Subbasin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River (17010301)

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List of 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
ì	micro, one-one thousandth
AWS	agricultural water supply
BAG	Basin Advisory Group
BLM	United States Bureau of Land Management
BMP	best management practice
BURP	Beneficial Use Reconnaissance Program
C	Celsius
CFR	Code of Federal Regulations (refers to citations in the federal administrative rules)
cfs	cubic feet per second
CW	cold water
CWA	Clean Water Act
CWE	cumulative watershed effects
DEQ	Idaho Department of Environmental Quality
DO	dissolved oxygen
DWS	domestic water supply
EPA	United States Environmental Protection Agency
FPA	Idaho Forest Practices Act
GIS	Geographical Information Systems
HUC	Hydrologic Unit Code
IDAPA	Refers to citations of Idaho administrative rules
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
LA	load allocation
LC	load capacity
m	meter
m^3	cubic meter
mi	mile
mi^2	square miles
MBI	macroinvertebrate biotic index
mg/l	milligrams per liter
MOS	margin of safety
n.a.	not applicable
NA	not assessed
nd	no data (data not available)
PCR	primary contact recreation
ppm	part(s) per million

NFS	not fully supporting
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTU	nephlometric turbidity unit
QA	quality assurance
QC	quality control
SBA	subbasin assessment
SCR	secondary contact recreation
SS	salmonid spawning
STATSGO	State Soil Geographic Database
TIN	total inorganic nitrogen
TKN	total Kjeldahl nitrogen
TMDL	total maximum daily load
TP	total phosphorus
t/yr	tons per year
U.S.	United States
USFS	United States Forest Service
USGS	United States Geological Survey
WAG	Watershed Advisory Group
WBAG	*Water Body Assessment Guidance*
WLA	waste load allocation
WQLS	water quality limited segment
WQS	water quality standard

1. Executive Summary

The North Fork Coeur d'Alene River Subbasin is assessed. Eighteen water bodies are section 303(d) listed, while an additional sixteen were removed from the list between 1996 and 1998. Most water bodies have been listed for sediment. A few segments are listed for habitat and flow alteration. Prichard Creek and the East Fork Eagle Creek are listed for metals and pH. Prichard Creek is also listed for bacteria, dissolved oxygen, nutrients, and oil and grease

The subbasin assessment reviews the existing data for the streams. Bacteria, dissolved oxygen, plant growth nutrient, and oil and grease analyses of Prichard Creek water samples did not reveal any exceedances of state water quality standards and guidelines. Although pH was not found to exceed the standard in either East Fork Eagle or Prichard Creeks, the metals cadmium, lead, and zinc were found to exceed standards. Exceedances of these metals standards were also found in Beaver Creek. Sediment modeling was completed for the entire subbasin. Model results demonstrate that six of the seven subbasins of the watershed have sedimentation rates at or well in excess of 100% above background sedimentation rates. Sedimentation rates at or in excess of 100% of background are believed to be the point at which water quality is impaired. Pool volume and fish population data support the impairment determination. The exception is the Upper North Fork subbasin, which has lighter road densities and is 43% above background sedimentation rates. Pool volume and fish population data from streams of the Upper North Fork Subbasin indicate full support of the cold water and salmonid spawning uses.

The assessment finds that Prichard Creek is not exceeding bacteria, dissolved oxygen, nutrient, oil and grease, and pH standards and guidelines. It does not find an exceedance of the pH standard in East Fork Eagle Creek. The assessment recommends the delisting of East Fork Eagle Creek for pH and Prichard Creek for bacteria, dissolved oxygen, nutrient, oil and grease, and pH.

Habitat and flow alteration are not impacts amenable to development of total maximum daily load (TMDL) allocations. Segments of the North Fork Coeur d'Alene and Little North Fork Coeur d'Alene Rivers and Tepee, Prichard, East Fork Eagle Cougar and Steamboat Creeks are listed for either flow and or habitat alteration.

The assessment finds that Beaver, East Fork Eagle, and Prichard Creeks exceed dissolved cadmium, lead, and zinc standards. The assessment recommends that TMDLs be developed for these streams and metals. A metals TMDL addressing cadmium, lead, and zinc standards exceedances of East Fork Eagle Creek has been prepared. Since Beaver Creek is not listed for metals, it will be nominated for listed on the 2002 water quality limited (303(d)) list. The Beaver Creek TMDL will be deferred until the listing is complete. Insufficient metal load data is currently available to complete the metals TMDL for Prichard Creek. The Prichard Creek TMDL will be deferred until sufficient metals load data is developed (Table 1).

Sediment modeling and supporting information demonstrates a systemic sediment problem in the North Fork Coeur d'Alene watershed. Since the most downstream segments of the watershed are sediment impaired and all upstream watersheds contribute at least in part to the sediment load, the assessment recommends a subbasin-wide sediment TMDL. A sediment TMDL addressing the entire North Fork Coeur d'Alene River Subbasin has been prepared.

Table 1: Results of Water Body Assessment and TMDL Development Based on Application of the Available Data

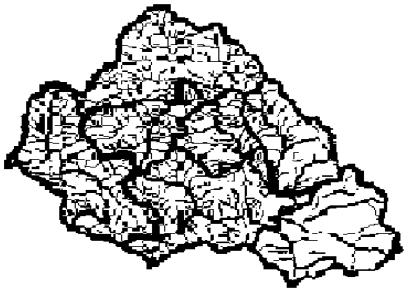
Water Body Name and HUC[1] Number	Assessed Support Status	Reasons Segment to be Delisted for Pollutant	Reason TMDL[2] Deferred
North Fork Coeur d'Alene River 17010301 3482	impaired by sediment	N/A[3]	N/A
Tepee Creek 17010301 3508	impaired by sediment	N/A	N/A
Big Elk Creek 17010301 3511	impaired by sediment	N/A	N/A
Calamity Creek 17010301 5034	impaired by sediment	N/A	N/A
Cub Creek 17010301 5054	impaired by sediment	N/A	N/A
Yellow Dog Creek 17010301 3506	impaired by sediment	N/A	N/A
Shoshone Creek 17010301 3504	impaired by sediment	N/A	N/A
Lost Creek 17010301 5643	impaired by sediment	N/A	N/A
Falls Creek 17010301 7504	impaired by sediment	N/A	N/A
Beaver Creek 17010301 3499	impaired by metals	fish / residual pool volume data indicated full support for sediment	Water body must first be 303(d) listed for metals
Prichard Creek 17010301 3500	impaired by sediment and metals	no evidence of bacteria, dissolved oxygen, nutrient, and oil and grease exceedances	Sufficient metals data not available; data expected end of water year 2001
East Fork Eagle Creek 17010301 5617	impaired by sediment and metals	no support for pH impairment	N/A
Cougar Gulch 17010301 7501	impaired by sediment	N/A	N/A
North Fork Coeur d'Alene River 17010301 3481	impaired by sediment	N/A	N/A
Steamboat Creek 17010301 3495	impaired by sediment	N/A	N/A
Little North Fork Coeur d'Alene River 17010301 3485	impaired by sediment	N/A	N/A
Copper Creek 17010301 3487	impaired by sediment	N/A	N/A
Burnt Cabin Creek 17010301 5032	impaired by sediment	N/A	N/A

[1] Hydrologic Unit Code
[2] Total maximum daily load
[3] not applicable

2. North Fork Coeur d'Alene River (17010301) Subbasin Assessment

2.0 North Fork Coeur d'Alene River Subbasin Water Quality at a Glance

Hydrologic Unit Code.....	17010301
Water Quality Limited Segments.....	18 segments
Beneficial Uses Affected.....	Cold Water Biota, Salmonid Spawning
Pollutants of Concern.....…	Sediment, Metals
Known Land Uses.....…..	Forestry, Agriculture, Recreation



2.1. Characterization of the Watershed

The North Fork Coeur d'Alene River[1] (North Fork) and its tributaries drain the entire Subbasin (17010301). The river and its tributaries flow from the Coeur d'Alene Mountains to the river's confluence with the South Fork Coeur d'Alene River (South Fork) near Enaville, Idaho. This water quality assessment addresses the entire Subbasin (Figure 1). The watershed above the South Fork confluence encompasses approximately 895 square miles.

2.1.1. Physical and Biological Characteristics

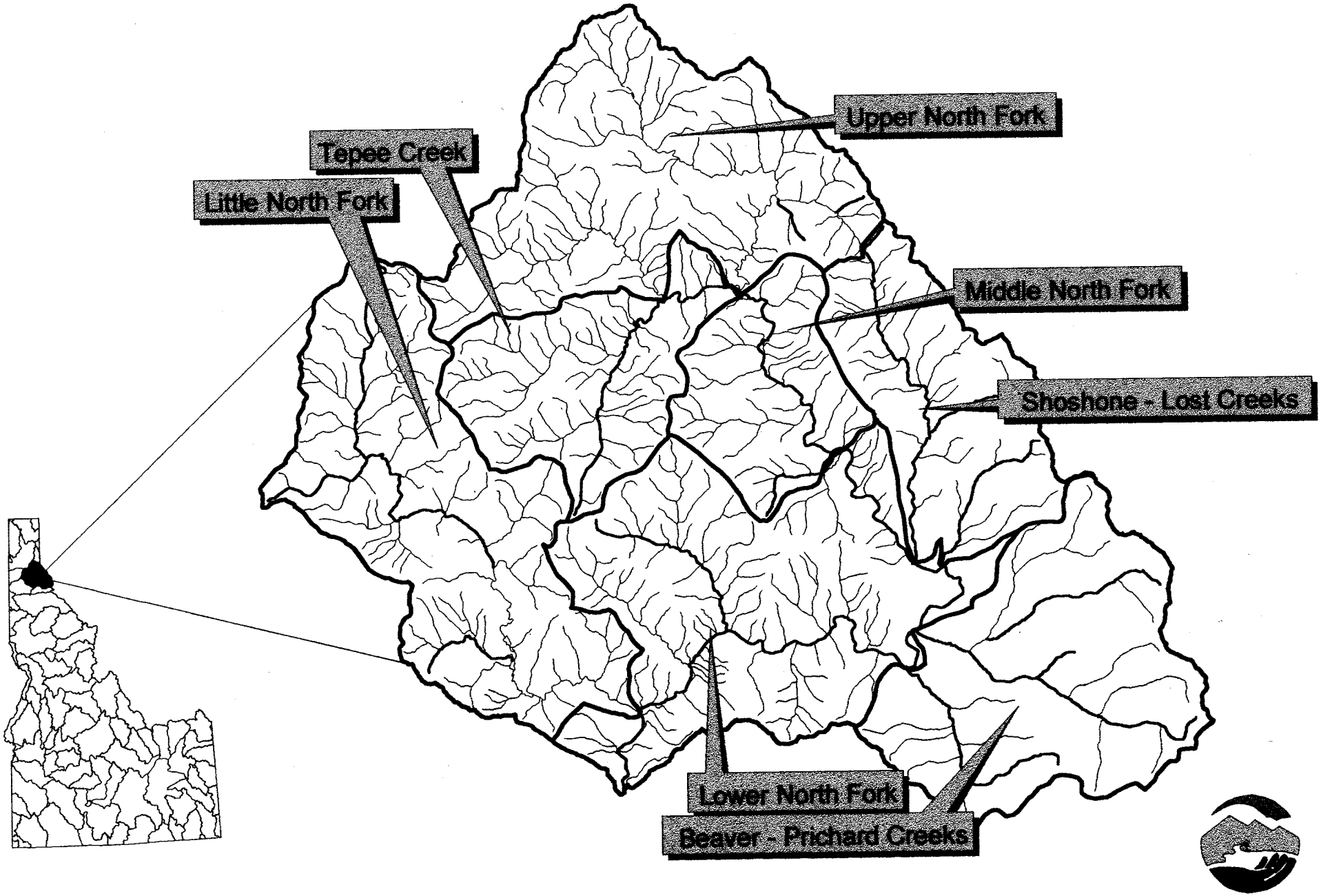
2.1.1.1. Climate

Northern Idaho is located in the Northern Rocky Mountain physiographic region to the west of the Bitterroot Range. The Coeur d'Alene Mountains, which the North Fork drains, are a part of this range. The local climate is influenced by both Pacific maritime air masses from the west and continental air masses from Canada to the north. The annual weather cycle generally consists of cool to warm summers with cold and wet winters. The relative warmth of summers or winters depends on the dominance of the warmer, wetter Pacific or cooler, dryer continental air masses. Precipitation is greatest during the winter.

Although intervening mountain ranges progressively dry the Pacific maritime air masses, these air masses deposit appreciable moisture, primarily as snow, on the North Fork watershed. Maritime air masses can originate in the mid-Pacific. These air masses are relatively warm, often yielding their precipitation as rain. Relief of the watershed is generally between 3,000 and 5,000 feet above seas level. The majority of the watershed is in the rain on snow elevation range of 3,300 to 4,500 feet.

1. The Coeur d'Alene River above the South Fork Coeur d'Alene River was renamed the North Fork Coeur d'Alene River in 1991 (U.S. Board on Geographic Names, 1991).

Figure 1. North Fork Coeur d'Alene River



Below 3,300 feet, the snow pack is transitory, while above 4,500 feet the snow pack is sufficiently cool that warming by a maritime front is insufficient to cause a significant thaw. In the rain on snow elevation range (3,300 - 4,500 feet), a warm and heavy snow pack accumulates each winter. A warm maritime front can sufficiently warm the snow pack, making it isothermal and capable of yielding large volumes of water during a runoff event.

2.1.1.2. Hydrology

The U.S. Geological Survey (USGS) has continuously operated the Enaville Gauging Station since October 1939 (58 years) and the Prichard Gauging Station since December 1950 (47 years). The average annual discharge hydrographs of the stations indicate that spring snowmelt dominates the pattern of stream discharge (Figure 2). Mean high flow discharge occurs in April. Mean high flow discharges are 5,227 and 2,108 cubic feet per second (cfs), respectively. Mean low flow discharge occur in September. Mean low flow discharges are 269 and 106 cfs, respectively. A more intermittent feature observed on individual yearly discharge hydrographs is rain on snow events, precipitated by the climate factors discussed earlier (Figure 3). These events occur between November and March; some years have several occurrences and others have none. Rain on snow conditions often result in large discharge (flood) events.

