/1/1992	417	1.23E+04	6.1	12
4/18/1994	1099	875	38	8.13E+04	40.7	4/18/1994	7.0022	6.7742	3.6376	11.3063	4/18/1994	1099	5.56E+04	27.8	21
4/20/1994	1185	1280	75	2.35E+05	117.4	4/20/1994	7.0775	7.1546	4.3175	12.3666	4/20/1994	1185	6.26E+04	31.3	22
4/25/1994	1292	1200	13	3.82E+04	19.1	4/25/1994	7.1639	7.0901	2.5649	10.5495	4/25/1994	1292	7.16E+04	35.8	23
4/27/1994	1264	917	9	2.02E+04	10.1	4/27/1994	7.1420	6.8211	2.1972	9.9129	4/27/1994	1264	6.92E+04	34.6	22
5/2/1994	1436	718	4	7.03E+03	3.5	5/2/1994	7.2696	6.5765	1.3863	8.8573	5/2/1994	1436	8.44E+04	42.2	24
5/4/1994	1559	728	4	7.12E+03	3.6	5/4/1994	7.3518	6.5903	1.3863	8.8711	5/4/1994	1559	9.60E+04	48.0	25
5/9/1994	1841	1680	53	2.18E+05	108.9	5/9/1994	7.5181	7.4265	3.9703	12.2914	5/9/1994	1841	1.24E+05	62.2	28
5/11/1994	1894	2140	81	4.24E+05	212.0	5/11/1994	7.5464	7.6686	4.3944	12.9575	5/11/1994	1894	1.30E+05	65.0	28
5/14/1994	2033	2130	35	1.82E+05	91.2	5/14/1994	7.6173	7.6639	3.5553	12.1137	5/14/1994	2033	1.45E+05	72.6	29
5/16/1994	2209	1600	18	7.04E+04	35.2	5/16/1994	7.7003	7.3778	2.8904	11.1626	5/16/1994	2209	1.65E+05	82.7	31
5/17/1994	2272	1450	12	4.26E+04	21.3	5/17/1994	7.7284	7.2793	2.4849	10.6587	5/17/1994	2272	1.73E+05	86.4	31
5/23/1994	2585	1020	4	9.98E+03	5.0	5/23/1994	7.8575	6.9276	1.3863	9.2084	5/23/1994	2585	2.11E+05	105.6	33
5/25/1994	2710	1240	10	3.03E+04	15.2	5/25/1994	7.9047	7.1229	2.3026	10.3200	5/25/1994	2710	2.27E+05	113.7	34
5/31/1994	2984	1510	12	4.43E+04	22.2	5/31/1994	8.0010	7.3199	2.4849	10.6993	5/31/1994	2984	2.64E+05	132.1	36
6/2/1994	2948	1520	9	3.35E+04	16.7	6/2/1994	7.9889	7.3265	2.1972	10.4182	6/2/1994	2948	2.59E+05	129.7	36
6/6/1994	3019	1300	5	1.59E+04	8.0	6/6/1994	8.0127	7.1701	1.6094	9.6741	6/6/1994	3019	2.69E+05	134.6	36
6/13/1994	2839	1020	6	1.50E+04	7.5	6/13/1994	7.9512	6.9276	1.7918	9.6138	6/13/1994	2839	2.45E+05	122.3	35
11/22/1994	359	160	1	3.91E+02	0.2	11/22/1994	5.8833	5.0752	0.0000	5.9697	11/22/1994	359	9.70E+03	4.9	11
3/22/1995	490	927	8	1.81E+04	9.1	3/22/1995	6.1944	6.8320	2.0794	9.8059	3/22/1995	490	1.58E+04	7.9	13
5/1/1995	1371	1260	12	3.70E+04	18.5	5/1/1995	7.2233	7.1389	2.4849	10.5183	5/1/1995	1371	7.85E+04	39.3	23
5/2/1995	1436	1330	21	6.83E+04	34.2	5/2/1995	7.2696	7.1929	3.0445	11.1320	5/2/1995	1436	8.44E+04	42.2	24
5/8/1995	1797	1690	27	1.12E+05	55.8	5/8/1995	7.4939	7.4325	3.2958	11.6228	5/8/1995	1797	1.20E+05	59.9	27
5/9/1995	1841	1790	50	2.19E+05	109.5	5/9/1995	7.5181	7.4900	3.9120	12.2965	5/9/1995	1841	1.24E+05	62.2	28
5/16/1995	2209	2210	71	3.84E+05	191.9	5/16/1995	7.7003	7.7007	4.2627	12.8579	5/16/1995	2209	1.65E+05	82.7	31
5/17/1995	2272	2460	125	7.52E+05	376.1	5/17/1995	7.7284	7.8079	4.8283	13.5307	5/17/1995	2272	1.73E+05	86.4	31
5/19/1995	2390	2800	121	8.29E+05	414.4	5/19/1995	7.7790	7.9374	4.7958	13.6277	5/19/1995	2390	1.87E+05	93.5	32
