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3. Subbasin Assessment – Pollutant Source Inventory

This section summarizes point and nonpoint sources of pollutants in the SF CWR Subbasin.

3.1 Sources of Pollutants of Concern

The primary nonpoint pollution sources in the SF CWR Subbasin are forestry, grazing, agriculture, mining, roads, and storm water runoff. Additional sources include natural and road-related mass failures. Agricultural related nonpoint source pollution is caused by tillage practices and livestock management. Potential impacts to water quality also stem from livestock grazing. Forestry related nonpoint pollution sources include forest roads, skid trails, stream crossings, and loss of stream shade within riparian areas.

Storm water related pollution is caused by construction activities, residential and business activities, roadways, and parking lots. Discrete facilities within the watershed such as mills and gravel pits also contribute storm water runoff. For the sites not currently managed under the USEPA NPDES Storm Water Program, the TMDL pollutant loads and allocations have been grouped with nonpoint storm water discharge activities. Activities that are covered by the storm water program are addressed under point source discussions.

Point Sources

Several types of point sources exist within the SF CWR Subbasin, including municipal WWTPs, suction dredge mining operations, CAFOs and storm water runoff. Point sources are generally minor contributors to the loading of the most significant pollutants in the SF CWR Subbasin (temperature, sediment, nutrients and bacteria), when compared to nonpoint source loading. However, the Grangeville wastewater treatment plant (WWTP) is a significant contributor to nutrient and heat loading in Threemile Creek.

Municipal Wastewater Treatment Plants

Five municipal WWTPs exist within the SF CWR Subbasin: Kooskia, Stites, Grangeville, Elk City, and Red River Ranger Station. Each of these facilities has been issued an NPDES permit by USEPA to discharge wastewater to waters of the United States. These permits contain conditions and limits for certain pollutants based on the design flow for each facility and have a five-year life. The USEPA reissued NPDES permits for Kooskia, Stites, Elk City and Red River Ranger Station in October 2002. Typically, reissuance of NPDES permits should occur immediately following completion of a TMDL, so that wasteload allocations for point sources in the TMDL can be incorporated into the permit. However, due to delays in initiating work on the SF CWR TMDL, the NPDES permits for all facilities except Grangeville have already been reissued. Table 28 lists the five municipal WWTPs, and identifies existing permit limits and the design flows. Figure 42 shows their locations in the SF CWR Subbasin

Table 28. NPDES permitted point sources in the SF CWR Subbasin.

Source	Permit #	Expiration Date	Location	Receiving Water	Permit Limits	Discharge Volume (MGD[a])
City of Kooskia	ID-002181-4	9/30/07	Kooskia	SF CWR	BOD[b] TSS[c] TRC[d] Fecal[e]	0.198
City of Stites	ID-002034-6	9/30/07	Stites	SF CWR	BODTSS TRC, Fecal	0.070
Elk City	ID-002201-2	9/30/07	Elk City	Elk Creek	BOD TSS TRC Fecal	0.12
Red River Ranger Station	ID-002069-9	9/30/07	S.F. Red River	South Fork Red River	BOD TSS	0.00625
City of Grange-ville	ID-002003-6	12/29/92	Grangeville	Threemile Creek	BOD TSS TRC Fecal TA[f], pH	0.88

[a]Million gallons per day
[b]Biological oxygen demand
[c]Total suspended solids
[d]Total residual chlorine
[e]Fecal coliform bacteria
[f]Total ammonia

The most significant pollutants discharged from WWTPs include nutrients (N and P), bacteria (*E. coli*, fecal coliform, etc.), sediment (TSS), oxygen demanding materials (biological oxygen demand [BOD]), and heat. Depending on the concentrations of these pollutants in the effluent, and the magnitude of the discharge compared to the stream flow, WWTP discharge can be an exceedingly minor contributor or a major contributor. Kooskia, Stites, Elk City, and the Red River Ranger Station discharges are relatively small in comparison to stream flow. However, the discharge from the Grangeville WWTP can be quite significant in comparison to the flow in Threemile Creek, particularly during the summer and fall. More specific discussions of pollutant loading from these facilities are included in later sections.

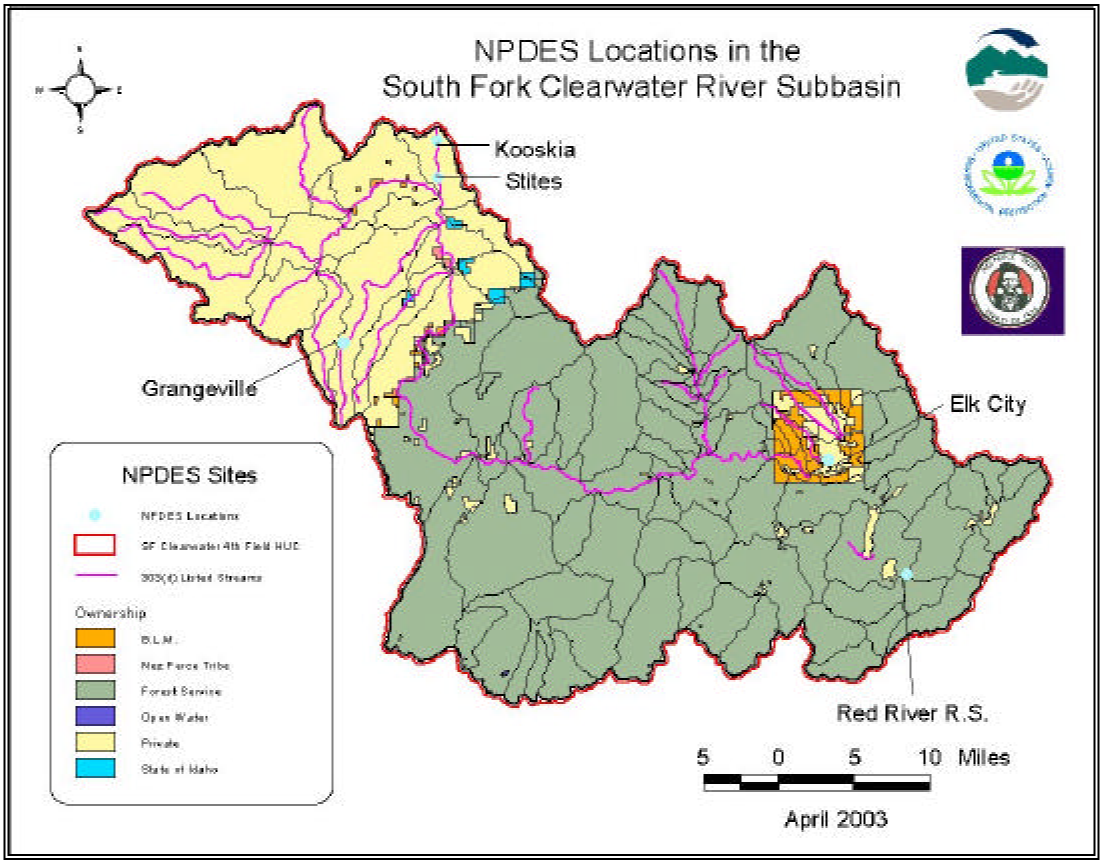

Figure 42. Locations of NPDES Permitted Sites in the SF CWR Subbasin

Suction Dredge Mining

Gold was discovered in the SF CWR Subbasin in 1861, with relatively active and intense hydraulic and dredge mining occurred off and on until World War II. Since that time, there has been far less mining activity, although there was a surge in suction dredge mining in the 1970s as a result of increasing gold prices.

A suction dredge typically consists of a floating platform on which a pump and sluice box are mounted, with a 2" to 12" flexible suction hose which reaches the bottom of the stream. The gasoline powered pump is used to lift gravels from the stream bottom through the hose onto the sluice box mounted on a floating platform for gold recovery. The objective is to get to bedrock where it is most common to find the largest deposits of gold. The intake size of the hose and the horsepower of the engine driving the pump determine the volume of gravel that a dredge can potentially move. The amount of material actually moved depends on the skill of the operator and the conditions in which the operator is working (USEPA 1993).