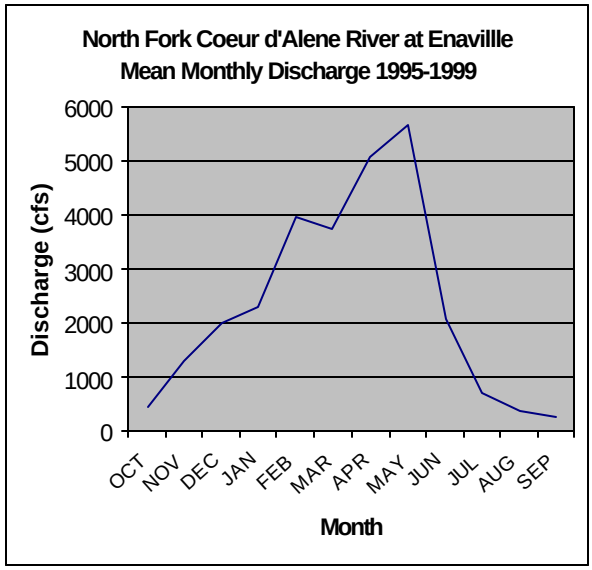


Figure 2: North Fork Coeur d'Alene River at Enaville, Idaho, Average Monthly Discharge (cubic feet per second) for water years 1995-1999 (USGS 1995-2000)

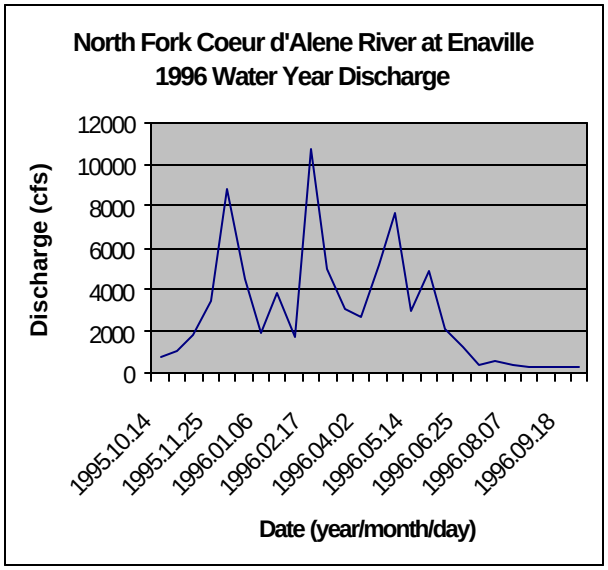


Figure 3: North Fork Coeur d'Alene River at Enaville, Idaho, Average Biweekly Discharge (cubic feet per second), for water year 1996 (USGS, 1997)

2.1.1.3. Land Forms, Geology, and Soils

The North Fork drains the Coeur d'Alene Mountains, a subset of the Bitterroot Mountains. The mountains are composed of metasedimentary rocks of the Proterozoic Belt Supergroup. High massive mountains and deep dissected intermountain valleys characterize the mountain range.

The valleys range down to 3,000 feet, while most mountains reach just over 5,000 feet. Only mountains on the Bitterroot Divide reach to over 6,000 feet. The land is steep but generally stable. Mass failures are not a typical feature of the landform development, but are specific to a few land types. These are typically glacial deposits located primarily in the valley bottoms. Valley bottoms are composed of colluvial deposits in the steep valleys and gulches. The valley bottoms in the broader floodplains of the North Fork below Tepee Creek and Beaver Creek are made of alluvial materials worked by these streams.

The mountain slopes are underlain by silty to silt loam podsolic soils developed under cool conditions. Volcanic ash deposits are variably found in the soil mantle. The soil mantle is generally thin on slopes with A and B horizons of 3 to 4 inches and generally decreases with altitude. Soils in the bottomlands can be silty to sandy podsols developed under upland forest. Near streams and in some pockets, black mucky soils exist where red cedar stands were the dominant vegetation.

2.1.1.4. Vegetation

The mountain slopes are mantled with mixed coniferous forests of true fir, Douglas fir, larch, and pine. White pine, ponderosa pine, and western larch have been selectively removed from the forest, resulting in stands more susceptible to root rot diseases. Rivers and streams are flanked by riparian stands dominated by cottonwood at lower elevations and alder in the higher valleys. Prior to settlement, riparian forests dominated by western red cedar flanked the river and the lower reaches of its tributaries. Red cedar boles that fell into the streams were an important source of large organic debris (LOD). The boles provided pool habitat and sediment storage. Logging of the riparian cedar stands and removal of LOD in log drives has altered the aquatic habitat of the North Fork and its tributaries (Russell,1985). In the lower the North Fork valley, lands converted to pasture flank the river.

2.1.1.5. Aquatic Fauna

The native salmonids of the subbasin's streams are cutthroat trout, whitefish, and bull trout. Sculpin and shiners are non-salmonid natives. Tailed frogs, giant salamanders, and turtles complete the vertebrate species. The fish fauna of the river and some of its tributaries has been altered by the introduction of rainbow and brook trout as well as chinook salmon. Introduced fish have been able to establish themselves in some habitats at lower elevations, while higher elevation water bodies tend to retain the native trout. Although fish composition appears stable in the headwaters, fish abundance is generally believed to be lower than historic levels.

2.1.2. Cultural Impacts

Three small towns, Enaville, Prichard, and Murray, are located in the North Fork Subbasin. None of these has a population in excess of 50. Resident and seasonal population is sparse in the remainder of the watershed. Subdivision of pastures along the lower North Fork into summer recreational vehicle parks has increased summer occupancy in these areas in recent years. Summer cabin subdivisions near Prichard are another summer population center.

In the 573,695-acre watershed, management is divided into 536,605 acres of U.S. Forest Service (USFS) managed land (93.5%), 24,385 acres of private land (4.3%), 9,309 acres state managed land (1.6%), and 3,378 acres Bureau of Land Management (BLM) managed land (0.6%)(IDL GIS database). Private properties are primarily bottomland along the lower North Fork and small ranches of 40 to 160 acres. The bulk of the watershed is part of the Coeur d'Alene National Forest. The Magee area on Tepee Creek was once a small population center composed of a sawmill and a Forest Service work center.

Land use is primarily in forest management for multiple resource outputs (timber, grazing, water, and recreation). Recreational and retirement homes as well as recreational vehicle camps are located in bottomlands along the lower river. Nine recreation areas (primarily picnic areas and campgrounds) and three national recreational trails are located in the watershed. Minor grazing occurs throughout the watershed, but is centered in the lower river valley. A few mineral deposits have been located and have been developed throughout the watershed. Mineral development was relatively extensive in the Prichard and Beaver Creek sub-watersheds where primarily placer gold deposits were developed during the 1880s. A few underground gold mines were developed above Murray along Prichard Creek. Zinc and lead mines were developed as well. These include the Jack Waite Mine on the East Fork of Eagle Creek; the Crystal Lead Mine on the West Fork Eagle Creek; the Monarch, Paragon, Bear, Ione, and Terrible Edith Mines in Prichard Creek; and Carlisle Mine on Beaver Creek. The watershed has sustained appreciable timber harvest since the turn of the century. Loggers initially used the waterways as the log transport system. A system of log flumes, splash dams, and log drives was used to move logs to mills along the Coeur d'Alene River. The splash dams and log drives caused severe structural disruptions to the streams, including the removal of large organic debris. Railroad logging was practiced in the watershed. Railroad grades entered the Little North Fork, Shoshone Creek, and other sub-watersheds. Between the late 1930s and the 1980s, an extensive forest road network was installed in watersheds. Many of these roads were built in the stream bottoms, fundamentally altering stream gradient and stability. From the 1940s to the 1970s, timber harvest depended on an extensive road network. Logging with the early jammer systems necessitated roads at approximately 100yard intervals on the slopes. The result is a network of roads inventoried or forgotten that intercept the natural drainage system at numerous locations throughout its dendric pattern. Mid-century harvests also relied heavily on clear cut prescriptions. As a result, the watershed has had approximately 15.5% of its area harvested at least once (USFS GIS data base), mostly in the form of this by clear cuts.

2.2. Regulatory Requirements

2.2.1. Segments of Concern

The North Fork Coeur d'Alene River below the Jordan Creek confluence, and several of the stream segments, in its watershed are listed as water quality limited under section 303(d) of the Clean Water Act (CWA). Sediment is uniformly listed as the pollutant of concern. Some stream segments also have hydrologic modification and fish habitat degradation listed as concerns (Table 2). Fish density surveys (Hunt and Bjornn, 1993; Dunnigan and Bennett, unpublished data; Idaho Department of Environmental Quality (DEQ) Beneficial Use Reconnaissance

Program (DEQ, 1996) indicate that these factors have contributed to the decline of trout populations in the North Fork and its tributaries.

The North Fork Coeur d'Alene River Subbasin has eighteen water quality limited, 303(d) listed stream segments according to the 1998 303(d) list. These segments are listed, along with the reasons for listing, in Tables 2a-2f). The listed segments are mapped in Figures 1.

Table 2: Water Quality Limited Segments of the North Fork Coeur d'Alene River Subbasin

a) Water Quality Limited Segments of the Tepee Creek and Middle North Fork Coeur d'Alene River Sub-Watersheds

Stream	HUC[1] Number	Boundaries	Pollutants(s)
North Fork	17010301 3482	Tepee Creek to Yellowdog Creek	sediment, flow and habitat alteration
Tepee Creek	17010301 3508	Headwaters to Big Elk Creek	sediment and habitat alteration
Big Elk Creek	17010301 3511	Headwaters to Tepee Creek	sediment
Calamity Creek	17010301 5034	Headwaters to Jordan Creek	sediment
Cub Creek	17010301 5054	Headwaters to Lost Fork	sediment
Yellowdog Creek	17010301 3506	Headwaters to North Fork Coeur d'Alene River	sediment

1. Hydrologic Unit Code

b) Water Quality Limited Segments of the Shoshone-Lost Creek Sub-Watershed

Stream	HUC[1] Number	Boundaries	Pollutants(s)
Shoshone Creek	17010301 3504	Sentinel Creek to North Fork Coeur d'Alene River	unknown
Lost Creek	17010301 5643	Headwaters to North Fork Coeur d'Alene River	sediment
Falls Creek	17010301 7504	Headwaters to Shoshone Creek	sediment

1. Hydrologic Unit Code

c) Water Quality Limited Segments of the Prichard-Beaver Creeks Sub-Watershed

Stream	HUC[1] Number	Boundaries	Pollutants(s)
Beaver Creek	17010301 3499	Headwaters to North Fork Coeur d'Alene River	sediment
Prichard Creek	17010301 3500	Barton Gulch to North Fork Coeur d'Alene River	bacteria, dissolved oxygen, habitat alteration, nutrients, oil and grease, sediment
East Fork Eagle Creek	17010301 5617	Headwaters to Eagle Creek	habitat alteration, metals, pH, sediment
Cougar Gulch	17010301 7501	Headwaters to Prichard Creek	sediment and habitat alteration

1. Hydrologic Unit Code

d) Water Quality Limited Segments of the Lower North Fork Coeur d'Alene River Sub-Watershed.

Stream	HUC[1] Number	Boundaries	Pollutants(s)
North Fork Coeur d'Alene River	17010301 3481	Yellowdog Creek to South Fork Coeur d'Alene River	sediment, flow, habitat alteration
Steamboat Creek	17010301 3495	Barrymore Creek to North Fork Coeur d'Alene River	sediment, flow, habitat alteration

1. Hydrologic Unit Code

e) Water Quality Limited Segments of the Little North Fork Coeur d'Alene River Sub-Watershed.

Stream	HUC[1] Number	Boundaries	Pollutants(s)
Little North Fork Coeur d'Alene River	17010301 3485	Headwaters to Laverne Creek	sediment, flow, habitat alteration
Copper Creek	17010301 3487	Headwaters to Lt. North Fork Coeur d'Alene River	sediment
Burnt Cabin Creek	17010301 5032	Headwaters to Little North Fork Coeur d'Alene River	sediment

1. Hydrologic Unit Code

Additional water bodies had been listed on the 1996 list. These are listed in Tables 3a-3d. These water bodies were removed from the list when analysis of more recent water quality data provided macroinvertebrate biotic index scores sufficiently high for delisting (DEQ 1996). In one case, (Lost Creek) a segment was added to the list of water quality limited segments by this same assessment process.

Table 3: Water Bodies Found Supporting Beneficial Uses Based on 1998 Water Body Assessment

a) Tepee Creek and Middle North Fork Coeur d'Alene River Sub-Watersheds

Stream	HUC[1] Number	Boundaries	Pollutant(s)
Cinnamon Creek	17010301 5042	Headwaters to North Fork Coeur d'Alene River	sediment
Flat Creek	17010301 3507	Headwaters to North Fork Coeur d'Alene River	sediment
Lost Fork Creek	17010301 5115	Headwaters to Jordan Creek	sediment
Trail Creek	17010301 3510	Headwaters to Tepee Creek	sediment

1. Hydrologic Unit Code

b) Prichard-Beaver Creeks Sub-Watershed

Stream	HUC[1] Number	Boundaries	Pollutants(s)
West Fork Eagle Creek	17010301 3501	Headwaters to Eagle Creek	sediment
Wesp Gulch	17010301 7502	Headwaters to Prichard Creek	sediment, habitat alteration
Tiger Gulch	17010301 7500	Headwaters to Prichard Creek	sediment
Ophir Gulch	17010301 7500	Headwaters to Prichard Creek	sediment, habitat alteration
Idaho Gulch	17010301 7505	Headwaters to Prichard Creek	sediment, habitat alteration
Barton Gulch	17010301 5008	Headwaters to Granite Gulch	sediment

1. Hydrologic Unit Code

c) Lower North Fork Coeur d'Alene River Sub-Watershed

Stream	HUC[1] Number	Boundaries	Pollutants(s)
Downey Creek	17010301 3505	Headwaters to North Fork Coeur d'Alene River	sediment

1. Hydrologic Unit Code

d) Little North Fork Coeur d'Alene River Sub-Watershed

Stream	HUC[1] Number	Boundaries	Pollutants(s)
Barney Creek	17010301 5007	Headwaters to Little North Fork Coeur d'Alene River	sediment
Skookum Creek	17010301 3490	Headwaters to Little North Fork Coeur d'Alene River	sediment
Leiberg Creek	17010301 3489	Headwaters to Little North Fork Coeur d'Alene River	sediment
Laverne Creek	17010301 3488	Headwaters to Little North Fork Coeur d'Alene River	sediment
Bumblebee Creek	17010301 3486	Headwaters to Little North Fork Coeur d'Alene River	sediment

1. Hydrologic Unit Code

All North Fork Coeur d'Alene River watershed water quality limited segments that were listed in 1996 have been assessed using standard BURP methods (DEQ, 1996). The assessment data is based on physical, habitat, and biotic measurements. The results of this assessment are reflected in the 1998 303(d) list and Tables 2 and 3above.