5/22/1995	2518	3090	115	8.69E+05	434.6	5/22/1995	7.8312	8.0359	4.7449	13.6754	5/22/1995	2518	2.03E+05	101.4	33
5/23/1995	2585	3080	126	9.49E+05	474.7	5/23/1995	7.8575	8.0327	4.8363	13.7635	5/23/1995	2585	2.11E+05	105.6	33
5/25/1995	2710	2820	81	5.59E+05	279.4	5/25/1995	7.9047	7.9445	4.3944	13.2335	5/25/1995	2710	2.27E+05	113.7	34
5/30/1995	2985	3280	124	9.95E+05	497.5	5/30/1995	8.0014	8.0956	4.8203	13.8104	5/30/1995	2985	2.64E+05	132.2	36
5/31/1995	2984	3680	215	1.94E+06	967.7	5/31/1995	8.0010	8.2107	5.3706	14.4758	5/31/1995	2984	2.64E+05	132.1	36
6/3/1995	2964	4180	173	1.77E+06	884.5	6/3/1995	7.9943	8.3381	5.1533	14.3859	6/3/1995	2964	2.62E+05	130.8	36
6/4/1995	2980	4230	229	2.37E+06	1184.8	6/4/1995	7.9997	8.3500	5.4337	14.6782	6/4/1995	2980	2.64E+05	131.9	36
6/5/1995	3025	4600	374	4.21E+06	2104.2	6/5/1995	8.0147	8.4338	5.9243	15.2526	6/5/1995	3025	2.70E+05	135.0	36
6/14/1995	2812	3930	126	1.21E+06	605.6	6/14/1995	7.9417	8.2764	4.8363	14.0072	6/14/1995	2812	2.41E+05	120.5	35
6/19/1995	2697	3750	134	1.23E+06	614.6	6/19/1995	7.8999	8.2295	4.8978	14.0219	6/19/1995	2697	2.26E+05	112.9	34
6/20/1995	2645	3260	87	6.94E+05	346.9	6/20/1995	7.8804	8.0895	4.4659	13.4499	6/20/1995	2645	2.19E+05	109.5	34
6/26/1995	2281	3610	100	8.83E+05	441.5	6/26/1995	7.7324	8.1915	4.6052	13.6912	6/26/1995	2281	1.74E+05	86.9	31
6/27/1995	2227	4200	159	1.63E+06	816.8	6/27/1995	7.7084	8.3428	5.0689	14.3063	6/27/1995	2227	1.67E+05	83.7	31
9/18/1995	484	446	1	1.09E+03	0.5	9/18/1995	6.1821	6.1003	0.0000	6.9948	9/18/1995	484	1.55E+04	7.7	13
5/17/1997	2272	6390	692	1.08E+07	5408.3	5/17/1997	7.7284	8.7625	6.5396	16.1966	5/17/1997	2272	1.73E+05	86.4	31
4/14/1998	951	590	2	2.89E+03	1.4	4/14/1998	6.8575	6.3801	0.6931	7.9678	4/14/1998	951	4.44E+04	22.2	19
5/11/1998	1894	2770	66	4.47E+05	223.6	5/11/1998	7.5464	7.9266	4.1897	13.0108	5/11/1998	1894	1.30E+05	65.0	28
6/15/1998	2814	2610	32	2.04E+05	102.2	6/15/1998	7.9424	7.8671	3.4657	12.2274	6/15/1998	2814	2.41E+05	120.6	35
7/16/1998	1121	1190	16	4.66E+04	23.3	7/16/1998	7.0220	7.0817	2.7726	10.7488	7/16/1998	1121	5.74E+04	28.7	21
8/13/1998	528	601	3	4.41E+03	2.2	8/13/1998	6.2691	6.3986	1.0986	8.3917	8/13/1998	528	1.77E+04	8.9	14
9/17/1998	383	421	10	1.03E+04	5.1	9/17/1998	5.9480	6.0426	2.3026	9.2397	9/17/1998	383	1.07E+04	5.4	11
4/9/2001	811	364	1	8.90E+02	0.4	4/9/2001	6.6983	5.8972	0.0000	6.7917	4/9/2001	811	3.46E+04	17.3	17
5/8/2001	1797	846	5	1.03E+04	5.2	5/8/2001	7.4939	6.7405	1.6094	9.2445	5/8/2001	1797	1.20E+05	59.9	27
6/5/2001	3025	962	3	7.06E+03	3.5	6/5/2001	8.0147	6.8690	1.0986	8.8621	6/5/2001	3025	2.70E+05	135.0	36
7/10/2001	1451	450	12	1.32E+04	6.6	7/10/2001	7.2800	6.1092	2.4849	9.4887	7/10/2001	1451	8.58E+04	42.9	24
8/6/2001	597	291	1	7.12E+02	0.4	8/6/2001	6.3919	5.6733	0.0000	6.5678	8/6/2001	597	2.15E+04	10.7	15
9/24/2001	364	227	1	5.55E+02	0.3	9/24/2001	5.8972	5.4250	0.0000	6.3195	9/24/2001	364	9.92E+03	5.0	11