Large gravel and cobble discharged to the stream is typically deposited immediately behind the sluice box. Finer material such as fine gravel and sand may move some distance downstream as bedload, and silt and finer materials are carried further downstream in the water column. Large rock and boulder piles can form where dredges have remained in one place for a long time. Large pools may also be formed by this process.

The IDWR regulates suction dredging through the Idaho Stream Channel Protection Act (IDAPA 37.03.07.064). Under this statute, dredge miners are required to obtain a permit from IDWR (IDWR 2003). Small-scale operations (≤5" nozzle; ≤ 15 horsepower) are covered under the Individual Recreational Dredging Application permit process (a.k.a. General Permit). In the SF CWR Subbasin, dredging is only allowed from July 15 through August 15 each year, in order to avoid periods when chinook, cutthroat, and steelhead are spawning and eggs are incubating. In addition, the USFS prohibits dredges in protected rivers and national recreation areas (IDWR 2002). The USEPA reviewed the IDWR General Permit for suction dredge mines in 1998, and found that it adequately addressed environmental concerns from these operations (USEPA 1998). Although there is currently no limit on the number of facilities which can operate in the SF CWR Subbasin under the General Permit, the actual number of permits issued in recent years has been limited (IDWR 2002): 14 in 2000, 7 in 2001, and 8 in 2002.

Larger scale operations, or facilities that operate in waters not listed under the IDWR General Permit, must obtain permits from IDWR and the Army Corps of Engineers (ACOE) under the Joint Application Permit process. In 2000, the USFS received three applications to operate suction dredges within the NPNF which did not fall within the General Permit. The Genesis Placer proposal is to operate two dredges (5 and 8 inch diameter nozzles) year around in the Red River. A draft environmental impact statement was issued for this proposal in July 2000. The El Luky Duk proposal is to operate four different dredges of 3, 5, 6 and 8 inch diameter nozzles from July to October on the SF CWR. The Booger Placer proposal is to operate an 8 inch dredge on Little Elk Creek. Within the past five years, the only known operation of dredges >5 inch was a test run of the 8 inch Booger Placer dredge on July 6-7, 2000. When compared to other sediment sources in the subbasin including roads and natural erosion processes, sediment loading from current recreational suction dredge operations appears to be minimal given their limited number, size, and 30 day annual operating window allowed under the current IDWR general permit. This is consistent with Harvey and Lisle (1998) who indicate that single dredging operations cannot mobilize significant volumes of fine sediment compared with the volume mobilized during high seasonal flows from throughout a watershed, when large portions of the streambed are entrained.

A great deal of literature exists on the effects of suction dredge mining on water quality and stream habitat. While the literature is mixed in terms of the nature and severity of effects from dredge mining operations, serious impacts to water quality and habitat have been documented, depending on the location and manner in which dredges are operated. For a recent summary of suction dredge impacts, see Harvey and Lisle (1998).

The NPNF began tracking, inspecting, and monitoring suction dredges in the SF CWR in 1980, with a more concentrated effort since 1995. The focus has been primarily on recreational dredging (5" or less diameter nozzle), but also to some extent on commercial dredging (greater than 5" diameter nozzle). The NPNF requires a Notice of Intent (NOI) from recreational suction dredgers which indicates the dates and locations of proposed mining. Inspections of these operations and instream monitoring are performed seasonally (DeRito 2000). The monitoring system is still being refined. Turbidity data that have been processed to date generally show turbidity levels below these facilities (below the mixing zone) to be less than 50 NTU above upstream measurements. Surface fines data have been difficult to interpret due to a lack of pre-dredge data, limited sample numbers, and relatively little information (DeRito 2000).

Measurements at several locations operating 3-inch to 8-inch dredges in 1980 indicated that bedload movement below dredges may exceed upstream measurements by more than 1,000% (USFS 1980). Bedload movement dropped dramatically within several hundred feet of each operation, though in most cases was still above background levels.

While turbidity and streambed composition data have been collected from some of these facilities off and on since 1980, there is little information available from which to estimate loading from an individual operation, or the industry as a whole. Monitoring results overall are mixed, with some adverse levels of sediment noted. For example, in a test operation of the 8 inch Booger Placer dredge on Little Elk Creek in July 2000, turbidities below the operation increased by 18 to greater than1000 NTU above background turbidities. These results are most likely due to the relatively large size of the dredge, and small size of the waterbody. Monitoring in recent years in the SF CWR (DEQ 2003) indicate that relatively small facilities operating properly under IDWR permits meet the ambient turbidity criteria, but may not in all cases meet the turbidity treatment requirements for point sources.

Confined Animal Feeding Operations

Confined animal feeding operations are facilities which confine, maintain, or feed animals for at least 45 days per year, and which harbor a minimum number of animals as defined in federal regulations (40 CFR §122.23). Smaller operations can also be classified as CAFOs if they are determined by USEPA or IDA to be significant contributors of pollution. A CAFO is considered to be a point source and therefore is subject to NPDES permits. While quite a number of animal feeding operations exist in the subbasin, particularly in the Threemile and Butcher Creek watersheds, there is no record that any of these operations are large enough outright to be considered CAFOs, nor have any animal feeding operations yet been determined to be significant contributors of pollution. Pollutant loading and allocations for existing animal feeding operations will therefore be addressed through the nonpoint source loading and allocation.

Storm Water

Storm water discharges from certain municipalities, construction activities, and industrial operations, are considered to be a point sources of pollution under federal regulations (40 CFR 122.26).

There are currently no municipal separate storm sewer systems within the SF CWR meeting the definitions of 40 CFR 122.26 and which are required to obtain an NPDES storm water discharge permit. As a result, storm water discharge from these areas is addressed as a component of the nonpoint source loading and allocation.

Construction activities disturbing one or more acres must obtain NPDES storm water permit coverage from EPA for discharges occurring during the active construction phase; however, within the SF CWR, there is no information available to determine current sediment contribution from construction-related storm water runoff to the SF CWR drainage. However, construction sites and activities are generally not extensive and are widely dispersed throughout the watershed, therefore, construction activity is not considered to be a significant anthropogenic sediment contribution at this time.

Twenty-nine categories of industrial operations (determined by Standard Industrial Classification code) are required to obtain coverage under EPA's general storm water NPDES permit for any storm water discharges associated with industrial activities. Within the SW CWR, no industrial facilities are currently authorized to discharge under EPA's *Multi Sector General Permit for Storm Water Associated with Industrial Activity,* according to EPA's list of permitted storm water facilities in February 2003. Such facilities may exist in the SF CWR, and yet be unaware of their obligation to apply for NPDES permit coverage. Two facilities that have greater potential for impact due to their size and proximity to surface water are the Clearwater Forest Industries (CFI) timber processing facility in Kooskia and the Shearer Lumber Mill near Elk City. Historically Clearwater Forest Industries discharged storm water, log deck sprinkling water, and process water through a series of seven outfalls. Process water (e.g., boiler blowdown) may be a source of excess heat loading, and storm water and log deck runoff could be sources of sediment loading. However, no monitoring for any of these parameters has been conducted to date. In 1996 CFI applied for an NPDES discharge permit. In 2001 USEPA initiated the permit issuance process that covered all seven outfalls, and proposed a draft permit in March 2002 (USEPA 2002c). Subsequently CFI has changed its method of operation, and recycles all process water (boiler blowdown, kiln condensate) and log deck sprinkling water. The only discharge at this point is storm water runoff. Due to these changes, USEPA withdrew the draft NPDES permit, and CFI is in the process of applying for coverage under the General Storm Water Permit. Storm water discharge from CFI is considered a minor source of sediment loading (USEPA 2002c).

Shearer Lumber Mill is located on the SF CWR just below the confluence of Red River and American River. Runoff from the mill is collected through surface and underground collection systems and disposed in an underground infiltration gallery (Wilhite 2002). Shearer Lumber was covered by the NPDES General Storm Water Permit from May 1997 through September 2000, but is not currently included in the permit. .

There is no information available to determine current sediment contribution from municipal, industrial or construction related storm water to the SF CWR drainage, although it is generally believed to be quite low compared to other anthropogenic sources, and the overall nonpoint source sediment load.