Unlisted segments that contribute to listed segments, have watersheds greater than three square miles, and have significant road densities are probably contributing to the water quality limitations of the listed segments. Remedial actions will be necessary in the watersheds of these unlisted tributaries in order to address the water quality limitations of the 303(d) listed segments.

2.2.2. Beneficial Uses

The North Fork Coeur d'Alene River (Unit P-1, Yellowdog Creek to mouth; Unit P-13, Jordan Creek to Yellowdog Creek; Unit P-14, source to Jordan Creek) has legislatively designated beneficial uses of domestic water supply, salmonid spawning, cold water biota, primary contact recreation, and special resource water (IDAPA 58.01.02.08.). Beneficial uses have not been legislatively designated for most tributaries to the North Fork Coeur d'Alene River including most of the 303(d) listed segments. Prichard Creek and the Little North Fork Coeur d'Alene River are exceptions to this and do have designated beneficial uses. Prichard Creek (Unit P-4) is designated for domestic water supply, salmonid spawning, cold water biota, and primary contact recreation (IDAPA 58.01.02.08.). The Little North Fork Coeur d'Alene River (Unit P-30) is designated for domestic water supply, salmonid spawning, cold water biota, primary contact recreation, and special resource water (IDAPA 58.01.02.08.). All undesignated streams of the watershed are by default designated for cold water biota, and primary and/or secondary contact recreation (IDAPA 58.01.02.101.01.a.). Wildlife habitat (IDAPA 58.01.02.100.04.) and aesthetics (IDAPA 58.01.02.100.05.) are designated as beneficial uses of all the waters of the state (DEQ, 2000a).

2.2.3. Water Quality Criteria:

Water quality criteria supportive of the beneficial uses are stated in the *Idaho Water Quality Standards and Wastewater Treatment Requirements* (DEQ, 2000a). The criteria supporting the beneficial uses are outlined in Table 4. In addition to these criteria, cold water biota and salmonid spawning are supported by two narrative standards, addressing sediment and nutrients. The narrative sediment standard states:

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

The excess nutrients standard states:

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

Table 4: Water Quality Criteria Supportive of Beneficial Uses (IDAPA 58.01.02.250)

Designated Use	Primary Contact Recreation Standards	Secondary Contact Recreation Standards	Cold Water Biota Standards	Salmonid Spawning Standards
Escherichia coli and pH	406 EC[1]/100mL[2]	576 EC/100mL	pH between 6.5 and 9.5	pH between 6.5 and 9.5
Escherichia coli and dissolved gas	126 EC/100mL geometric mean over 30days	126 EC/100mL geometric mean over 30 days	dissolved gas not exceeding 110%	dissolved gas not exceeding 110%
chlorine	No applicable standard	No applicable standard	total chlorine residual less than 19 ug/L[3]/hr[4] or an average 11 ug/L/4 day period	total chlorine residual less than 19 ug/L/hr or an average 11 ug/L/4 day period
toxics substances	No applicable standard	No applicable standard	less than toxic substances set forth in 40 CFR[5] 131.36(b)(1) Columns B1, B2, D2	less than toxic substances set forth in 40 CFR 131.36(b)(1) Columns B1, B2, D2
dissolved oxygen	No applicable standard	No applicable standard	exceeding 6 mg/L D.O.[6]	exceeding 5 mg/L intergraval DO; exceeding 6 mg/L surface
temperature	No applicable standard	No applicable standard	less than 22°C[7] (72°F[8]) instantaneous; 19°C (66°F) daily average	less than 13°C (55°F) instantaneous; 9°C (48°F) daily average
ammonia	No applicable standard	No applicable standard	low ammonia (formula/tables for exact concentration)	low ammonia (formula/tables for exact concentration)
turbidity	No applicable standard	No applicable standard	less than 50 NTU[9] instantaneous; 25 NTU over 10 days greater than background[10]	No applicable standard

1. *Escherichia coli*
2. milliliters
3. micrograms
4. hours
5. code of federal regulations
6. dissolved oxygen
7. centigrade
8. Fahrenheit
9. Neplometric turbidity units
10. The turbidity standard is a standard applied to the mixing zones of point discharges in the standards (IDAPA 58.01.02.250.01.d.) However, the standard is technically based on the ability of salmonids to sight feed. This it is applicable through the narrative sediment standard (IDAPA.0.02.200.08) to impacts on salmonids (cold water biota) wherever these may occur.

2.3. Water Quality Concerns and Status

2.3.1. Pollutants Sources

The water bodies listed in the Subbasin have reported pollutant exceedances for one or more of the following pollutants: bacteria, dissolved oxygen, flow alteration, habitat alteration, metals, nutrients, oil and grease, pH, and sediment.

With the exception of sediment, flow alteration, and habitat alteration, the pollutants are listed for Prichard Creek (bacteria, dissolved oxygen, nutrients, and oil and grease) and its tributary, the East Fork of Eagle Creek (pH and metals). Bacterial and nutrient contamination come predominantly from human sources in the Prichard Creek watershed. Livestock grazing is minimal in the watershed. Dissolved oxygen standard exceedances are not expected given the gradient of the stream and its mountain valley setting. The oil and grease concern is related to the Yellowstone gasoline pipeline that passes over Thompson Pass and down the Prichard Creek watershed. The pipeline traverses the North Fork valley from the Prichard Creek confluence to its confluence with the South Fork. Although the pipeline poses a potential threat to the water quality of Prichard Creek and the North Fork, the last gasoline release was in 1973. Current Region 10 U.S. Environmental Protection Agency (EPA) policy is that "threatened" water bodies are those where a downward water quality trend is expected to result in water quality exceedances in the next listing period, which is two years (EPA,1995). The presence of the pipeline does not cause the water bodies to meet this guideline. The metals listing for Prichard Creek is related to the numerous mines and mills in its watershed. The pH and metals listing of East Fork Eagle Creek are related to metals discharge from the Jack Waite mining complex in its headwaters (Tributary Creek). Metals exceedances are possible from these sources. Exceedances of the pH criterion are not typically observed in the Coeur d'Alene Basin in-stream. (DEQ, 1997)

Flow alteration is listed for several of the larger streams of the Subbasin. This alteration is believed by some to be a change in the magnitude of flood flows as a result of vegetation manipulation in the watershed. Habitat alteration can occur from several actions, including road construction, removal of riparian vegetation, channelization, or excess sedimentation. Sediment is a water constituent naturally yielded by watersheds to water bodies. Excess sedimentation in a forested watershed like the North Fork most often has its origin in roads developed for logging or access to a watershed or improper forest harvest practices. Roads may yield sediment directly from their surfaces or beds through mass wasting, or the location of the road may cause the adjacent stream to begin bank cutting. Improper harvest practices include skidding logs on steep slopes or in stream corridors. The Beaver and Prichard sub-watersheds have added sedimentation that is the result of dredge, hydraulic, and underground mining with its associated development.

2.3.2. Available Water Quality Data

2.3.2.1 Stream Discharge Data

The USGS has continuously operated gauging stations near Enaville and Prichard, above the Shoshone Creek confluence, since October 1939 and December 1950, respectively. A discharge hydrograph based on the mean monthly discharge for the past five years is provided in Figure 2. The flood frequency of the Subbasin as a whole can also be developed from a more extensive review of the data from the Coeur d'Alene River gauging stations.

2.3.2.1.1. Flood Magnitude and Frequency

After the floods that occurred during February 1996 in northern Idaho, there has been much discussion centered on the magnitude and frequency of flood events in the Coeur d'Alene Basin. Heavy rainfall, combined with warm winds, contributed to rapid snowmelt of a significant snow pack leading to the February 1996 floods. These floods were the second worst on record at several gauging stations in the Coeur d'Alene River Basin and the third worst based on the Post Falls USGS gauge and historical data.

The USGS operates several stream discharge gauging stations on the North Fork at Enaville; the South Fork at Pinehurst; and the Coeur d'Alene River at Cataldo, Rose Lake, and Harrison. The period of record for these stations ranges from less than ten years at Rose Lake and Harrison to more than fifty years at the Enaville and Cataldo gauge sites. The following table (Table 5) reflects the flood frequency data, which was computed by fitting the log Pearson Type III frequency distribution to the data collected through 1996 (U.S. Interagency Advisory Committee on Water Data, 1982).

Table 5: Magnitude and Frequency of Historical Flood Peaks at Selected Gauging Stations of the Coeur d'Alene River, Idaho (Brackson et. al., 1996)

Gauging Station	February 1996 Flood Peak (ft^3/S^3)	100 Year Flood Peak (ft^3/S)	Years of Gauging Record	Date and Magnitude of Historical Flood Peak (ft^3/S)
North Fork Coeur d'Alene River, Enaville	56,600	58,400	57	January 16, 1974 61,000
South Fork Coeur d'Alene River, Pinehurst	11,700	_____[2]	9	Not operating during historic flood peak
Coeur d'Alene River, Cataldo	68,300	70,800	63	January 16, 1974 79,000
Coeur d'Alene River, Rose Lake	50,500[1]	_____[2]	7	Not operating during historic flood peak
Coeur d'Alene River, Harrison	47,700[1]	_____[2]	7	Not operating during historic flood peak

[1]. Mean daily flow for February 9, 1996, as computed using hydraulic model that simulates unsteady open channel flow in the low gradient reach of the Coeur d'Alene River which is influenced by the level of Coeur d'Alene Lake, where no relation exists between river stage and flow.
[2] Unable to calculate because of an insufficient record.
[3] Cubic feet per second

Table 5 indicates that the magnitude of the February 1996 flood event on the Coeur d'Alene River Basin was less than the 100-year peak and the historical flood peaks of January 1974. The 100-year flood has a one percent probability of occurring in any given year.

This information clearly indicates that the recurrence interval of large flood events on the Coeur d'Alene River Basin has not increased during the period of record. It helps to dispel the claims of large floods occurring on an annual basis. Both the large flood events of January 1974 and February 1996 were enhanced by above normal precipitation and saturated or frozen soil conditions.

No data is available for the high discharge event of 1933 for the Coeur d'Alene River. However, records for the Post Falls gauge that has operated since 1912 indicate that it reached its peak discharge of record on December 25, 1933, at 50,100 cfs. By comparison, the Post Falls gauge reached 38,600 cfs during the high discharge event of February 1996.

The flood frequency analysis and history indicate that high discharge events occur at 10 to 15-year intervals. This frequency has not accelerated in the mid-part of the twentieth century. The historical record indicates the 1933 high discharge event was the largest of record, while the 1974 and 1996 events were the second and third largest of record. Timber harvest by clear cut began in earnest in the 1940s, accelerated in the 1950s, 1960s, and 1970s, and decelerated in the 1980s after implementation of the National Forest Management Act curtailed the practice. If timber harvest by clear cut increased discharge on a large watershed basis, the 1974 or the 1996 events would be expected to be the largest of record, not the 1933 event. The flood frequency and history based on the USGS gauges and historical photos do not support the contention that timber harvest has increased discharge frequency or magnitude on a whole watershed basis.

It is possible that discharge has been increased by clear cut harvest in the first or even second order tributaries. These small watersheds would be most susceptible to discharge increases due to vegetation manipulation. Little gauging evidence has been collected to support this supposition. Some data was collected in the first and second order tributaries as part of the Coeur d'Alene River Basin Study (Soil Conservation Service, 1994). These data can be interpreted to indicate that the discharge hydrograph of upper Elk Creek (harvested) exhibited discharges with higher peaks for shorter duration than Halsey Creek (not harvested). The effect is soon lost in the de-synchronization caused by the many discharges from watersheds of different elevations and aspects that comprise a large watershed like the North Fork. Information exists that indicates that discharge modification in the first and second order tributaries might cause localized severe erosion. It is unlikely this is a widespread factor in stream sedimentation.

2.3.2.2. Water Column Chemistry Data

Some water column chemistry data was collected in water years 1993 and 1994. The data addresses trace (heavy) metals, temperature, and specific conductance (USGS, 1993; USGS, 1994). Water temperatures indicate a stream that would support cold water biota and salmonid spawning. Trace metals are at very low concentrations near the Shoshone Work Center on the North Fork and slightly higher, but generally low and below Idaho standards, at Enaville below the Prichard Creek and Beaver Creek confluences. The metals have an origin in the Prichard and Beaver Creek watersheds where several gold and lead-zinc mines and mills are located

(Appendix A). Suspended solids data indicate a stream that generally has low suspended solid loads except during high discharge periods. Specific conductance that can be most closely correlated with total suspended solids, indicate a stream that generally has low suspended solid loads except during high discharge periods.

Samples of *Escherichia coli* (E-coli) in the lower North Fork Coeur d'Alene River during summer 2000 did not show any exceedances of the state standard. Less than one to four colonies per 100 milliliters were detected (DEQ, 2000a, unpublished data; Appendix B).