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.99350999
R Square	0.9870621
Adjusted R Square	0.969204957
Standard Error	1.306063631
Observations	57

ANOVA

	df	SS	MS	F	Significance F
Regression	1	7287.815623	7287.815623	4272.3685	7.87556E-54
Residual	56	95.52492369	1.705802209		
Total	57	7383.340547			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Q Measured	1.560403865	0.023872762	65.36335747	1.44818E-54	1.512580976	1.608226753	1.512580976	1.608226753

RESIDUAL OUTPUT

PROBABILITY OUTPUT

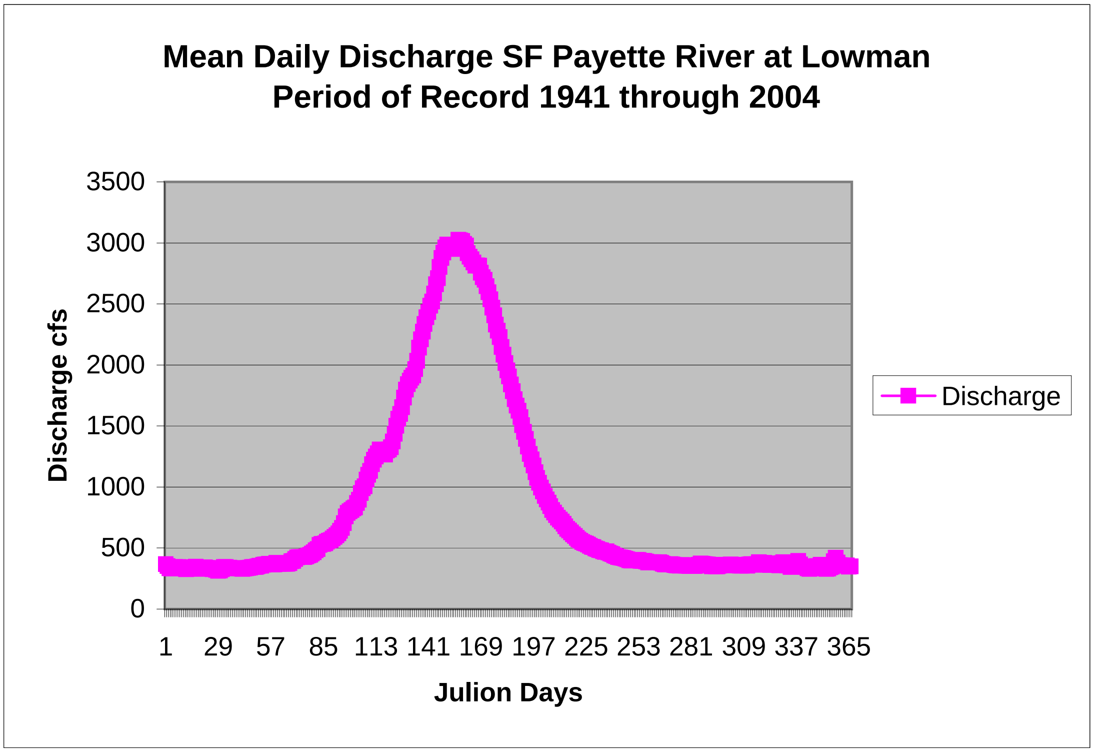
Observation	Predicted SSC Load	Residuals	Standard Residuals	Percentile	SSC Load
1	8.809177156	-0.882917758	-0.682023485	0.877192982	5.969691955
2	9.607373803	-0.3586521	-0.277046365	2.631578947	6.319468157
3	11.06338329	0.558797841	0.43165204	4.385964912	6.370981692
4	8.545494891	-2.174513199	-1.679736372	6.140350877	6.567841407
5	10.57052513	0.735803054	0.568382456	7.894736842	6.791672008
6	11.16408945	1.202532158	0.928914575	9.649122807	6.994837092
7	11.06338329	-0.513838962	-0.396922858	11.40350877	7.926259399
8	10.64368246	-0.730832271	-0.564542698	13.15789474	7.967787857
9	10.26194853	-1.404666461	-1.085056345	14.9122807	8.391725363
10	10.28353122	-1.412417675	-1.091043891	16.66666667	8.85728207
11	11.58841587	0.702943253	0.542999394	18.42105263	8.862144879
12	11.96605239	0.991476014	0.76588099	20.1754386	8.871113549
13	11.95874369	0.154999768	0.119731969	21.92982456	9.208370407
14	11.51228351	-0.349634706	-0.27008074	23.68421053	9.239736067
15	11.35867724	-0.699933617	-0.540674554	25.43859649	9.244475412
16	10.80978813	-1.601417722	-1.237039902	27.19298246	9.248721703
17	11.11454866	-0.79457877	-0.613784667	28.94736842	9.488672372
18	11.42194552	-0.722655805	-0.55822666	30.70175439	9.613835515
19	11.43224526	-1.014036927	-0.783308516	32.45614035	9.674075596
20	11.18828225	-1.514206649	-1.169672359	34.21052632	9.805913247
21	10.80978813	-1.195952614	-0.923832104	35.96491228	9.912850189
22	7.919320835	-1.94962888	-1.506020999	37.71929825	10.31996989
23	10.66060675	-0.854693499	-0.66022122	39.47368421	10.41820833
24	11.13951566	-0.621223866	-0.479873989	41.22807018	10.51829179
25	11.22388236	-0.091907558	-0.070995415	42.98245614	10.54954433
26	11.59767646	0.025162356	0.019437052	44.73684211	10.65874363
27	11.68737954	0.609132508	0.470533832	46.49122807	10.69928972
28	12.01627662	0.841669193	0.650160393	48.24561404	10.74881545
29	12.18350328	1.347245224	1.040700422	50	11.1319748
30	12.38551015	1.242173231	0.959535935	51.75438596	11.16264881
31	12.53929056	1.136086075	0.87758727	53.50877193	11.30632819
32	12.53423252	1.229252399	0.949555039	55.26315789	11.62218114
33	12.39661627	0.836843184	0.646432468	57.01754386	11.62283881
34	12.6324035	1.177994907	0.909960396	58.77192982	12.11374346
35	12.81195813	1.663866073	1.285279097	60.52631579	12.22735954
36	13.01075123	1.37512503	1.06223661	62.28070175	12.29135913
37	13.0293056	1.648891819	1.273712003	64.03508772	12.29651204
38	13.16015219	2.092433333	1.616332509	65.78947368	12.36662161
39	12.91451828	1.092676469	0.844054848	67.54385965	12.85794581
40	12.84136095	1.180508105	0.911901755	69.29824561	12.9575284
41	12.62285972	0.827049017	0.638866812	71.05263158	13.01077548
42	12.7819906	0.909160775	0.70229531	72.80701754	13.23345946
43	13.01819947	1.288062674	0.994983946	74.56140351	13.44990873
44	9.518961268	-2.524124176	-1.949798781	76.31578947	13.53074851
45	13.67302255	2.52357109	1.949371541	78.07017544	13.62768338
46	9.955567863	-1.987780006	-1.535491427	79.8245614	13.67537664
47	12.36870133	0.642074152	0.495980115	81.57894737	13.69115138
48	12.27586183	-0.048502283	-0.037466339	83.33333333	13.76348492
49	11.05032545	-0.301509997	-0.232906063	85.0877193	13.81039841
50	9.984392264	-1.592666901	-1.230280194	86.84210526	14.00719475
51	9.428947626	-0.189211559	-0.146159397	88.59649123	14.02186906
52	9.201941685	-2.410269678	-1.861850112	90.35087719	14.30626215
53	10.51793246	-1.273457046	-0.983701602	92.10526316	14.38587626
54	10.71843669	-1.856291815	-1.43392134	93.85964912	14.4758242
55	9.532893538	-0.044221165	-0.034159324	95.61403509	14.67819742
56	8.852675551	-2.284834144	-1.764955493	97.36842105	15.25258552
57	8.465112972	-2.145644815	-1.657436542	99.12280702	16.19659364