Nonpoint Sources

Land use practices (mining, timber harvesting, agricultural practices, and grazing) contributing nonpoint pollutants to the SF CWR Subbasin were discussed in Section 1.3. Table 29 identifies acres of land use within each water body in the subbasin. Figure 43 shows the distribution of land use throughout the SF CWR Subbasin.

Table 29. Land use in each SF CWR Subbasin WBID units.

Water Body ID	Water Body Name	Agriculture (acres)	Grazing (acres)	Forestry (acres)	Urban (acres)	Water (acres)
1	Lower SF CWR	6,758	8,513	4,129	0	0
2	Lower Cottonwood Creek	6,195	8,088	2,017	0	0
3	Upper Cottonwood Creek	16,303	3,100	1,494	248	2
4	Lower Red Rock Creek	1,499	1,279	200	0	0
5	Upper Red Rock Creek	21,080	1,821	75	0	0
6	Stockney Creek	18,793	589	190	0	0
7	Shebang Creek	16,713	684	175	0	0
8	S.F. Cottonwood Creek	12,218	192	10	0	0
9	Long Haul Creek	7,356	519	137	255	0
10	Threemile Creek	14,235	4,146	2,671	391	0
11	Butcher Creek	6,432	2,393	1,921	0	0
12	Mid-Lower SF CWR	3,025	12,551	40,063	0	44
13	Mill Creek	0	1,127	21,977	0	0
14	Lower Johns Creek	0	1,145	25,225	0	10
15	Gospel Creek	0	1,462	9,291	0	32
16	West Fork Gospel Creek	0	377	4,023	0	16
17	Middle Johns Creek	0	316	9,879	0	5
18	Upper Johns Creek	0	232	8,442	0	0
19	Moores Creek	0	315	3,546	0	0
20	Square Mountain Creek	0	216	2,051	0	0
21	Hagen Creek	0	215	5,225	0	22
22	Middle SF CWR	0	1,335	17,591	0	28
23	Wing Creek	0	31	5,298	0	0
24	Twentymile Creek	0	198	14,422	1	13
25	Lower Tenmile Creek	0	69	2,377	0	0
26	Middle Tenmile Creek	0	25	7,200	0	4
27	Upper Tenmile Creek	0	810	12,626	0	18

Water Body ID	Water Body Name	Agriculture (acres)	Grazing (acres)	Forestry (acres)	Urban (acres)	Water (acres)
28	Williams Creek	0	71	5,810	0	4
29	Sixmile Creek	0	72	5,054	0	0
30	Mid-Upper SF CWR	0	486	16,655	0	28
31	Lower Crooked River	0	421	9,060	0	1
32	Upper Crooked River	0	434	14,050	0	0
33	West Fork Crooked River	0	533	7,044	0	13
34	East Fork Crooked River	0	18	6,429	0	0
35	Relief Creek	0	355	7,129	0	0
36	Upper SF CWR	0	105	2,586	0	5
37	Lower Red River	0	720	9,610	0	3
38	Middle Red River	0	1,682	14,362	0	0
39	Moose Butte Creek	0	339	6,748	0	0
40	Lower S.F. Red River	0	260	2,892	0	0
41	Middle S.F. Red River	0	149	2,640	0	0
42	West Fork Red River	0	147	6,258	2	0
43	Upper S.F. Red River	0	342	3,912	2	0
44	Trapper Creek	0	495	6,501	0	0
45	Upper Red River	0	940	18,216	0	0
46	Soda Creek	0	263	3,071	1	0
47	Bridge Creek	0	10	2,150	0	0
48	Otterson Creek	0	6	2,380	0	0
49	Trail Creek	0	65	4,472	0	0
50	Siegel Creek	0	164	7,579	0	0
51	Red Horse Creek	0	144	5,540	0	0
52	Lower American River	0	284	6,928	0	2
53	Kirks Fork	0	137	6,067	1	0
54	East Fork American River	0	178	11,059	0	0
55	Upper American River	0	290	14,628	0	0
56	Elk Creek	0	662	1,639	24	0
57	Little Elk Creek	0	475	4,605	0	2
58	Big Elk Creek	0	910	7,901	3	0
59	Buffalo Gulch	0	105	2,034	0	0
60	Whiskey Creek	0	15	1,645	0	0

Water Body ID	Water Body Name	Agriculture (acres)	Grazing (acres)	Forestry (acres)	Urban (acres)	Water (acres)
61	Maurice Creek	0	18	1,074	0	0
62	Lower Newsome Creek	0	119	4,024	0	3
63	Bear Creek	0	101	3,730	0	0
64	Nugget Creek	0	78	1,372	0	0
65	Beaver Creek	0	76	3,567	0	0
66	Middle Newsome Creek	0	38	1,096	0	0
67	Mule Creek	0	143	5,217	0	0
68	Upper Newsome Creek	0	74	5,818	0	0
69	Haysfork Creek	0	92	3,012	0	0
70	Baldy Creek	0	113	2,534	1	0
71	Pilot Creek	0	76	3,816	1	0
72	Sawmill Creek	0	14	1,757	0	0
73	Sing Lee Creek	0	36	1,516	0	0
74	West Fork Newsome Creek	0	139	3,167	1	0
75	Leggett Creek	0	203	4,789	0	1
76	Fall Creek	0	111	2,223	0	1
77	Silver Creek	0	222	16,172	2	0
78	Peasley Creek	0	301	8,793	1	0
79	Cougar Creek	0	379	7,353	0	0
80	Meadow Creek	0	844	23,002	0	0
81	Sally Ann Creek	2,370	1,365	5,148	0	0
82	Rabbit Creek	2,464	828	1,945	0	0

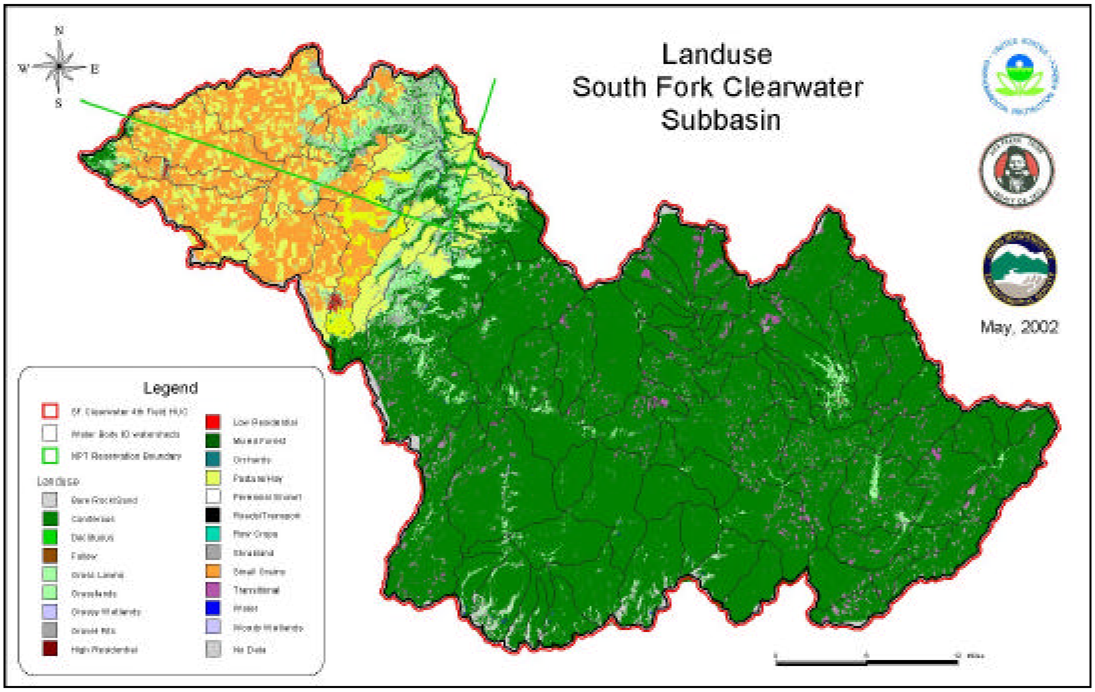

Figure 43. Land Use Distribution in the SF CWR Subbasin

Sediment

As early settlers began moving into the SF CWR Subbasin, surface erosion rates increased due to road construction, mining, timber harvest, building construction, agriculture, and grazing. This SBA identifies the major sources of sediment as road erosion, stream bank erosion, mass failures, agricultural field erosion, and grazed land erosion. Using various methods in a Geographical Information Systems (GIS) environment, we calculated estimates of the magnitude of the erosion from each source and created a sediment budget from the results. Summary results from the sediment budget on a water body by water body basis are presented in Table 30.