Samples were collected during high and low discharge conditions to assess the presence of oil and grease, nutrients, and bacteria in Prichard Creek. Oil and grease were not detected in any of these samples (Appendix B). Total phosphorous concentrations of Prichard Creek averaged 84.5 micrograms per liter (ug/L). A total phosphorous concentration limit of 100 ug/L is normally applied for nuisance weed growth in streams (EPA,1972). The nitrite-nitrate concentration of Prichard Creek is 21 ug/L, which is well below the guideline for excess nitrate, which is 300 ug/L as nitrogen (Sawyer, 1947; Müller, 1953). Water samples assessed for E-coli were either at non-detection levels or one E. Coli per 100 ml. These levels are well below the standard cited in Table 4. Dissolved oxygen measured during summer low discharge at several locations averaged 11.7 mg/L. This level is consistent with a rapidly flowing mountain stream and is well above the standard of 6 mg/L. Based on these data, Prichard Creek is not limited by oil and grease, nutrients, dissolved oxygen, or bacteria. Prichard Creek should be delisted for these pollutants.

2.3.2.2.1. Metals Data

2.3.2.2.1.1. Metals Concentrations

The waters of the Beaver and Prichard Creek watersheds have been assessed for metals concentration by several agencies and their contractors (Appendix A). The data are represented in Figure 4 (S. Box, Personal Communication). Zinc concentrations are used to illustrate the stream reaches where the chronic zinc standard is exceeded based on a water hardness of 25 milligrams per liter (mg/L) calcium carbonate ($CaCO_3$). The standard is exceeded over the entire reach of the East Fork Eagle Creek below the Tributary Creek confluence. Prichard Creek exceeds the standard from the vicinity of the Sullivan town site to the confluence with Eagle Creek. Wesp and Bear Gulches, tributaries to the creek, exceed the standard. Beaver Creek exceeds the standards from the vicinity of the Carbon Center town site to its mouth. The exceedances are diluted in the down stream direction in all cases, indicating that relatively few sources on each stream cause the exceedances. Although metals reach the North Fork, metals exceedances are not observed. Metals standards for cadmium, copper, and lead are also exceeded in the water samples analyzed. Cadmium, copper, and lead reflect a similar pattern to zinc, but concentrations decline more rapidly. Copper is not present above the standard in Beaver Creek. There were no instances of arsenate exceedances found in any of the creeks. Two mercury exceedances were found. These could be localized mercury contamination from the use mercury as an amalgam of gold. The database (Appendix A) indicates several pH values lower than 6.5, but these are mine portal adit discharges. Data collected to date in East Fork Eagle and Beaver Creeks indicate a pH range between 6.8 and 7.8. These data indicate that the East Fork Eagle Creek is not limited by pH.

DEQ found exceedances of cadmium, lead, and zinc standards in East Fork Eagle Creek. The cadmium standard was not exceeded in seven of thirteen samplings. The lead standard was not exceeded in two cases of thirteen samplings, while zinc exceeded the standard in every case. Monitoring of Beaver Creek showed exceedances of the cadmium, lead, and zinc standards. The but these are mine portal adit discharges. Data collected to date in East Fork Eagle and Beaver standards in every case. The USGS monitored Prichard Creek at Prichard. Several zinc standard violations were found, while cadmium and lead violations were not recorded. The Prichard Station is downstream of the Eagle Creek confluence and poorly situated to resolve standards violations in Prichard Creek.

2.3.2.2.1.2 Stream Discharge Analysis of Beaver, East Fork Eagle, and Prichard Creeks

The seasonal stream discharges of the metals-impaired streams were developed based on the extensive period of record at the Silverton Gauge Station on the South Fork. The discharge at Silverton station has a strong correlation (r^2=0.797) with the Prichard Station at Prichard (Appendix A). Correlations of the Silverton discharge with measured discharges of the East Fork Eagle Creek at the Eagle Road Bridge (r^2= 0.909) and Beaver Creek at the Carbon Center Bridge (r^2= 0.834) are strong. Based on these relationships, a water yield per watershed acre above each stream gauging site was developed for 7Q10, 10th, 50th, and 90th percentile flows. These flows represent extremely low, moderately low, average and moderately high flows, respectively. The resultant estimated flows are provided in Table 6.

Table 6: Projected Discharges at the Points of Compliance from Beaver, East Fork Eagle, and Prichard Creeks

Stream and Point of Compliance	7Q10 Flow (cfs)[1]	10th Percentile Flow (cfs)	50th Percentile Flow (cfs)	90th Percentile Flow (cfs)
Beaver Creek at Carbon Center Bridge	2.3	3.5	8.0	47.5
East Fork Eagle Creek at Eagle Road Bridge	6.7	10.4	23.5	140.1
Prichard Creek at Murrey Bridge	12.6	19.5	44.2	263.2

1. cubic feet per second

2.3.2.2.1.3 Hardness Relation to Stream Discharge

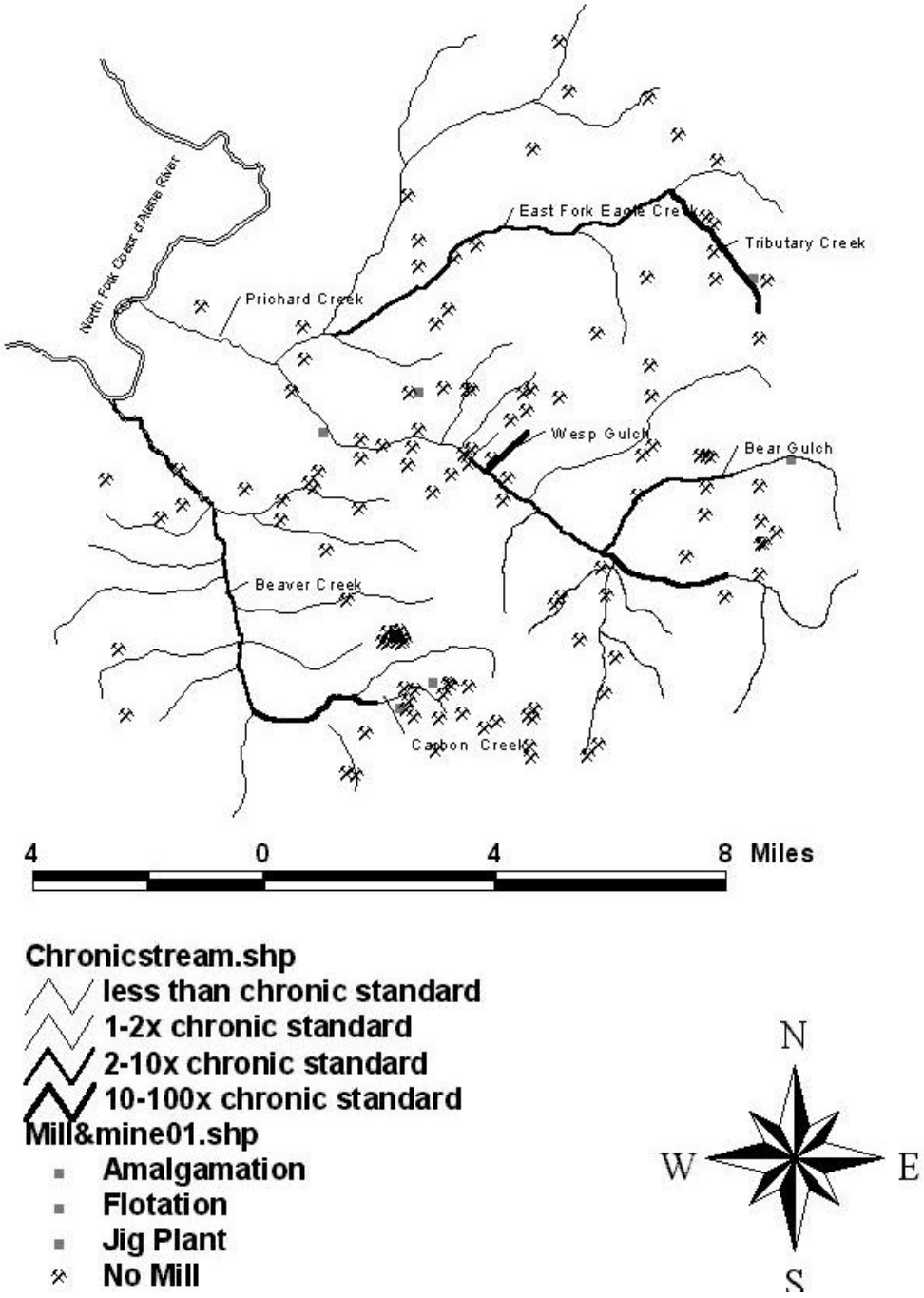
Relationships between stream hardness (milligrams $CaCO_3$ per liter) and stream discharge were developed for the Coeur d'Alene River system (EPA-DEQ, 2000). Similar relationships were developed for the metals-impaired streams of the North Fork (Appendix A). East Fork Eagle and Prichard Creeks did not have hardness values that exceeded 25 mg/L $CaCO_3$. These streams will have metals goals set at the lower threshold of hardness that is 25 mg/L $CaCO_3$. Beaver Creek has hardness values at low discharge that exceed 25 mg/L $CaCO_3$. The relationship has an r^2 value of 0.79. Based on this relationship, the hardness at the discharges defined in Table 7 was developed for Beaver Creek.

Table 7: Hardness (mg/L $CaCO_3$) of Beaver Creek at Discharge Levels

Stream and Point of Compliance	7Q10 Hardness	10th Percentile Hardness	50th Percentile Hardness	90th Percentile Hardness
Beaver Creek at Carbon Center Bridge	32.2	31.3	28.6	20

Note: EF Eagle and Prichard Creeks have not exhibited hardness values in excess of 25 mg/L $CaCO_3$.

Figure 4: Zinc Concentration in Water of Prichard and Beaver Creeks



2.3.2.2.1.4 Metals Loads

One water year's (2000) of metals concentrations and load data was collected for sites on Beaver Creek, East Fork Eagle Creek, and Prichard Creek The measured metals loads of cadmium, lead, and zinc at four flow tiers is provided in Table 8. Values for Prichard Creek will not be available until the end of water year 2001.

Table 8: Mean of Dissolved Cadmium (Cd), Lead (Pb), and Zinc (Zn) Loads of Beaver and East Fork Eagle, Creeks in Discharge Categories

Stream and Point of Compliance	**<7Q10 to 10th** Cd Pb Zn (pounds per day)	**10th to 50th** Cd Pb Zn (pounds per day)	**50th to 90th** Cd Pb Zn (pounds per day)	**90th plus** Cd Pb Zn (pounds per day)
Beaver Creek at Carbon Center Bridge	**0.02 0.02 3.1 n = 3**	**0.07 0.09 15.2 n = 3**	**0.24 0.19 50.9 n = 6**	**1.10 3.60 166.3 n = 1**
East Fork Eagle Creek at Eagle Road Bridge	**0.01 0.04 2.4 n =4**	**0.03 0.20 7.3 n = 3**	**0.31 1.08 27.3 n = 3**	**1.72 5.50 105.7 n = 2**

2.3.2.2.1.5 Metals Background

The issue of natural mineralization was addressed in the Coeur d'Alene Basin metals TMDL and in the Natural Resource Damage Assessment process. Technical analyses of 40 sites in the mineralized zone of the Silver Valley demonstrate that metals background in water is somewhat higher than non-mineralized zones, but well below the metals standards (EPA-DEQ, 2000). Similar levels of background metals are expected in the Prichard and Beaver Creek watersheds.

2.3.2.2.1.6 Discrete Discharges of Metals

The point discharge sources of the metals cadmium, lead, and zinc are listed in Table 7. In every case, the adit discharges exceed the cadmium, lead, and zinc standards. The daily load of each source was calculated based on estimates discharge weighted for seasonal flow (Appendix A). The discharge patterns of these adits are assumed to be similar to that of the Gem adit. In the case of the Jack Waite adit, additional discharge data was available (McCulley, Frick, and Gilman, 2001). The total load from point discharges is estimated as 0.008 pounds cadmium per day, 0.1 pounds lead per day, and 2.1 pounds zinc per day to the East Fork Eagle Creek under low discharge conditions (7Q10 –10th) and 0.09 pounds cadmium per day, 0.13 pounds lead per day, and 24.3 pounds zinc per day to the East Fork Eagle Creek under high discharge conditions (50th –90th). The total load from point discharges is estimated as 0.005 pounds cadmium per day, 0.009 pounds lead per day, and 0.82 pounds zinc per day to Prichard Creek, and 0.008 pounds cadmium per day, 0.001 pounds lead per day, and 1.95 pounds zinc per day to Beaver Creek. Based on Tables 8 and 9, the percentages of the loads accounted for by the discrete discharges can be calculated for Beaver and East Fork Eagle Creeks. Sufficient data is not currently available for Prichard Creek. The percent of metals load attributable to the discrete discharges at the four discharge tiers is provided in Table 10.