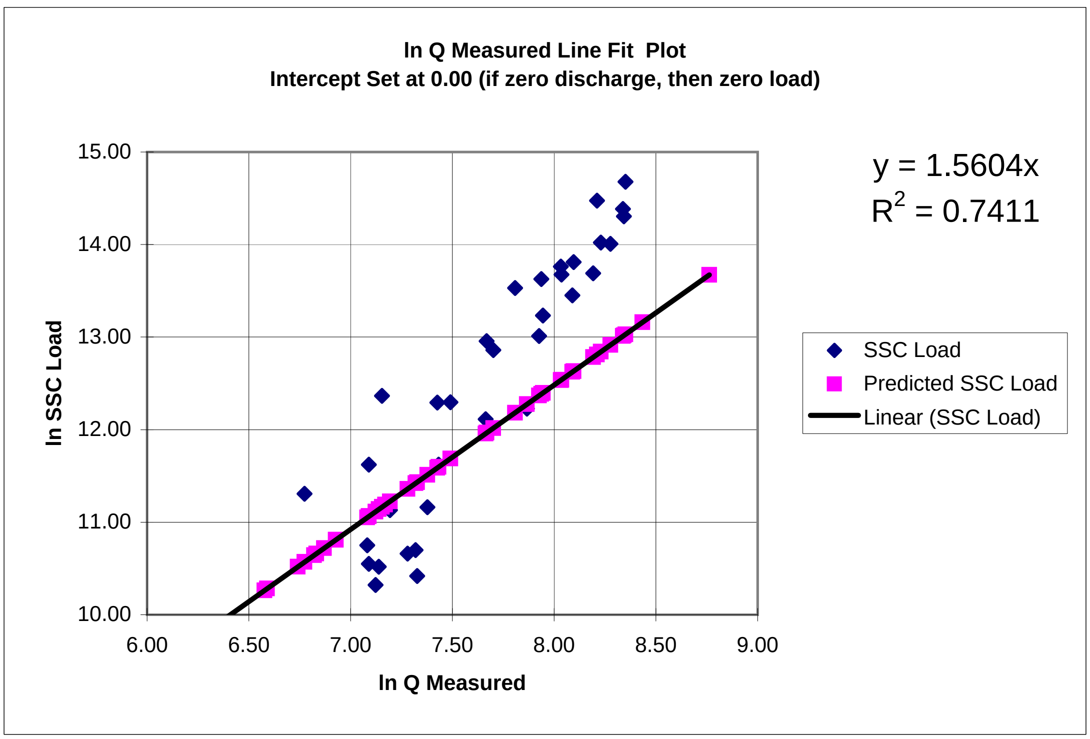
DATE	Natural Log SS Load Predicted	Square	Natural Log SS Load Measured	Square	X * Y
11/8/1991	7.9263	62.8256	5.6454	31.8711	44.7473
3/3/1992	9.2487	85.5389	6.1570	37.9084	56.9442
5/13/1992	11.6222	135.0751	7.0901	50.2692	82.4022
9/1/1992	6.3710	40.5894	5.4765	29.9917	34.8904
4/18/1994	11.3063	127.8331	6.7742	45.8901	76.5916
4/20/1994	12.3666	152.9333	7.1546	51.1885	88.4784
4/25/1994	10.5495	111.2929	7.0901	50.2692	74.7971
4/27/1994	9.9129	98.2646	6.8211	46.5275	67.6166
5/2/1994	8.8573	78.4514	6.5765	43.2500	58.2496
5/4/1994	8.8711	78.6967	6.5903	43.4321	58.4633
5/9/1994	12.2914	151.0775	7.4265	55.1536	91.2824
5/11/1994	12.9575	167.8975	7.6686	58.8068	99.3656
5/14/1994	12.1137	146.7428	7.6639	58.7350	92.8382
5/16/1994	11.1626	124.6047	7.3778	54.4313	82.3553
5/17/1994	10.6587	113.6088	7.2793	52.9885	77.5884
5/23/1994	9.2084	84.7941	6.9276	47.9911	63.7915
5/25/1994	10.3200	106.5018	7.1229	50.7352	73.5078
5/31/1994	10.6993	114.4748	7.3199	53.5804	78.3174
6/2/1994	10.4182	108.5391	7.3265	53.6771	76.3286
6/6/1994	9.6741	93.5877	7.1701	51.4106	69.3643
6/13/1994	9.6138	92.4258	6.9276	47.9911	66.6004
11/22/1994	5.9697	35.6372	5.0752	25.7574	30.2972
3/22/1995	9.8059	96.1559	6.8320	46.6756	66.9935
5/1/1995	10.5183	110.6345	7.1389	50.9634	75.0887
5/2/1995	11.1320	123.9209	7.1929	51.7383	80.0716
5/8/1995	11.6228	135.0904	7.4325	55.2418	86.3866
5/9/1995	12.2965	151.2042	7.4900	56.0997	92.1005
5/16/1995	12.8579	165.3268	7.7007	59.3015	99.0158
5/17/1995	13.5307	183.0812	7.8079	60.9636	105.6470
5/19/1995	13.6277	185.7138	7.9374	63.0019	108.1680
5/22/1995	13.6754	187.0159	8.0359	64.5761	109.8943
5/23/1995	13.7635	189.4335	8.0327	64.5240	110.5577
5/25/1995	13.2335	175.1244	7.9445	63.1150	105.1331
5/30/1995	13.8104	190.7271	8.0956	65.5387	111.8034
5/31/1995	14.4758	209.5495	8.2107	67.4151	118.8562
6/3/1995	14.3859	206.9534	8.3381	69.5234	119.9504
6/4/1995	14.6782	215.4495	8.3500	69.7218	122.5623
6/5/1995	15.2526	232.6414	8.4338	71.1292	128.6374
6/14/1995	14.0072	196.2015	8.2764	68.4987	115.9291
6/19/1995	14.0219	196.6128	8.2295	67.7249	115.3931
6/20/1995	13.4499	180.9000	8.0895	65.4397	108.8028
6/26/1995	13.6912	187.4476	8.1915	67.1001	112.1506
6/27/1995	14.3063	204.6691	8.3428	69.6030	119.3549
9/18/1995	6.9948	48.9277	6.1003	37.2139	42.6707
5/17/1997	16.1966	262.3296	8.7625	76.7812	141.9225
4/14/1998	7.9678	63.4856	6.3801	40.7060	50.8355
5/11/1998	13.0108	169.2803	7.9266	62.8310	103.1312
6/15/1998	12.2274	149.5083	7.8671	61.8913	96.1939
7/16/1998	10.7488	115.5370	7.0817	50.1506	76.1200
8/13/1998	8.3917	70.4211	6.3986	40.9420	53.6953
9/17/1998	9.2397	85.3727	6.0426	36.5134	55.8323
4/9/2001	6.7917	46.1268	5.8972	34.7764	40.0515
5/8/2001	9.2445	85.4603	6.7405	45.4346	62.3126
6/5/2001	8.8621	78.5376	6.8690	47.1834	60.8742
7/10/2001	9.4887	90.0349	6.1092	37.3229	57.9686
8/6/2001	6.5678	43.1365	5.6733	32.1866	37.2615
9/24/2001	6.3195	39.9357	5.4250	29.4301	34.2828
Avg	11.0932		7.1937		
Max	16.1966		8.7625		
Min	5.9697		5.0752		
Std DEV	2.5667		0.8807		
Sum of	632	7383	410	2993	4670
Average	11.0932		7.1937		
Count	57		57		