The largest nonpoint sources of sediment in the subbasin are the agricultural lands in the Threemile, Butcher, Sally Ann, and Rabbit Creek drainages and the lower main stem sidewalls (Table 30). Another large source is erosion caused by livestock grazing, from the grazed lands themselves and from increased in-stream erosion as the result of reduced vegetative cover.

Surface erosion from agricultural, grazing, and forestlands outside the federal ownership perimeter was modeled using the RUSLE model (Renard et al. 1997) in a GIS environment (Engel 1999). The modeling was done by staff from the University of Idaho Biological and Engineering Department following methods reported in Boll et al. (2001), with an updated land use map for the SF CWR area.

Lands within the outside perimeter of the NPNF, including BLM and private inclusions, were evaluated for sediment production using the NEZSED sediment model (USFS 1981). This model estimates sediment produced by forest practices and then routes it through the hydrologic system. The most important source of estimated sediment in this model is from forest roads. Less important sources are logging areas, burned areas, logging decks, and other forest practice impacted areas. The NEZSED model does not estimate sediment from grazing or mining practices that occur within the federal perimeter, nor does it include estimates of human activity-related mass failures.

Mass failures within the federal perimeter were accounted for by an inventory conducted by the NPNF and the BLM. We extrapolated those results to estimate sediment from mass failures throughout the SF CWR Subbasin.

The primary effect of grazing on sediment is increased stream bank erosion as the cattle access the stream. We conducted an inventory of stream bank erosion to quantify sediment from this source. We inventoried all of the known eroding streams in the subbasin. The inventory method is presented in Appendix L.

Using the WEPP road model, the University of Idaho developed a database to model sediment from county roads outside the federal perimeter (Flanagan and Livingston 1995). For gravel and other sediment coming from State Highway 14 that follows the main stem from Kooskia to Elk City, we estimated the amount of sediment being delivered to the river based on the amount of rock ITD crushes on a yearly basis. The estimate was adjusted for delivery, as were other sediment sources (Appendix L).

All of these sources of sediment and our calculations are presented in Appendix L, Sediment Budget. Summary sediment delivery results for all subbasin water bodies are shown in Table 30.

Table 30. Sediment loads from nonpoint sources for each of the water bodies in the SF CWR Subbasin.

Water Body No.	Area	WEPP & Highway 14	NEZSED	RUSLE	Mass Failures	Instream Erosion	Total Sediment	Background Sediment Rate	Total Background Sediment	Routing Coeffic-ient	Routed Activity Sediment
	(mi^2)	(t/WB/yr)	(t/yr/WB)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/mi^2)	(t/WB/yr)		(t/WB/yr)
1	30.8	72		2638	21		2,732	30E	925	0.54	975
2	26.5	MD		12572	MD	MD	12,572	30E	794	0.55	6,532
3	33.2	MD		19807	MD	MD	19,807	30E	995	0.53	10,017
4	4.6	MD		2633	MD	MD	2,633	30E	139	0.76	1,892
5	36.7	MD		25261	MD	MD	25,261	30E	1,101	0.52	12,632
6	31.2	MD		19898	MD	MD	19,898	30E	937	0.54	10,207
7	28.7	MD		11691	MD	MD	11,691	30E	862	0.55	5,918
8	19.8	MD		10108	MD	MD	10,108	30E	594	0.58	5,558
9	13.8	MD		6194	MD	MD	6,194	30E	413	0.62	3,606
10	33.6	205		11632	43	616	12,496	30E	1,007	0.53	6,105
11	16.8	137		1708	21	211	2,078	30E	503	0.60	948
12 NFM	27.6	177		4817	21		5,015	30E	694	0.55	2,379
12 FM	61.0	948	2,651		381		3,980	38	2,503	0.55	813
13	36.6		1,050		180		1,230	27	971	0.52	136
14	41.2		1,248		8		1,256	29	1,212	0.51	23
15	16.9		1,207				1,207	72	1,207	0.60	0
16	7.0		346				346	50	346	0.70	0
17	15.9		510				510	32	509	0.61	1
18	13.6		544				544	40	544	0.63	0

Water Body No.	Area	WEPP & Highway 14	NEZSED	RUSLE	Mass Failures	Instream Erosion	Total Sediment	Background Sediment Rate	Total Background Sediment	Routing Coeffic-ient	Routed Activity Sediment
	(mi^2)	(t/WB/yr)	(t/yr/WB)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/mi^2)	(t/WB/yr)		(t/WB/yr)
19	6.2		551				551	89	551	0.72	0
20	3.6		316				316	89	316	0.80	0
21	8.7		417				417	48	417	0.68	0
22	29.6	468	1,167		23		1,658	36	1,073	0.54	318
23	8.3		256				256	30	251	0.68	3
24	22.9		476				476	20	458	0.57	10
25	3.8		120				120	30	115	0.79	4
26	11.3		313				313	27	303	0.65	7
27	21.3		998				998	47	998	0.58	0
28	9.2		262				262	29	262	0.67	0
29	8.0		152				152	17	135	0.69	11
30	26.8	472	848				1,320	28	752	0.55	314
31	14.8		418				418	25	371	0.62	29
32	22.6		460				460	19	425	0.57	20
33	11.9		270				270	23	267	0.64	2
34	10.5		287				287	27	280	0.66	4
35	11.7		226				226	17	196	0.64	19
36	4.2	148	147				295	26	109	0.77	144
37	16.1		376		49		425	17	281	0.61	87
38	25.1		680			210	891	20	503	0.56	217

Water Body No.	Area	WEPP & Highway 14	NEZSED	RUSLE	Mass Failures	Instream Erosion	Total Sediment	Background Sediment Rate	Total Background Sediment	Routing Coeffic-ient	Routed Activity Sediment
	(mi^2)	(t/WB/yr)	(t/yr/WB)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/mi^2)	(t/WB/yr)		(t/WB/yr)
39	11.1		261			12	273	17	192	0.65	53
40	4.9		112				112	18	88	0.75	18
41	4.4		108				108	19	82	0.77	20
42	10.0		186				186	17	170	0.66	10
43	7.4		136				136	17	124	0.70	8
44	11.1		215				215	18	193	0.65	14
45	30.1		745			62	807	20	593	0.54	116
46	5.2		115				115	18	95	0.74	15
47	3.7		90				90	21	80	0.79	8
48	3.9		81				81	21	81	0.78	0
49	7.1		160			3	163	20	142	0.70	15
50	12.2		266			15	282	18	216	0.64	42
51	9.1		217				217	21	192	0.67	17
52	11.3		281				281	17	196	0.65	55
53	9.8		235				235	23	225	0.66	7
54	17.9		413				413	18	329	0.60	50
55	23.9		622		28	39	689	24	560	0.56	73
56	3.6		128			124	252	29	105	0.79	116
57	7.9		190			25	215	18	144	0.69	49
58	13.8		416			63	479	24	337	0.62	88

Water Body No.	Area	WEPP & Highway 14	NEZSED	RUSLE	Mass Failures	Instream Erosion	Total Sediment	Background Sediment Rate	Total Background Sediment	Routing Coeffic-ient	Routed Activity Sediment
	(mi^2)	(t/WB/yr)	(t/yr/WB)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/mi^2)	(t/WB/yr)		(t/WB/yr)
59	3.3		86			4	90	21	69	0.80	17
60	2.6		62				62	21	53	0.84	8
61	1.7		39				39	20	33	0.91	5
62	6.5		189			36	225	24	157	0.71	49
63	6.0		143				143	20	117	0.72	19
64	2.3		44				44	16	37	0.86	6
65	5.8		122				122	19	112	0.73	7
66	1.8		52				52	24	43	0.90	8
67	8.6		190				190	18	152	0.68	26
68	9.9		224				224	21	209	0.66	10
69	5.0		135				135	23	114	0.75	15
70	4.3		119				119	25	107	0.77	9
71	6.1		163				163	26	158	0.72	4
72	2.8		77				77	28	77	0.83	0
73	2.4		73				73	27	66	0.85	6
74	5.2		151				151	28	143	0.74	6
75	7.8		231			0	231	26	205	0.69	18
76	3.6		108				108	26	95	0.79	10
77	25.8		639		11		650	24	623	0.56	15
78	14.2		440		8		448	27	378	0.62	44