Table 9: Discrete Discharges of Dissolved Cadmium (Cd), Lead (Pb) and Zinc (Zn)

Adit Name	Weighted[1] Discharge (cfs)	Dis. Cd (ug/L[2])	Dis. Pb (ug/L)	Dis. Zn (ug/L)	Cd Load (lb/d[3])	Pb Load (lb/d)	Zn Load (lb/d)
Mother Lode	0.0016	4	6	470	0.000036	0.000053	0.004175
Black Horse	0.0091	7	89	570	0.000342	0.004348	0.027845
Monarch (lower workings)	0.0148	4	2	79	0.000320	0.000160	0.006315
Orofino	0.0132	14	4	2000	0.000995	0.000284	0.142111
Red Monarch	0.0371	10	2	2600	0.001998	0.000400	0.519593
Silver Strike	0.0091	4	41	470	0.000195	0.002003	0.022960
Terrible Edith	0.0231	11	16	780	0.001368	0.001990	0.096991
Carlisle	0.0552	26	2	6600	0.007736	0.000595	1.963795
Jack Waite 7Q10-10th	0.032^	8	17	2520	0.00138	0.003	0.435
Jack Waite 50th-90th	1.8[4]	9	10	2510	0.09	0.10	24.3

[1] Weighted discharge based on the discharge of the Gem Adit (Appendix A)
[2] micrograms per liter
[3] pounds per day
[4] based on (McCulley, Frick and Gilman, 2001)

Table 10: Contribution of Point Discharges to Metals Loads of Beaver and East Fork Eagle Creeks at Flow Intervals

a) Beaver Creek

Discharge	7Q10-10th	10th - 50th	50th - 90th	90th+
Cadmium	38.7%	11%	3.2%	0.7%
Lead	4.0%	0.7%	0.3%	0.02%
Zinc	63.3%	12.9%	3.9%	1.2%

b) East Fork Eagle Creek

Discharge	7Q10-10th	10th - 50th	50th - 90th	90th+
Cadmium	13.8%	4.6%	28.2%	5.1%
Lead	7.5%	1.5%	9.0%	1.8%
Zinc	18.1%	5.9%	89%	23%

2.3.2.2.1.7 Non-discrete Discharges of Metals

The non-discrete discharge sources to the East Fork Eagle Creek are the Jack Waite mine waste piles, contaminated material eroded into Tributary Creek and contaminated material deposited further downstream along the East Fork. It is estimated the Jack Waite-Tributary Creek complex contributes 80% of the non-discrete load while the East Fork deposits contribute 20%. The non-

discrete discharge sources to Beaver Creek are the Ray Jefferson Mill site waste piles, contaminated material deposited into the stream between the mill and the Carbon Center Bridge, and some tailings deposits identified upstream of Carbon Creek. The Ray Jefferson Mill site and waste piles are estimated to be 60% of the non-discrete load, while the stream deposits and upstream materials are 40%. The non-discrete sources to Prichard Creek above Murray are the Paragon and Monarch Mill sites and associated waste dumps, the Terrible Edith and Chester sites in Wesp Gulch, and fluvially deposited contaminated materials between the Paragon site and the Murray Bridge. The Paragon site is estimated to contribute 30% of the non-discrete load. The Monarch site is estimated to contribute and additional 30%. The Wesp Gulch sites are estimated to contribute 10%, while the stream deposits contribute the additional 30%.

2.3.2.3. Sedimentation Data

Inspections of the North Fork and the Coeur d'Alene River provide abundant evidence suggesting bed load sediment has increased in the North Fork. Numerous large alluvial bars are present in the North Fork. Newly deposited bars are present along the floodplain of the North Fork, as are new channels cut after floods to bypass sediment deposits in channels. The Little North Fork is intermittent at locations due to cobble deposits. The gravel and cobble in transport is deposited eventually at the grade break in the river system that is located in the Coeur d'Alene River between Kingston and Cataldo. In this reach of the Coeur d'Alene River, the channel is braided through the deposited alluvium. Historical descriptions of the Coeur d'Alene River and its North Fork do not include the current sediment bars and braided channels (Russell, 1985).

2.3.2.3.1 Riffle Armor Stability Indices

A more quantitative index of streambed instability is the riffle armor stability index (RASI) (Kappesser, 1993). The measurement consists of a 200-particle count and size measurement on a transect across a stream riffle using the methods of Wolman (1954). With this information, a particle size distribution curve is developed for the riffle. A RASI involves an additional measurement of the 30 largest particles found deposited on the point deposition bar located immediately downstream of the riffle. The RASI value is the percentage of particles in the distribution curve smaller than the mean size of the largest particles deposited on the point bar. Since the largest particles on the point bar represent the largest stream bed particles moved by the stream during the most recent channel altering event, the RASI provides an assessment of the percentage of the stream bed materials mobilized during the event. A RASI value provides an assessment of relative streambed stability. Values in the range of 28-60, with a mean of 44, have been calculated in non-managed streams of the upper St Joe River basin, which are believed to have high relative stability. These watersheds have very few or no roads and the last general disturbance of the area was the 1910 wildfire. Streams of managed watersheds with appreciable road infrastructures provide RASI values in the range of 66-99, with a mean of 82. These streams are believed to have streambed instability (Cross and Everest, 1995).

The RASI values for the stream segments listed as water quality limited, as well as an additional segments believed not to have impaired uses, are provided in Tables 11 and 12. With the exception of one stream (Tepee Creek), the RASI value range and means are indicative of streambed instability.

Table 11: Riffle Armor Stability Indices (RASI) for the Listed Water Quality Limited Segments of the North Fork Coeur d'Alene River

Stream	HUC[1] Number	RASI Range	RASI Mean
North Fork Coeur d'Alene River	17010301 3482	74-94	86
Tepee Creek	17010301 3508	53-61	56
Big Elk Creek	17010301 3511	86-89	87
Calamity Creek	17010301 5034	67-85	76
Yellowdog Creek	17010301 3506	68-72	72
Prichard Creek	17010301 3500	85-96	92
East Fork Eagle Creek	17010301 5617	80-85	85
North Fork Coeur d'Alene River	17010301 3481	90-94	93
Little North Fork Coeur d'Alene River	17010301 3485	92-96	94
Copper Creek	17010301 3487	93-97	95
Burnt Cabin Creek	17010301 5032	97-98	97

Note: RASI data developed by U.S. Forest Service (Lider, unpublished data).
[1] hydrologic unit code

Table 12:Riffle Armor Stability Indices (RASI) for Low Development Segments of the North Fork Coeur d'Alene River Subbasin

Stream	HUC[1] Number	RASI Range	RASI Mean
North Fork Coeur d'Alene River	17010301	85-94	89

Excessive streambed instability during the winter and spring months, when the eggs of fall spawning salmonids are incubating and the alevin life stage is using inter-gravel habitats, has been interpreted by Cross and Everest (1995) to seriously disrupt the reproduction of these species. Recent investigation indicates the scour depth of stream channels is a few inches deep (DeVries, 2000). Shallow scour depths spare redds placed deeper in the streambed, but would not protect alevins and young of the year that use the interstitial spaces of cobble near the bed surface. Instability also causes the filling of pools with cobble materials normally found on riffle gravel bars in a stream with a stable streambed. An additional and important result of bed instability is the loss of pool volume.

2.3.2.3.2 Residual Pool Volume

The amount of pool volume in streams can be estimated using residual pool volume measurements. Residual pool volume is the volume a stream pool would occupy if the stream reached a zero discharge condition. Under this condition, water would not flow over stream riffles, stream runs would hold little water, and the pools would make up the majority of the

wetted volume of the stream. Residual pool volume is calculated using a box model from measurements of average pool depth, average pool width, pool length, and pool tail out depth. Pool tail out depth is subtracted from average pool depth to develop the third side of the box model. Residual pool volume is normally developed for a reach length of stream determined by a multiple of 20 times the bank full width. The values are normalized on the basis of pool volume per mile of stream. Residual pool volume increases with stream width. For this reason, residual pool volume values must be stratified by stream width to assess the relative amount of pool volume.

Residual pool volume data for the water quality limited segments have been stratified by bank full stream width (Table 13). Pool volume data of reference streams, which have low road densities, are provided for each stratification class allowing the interpretation of the values of the water quality limited segments. The North Fork segment between Yellowdog Creek and the South Fork confluence has diminished pool volume when compared to the upstream segment of the North Fork, which has few impacts, and the segment Tepee and Yellowdog Creeks, which have less width. Steamboat Creek has significant reduction in mean residual pool volume. All the other tributary segments listed as water quality limited have diminished residual pool volumes with the possible exception of the Little North Fork Coeur d'Alene River and Big Elk Creek. Some tributaries (Prichard, Shoshone, East Fork Eagle, and Yellowdog Creeks) have values indicative of the loss of most of the pool volume. The values shown in Table 13 indicate filling of pool volume is one result of stream channel instability.

2.3.2.4. Fish Population Data

Interference with natural recruitment and filling of pools caused by streambed instability should be reflected in the trout populations of the North Fork and its tributaries. Fall spawning fish that could have recruitment directly affected by streambed instability are no longer common in the North Fork or its tributaries. Mountain whitefish and bull trout are the native fall spawning fish. Whitefish populations are low, and bull trout are rare in the North Fork system (Idaho Department of Fish and Game [IDFG], 2001). The fall spawning Chinook salmon does spawn successfully in the lower reaches of the North Fork. Hunt and Bjornn (1993) assessed fish population density in the North Fork and its larger tributaries. More recently, Dunnigan and Bennett (1996) and DEQ BURP teams have estimated populations in some of the smaller tributaries.

Cutthroat trout and whitefish are salmonids found almost exclusively in the North Fork and its tributaries above the Yellowdog Creek confluence. Cutthroat trout spawning occurs almost exclusively in the tributaries to the North Fork Coeur d'Alene River (IDFG, 2001). Cutthroat trout and whitefish predominate in the river system below this point, but brook and rainbow trout were occasionally found in some tributaries.

Salmonid (trout) population densities (salmonid/square meter [m^2]/hour effort) of the listed and reference streams of similar size, but with little or no development (bold type), are summarized in Table 14. Reference streams (highlighted) are located in the Upper North Fork sub-watershed that has very little development. Reference streams range from 01 - 0.3 salmonid/m^2/hour effort with the exception of Independence Creek. The Independence Creek value developed from DEQ

data may be low because it was collected in a reach of the stream quite near a popular camping area. The value developed from Hunt and Bjornn's data (1996) was developed in this lower reach of the stream as well. Where data are available, trout density values in most water quality limited segments are one or two orders of magnitude lower than the reference streams.

Table 13: Mean Residual Pool Volume and Stream Width for the Water Quality Limited Segments of the North Fork Coeur d'Alene River Subbasin (Streams are stratified by bank full width; reference streams (bold type and asterisk) with little development are listed to indicate expected mean residual pool volume)

Stream	HUC Number	Bank Full Width (ft^2)	Residual Pool Volume (ft^3/mi^3)
North Fork Coeur d'Alene River*	17010301 2700	23.9	41,099
North Fork Coeur d'Alene River	17010301 3481	77.6	118,907
North Fork Coeur d'Alene River	17010301 3482	48.2	314,757
Steamboat Creek	17010301 3495	25.8	14,916
Independence Creek*	17010301 3200	20.4	79,701
Prichard Creek	17010301 3500	20.5	2,304
Burnt Cabin Creek	17010301 5032	18.0	28,228
Shoshone Creek	17010301 3504	17.3	9,128
East Fork Eagle Creek	17010301 5617	17.2	9,235
Lost Creek	17010301 5643	16.3	20,047
Falls Creek	17010301 7504	15.6	32,727
Little North Fork Coeur d'Alene River	17010301 3485	15.4	119,540
Beaver Creek	17010301 3499	14.8	15,528
Buckskin Creek*	17010301 0000	12.6	24,345[2]
Copper Creek	17010301 3487	13.1	12,253
Yellowdog Creek	17010301 3506	10.5	3,597
Big Elk Creek	17010301 3511	9.4	43,962
Spruce Creek *	17010301 0000	8.0	19,091[6]
Tepee Creek	17010301 3508	8.0	6,534[6]
Calamity Creek	17010301 5034	8.0[5]	1,314[6]
Cub Creek	17010301 5054	4.9	9,622

Note: Data developed from DEQ (Hartz, 1993b) and U.S. Forest Service (Lider, unpublished data).

1. hydrologic unit code
2. feet
3. cubic feet per mile
4. reference stream
5. estimated from wetted widths
6. value high possibly because of small data

Table 14: Fish Population per Unit Stream Length of the Water Quality Limited Segments of the North Fork Coeur d'Alene River Subbasin

Stream	HUC[4] Number	Salmonid Density (fish/m^2/hr[5] effort)	Presence of Three Salmonid Age Classes	Sculpin Density (fish/m^2/hr effort)	Presence of Sculpin and Tailed Frogs
North Fork Coeur d'Alene River*	17010301 2700	0.3314[1]	N.D.	0.4285	Yes
North Fork Coeur d'Alene River	17010301 3481	0.0034[3]	N.D.	N.D.	N.D.
North Fork Coeur d'Alene River	17010301 3482	0.0015[2]	No	0.0028	No
Steamboat Creek	17010301 3495	0.0630[1,2]	Yes	0.1654	Yes
Independence Creek*	17010301 3200	0.0021[2] 0.0048[3]	Yes	0.1083[2]	Yes
Prichard Creek	17010301 3500	0.0363[2]	Yes	0.1039	No
Burnt Cabin Creek	17010301 5032	0.0079[1,2]	No	0.3664	Yes
Shoshone Creek	17010301 3504	0.0241[2]	Yes	0.3364	No
EF Eagle Creek	17010301 5617	0.0830[2]	Yes	0.0000	No
Falls Creek	17010301 7504	0.0344[1,2]	Yes	0.2421	Yes
Little North Fork Coeur d'Alene River	17010301 3485	0.0528[1,2]	Yes	0.1178	Yes
Beaver Creek	17010301 3499	0.2847[2]	Yes	0.3041	No
Buckskin Creek*	17010301 0000	0.1476[1,2]	Yes	0.3576	Yes
Copper Creek	17010301 3487	0.0513[1,2]	Yes	0.1289	Yes
Yellowdog Creek	17010301 3506	0.0309[1,2]	No	0.1248	Yes
Spruce Creek	17010301 0000	0.2598[1,2]	Yes	0.8295	Yes
Tepee Creek	17010301 3508	0.2360[2]	Yes	0.4844	Yes
Calamity Creek	17010301 5034	0.0860[2]	No	0.4997	Yes

Note: Bold streams are reference streams; Sculpin and tailed frogs are the other major cold water vertebrate species found by biological surveys on the North Fork. 1 - data from U.S. Forest Service; 2 - data from DEQ Beneficial Use Reconnaissance Program; 3- data from Hunt and Bjornn, 1993; 4- hydrologic unit code; 5- fish per square meter per hour effort electrofishing.