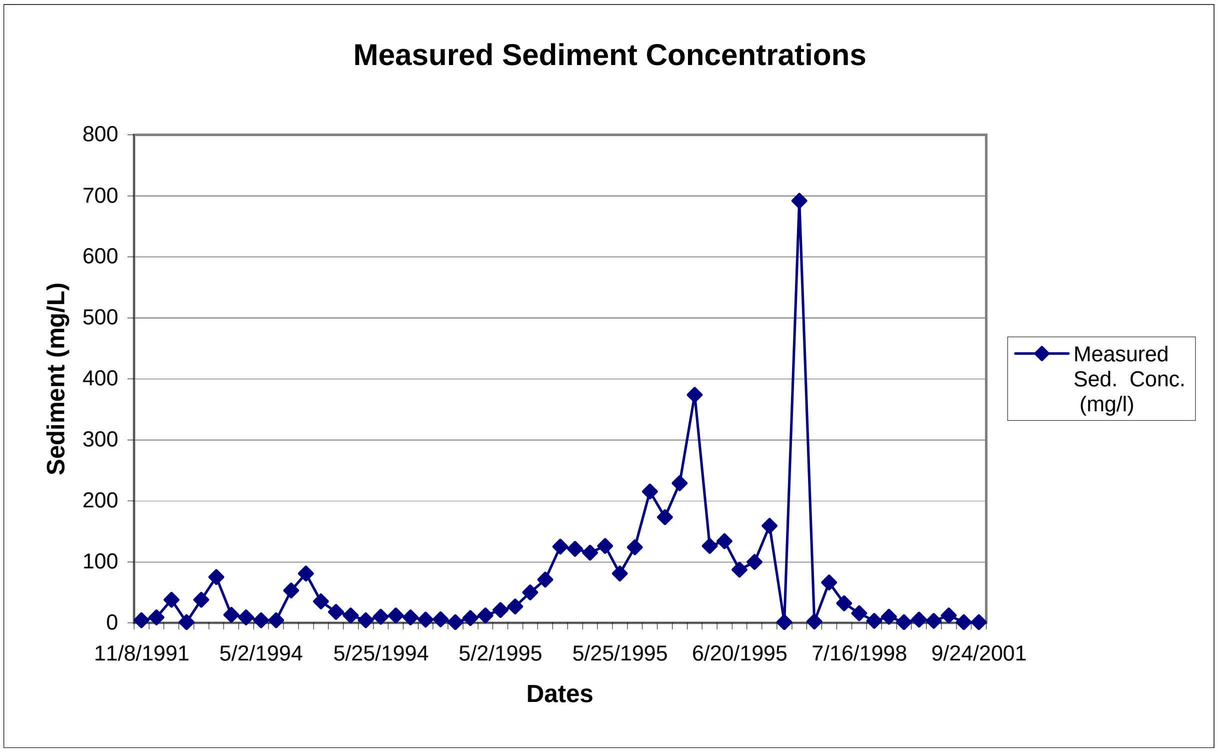
Sx=sum of Xi	Sx=	632.3147507
Sy=sum of Yi	Sy=	410.0383613
Sxx=SumXi2-(Sx2/N)	Sxx=	368.9204775
Syy=SumYi2-(Sy2/N)	Syy=	43.43988126
Sxy= (Sx-(Sx*Sy))/N)	Sxy=	121.8130957
b1= Sxy/Sxx	b1=	0.330187949
(Sx-(b1*(power(Sxy)2)/Sxx)))	bo=	619.0341898
(Syy-(Power(Sxy)2)/Sxx)))	SEE=	3.218665036
model root mean square error	sq root of SEE	1.794063833