Water Body No.	Area	WEPP & Highway 14	NEZSED	RUSLE	Mass Failures	Instream Erosion	Total Sediment	Background Sediment Rate	Total Background Sediment	Routing Coeffic-ient	Routed Activity Sediment
	(mi^2)	(t/WB/yr)	(t/yr/WB)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/WB/yr)	(t/mi^2)	(t/WB/yr)		(t/WB/yr)
79	12.1		343		15		357	23	279	0.64	50
80	37.5		1,164		12	53	1,229	27	1,003	0.52	118
81-NFM	9.8	53		1205		1	1,258	30E	294	0.66	639
81-FM	4.1		129				129	28	114	0.66	10
82-NFM	9.0	28	0	784		0	812	30E	270	0.67	365
82-FM	0.7		13				13	18	12	0.66	1
Totals		2,708	26,210	130947	822	1,473	162,160		33,378		71,169

Explanation of Table 30

A complete discussion is presented in Appendix L, Sediment Budget.

"t/WB/yr" means tons per water body per year.
"E" is the estimated background erosion rate.
"MD" is missing data from the water bodies covered in the Cottonwood Creek TMDL for which we did not allocate resources to complete.
"FM" means federally managed lands
"NFM" means not federally managed lands
"Area" is the area of each water body in square miles.
"WEPP & Highway 14" is a combination of sediment production from roads outside the federally managed area estimated using the WEPP model and estimates of sediment from Highway 14.
"NEZSED" is sediment production from lands within the overall boundary of federal ownership estimated using the NEZSED model.
"RUSLE" is sediment production from agriculture and grazing lands predicted by the RUSLE model.
"Mass Failures" are estimates of sediment from road related mass failures delivered to streams based on data from the NPNF.
"Instream Erosion" is sediment estimated using the Natural Resources Conservation Service (NRCS) field methods described in the Sediment Budget (Appendix L).
"Total Sediment" is the total estimated sediment produced from the landscape in a water body, on an annual basis. These numbers are for the water body *per se*, and, in this table, are not cumulative from all water bodies upstream.
"Background Sediment Rate" is the rate derived by the NPNF for NEZSED, or our estimated rate based on the literature.
"Total Background Sediment" is the total amount of sediment from the water body landscape that is estimated to be background.
"Routing Coefficient" is that of Roehl (1962) and is an estimate of what proportion of sediment produced on the landscape is routed through the streams.
"Routed Activity Sediment" is the Total Sediment minus the Background Sediment multiplied by the Routing Coefficient, resulting an estimate of human-caused sediment being delivered by the stream at the mouth of each water body.
Water bodies 1, 10, 11, 12, 22, 30, 36, 59, 62, 64, 65, 73, and 79 are the 303(d) listed water bodies.
Water bodies 12, 81, and 82 are reported in two parts, that part managed by federal agencies, and that part in private ownership.
Water bodies 2 through 9 are those that were covered in the Cottonwood Creek TMDL.

Sediment Transport

One of the major issues with the sediment budget approach to sediment loading analysis is the question of sediment yield, or sediment routing, as we have chosen to term it in this document. There are methods for validating estimates of sediment production from the landscape and we have looked at various sources of information to be relatively sure that our estimates of sediment production make sense. However, what happens to sediment once it enters a stream network is highly uncertain in terms of being able to predict and quantify. At a conceptual level, we know that some portion of sediment delivered to a stream is actually stored within a watershed in such places as bars, floodplains, outwash fans, etc. The steeper and more energetic a stream, the higher the likelihood that sediment will be flushed through rather than stored. And, in general, the larger the water body being analyzed, the greater the amount of sediment that will be stored.

In consultation with several hydrologists in the region, we concluded that it would be nearly impossible to predict sediment routing in any sort of a reliable way. We decided, therefore, to use the routing coefficient developed by Roehl (1962), which simply relates the amount of sediment routed through a watershed to the size of the watershed. The R1/R4 suite of models (USFS 1981) for sediment estimation from forestlands uses this equation. We decided to apply it to all of our sediment sources on a uniform, waterbody basis, i.e., it was applied to each water body independently based on the area of that water body. However, consistent with USFS use, it was not applied at a cumulative water body level, or at the level of the total SF CWR subbasin. The sediment budget summary in Table 30, above, shows the use of the routing coefficient. Appendix L, Sediment Budget, explains its use further.

While we have very poor bedload data to use to draw any reliable conclusions about our use of the routing coefficient, the data we do have indicate that somewhat more sediment is being produced in the landscape than we have been able to account for in our TSS and bedload data. In other words, it appears that there is more storage in the watersheds than the Roehl equation predicts, especially for Threemile and Butcher Creeks. Since we switch from instream-based, TSS sediment estimation to sediment-budget-based, total sediment estimation from the non-federal to the federal part of the subbasin, we have had to make adjustments in our calculations to account for problems in our routing estimates. These are explained more fully in Appendix L.

Human Caused Sediment

For the water bodies above Harpster, the total amount of human-caused (activity) sediment being routed through the water bodies ranges from zero for those water bodies in the wilderness to a high of 3,191 t/year for the water body around Harpster (WB #12). The next two highest sediment producing water bodies are the next two water bodies upstream from Harpster on the main stem (WB #22 and WB #30). Aside from these main stem water bodies, the following water bodies upstream from Harpster are producing greater than 100 tons of sediment per year: Mill Creek, Middle Red River (which includes Dawson Creek), Upper Red River, Lower Elk Creek, and Meadow Creek. Water bodies producing between 50 and 100 tons of sediment per year include: Lower Red River, Moose Butte Creek, Lower American River, East Fork American River, Upper American River, Big Elk Creek, and Cougar Creek. Figure 44 shows the distribution of human-caused sediment by water body.

To account for the varying sizes of the water bodies, another way of looking at sediment production is on a per unit area basis. Apart from the main stem water bodies which produce the most sediment on a per unit area basis, the following water bodies are producing the most sediment: Lower Elk Creek @ 32 t/mi^2/yr, Middle Red River @ 9 t/mi^2/yr (which includes Dawson Creek), Lower Newsome Creek @ 8 t/mi^2/yr, Big Elk Creek @ 6 t/mi^2/yr, Little Elk Creek @ 6 t/mi^2/yr, Lower Red River @ 5 t/mi^2/yr, and Buffalo Gulch @ 5 t/mi^2/yr. Water bodies in the 3-5 t/mi^2/yr range include Mill Creek, Meadow Creek, Cougar Creek, Peasley Creek, Haysfork Creek, Mule Creek, Bear Creek, Middle Newsome Creek, Maurice Creek, Lower and Upper American River, Siegel Creek, Moose Butte Creek, Lower and Middle South Fork Red River, and Upper Red River. The other 303(d) listed water bodies, Sing Lee Creek, Nugget Creek, and Beaver Creek, are producing in the range of 1 to 3 t/mi^2/yr of human caused sediment. Figure 45 shows the distribution of human-caused sediment per unit area.