Two streams differ from typical trout density values where water quality limited segments are one or two orders of magnitude lower than reference streams. Beaver and upper Tepee Creeks have values in the range of the reference streams. At least three age classes of salmonids were found in most streams where age class data was available. Fewer age classes were the North Fork between Tepee and Yellowdog Creeks, Burnt Cabin, Yellowdog, and Calamity Creeks. Sculpin population densities were typically found in a range of 0.1 - 0.5 fish/m^2/hour effort. Only two streams where data was available were below this level: the North Fork between Tepee and Yellowdog Creeks and East Fork Eagle Creek. The absence of sculpin in the East Fork of Eagle Creek is likely the result of the presence of heavy metals. A similar absence of sculpin has been noted by DEQ, USGS, and others in metals impaired streams of the Silver Valley (Maret, 2001). Spruce Creek was above the normal range at 0.89 fish/m^2/hour effort. One explanation for

the observed general reduction of trout density, while sculpin density is high, is that trout are harvested by anglers, while sculpin are not. Another explanation is the reduction of pool volume, on which trout are dependent, in the watershed. Tailed frogs were found in many cases where data on other species was available. Tailed frogs were not detected on five stream segments.

Trout densities can be affected by increased pressure by anglers, since cutthroat trout are easily over-harvested. Studies in the 1970s indicated that trout populations in the North Fork and St Joe Rivers were declining. As a result, IDFG instituted stringent harvest regulations designed to recover trout populations. St. Joe River trout populations have increased in response to these regulations, while the North Fork populations have not. However, a recent assessment indicated that compliance with the harvest regulations is superior on the North Fork when compared to the St. Joe River (Chip Corsi, Personal Communication). Fish populations in the St. Joe River Subbasin have been assessed and found to generally be much higher than those of the North Fork Coeur d'Alene River Subbasin (DEQ, 2000b). The evidence indicates that streambed instability may have lead to interference with trout recruitment and the loss of pools, a critical habitat to trout. As a result, trout densities in the North Fork are low. Fishing regulations were made more restrictive in the North Fork in 2000. The six fish limit in the North Fork below Yellowdog Creek and in the Little North Fork below Laverne Creek was reduced to two fish with no fish between 8 and 16 inches.

2.3.2.5. Sediment Loading Data

Sediment monitoring in-stream is a very time consuming and costly undertaking. Sediment monitoring should be conducted for seven years at a site to develop a database that accounts for the variance of discharge affects on sediment yield and transport from year to year. The investment required to conduct sediment monitoring is high; therefore, the time and costs involved do not make sediment monitoring a viable approach to determining if sediment is a pollutant of concern. A sediment modeling approach uses coefficients developed over long periods in paired watersheds. This approach is the most time and cost efficient approach to estimating sediment for the purposes of total maximum daily loads (TMDLs).

2.3.2.5.1. Land Use Data

Sediment loading occurs from the entire watershed. It is not necessarily restricted to the water quality limited segments of the North Fork Coeur d'Alene River Subbasin. In the following table set (Tables 15a-15g), sediment load is analyzed based on major contributing watersheds to the seven sub-watersheds (Upper North Fork, Tepee Creek, Middle North Fork, Shoshone-Lost Creeks, Prichard-Beaver Creeks, Lower North Fork, and Little North Fork) of the larger Subbasin. Sediment yield is estimated from land use data developed from USFS and Idaho Department of Lands (IDL) geographical information systems (GIS) timber stand coverage and delineation of pasture lands along the river bottom. Fire and road GIS coverages developed by the USFS and BLM were used to develop data on areas that received two wildfires and the forest road mileage and densities. A USFS GIS coverage of unstable land types was used to develop the road mileage on unstable land types. Highway land use acreage was estimated based on the road length (GIS road coverage) and the known right of way width. These values are reported in Tables 15 a-15g.

Table 15: Land Use of Major Watersheds Draining to North Fork Coeur d'Alene River

a) Upper North Fork Coeur d'Alene River

Watershed	Upper NF Cd'A River	Mosquito Creek	Buckskin Creek	Spruce Creek	Devil Creek	Mid-Upper North Fork	Deer Creek	Alden Creek	Jordan Creek	Independence Creek	Lower Upper North Fork
Conifer forest (acres)	8,984	3,509	4,361	6,628	3,242	5,947	6,107	4,745	9,756	36,760	7,966
Non-stocked forest (acres)	127	0	315	163	25	386	307	323	1,547	1,320	1,350
Double wildfire burn (acres)	0	1	538	7	1,494	?	1,074	4,858	2,844	14,467	10,956
Highway (acres)	0	0	0	0	0	0	0	0	0	0	5.7
Forest road (miles)	41.2	18.3	23.3	32.1	10.5	13.1	4.9	6.0	29.8	110.9	21.2
Average road density (miles/mile^2)	2.9	3.3	3.2	3.0	2.1	1.3	0.5	0.8	1.7	1.9	1.4
Road crossing number	5	5	8	7	1	4	0	1	11	25	4
Road crossing frequency	0.3	0.6	0.8	0.6	0.2	0.4	-	0.1	0.5	0.3	0.2
Unstable roads (miles)	27.4	11.4	13.7	21.2	8.5	7.4	0	4.7	22.8	72.5	10.5
Encroaching road (miles)	1.5	1.0	1.4	2.4	0.1	1.5	0	0.4	1.9	3.9	1.8
Projected CWE[1] Score	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5

Data taken from CDASTDS, IDPNFIRE and CDAROADS databases cut for specific sub-watersheds. 1. Cumulative effects watershed score calculated from average of known watershed.

b) Tepee Creek above Independence Creek

Watershed	Big Elk Creek	Upper Tepee Creek	Trail Creek	Lower Tepee Creek
Conifer forest (acres)	7,468	14,863	15,801	13,209
Non-stocked forest (aresc)	35	516	347	1,013
Double wildfire burn (acres)	0	250	1,791	4,942
Forest road (miles)	93.1	90.7	158.8	16.7
Average road density (miles/mile^2)	7.9	3.8	6.3	0.8
Road crossing number	22	13	38	16
Road crossing frequency	1.3	0.4	1.1	0.4
Unstable roads (miles)	75.1	49.3	126.1	16.1
Encroaching road (miles)	4.8	3.8	11.2	3.0
Calculated CWE[1] Score	16.5	16.5	16.5	16.5

Data taken from CDASTDS, IDPNFIRE and CDAROADS databases cut for specific sub-watersheds.
1. Cumulative effects watershed score calculated from average of known watersheds.

c) Middle North Fork Coeur d'Alene River

Watershed	Cinnamon Creek	Brett Creek	Miners Creek	Flat Creek	Big Hank Creek and East Side Streams	Yellowdog Creek
Conifer forest (acres)	3,552	4,945	3,967	11,238	9,325	5,090
Non-stocked forest (acres)	842	568	24	13	1,018	5
Double wildfire burn (acres)	1,007	3,570	0	0	990	0
Highway (acres)	3.1	15.4	10.6	19.4	9.9	0
Forest road (miles)	13.7	25.6	50.4	161.8	77.0	74.5
Average road density (miles/mile^2)	2.0	3.0	8.1	9.2	4.8	9.4
Road crossing number	3	17	8	34	29	19
Road crossing frequency	0.3	1.2	1.2	1.6	1.1	1.6
Unstable roads (miles)	1.5	23.7	31.6	103.6	37.0	38.9
Encroaching road (miles)	0.3	3.8	1.6	8.5	5.3	4.6
Calculated CWE[1] Score	16.5	16.5	16.5	16.5	16.5	16.5

Data taken from CDASTDS, IDPNFIRE and CDAROADS databases cut for specific sub-watersheds.
1 Cumulative effects watershed score calculated from average of known watersheds.

d) Shoshone and Lost Creeks

Watershed	Upper Shoshone Creek	Falls Creek	Lower Shoshone Creek	Lost Creek
Conifer forest (acres)	25,288	8,607	9,967	13,093
Non-stocked forest (acres)	637	70	152	1,384
Double wildfire burn (acres)	66	0	0	0
Forest road (miles)	232.6	149.7	131.3	65.6
Average road density (miles/mile^2)	5.7	5.1	4.5	2.9
Road crossing number	54	21	18	21
Road crossing frequency	1.0	2.6	1.2	1.0
Unstable roads (miles)	128.8	78.7	52.9	39.3
Encroaching road (miles)	13.3	2.9	4.9	3.4
Calculated CWE[1] Score	16.5	16.5	16.5	16.5

Data taken from CDASTDS, IDPNFIRE and CDAROADS databases cut for specific sub-watersheds.
1 Cumulative effects watershed score calculated from average of known watersheds.

e) Prichard and Beaver Creeks

Watershed	WF Eagle Creek	EF Eagle Creek	Eagle Creek	Upper Prichard Creek [2]	Lower Prichard Creek [2]	Upper Beaver Creek [2]	Lower Beaver Creek
Conifer forest (acres)	12,258	14,187	1,340	20,858	9,637	12,792	13,673
Non-stocked forest (acres)	233	600	13	3,759	19	869	491
Double wildfire burn (acres)	0	0	0	862	0	0	0
Highway (acres)	0	0	4.8	40.5	34.7	21.8	22.9
Forest road (miles)	87.5	123.8	17.5	81.5	111.7	118.1	103.5
Average road density (miles/mile^2)	4.5	5.4	8.3	2.1	7.4	5.5	4.7
Road crossing number	25	35	1	45	25	63	36
Road crossing frequency	1.7	2.2	1.0	1.4	1.6	2.7	1.4
Unstable roads (miles)	55.2	82.6	7.1	47.1	52.2	79.5	66.6
Encroaching road (miles)	6.2	10.3	0.2	12.0	3.7	13.3	6.3
Calculated CWE[1] Score	16.5	16.5	16.5	16.5	16.5	16.5	16.5

Data taken from CDASTDS, IDPNFIRE and CDAROADS databases cut for specific sub-watersheds.
1. Cumulative effects watershed score calculated from average of known watersheds.
2. BLM land assumed to have the same non-stocked rate as USFS lands (UP - 13.6% of 3,069 acres = 417 acres; LP - 0.13% of 4,415 acres = 6 acres; UB - 5.4% of 2,863 acres = 154 acres)

f) Lower North Fork Coeur d'Alene River

Watershed	Downey Creek	Uranus and Creaky Creek Group	Grizzly Creek	Browns Gulch	Steamboat Creek	Graham Creek	Cougar Gulch	Lower NF Cd'A River
Pasture (acres)	-	1,096	-	1.023	-	-	-	1,472
Conifer forest (acres)	5,960	16,998	10,120	11,405	25,922	5,779	12,222	19,206
Non-stocked forest (acres)	75	276	306	304	582	184	99	237
Double wildfire burn (acres)	0	6	87	111	0	0	0	0
Highway (acres)	0.2	61.0	13.2	19.9	0	0.9	0	50.0
Forest road (miles)	79.6	186.7	68.2	125.5	423.0	0.2	170.1	219.5
Average road density (miles/mile^2)	8.4	6.5	4.2	6.3	10.2	0.0	8.8	3.0
Road crossing number	47	43	21	38	111	1	33	86
Road crossing frequency	3.8	1.4	0.8	1.4	2.1	0.1	1.3	1.5
Unstable roads (miles)	52.8	118.6	50.1	67.5	213.6	0.0	88.1	100.2
Encroaching road (miles)	6.4	9.0	5.8	7.1	25.3	0.0	6.0	17.7
Calculated CWE[1] Score	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5

Data taken from CDASTDS, IDPNFIRE and CDAROADS databases cut for specific sub-watersheds.
1. Cumulative effects watershed score calculated from average of known watersheds.

g) Little North Fork Coeur d'Alene River

Watershed	Upper Little NF Cd'A River	Hudlow Creek	Iron Creek	Barney Creek	Burnt Cabin Creek & adj.	Deception Creek	Skookum Creek	Lieberg Creek	Laverne Creek	Copper Creek	Bumblebee Creek	Lower Little NF Cd'A River
Pasture (acres)	-	-	-	-	-	-	-	-	-	-	-	344.2
Conifer forest (acres)	10,680	6,636	6,055	2,652	18,404	3,505	4,371	15,501	11,314	12,152	15,448	-
Non-stocked forest (acres)	21	112	14	33	37	0	156	172	59	26	490	-
Double wildfire burn (acres)	0	0	0	0	0	0	0	0	0	0	0	-
Forest road (miles)	142.4	77.0	116.0	30.6	308.8	68.4	61.0	210.1	127.6	145.0	170.4	-
Average road density (miles/mile^2)	8.5	7.3	12.2	7.3	10.7	12.5	8.6	8.6	7.2	7.6	6.8	-
Road crossing number	38	26	28	4	69	39	9	31	19	31	42	
Road crossing frequency	1.6	1.9	2.1	0.6	2.0	4.6	1.1	1.2	0.8	1.2	1.3	-
Unstable roads (miles)	79.8	51.3	89.2	15.2	119.7	45.7	24.1	155.9	47.1	72.4	126.4	
Encroaching road (miles)	7.9	6.4	7.0	0.9	17.1	7.4	1.9	8.7	4.4	6.2	9.9	
Calculated CWE[1] Score	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	

Data taken from CDASTDS, IDPNFIRE and CDAROADS databases cut for specific sub-watersheds. 1. Cumulative effects watershed score calculated from average of known watershed

2.3.2.5.1. Sediment Yield and Export.

Sediment yields were developed separately for agricultural lands (pasture), forestlands, forest roads, and stream banks. Sediment export from eroding land to the stream system was assumed to be 100%. Additional assumptions and documentation of the sediment model are provided in Appendix C.

2.3.2.5.1.1. Land Use

2.3.2.5.1.1.1. Agricultural Land Sediment Yield

Sediment yield was estimated from agricultural lands (pasture) using the Revised Universal Soil Loss Equation (RUSLE) (equation 1) (Hogan, 1999).