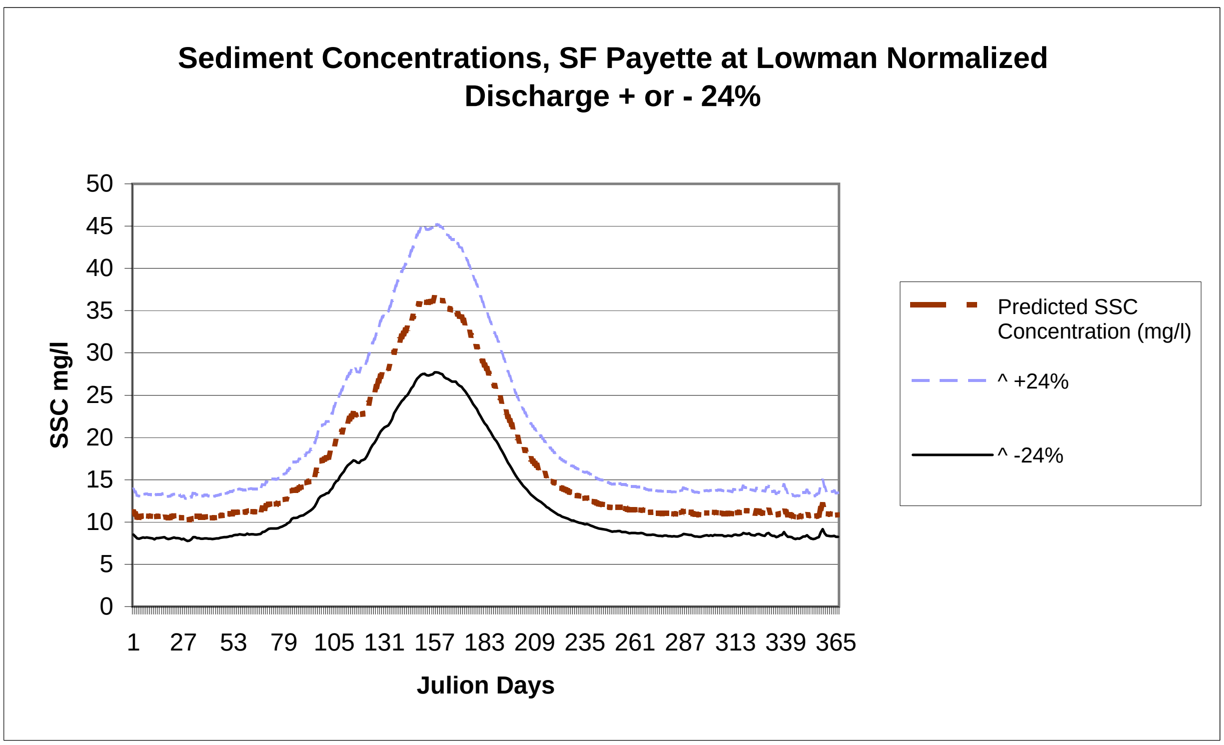
Percent Difference Measured	16.2%
Percent Difference Predicted	24.9%

SumXi2=	7383.341
Sx2=	399821.9
Sx2/n=	7014.42
Sxx=	368.9205
SumYi2=	2993.115
Sy2=	168131.5
Sy2/n=	2949.675
Syy=	43.43988
Sx=	4670.468
Sx*Sy=	259273.3
(Sx*Sy)/n=	4548.654
Sxy=	121.8131
b1=	0.330188
bo=	
Sx=	632.3148
b1	0.330188
Sxy2	14838.43
Sxx	368.9205
Sxy2/Sxx	40.22122
b1*(Sxy/Sx	13.28056
bo=	619.0342
SEE	
Syy	43.43988
Sxy2	14838.43
Sxy2/Sxx	40.22122
SEE=	3.218665
Sqr root err	1.794064


Mean Daily Discharge SF Payette River at Lowman
Period of Record 1941 through 2004
3500
3000
2500
2000
1500
1000
500
0
Discharge cfs
1
29
57
85
113
141
169
197
225
253
281
309
337
365
Julion Days
Discharge


ln Q Measured Line Fit Plot
Intercept Set at 0.00 (if zero discharge, then zero load)
15.00
14.00
13.00
12.00
11.00
10.00
ln SSC Load
6.00
6.50
7.00
7.50
8.00
8.50
9.00
ln Q Measured
y = 1.5604x
R2 = 0.7411
SSC Load
Predicted SSC Load
Linear (SSC Load)


Measured Sediment Concentrations
Sediment (mg/L)
800
700
600
500
400
300
200
100
0
11/8/1991
5/2/1994
5/25/1994
5/2/1995
5/25/1995
6/20/1995
7/16/1998
9/24/2001
Dates
Measured Sed. Conc. (mg/l)


Sediment Concentrations, SF Payette at Lowman Normalized Discharge + or - 24%
SSC mg/l
50
45
40
35
30
25
20
15
10
5
0
1
27
53
79
105
131
157
183
209
235
261
287
313
339
365
Julion Days
Predicted SSC Concentration (mg/l)
^ +24%
^ -24%