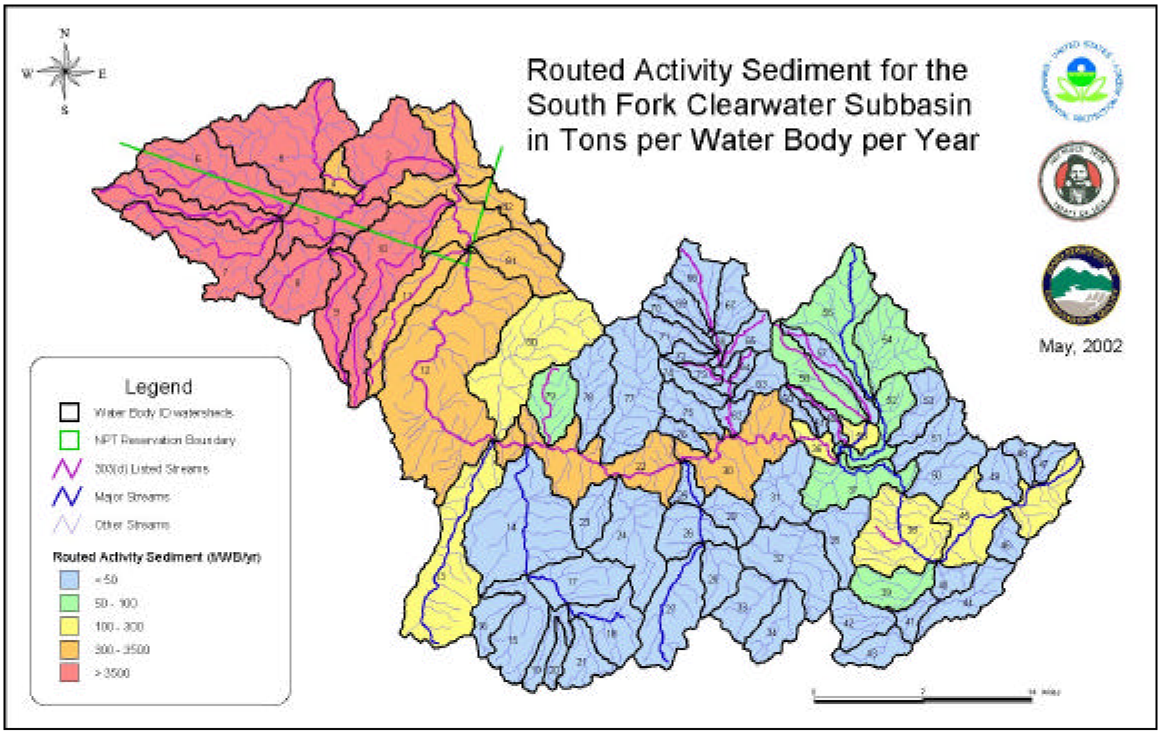

Figure 44. Sediment Production by Water Body in the SF CWR Subbasin

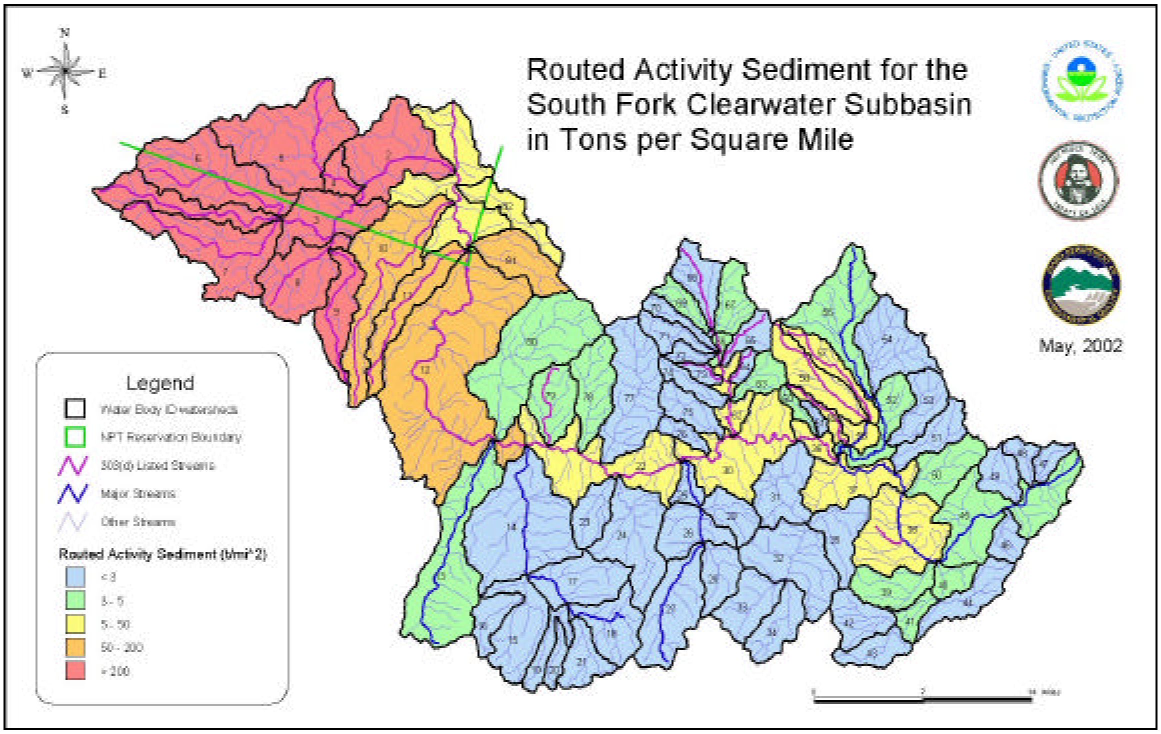

Figure 45. Annual Sediment Production per Square Mile in the SF CWR Subbasin

Sediment from Roads

The sediment budget is based on a number of data sources as presented in Appendix L and summarized in Table 30. The NEZSED model predicts sediment delivery from all forest practices, but beyond the first few years after a fire or harvest activity, the largest amount of sediment comes from roads. Table 31 shows the distribution of roads in the subbasin in relation to streams. Shaded cells show water bodies that have the highest road densities, road stream crossings, or miles of roads close to streams. Most of the 303(d) listed water bodies have high road densities and/or a large number of stream crossings.

Table 31. Road data for the SF CWR Subbasin.

WB ID	Water Body Name	Area (mi^2)	Miles of Stream	Road Miles per Water Body (mi/WB)	Road Density (mi/mi^2)	Road Crossings	Miles of Road Within 100 Feet of Stream
1	Lower SF CWR	30.8	38.3	62.3	2.0	24	4.1
10	Threemile Cr.	33.6	49.8	70.7	2.1	62	3.9
11	Butcher Cr.	16.8	18.9	32.2	1.9	13	0.7
12	Mid-Lower SF CWR	89.0	114.2	344	3.9	132	12.4
13	Mill Cr.	36.6	44.7	108.0	3.0	40	5.0

WB ID	Water Body Name	Area (mi^2)	Miles of Stream	Road Miles per Water Body (mi/WB)	Road Density (mi/mi^2)	Road Crossings	Miles of Road Within 100 Feet of Stream
14	Lower Johns Cr.	41.2	52.1	77.3	1.9	24	3.1
15	Gospel Cr.	16.9	21.3	6.2	0.4	4	0.2
16	WF Gospel Cr.	7.0	5.9	3.0	0.4	1	0.1
17	Middle Johns Cr.	15.9	18.9	9.8	0.6	3	0.3
18	Upper Johns Cr.	13.6	21.3	9.4	0.7	5	0.4
19	Moores Cr.	6.2	8.8	9.1	1.5	6	1.5
20	Square Mntn. Cr.	3.6	5.0	1.4	0.4	0	0.0
21	Hagen Cr.	8.7	11.3	3.5	0.4	0	0.0
22	Middle SF CWR	29.6	49.8	79.2	2.7	45	8.4
23	Wing Cr.	8.3	11.0	13.9	1.7	2	0.2
24	Twentymile Cr.	22.9	27.9	35.7	1.6	12	1.1
25	Lower Tenmile Cr.	3.8	6.4	2.4	0.6	0	0.0
26	Middle Tenmile Cr.	11.3	15.0	17.6	1.6	5	0.4
27	Upper Tenmile Cr.	21.3	21.7	21.3	1.0	6	0.4
28	Williams Cr.	9.2	11.7	2.2	0.2	1	0.1
29	Sixmile Cr.	8.0	13.8	15.5	1.9	6	0.6
30	Mid-Upper SF CWR	26.8	40.2	93.4	3.5	36	7.9
31	Lower Crooked R.	14.8	19.9	46.8	3.2	11	1.4
32	Upper Crooked R.	22.6	33.7	46.2	2.0	23	2.3
33	WF Crooked R.	11.9	13.5	11.4	1.0	1	0.1
34	EF Crooked R.	10.5	12.0	6.9	0.7	1	0.0
35	Relief Cr.	11.7	13.5	43.2	3.7	5	0.6
36	Upper SF CWR	4.2	6.5	12.2	2.9	4	0.3
37	Lower Red R.	16.1	24.9	93.4	5.8	31	4.0
38	Middle Red R.	25.1	43.6	129.6	5.2	58	6.0
39	Moose Butte Cr.	11.1	15.2	57.0	5.1	19	4.5
40	Lower SF Red R.	4.9	6.4	20.5	4.2	4	0.9
41	Middle SF Red R.	4.4	7.8	18.8	4.3	9	0.8
42	WF Red R.	10.0	14.9	23.7	2.4	7	0.5
43	Upper SF Red R.	7.4	7.9	27.1	3.7	4	0.5
44	Trapper Cr.	11.1	13.8	34.1	3.1	7	0.5