Equation 1: A = (R)(K)(LS)(C)(D) tons per acre per year where:

- A is the average annual soil loss from sheet and rill erosion
- R is climate erosivity
- K is the soil erodibility
- LS is the slope length and steepness
- C is the cover management
- D is the support practices

RUSLE does not take into account bank erosion, gully erosion, or scour. RUSLE applies to cropland, pasture, hay land, or other land that has some vegetation improvement by tilling or seeding. Based on the soils characteristics and the slope, sediment yield was developed for the agricultural lands of each watershed. Sediment yield from agricultural (grazing) lands was estimated by applying the RUSLE developed sediment yield coefficients of 0.03 and 0.06 tons/acre/year to the land area in agricultural use (see Tables 15a-15g). Although the agricultural land in the North Fork is in the floodplain and relatively flat, drainage ways to the river exist. The RUSLE model assumes sediment delivery is to adjacent water bodies.

2.3.2.5.1.1.2. Forestland Sediment Yield

Forestland sediment yield was based on sediment production coefficients. These are the mean coefficients developed from in-stream sediment measurements on Belt geologies of northern and north central Idaho (Patten, Personal Communication.). The sediment yield is 15 tons per square mile per year with a range from 12-17 for the Belt Super group geology. The mean values were used for conifer and sparse conifer forests, including clear-cut areas that are fully stocked under state forest practices rules. Model runs were completed that provided the clear-cut areas (seedling-sapling) with the highest sediment yield coefficient. These model runs did not yield significantly higher sediment yields. The professional judgement of the sediment advisory group was to differentiate the higher sediment yield for non-stocked land. The highest values in the range were used for lands that were not fully stocked with trees. Areas twice burned by wildfires were provided a small sediment yield value increase to adjust the sediment yield from these areas to the level of non-stocked lands. These values were divided by 640 acres per square mile (Table

16). Sediment yields from forestlands were estimated by applying the sediment yield coefficients to the land area in forest use (See Tables 15a-15g).

Table 16: Estimated Sediment Yield Coefficients for Forestland Uses Based on the Geologies of the Watersheds

Land use type sediment export coefficient	Belt Super group Precambrian meta sediments
Conifer forest (ton/acre/year)	0.023
Non-stocked Forest (tons/acre/year)	0.027
Double Wildfire Burn (ton/acre/year)	0.004
Highway (tons/acre/year)	0.019

2.3.2.5.1.1.3. Highway Sediment Yield

Land in developed highway (paved road) right of ways was assigned a sediment yield coefficient on the low end of the range expected from a Belt geologic type. Much of the prism of a paved road is covered by a non-erosive surface. Thus the yield from these areas is curtailed.

2.3.2.5.1.2. Forest Roads

2.3.2.5.1.2.1. Road Surface Sediment

Forest road fine sediment yield was estimated using a relationship between the cumulative watershed effects (CWE) score and the sediment yield per mile of road (Figure 5)(IDL, 2000). The relationship was developed for roads on a Kaniksu granitic geology in the LaClerc Creek watershed (McGreer,1998). Its application to roads on Belt geologies conservatively overestimates sediment yields from these systems. Since CWE scores are not available for forest roads of the North Fork Subbasin, a score of 16.5 was assigned. This value is based on the average CWE score of six reference watersheds in neighboring Subbasin 17010303 (Wolf Lodge, Cedar, Fourth of July, Thompson, Latour, and Baldy), where CWE scores were developed. These reference watersheds are located on Belt Super group geologic type. The watershed CWE score was used to develop a sediment yield in tons per mile, which was multiplied by the estimated road mileage within 200 feet of the road crossing (See Tables 15a-15g). In the case of roads, it was assumed that all sediment was delivered to the stream system. These are conservative over-estimates of actual delivery.

2.3.2.5.1.2.2. Road Failure Sediment

Forest roads can fail into streams. The delivery from road failures is typically estimated directly in the CWE assessments. Since CWE assessments have not been completed in the North Fork Subbasin, the road failure sediment delivery rate was estimated from existing data. The miles of road on unstable land types were estimated for the North Fork sub-watersheds and for five reference watersheds (Wolf Lodge, Cedar, Fourth of July, Willow, and Thompson) where CWE

assessment was completed. The reference watersheds are on the same geologic type as the North Fork watersheds. The failure and delivery rates are known for the reference watersheds and were calculated by ratio of the roads on unstable land types for the North Fork watersheds. Road failure sediment yield was annualized based on high discharge events with an estimated ten year return time.

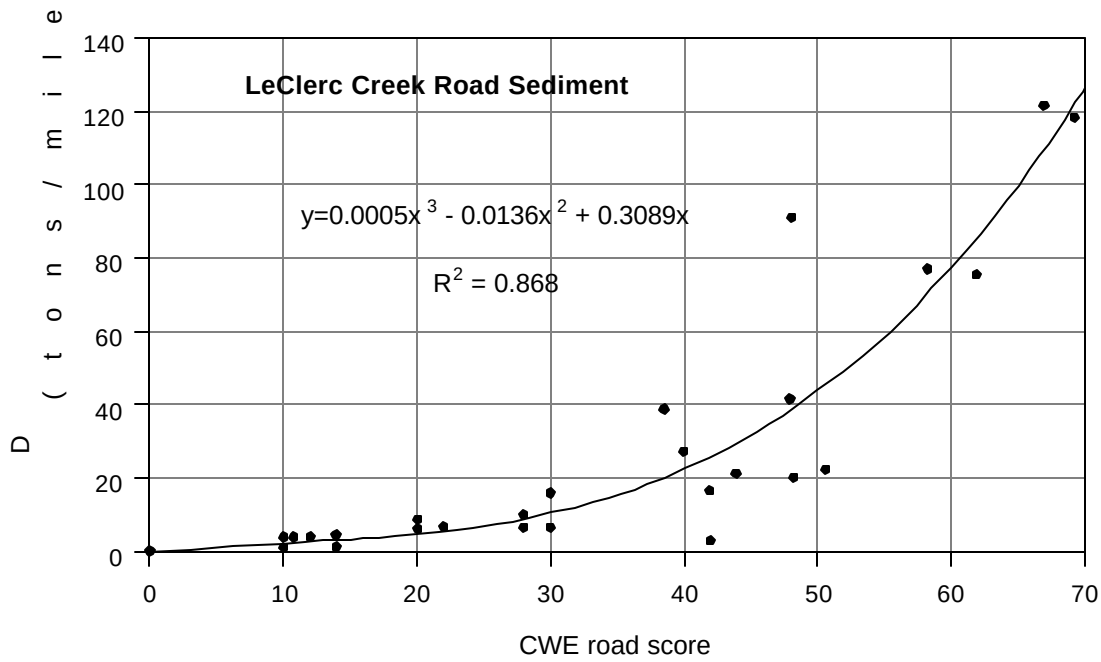


Figure 5: Sediment Export of Roads Based on Cumulative Watershed Effects Scores

2.3.2.5.1.2.3. Road Encroachment Sediment

Sediment yield resulting from road encroachment was modeled based on a set cross-section of 56 feet. This is the weighted mean channel width of the many channels for which data has been collected. The mean was weighted by stream length (Appendix C). The model assumes one-quarter inch erosion from the channel and the banks of stream reaches where roads encroach within 50 feet of the stream. The sediment contribution from this source was annualized based on large discharge events every 10 years.

2.3.2.5.1.3. Stream Bank Erosion

Stream bank erosion yields sediment to the stream along the North Fork between Prichard Creek and the confluence with the South Fork. The bank recession rate and height and length of eroding bank were measured using Natural Resource Conservation Service methods. The sedimentation rate from eroding banks was estimated based on these measurements (Sampson, Personal Communication).

2.3.2.5.2 Sedimentation Estimates

Sedimentation estimates were developed by adding the various sediment yields prorated for delivery to the channels (Tables 17a-17g).

Table 17: Estimated Sediment Export of Major Watersheds
a) Upper North Fork Coeur d'Alene River

Watershed	Upper NF Cd'A River	Mosquito Creek	Buckskin Creek	Spruce Creek	Devil Creek	Mid Upper NF	Deer Creek	Alden Creek	Jordan Creek	Independence Creek	Lower Upper North Fork
Conifer forest (tons/year)	206.6	80.7	100.3	152.5	74.6	136.8	140.5	109.1	224.4	845.5	183.2
Unstocked forest (tons/year)	3.4	0.0	8.5	4.4	0.6	10.4	8.3	8.8	41.7	35.7	36.5
Double wildfire yield (tons/year)	0.0	0.0	2.2	0.0	6.0	4.8	4.3	19.4	11.4	57.9	37.2
Road crossings (tons/year)	1.9	1.9	3.0	2.7	0.4	1.5	0.0	0.4	4.2	9.5	1.5
Road failures (tons/year)	4.8	3.2	2.4	3.7	1.5	1.3	0.0	0.8	4.0	12.8	1.8
Road encroachment (tons/year)	74.9	50.0	70.0	119.9	4.9	74.9	0.0	20.0	94.9	289.7	89.9
Total (tons/year)	291.7	135.8	186.4	283.2	88.0	229.7	153.1	158.5	380.3	1,156.1	350.1

Note: Road sedimentation based on cumulative watershed effects score of 16.5 that translates to 5 tons/mile/year based on figure 5.

b) Tepee Creek above Independence Creek

Watershed	Big Elk Creek	Upper Tepee Creek	Trail Creek	Lower Tepee Creek
Conifer forest (tons/year)	171.8	341.8	363.5	303.8
Unstocked forest (tons/year)	1.0	14.0	9.3	27.3
Double wildfire yield (tons/year)	0.0	1.0	7.2	19.8
Road crossings (tons/year)	8.3	4.9	14.4	6.1
Road failures (tons/year)	13.3	8.7	22.3	2.8
Road encroachment (tons/year)	239.7	189.8	559.4	149.8
Total (tons/year)	434.1	560.2	976.1	509.6

Note: Road sedimentation based on cumulative watershed effects score of 16.5 that translates to 5 tons/mile/year based on figure 5.

c) Middle North Fork Coeur d'Alene River

Watershed	Cinnamon Creek	Brett Creek	Miners Creek	Flat Creek	Big Hank Creek and East Side Streams	Yellowdog Creek
Conifer forest (tons/year)	81.7	113.7	91.2	258.5	214.5	117.1
Unstocked forest (tons/year)	22.8	15.4	0.6	0.3	27.5	0.1
Double wildfire yield (tons/year)	4.0	14.3	0.0	0.0	4.0	0.0
Road crossings (tons/year)	0.0	0.3	0.2	0.3	0.2	0.0
Road failures (tons/year)	1.1	6.4	3.0	12.9	11.0	7.2
Road encroachment (tons/year)	0.3	4.2	5.6	18.3	6.5	6.9
Total (tons/year)	14.9	189.8	79.9	424.6	264.8	229.7
	124.8	344.1	180.5	711.9	528.5	361.0

Note: Road sedimentation based on cumulative watershed effects score of 16.5 that translates to 5 tons/mile/year based on figure 5.

d) Shoshone and Lost Creeks

Watershed	Upper Shoshone Creek	Falls Creek	Lower Shoshone Creek	Lost Creek
Conifer forest (tons/year)	581.7	198.0	229.2	301.1
Unstocked forest (tons/year)	17.2	1.9	4.1	34.6
Double wildfire yield (tons/year)	0.1	0.0	0.0	0.0
Road crossings (tons/year)	20.5	8.0	6.8	8.0
Road failures (tons/year)	22.8	13.9	9.4	6.9
Road encroachment (tons/year)	664.3	144.9	244.8	169.8
Total (tons/year)	1,306.6	366.7	494.3	520.5

Note: Road sedimentation based on cumulative watershed effects score of 16.5 that translates to 5 tons/mile/year based on figure 5.

e) Prichard and Beaver Creeks

Watershed	West Fork Eagle Creek	East Fork Eagle Creek	Eagle Creek	Upper Prichard Creek	Lower Prichard Creek	Upper Beaver Creek	Lower Beaver Creek
Conifer forest (tons/year)	282.0	326.3	30.8	479.7	221.7	294.2	314.2
Unstocked forest (tons/year)	6.3	16.2	0.3	101.5	0.5	23.5	13.3
Double wildfire yield (tons/year)	0.0	0.0	0.0	3.5	0.0	0.0	0.0
Road crossings (tons/year)	0.0	0.0	0.1	0.8	0.7	0.5	0.5
Road failures (tons/year)	9.5	13.3	0.4	17.0	9.5	23.9	13.6
Road encroachment (tons/year)	9.8	14.6	1.3	8.3	9.2	14.0	11.8
Total (tons/year)	309.7	514.5	10.0	599.3	184.8	664.3	314.7
	617.3	884.9	42.9	1,210.1	426.4	1,020.4	668.1

Note: Road sedimentation based on cumulative watershed effects score of 16.5 that translates to 5 tons/mile/year based on figure 5.

f) Lower North Fork Coeur d'Alene River

Watershed	Downey Creek	Uranus and Creaky Creek Group	Grizzly Creek	Browns Gulch	Steamboat Creek	Graham Creek	Cougar Gulch	Lower North Fork Cd'A River
Pasture (tons/year)	0.0	32.9	0.0	30.7	0.0	0.0	0.0	44.2
Conifer forest (tons/year)	137.0	391.0	232.8	262.3	596.2	133.0	281.1	441.7
Unstocked forest (tons/year)	2.0	7.5	8.3	8.2	15.7	5.0	1.7	6.4
Double wildfire yield (tons/year)	0.0	0.0	0.3	0.5	0.0	0.0	0.0	0.0
Highway (tons/year)	0.0	1.2	0.2	0.4	0.0	0.0	0.0	1.0
Road crossings (tons/year)	17.8	16.3	8.0	14.4	42.0	0.4	12.5	32.6
Road failures (tons/year)	9.3	21.0	8.8	12.0	37.7	0.0	15.5	17.7
Road encroachment (tons/year)	320.7	449.4	289.7	354.7	1,263.7	0.0	299.7	884.0
Bank erosion (tons/year)	-	-	-	-	-	-	-	1,150
Total (tons/year)	486.8	919.3	548.1	683.2	1,955.3	138.4	610.5	2,577.6

Note: Road sedimentation based on cumulative watershed effects score of 16.5 that translates to 5 tons/mile/year based on figure 5. Dash (-) indicates no source in watershed.