Appendix F. Distribution List

Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Environmental Protection Agency
1435 North Orchard
Boise, Idaho 83706

City of Boise
Public Library
715 South Capitol
Boise, Idaho 83702

Garden Valley Library
Garden Valley, Idaho

Boise County Courthouse
413 Main Street
Idaho City, Idaho 83631

Boise National Forest
1249 South Vinnell Way
Boise, Idaho 83709

Appendix G. Public Comments

Comments From: US Environmental Protection Agency Received via email: March 3, 2005	**Response**
Thank you for the opportunity to review the South Fork (SF) Payette Subbasin Assessment and for taking the time to talk with EPA. As you may know, EPA makes final approval/disapproval decisions on proposals to de-list waters during the biennial review of the Integrated Report. Until that time, waters on the 303(d) list remain there. We request that this de-listing proposal and justification be included in the next Integrated Report. The following comments are EPA's evaluation of the SF Payette Subbasin Assessment and provide listing recommendations for decisions that will be made during the biennial review process.	Comment noted.
We appreciate the comprehensive description of the watershed, clarity of text, technical analysis, and hard work clearly shown in the subbasin assessment. The maps, photographs, tables and figures were particularly helpful to visualize the watershed and understand the technical rationale. From our phone conversation, it appears there are additional BURP data which will help describe that beneficial uses are supported on the mainstem SF Payette. This and any other information relating water quality to aquatic health would be important to include in a report to support the assertion that beneficial uses are attained in the mainstem and that a TMDL is not needed. Additionally, it would be helpful to include a map that shows the locations where BURP data were collected.	We have included additional biological analysis on pages 41 through 44. The analysis includes a narrative description of stream snorkel surveys by the Department of Fish & Game, the results of river BURP monitoring from the river at Lowman and USGS monitoring at the same location. We believe this site to be representative of a majority of the riffle habitat of the river. In accordance with river assessment protocols, the information provided shows the river to be fully supporting beneficial uses.
EPA has concerns about the proposal to delist the SF Payette River for sediment. While the assessment convincingly demonstrates that elevated suspended sediment concentration (SSC) levels likely do not occur in normal and low flow events, water quality and biological	Based on the information presented on pages 41 through 44, DEQ believes that the occasional high flow events are not creating impacts significant enough prevent support of beneficial uses. Additionally, the Boise National Forest Plan targets specific areas for

Comments From: US Environmental Protection Agency Received via email: March 3, 2005	Response
data related to bedload sediment is needed to better understand its impact in the river and downstream. Additionally, the report acknowledges exceedances to SSC targets during high flows. The report also attributes sediment problems to roads and natural causes, such as fire and catastrophic events. Since TMDLs address impairments to waters during critical periods from anthropogenic sources, a TMDL for sediment is needed for the mainstem SF Payette.	improvement which will further minimize sediment in tributaries. Finally, we are aware of significant sources of sediment along Highway 21 and fully intend to seek restoration of these areas in cooperation with the Idaho Department of Transportation.
A TMDL in the SF Payette will also help to address sediment problems downstream in the North Fork (NF) Payette. It appears that the SF Payette is a major source of sediment and that a TMDL which sets suspended and bedload sediment targets for road improvement projects in the SF Payette will improve water quality both in the SF and NF Payette.	Implementation of the prescriptive measures in the Boise National Forest Plan as well as implementation of improvements along Highway 21 will eventually improve bedload sediment loads. (The NF Payette has its own bedload issues to be dealt with above the confluence with the SF Payette. This considerable legacy bedload will take many years to improve because of controlled flows from Cascade Reservoir.)
EPA has additional concerns with the rationale for delisting the mainstem SF Payette River. While the four tributaries use Idaho's Waterbody Assessment Guidance (WBAG) [2002] and Beneficial Use Reconnaissance Program (BURP) data, the proposal for delisting in the mainstem relies on SSC targets alone. Fish, macroinvertebrate or habitat indices as described in WBAG are needed to provide a clear link to beneficial use support and rationale for delisting.	See response concerning additional information on pages 41 through 44.
Unless additional data is available which suggests that aquatic life uses are supported in the SF Payette River, our recommendation is to proceed with TMDL development. It appears that steps for completing a TMDL for the mainstem SF Payette are outlined on page 84 and 85 in the Source Summary Section and that SSC and percentage fine targets may be useful for developing allocations. The discussion on pages 84 and 85 seem identical to what might be the technical analysis in a TMDL. That	In addition to biological data, we also added a comparison of similar watersheds located in the Idaho batholith. This comparison shows debris torrents from burned and unburned tributaries of the Middle Fork Salmon River (located almost entirely in wilderness). DEQ believes that these types of events contribute a majority of the sediment to the SF Payette River. Coupled with data showing full support of beneficial uses, DEQ does not believe a TMDL is