WB ID	Water Body Name	Area (mi^2)	Miles of Stream	Road Miles per Water Body (mi/WB)	Road Density (mi/mi^2)	Road Crossings	Miles of Road Within 100 Feet of Stream
45	Upper Red R.	30.1	43.4	113.9	3.8	42	6.3
46	Soda Cr.	5.2	8.0	19.2	3.7	10	0.5
47	Bridge Cr.	3.7	7.2	7.3	1.9	3	0.6
48	Otterson Cr.	3.9	6.2	3.0	0.8	0	0.0
49	Trail Cr.	7.1	9.4	16.7	2.3	6	0.5
50	Siegel Cr.	12.2	13.6	43.9	3.6	16	3.0
51	Red Horse Cr.	9.1	14.0	21.9	2.4	12	1.8
52	Lower American R.	11.3	20.1	38.0	3.4	18	3.7
53	Kirks Fork	9.8	17.1	16.7	1.7	4	1.3
54	East Fork American R.	17.9	33.1	53.0	3.0	27	6.5
55	Upper American R.	23.9	39.3	61.4	2.6	29	4.6
56	Elk Cr.	3.6	4.4	10.0	2.8	6	0.3
57	Little Elk Cr.	7.9	12.7	26.8	3.4	12	1.3
58	Big Elk Cr.	13.8	19.7	40.5	2.9	19	1.3
59	Buffalo Gulch	3.3	6.5	14.5	4.3	9	0.8
60	Whiskey Cr.	2.6	4.2	9.0	3.5	3	0.2
61	Maurice Cr.	1.7	2.6	5.1	3.0	0	0.0
62	Lower Newsome Cr.	6.5	12.4	31.0	4.8	12	1.1
63	Bear Cr.	6.0	8.0	32.7	5.5	4	0.2
64	Nugget Cr.	2.3	4.6	10.4	4.6	4	0.2
65	Beaver Cr.	5.8	6.7	14.9	2.6	1	0.0
66	Middle Newsome Cr.	1.8	2.3	7.8	4.4	6	0.6
67	Mule Cr.	8.6	13.8	44.4	5.2	8	0.8
68	Upper Newsome Cr.	9.9	15.7	22.9	2.3	16	2.6
69	Haysfork Cr.	5.0	9.5	24.7	5.0	7	0.4
70	Baldy Cr.	4.3	8.0	19.9	4.7	3	0.3
71	Pilot Cr.	6.1	10.4	6.9	1.1	2	0.2
72	Sawmill Cr.	2.8	6.0	0.3	0.1	0	0.0
73	Sing Lee Cr.	2.4	4.5	10.3	4.2	3	0.2
74	WF Newsome Cr.	5.2	7.2	14.5	2.8	6	1.0
75	Leggett Cr.	7.8	11.9	34.7	4.4	12	1.6

WB ID	Water Body Name	Area (mi^2)	Miles of Stream	Road Miles per Water Body (mi/WB)	Road Density (mi/mi^2)	Road Crossings	Miles of Road Within 100 Feet of Stream
76	Fall Cr.	3.6	7.8	12.2	3.3	7	0.4
77	Silver Cr.	25.8	41.0	38.6	1.5	12	0.7
78	Peasley Cr.	14.2	22.3	66.1	4.7	24	1.9
79	Cougar Cr.	12.1	17.1	51.4	4.3	26	5.1
80	Meadow Cr.	37.5	47.8	168.1	4.5	47	6.2
81	Sally Ann Cr.	18.0	18.3	71.0	4.0	19	2.4
82	Rabbit Cr.	10.0	11.2	19.0	2.0	10	0.9

*Road Density Greater than 4.2
**Road Crossings Greater than 20 per water body
***Stream Miles Within 100 feet of Stream Greater than 2

Fisheries Technical Advisory Group Assessment of Sediment

Sediment production and delivery to a stream network, or even documented sediment in a stream channel, does not lead directly to the conclusion that the Idaho sediment WQS are being exceeded, or that beneficial uses are being impaired beyond a level acceptable under the narrative conditions of the WQS. The Fish TAG of fisheries professionals knowledgeable of fish conditions in the SF CWR subbasin was created and asked for its best professional judgement.

The results of Fish TAG deliberations are presented in Appendix D. Whereas the Fish TAG had access to the results presented above, as well as numerous other sources of information, its deliberations included the whole SF CWR subbasin and did not focus to any degree on the 303(d) listed water bodies. The conclusions about sediment problems (Figure 46) are relevant to the question of importance of sediment to salmonid spawning. Generally, the fisheries biologists think there are sediment problems in all the water bodies where any significant human activity has taken place. However, among those with sediment problems above Harpster, the biologists think that fish habitat conditions are poor in Cougar Creek, Lower and Middle Newsome Creek, Buffalo Gulch, Maurice Creek, Lower Crooked River, Lower and Middle Red River (which includes Dawson Creek), Lower Elk Creek, and Lower American River.

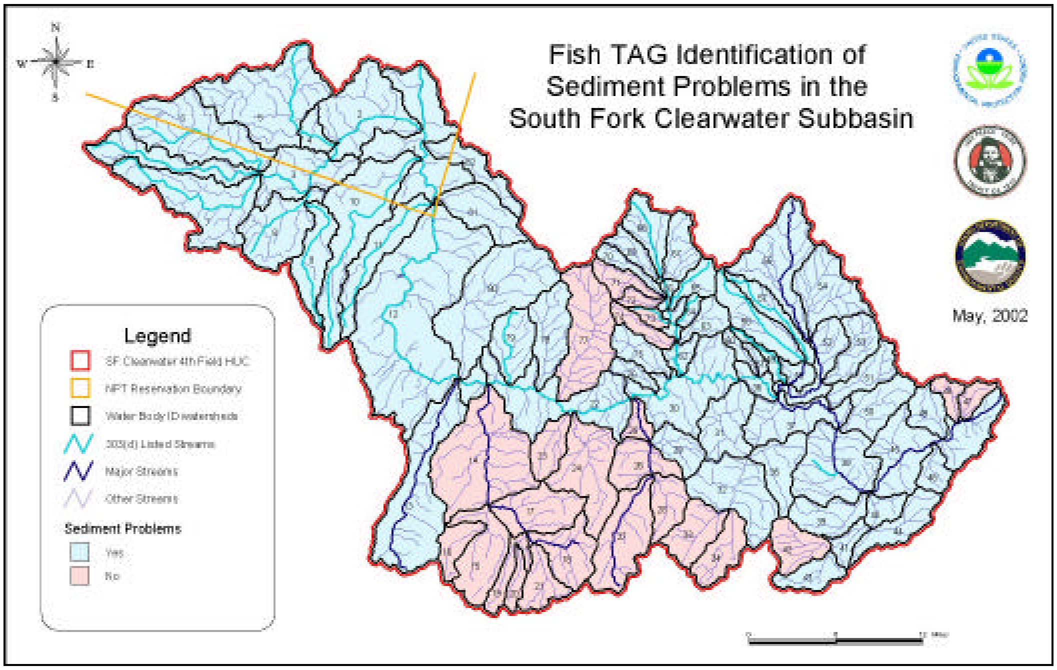

Figure 46. Fish TAG Assessment of Water Bodies in the SF CWR Subbasin with Significant Sediment Problems

The significant point of the Fish TAG identification of water bodies impacted by sediment is that they correspond relatively well with those identified by the sediment budget as having the highest sediment load (see Figure 46).

Temperature

Stream temperatures are primarily controlled by channel morphology, stream flow, shading, and air temperature. Wide, shallow streams with little shade will heat most quickly. In tributaries, forestry, mining, grazing, and other activities that cause widening of the channel, reduced depth, or reduced shade can increase stream temperatures and adversely affect salmonids. The introduction of bedload sediment resulting in increased surface area of streams may occur through overland flow from sources such as roads, agricultural practices, bank slumping, and erosion.

The lower SF CWR is naturally warm during the summer due to high air temperatures and local reach characteristics. Thermal refugia, or cold spots, in the main stem represent important areas for the survival and growth of salmonids, especially for adult fluvial bull trout. The cool water plumes at the mouths of tributaries represent another type of thermal refuge, so any activity that affects the associated tributary's temperature has the potential to degrade the quality of these areas (USFS 1999). Appendices G, H, and I present more details of water heating processes in the subbasin and our approaches to analyzing the situation.

3.2 Data Gaps

This assessment has identified several data gaps that limit full assessment of the effects of 303(d) listed pollutants on beneficial uses. Some of the data gaps will be filled with additional sampling efforts. As part of the TMDL implementation phase, a long-term monitoring plan will be developed that will address data gaps. Data limitations are also indicated in the TMDL loading analysis (Sections 5.1 through 5.3).

Point Sources

Additional nutrient monitoring and diurnal DO monitoring is needed to determine the effects of the Grangeville WWTP on Threemile Creek, particularly during the April – June time frame.

Nutrient monitoring is also recommended for Elk Creek. Observations indicate there are areas with potential excess algae growth which could result in low DO. Diurnal DO monitoring is recommended to evaluate effects of the Elk City WWTP.

There is a need to collect temperature data from the outflow of each of the WWTPs. Similarly, there is a need to collect flow data in the recipient streams at the point of discharge for each of the WWTPs.

Nonpoint Sources

The nature of the problem of nonpoint source pollution is that there are always significant data gaps resulting from extrapolation of data points across a landscape. Nonpoint source pollutant analysis can always benefit from a greater density of sampling, such sampling being limited by time and money.

Bacteria

Data are generally lacking altogether for bacteria in the upper part of the basin upstream from Harpster. Monitoring in other areas of north Idaho of grazed forest and meadow systems has shown elevated levels of bacteria. For the SF CWR SBA, this type of data was not available.

Temperature

For the purposes of this TMDL, we assume that the majority of human caused nonpoint source heat loading over background is the result of streamside vegetative alteration causing reduced shading of the streams and increased stream widths. We set our heat loading reduction targets based on this assumption. However, we lack data or models that describe pre-human vegetative condition/shading or stream channel morphology. We have used the results of various studies and models to arrive at a best approximation of desired streamside vegetative conditions and assume that these conditions will mitigate the effects of human activity with regard to stream temperature.

Sediment

Nonpoint source sediment is identified as bedload and TSS coming from a number of sources. Various models and direct monitoring techniques have been used to quantify the amounts of sediment from different sources and the fate of the sediment as it is transported through the system. Clearly, a high level of uncertainty exists when mixing and matching so many different technical approaches and models. A more unified and quality controlled system of measuring or modeling sediment production, routing, fate, and transport throughout the subbasin could add substantially to the reliability of the results of this analysis.

Probably the largest source of uncertainty in the overall sediment budget analysis is the routing of the bedload. It is recognized that sediment produced by various sources on the landscape is not all routed directly through the hydrologic system. Differing percentages of sediment are stored at various locations in the system (depositional areas, alluvial fans, floodplains, etc.), depending on the nature of the watershed and the events producing the sediment. As a generality, the larger the watershed under consideration, the higher percentage of the sediment that is stored, rather than transported through the system. With our various models and measurements, we are getting better at calculating sediment production on the landscape. However, we have relatively little ability to quantify the routing of such sediment. For the purposes of this TMDL, we used the Roehl (1962) routing equation for all particle sizes except the coarse bedload. For coarse bedload, we applied the results of a study by Beechie (2001). Both of these methods provide coarse generalities, and a method for quantifying sediment routing through any particular hydrologic system would add greatly to the sediment budget analysis.

The single largest source of sediment in the subbasin appears to be surface erosion from agricultural and grazing lands. Numbers for this source were generated using the RUSLE (Renard, et al. 1997) model in a GIS environment (Engle 1999). The largest source of error, as this model was applied to the private lands of the subbasin, was the land use map. An up-to-date land use map could change the results from this model. Similarly, the C-factor for erosion from the different land uses needs to be validated for the different land uses of the subbasin.

The largest portion of sediment in the SF CWR Subbasin is shown in this TMDL to move in pulses associated with high rainfall, rapid snowmelt, or large rain-on-snow events. In the largest of these, rain-on-snow events such as occurred in 1996, a significant portion of the sediment is generated by mass failures. The NPNF inventoried mass failures from the 1996 events; however, no similar inventory exists for the private lands. We extrapolated the results from the federally managed lands to the private lands, coupled with an aerial photo investigation. Several assumptions had to be made about percent delivery and whether the mass failure was natural or road related. A complete inventory of mass failures over the whole subbasin describing date of occurrence, size, percent delivery, particle size distribution, and cause would significantly improve the reliability of information about this sediment source. Alternatively, a model could be developed to predict sediment delivery from mass failures over time, but these events are so episodic as to be hard to predict except over a very long time frame.

To develop this TMDL, we collected data on in-stream erosion rates using a methodology developed by the NRCS (Appendix L). The field measurements for the methodology are fairly well set out, but the final calculation requires an estimation of bank recession rate, based largely on best professional judgement. While we conducted considerable field correlation and quality control of these estimates in the field, a better method for developing these estimates would increase the reliability of this method and confidence in its results.

We were able to better quantify sediment from roads. We developed estimates of sediment from the State Highway 14 that runs from Kooskia to Elk City based on the amount of gravel that is crushed each year and distributed on the road. We reduced the sediment load through estimates of percent roads delivering and the routing coefficient. Above the NPNF boundary, NEZSED was applied to Highway 14. Better collaboration with ITD could result in a much better understanding and quantification of this sediment load.

For the roads outside the federal boundary, we estimated sediment from the county roads using the WEPP model. However, we have no data for sediment coming from private forest practice or agricultural roads. The *Forest Practices Cumulative Watershed Effects Process for Idaho* (IDL 2000) identifies roads as the major source of sediment from forest practices. Similarly, NEZSED shows that sediment from roads is usually the major component. An equivalent rate of sediment production could be assumed for private agriculture and grazing use roads. However, we do not have an inventory of these roads, or any reasonable way to estimate their contribution to the sediment budget. It is unlikely that privately owned roads produce a greater magnitude of sediment than the WEPP modeled roads, so would be fairly insignificant in the larger picture of sediment production from this landscape. We assume that the nonpoint source sediment load reductions allocated to these water bodies will result in any needed sediment reductions from private roads as well.

The NEZSED model does not estimate surface erosion coming from cattle grazing. We estimated the effects of livestock as they affect stream bank stability, but we have no data to estimate the amount of sediment that is being delivered from cattle trails and from other effects of livestock grazing. This a data gap for the federally managed lands only. For the private lands, the RUSLE model estimates sediment coming from grazing in the land use and land cover parameters.

We lack data on the legacy effects of sediment left in place from the dredge and placer mining that took place in this subbasin 50 to 100 years ago. Relatively large portions of the stream channels were altered significantly by these operations. Today they appear relatively stable, with the dredge mining spoils appearing much the same as they have historically. While these dredge-mined areas are considered to be poor salmonid habitat, we have not been able to differentiate between historic and more recent sediment effects. Studies and data are limited on the effects of suction dredging taking place in the SF CWR Subbasin.

While the NEZSED model as part of the R1/R4 suite of models has estimated the background sedimentation rate for forested landscapes, a similar estimation of background erosion rates for agricultural and grazing lands is largely nonexistent. While it would take a significant change in the estimate of background erosion rates for private lands to change their load reduction allocations very much, the fact remains that this parameter is estimated with limited information.