Comments From: **US Environmental Protection Agency** **Received via email: March 3, 2005**	**Response**
information coupled with Table 44 will be a useful start to prioritize road improvements. The USFS expects to complete their road inventory in the SF Payette Subbasin by April 2005, which may be helpful in assessing and further prioritizing road impacts on sediment.	warranted.
For the four tributaries, EPA concurs with DEQ's recommendation to evaluate 2004 BURP data before adding these streams to the 2006 303(d) list. For Smokey Creek, Horn Creek, and Wash Creek, more information on impacts from roads is needed before it can be concluded that impairments are from natural causes alone. Since Chapman Creek has few roads and meets percent fine targets at one location, natural events may well be the cause of impairment. Additional BURP data will be helpful in assessing the degree and cause of impairment	Agreed.
Major Comments	
<u>Sediment Problems in High Flow Events on the Mainstem SF Payette.</u> Pages 38-41 provide a convincing demonstration that suspended sediment concentrations (SSCs) are well below the rolling 14-day geometric mean of 80 mg/L for normal and low flows at Lowman. Figure 17, the linear regression in Figure 19, and data presented in Table 9 and Figure 20 are helpful in confirming the validity of the regression equation and the hypothesis that at low and normal flows, SSCs are below targets.	Comment noted.
It is unclear whether this regression equation can be applied to high flow, high runoff events. If the regression equation is used to calculate flow for an SSC of 80 mg/L, the flow is 2662, implying that flows below this would not result in exceedances of the 80 mg/L standard. However, Figure 18 clearly shows violations of SSC targets with an annual average flow of approximately 1100 cfs. Thus, the equation	We have revised this section of the document entirely. A sediment rating curve has been developed that uses normalized flows to establish average suspended sediment concentrations throughout the year. A statistical analysis was used to show the highest average suspended sediment concentration to be 46 mg/L. While there will be exceedences of this, they are for very

Comments From: **US Environmental Protection Agency** **Received via email: March 3, 2005**	**Response**
may be less applicable for high flow events.	short durations and will not contribute to beneficial use impairment.
As discussed on page 41, sediment problems occur in high flow, high runoff events. Likewise, the Pollutant Source Inventory in Chapter 3 acknowledges that in addition to fires and natural catastrophic events, roads are a major contributor to sediment. TMDLs should be completed when anthropogenic sources contribute to impairments during critical conditions. Thus, a sediment TMDL for the SF Payette is needed to address anthropogenic sediment sources, particularly the impact of roads on sediment during high flow events. Pages 84 and 85 outline the technical analysis that would be identical to what might be in a sediment TMDL. Additionally, the USFS road inventory in the SF Payette is expected to be complete by April 2005 and may be useful to assess and further prioritize road impacts on sediment.	See above responses.
Bedload sediment. It is unclear what the impacts are from bedload sediment. Though the text discusses stream velocities, in-stream data characterizing bedload sediment and biological health would help characterize the extent and impact of bedload sediment in the river. Additionally, since SF Payette is believed to be a significant contributor to sediment problems downstream in the NF Payette, identifying sources of bedload sediment and addressing them will help to improve aquatic habitat in both the SF and NF Payette.	See above response.
WBAG. It appears that WBAG was not used to determine whether the SF Payette should be delisted. The Guidance calls for the use of a minimum of two indices in order to make a status call, unless other Tier 1 data "convincingly" establishes that the pollutant is	See above response.

Comments From: **US Environmental Protection Agency** **Received via email: March 3, 2005**	**Response**
not impairing beneficial uses. Our concern is that the delisting rationale does not rely on using fish, macroinvertebrate or habitat indices as described in WBAG. Further, other data provided (flow, SSC concentrations) do not provide a clear link to beneficial use support. While the SSC target cited has been used as a TMDL target, additional tools are needed to evaluate aquatic life beneficial use support. This is particularly so in a system which is a significant source of bedload sediment, particularly downstream in the NF Payette.	
Chapman Creek. EPA concurs that additional BURP data will be helpful to determine whether Chapman Creek should be included on the 2006 303(d) list. The lack of roads in the watershed supports the assertion that sediment problems likely stem from natural sources. Further, percent fines at one location have improved from 1997 to 2004 and currently meet the target of <30% fines being less than or equal to 6.0 mm. The 2004 BURP data will be helpful to determine the biological and physical conditions of Chapman Creek.	Agreed.
Smokey Creek, Horn Creek, and Wash Creek. EPA concurs that additional BURP data will be helpful to determine whether these three creeks should be included on the 2006 303(d) list. The photographs, text, and data illustrate the significant impact 1997 floods and fires had on these tributaries. It is unclear what impact roads have on sediments. More information on road density in Horn and Wash Creeks would be helpful.	Agreed.
Since WBAG II and BURP show beneficial uses are not supported, percent fine targets continue not to be met, and sediment impacts from roads are uncertain, more information is needed before it can be concluded that these creeks do not support beneficial uses from	Agreed.

Comments From: **US Environmental Protection Agency** **Received via email: March 3, 2005**	**Response**
natural causes alone. Additional BURP data and the USFS road inventory will be helpful in understanding the health of the watershed and making listing decisions in the 2006 Integrated Report. **Other Comments:**	
Tributaries Not Meeting Beneficial Uses. It appears that the subbasin assessment evaluates four tributaries: Wash Creek, Horn Creek, Chapman Creek, and Smokey Creek based on the text, Table A (page 3) and Table 41 (page 76). However, Table 5 (page 31) and Table 11(page 43) also include tributaries that are impaired, which are different from Tables A and 41. Bush Creek is in Table 5, but not Table A or Table 11. Deadwood River Below Mine and Eight mile Creek (Lower) are in Table 11, but not in Table A or 5. More clarification would be helpful.	Bush Creek was in the table in error and has been removed. The Deadwood River is not on the §303 (d) list, is not impaired and its assessment is not included in the document (other than the description in Table 11, now 15).
Chapter 1: Subbasin Characterization. This section provides an excellent characterization of the watershed, its history, current land uses, geology, and hydrography. The text was well-written and gives the reader a comprehensive picture of the SF Payette subbasin.	Comment noted.
Page 35, Stream Velocity in SF Payette. Three lines from the bottom of the page, the text states that there is a "62-year average stream velocity over 3.05 miles per hour [sic]". It appears that units should be feet per second, as in the text 5 lines from the bottom.	This has been changed in the document.
Chapter 3: Pollutant Source Inventory. The information in this chapter, especially Table 43, is impressive and will be a useful tool for prioritizing road improvements to improve water quality.	Thank you.