g) Little North Fork Coeur d'Alene River

Watershed	Upper Little North Fork Cd'A River	Hudlow Creek	Iron Creek	Barney Creek	Burnt Cabin Creek	Deception Creek	Skookum Creek	Lieberg Creek	Laverne Creek	Copper Creek	Bumblebee Creek	Lower Little NF
Pasture (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3
Conifer forest (tons/year)	245.7	152.7	139.3	61.0	423.3	80.6	100.5	356.5	260.2	279.5	355.3	0.0
Unstocked forest (tons/year)	0.5	3.0	0.4	0.9	1.0	0.0	4.2	4.7	2.0	0.7	13.2	0.0
Double wildfire yield (tons/year)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road crossings (tons/year)	14.4	9.8	10.6	1.5	26.1	14.8	3.4	11.7	7.2	11.7	15.9	0.0
Road failures (tons/year)	14.1	9.0	15.8	2.7	21.2	8.0	4.3	27.5	13.7	12.8	22.3	0.0
Road encroachment (tons/year)	394.6	319.7	349.4	45.0	854.1	369.6	78.8	434.5	219.8	309.7	494.5	0.0
Total (tons/year)	669.3	494.2	515.5	111.1	1,325.7	473.1	191.2	834.9	502.9	614.4	901.2	10.3

Note: Road sedimentation based on cumulative watershed effects score of 16.5 that translates to 5 tons/mile/year based on figure 5. Dash (-) indicates no source in water

The total estimated annual sediment delivery to the North Fork Coeur d'Alene River is 30,370 tons per year. The natural background sediment yield is based on the assumption that the watershed is forested in at least seedling and sapling trees. The mid-range value of the sediment yield coefficient was multiplied by the entire watershed acreage to develop a background sediment yield of 13,094 tons per year. An annual excess of 17,276 tons of sediment per year is estimated by this method to be delivered to the river. The sedimentation for the entire watershed is 132% above estimated natural sedimentation. The percentage above background sedimentation for each Subbasin ranges from 43 to 204% (Table 18). These annualized values are deceiving, because they have been annualized. Massive sediment delivery to the system occurs during high discharge events typically associated with rain on snow conditions. These events occur on the average every 10 to 15 years. Between 172,760 and 259,140 tons of excess sediment are delivered to the river during most of these single large events. The river exports the sediment during the periods between the large discharge events.

Table 18: Estimated Background and Sediment Delivery of Sub-Watersheds of the North Fork Coeur d'Alene River Subbasin

Watershed	Upper North Fork Cd'A River	Tepee Creek	Middle North Fork Cd'A River	Shoshone-Lost Creeks	Prichard - Beaver Creeks	Lower North Fork Cd'A River	Little North Fork Cd'A River	Subbasin Total
Estimated sediment (tons/year)	3,413.0	2,480.0	2,254.0	2,686.9	4,869.7	7,919.2	6,644.7	30,369.7
Estimated background (tons/year)	2,389.0	1,224.8	934.8	1,359.3	2089.7	2,608.5	2,488.2	13,094.3
Percent above background	42.8%	102.4%	141.1%	97.7%	133%	203.5%	167.0%	131.9%

Sedimentation rates in excess of 100% of natural sedimentation are likely sufficiently high to exceed water quality standards (Washington Forest Practices Board, 1995). However, the sediment yield from the Upper North Fork sub-watershed is 43% above natural background, and the beneficial uses are supported. The upper basin is of similar geology (Pre-cambrium Belt of the Wallace, Prichard, and Stripped Peak series), soils (predominantly podsolic), vegetation (mixed coniferous forest), weather patterns (weak maritime), and landform (glaciated mountains) to the other sub-watersheds. The upper watershed's sediment yield is an appropriate interim target for a sediment TMDL addressing the remaining sub-watersheds.

The estimated sediment yield per square mile based on the model is 33.9 tons. The USGS measured sediment at the Enaville gauge during water year 1999 for the Coeur d'Alene Basin Remedial Investigation and Feasibility Study (URS Greiner, 2000). The discharge of water year 1999 was numerically very close to average discharge from the North Fork. The USGS measurements provided a sediment yield of 28 tons per square mile. Although the results from the two methods are not identical, the results are in the same general range.

The model results only estimate the delivery of sediment to the river system. The transport of sediment in the North Fork watershed and export of sediment from the watershed is not addressed. The riffle armor stability and residual pool volume data indicate the current sediment load destabilizes the channels. Sediment loads associated with large fire events in the first three decades of the twentieth century are likely still present to some extent in the channels. The roads,

which flank both shores of the lower North Fork, cut off sloughs from the river. Visual evidence from excavation of one such slough near the Bumblebee Bridge indicates a large amount of cobble material was stored in the past in this slough (Fitting, Personal Communication). The road system effectively cuts off many such storage areas. All the sediment now delivered to the North Fork is confined to the narrow channel and floodplain between the two flanking roads. Out-of-channel sediment storage is limited to the river. Alterations of the floodplain function in many locations have removed the buffering capacity of the channel system. Even after sedimentation rates to the watercourses are reduced dramatically, it will take a substantial period for the current sediment load of the river to be exported or placed in stable deposits.

2.3.2.5.3. Data Gaps

The major data gap is the lack of in-stream sediment data. The USGS work (URS Greiner, 2000) was completed for the remedial investigation of metals impacts. This data was very expensive to develop. The development of much additional in-stream data is not expected. Other additional data gaps include the lack of CWE road scores and mass failure data for the North Fork Coeur d'Alene Subbasin. The USFS does not have a process similar to the CWE process nor has it developed a mass failure inventory for the central region of the forest. These data gaps were addressed by the extrapolation of CWE road scores and failure data from watersheds adjacent to the North Fork (see sections 2.3.2.5.1.2.1. and 2.3.2.5.1.2.2.).

2.3.2.5.4. Potential Sedimentation Mechanisms

The available data indicate that the stream channel of the North Fork and many of its tributaries has aggraded in the past few decades. The agrading conditions have caused streambed instability to rise to levels that permit in excess of 70% of the bed materials to move during channel altering discharge events (at least bank full or greater discharge). The excessively mobile bed may interfere with salmonid spawning through physical injury to redds and injury to at least the alevin life stage of young trout. In addition, streambed instability fills pools, a critical habitat to trout. The trout densities of the streams have declined. The decline is likely in part due to channel instability and pool filling. The waters are not fully supporting salmonid spawning and cold water biota beneficial uses.

Although the water quality limited listing attributes the limitation to sediment, the available water quality data clearly indicate that streambed instability is at the root of the water quality limitation. Streambed instability is typically caused by increases in the sedimentation or stream power. The potential root parameters of concern for the North Fork are either hydrologic modification or increased sediment yield to the watershed. Since forest harvest activity is the chief land use, it should be studied to ascertain the causes of hydrologic modification and increased sediment yield.

Hydrologic modification and sedimentation are at the root of the water quality limitations of the North Fork and its tributaries. Stream systems dynamically seek balance between sediment transport and stream power. Several hydrologic and sedimentation factors associated with timber harvest and the roads necessary to support harvest can cause imbalance over significant

periods. These factors have been discussed by Patten (1996) and are summarized in the following paragraphs.

2.3.2.5.4.1. Vegetation Alteration

Water yield from a watershed can be increased or desynchronized due to vegetation removal. Changes in the forest canopy can cause the biggest affect. Vegetation places a transpirational demand on the available soil moisture primarily in the summer months. Vegetation removal frees the phreatic portion of the soil moisture for ground water recharge and, eventually, support of perennial stream flow, typically as base flow. The equivalent of an inch or two of precipitation is made available for stream flow. In addition, tree canopies intercept snow. In their absence snow pack increases. The intercepted snow is more prone to evaporative loss from the watershed. Removal of the canopy locally increases the snow pack available at a later time for runoff. The effect can persist twenty to thirty years until a canopy is fully re-established. Canopy openings may create areas of greater snow accumulation by a second mechanism. Canopy openings foster more turbulent airflow that locally increases snow accumulations. This mechanism functions more readily with colder and drier snow than is typical of most precipitation in the North Fork watershed. Canopy openings also permit re-radiation cooling of the snow pack during nights with clear skies. The cooler snow pack may persist longer into the spring months as a result of nightly cooling until it is shed rapidly in a discharge event during a warm period. The snow pack retained on most slopes of the North Fork watershed is relatively warm since it is produced from only slightly modified maritime fronts. In addition, clear nights are not typical of spring weather in the watershed.

All the impacts of vegetation alteration assume more canopy opening exists at present than compared to the pre-management situation under which the watershed's streams developed. Two management actions that affect the canopy have occurred in the past hundred years. First, the canopy has been opened by timber harvest, especially clear cuts. Nearly 15.5% (88,840 acres/573,695 acres) of the forestland has at least partially hydrologically functional openings, caused by timber harvest. Second, fire, which naturally opened the canopy, has been suppressed for most of the past hundred years. It has been estimated that an average 18% area of the North Fork watershed had an open canopy as a result of fire prior to management (Zack, 1998). The variance about the average is broad (plus or minus 18%). As much as 36% or as little as 0% of the area might have had an open canopy at any given time in the watershed’s history. The current level of canopy opening is well within that estimated prior to management. It unlikely that vegetation alteration itself is contributing significantly to hydrologic modification on a subbasin-wide basis. The flood frequency and history developed in section 2.3.2.1.1. support these conclusions. The mechanisms discussed above may function in first and second order watersheds that have been intensively harvested.

2.3.2.5.4.2. Extended Stream Channel Network

Forest harvest in the North Fork watershed has relied on an extensive and intensive road system. Early log skidding systems required roads at hundred yard intervals on slopes. The result is a large number of abandoned or forgotten roads in many of the sub-watersheds.

Precipitation or melting snow normally infiltrates completely in unfrozen forest soils and travels down slope in the shallow ground water system. Forest road cuts typically intercept the shallow ground water flow allowing it to flow either onto the road surface or, in the case of a road with an inside ditch, into that ditch. If the road is out-sloped the water drains back onto undisturbed forest soils and infiltrates. If the road is in-sloped or crowned, the intercepted ground water and drainage from the impervious road surface are concentrated in the inside ditch. The ditch is typically relieved through a drainage culvert. If this relief is onto undisturbed soils, the water infiltrates back to the shallow ground water system. If the ditch transports the drainage to a stream's contributing area, the water rapidly enters the stream system, in comparison to that moving through the ground water system. The intensive road system of the North Fork watershed repeatedly intercepts the stream system or its contributing area, especially during precipitation or snowmelt events when the contributing area lengthens. The result is an additional increase in a stream's contributing area that may channel water directly to the stream system, where previously the water would have moved slowly through the ground water system. The result can be stream discharge that is greater for a shorter period. During these peak discharges, stream powers are achieved sufficient to move large bed load particles and cut stream banks.

Road crossings and approach areas are the primary areas that enlarge the contributing area of the streams. The modification of the discharge rate caused by the more efficient channeling of water to the stream system is probably contributing to the channel instability during runoff events in first and second order watersheds that have high road densities. The flood frequency and history information developed in section 2.3.2.1.1. do not support these conclusions on a basin wide basis. Discharge from the numerous watersheds of the basin that have different elevations and aspects likely desynchronizes the discharge sufficiently to moderate these effects.

2.3.2.5.4.3. Rain on Snow Response

The majority of the North Fork watershed is within the elevation range that has the greatest probability of rain on snow discharge events. Relatively warm maritime fronts can provide rain and vapor that warm the relatively warm snow pack held by the watershed. The soil beneath the pack is often frozen and has low permeability. Under these conditions the watershed yields large volumes to the streams resulting in large stream discharges. Under these conditions, the stream power and channel altering capability are high.

Rain on snow discharge events were and remain a feature of the North Fork watershed. The landform and its stream system developed under this condition. Rain on snow events can magnify other modifications in the watershed because these events develop stream power fully capable of channel alteration. Rain on snow events increase peak flow as the result of road associated increases in the contributing area and increased direct delivery of bed load to the channels.

2.3.2.5.4.4. Direct Delivery of Bed Load Materials

Mass wasting of slopes is not a prominent land-forming feature of the North Fork watershed. Many sub-units of the watershed do have a high density of roads. Most of these roads supported

earlier logging systems and have been abandoned. Roads are often located in the stream bottoms where they alter stream gradient. In these cases, the stream cuts at its bed and banks attempting to reach dynamic equilibrium. The result is direct delivery of sediment to the stream channels. Road failures, especially at stream crossings and their approaches, can be prevalent on the old logging roads throughout the system. Most entered watersheds have one or more major failures supplying additional bed load to the stream and several minor failures. The stream adjusts its channel to the increased bed load. Channel alterations consist of bank cutting and scour which develop additional bed load. Many streams have reached a point at which the stream is constantly adjusting to the channel changes that occurred during the last channel-forming event. Since the high probability of rain on snow fostered events guarantees channel altering discharges on a regular basis, the streams are in a constant state of instability.

2.3.2.5.5. Summary

To a greater or lesser extent, vegetation alteration, extension of the channel network, rain on snow events, and direct delivery of bed load are affecting the hydrology and sedimentation of the North Fork and its tributaries. Direct delivery of bed load from road encroachment into the floodplain, as well as road crossing and crossing approach failures, trigger the initial instability of the stream. Rain on snow events function in two capacities. These events increase sediment delivery and increase stream powers, which develop sufficiently to alter or adjust stream channels. Extension of the stream contributing area by otherwise stable crossings and crossing approaches magnifies the stream discharge during rain on snow or typical snowmelt events. Although vegetation alteration possibly has some transient effect on the hydrology, it is probably small and temporary.

The key pollutant sources are active and abandoned roads located in stream floodplains, crossings, and approaches. These features directly yield sediment to the streams and may essentially increase the contributing area of the streams under snowmelt conditions. The encroaching roads, crossings, and approaches must be remedied in a manner that will make the floodplains function without restriction and road crossings function more as the generally stable slopes of the North Fork watershed.

2.3.2.5.6. Additional Non-Sediment Discharge Impacts to the North Fork Watershed

The low fish densities measured in the North Fork are not solely the result of sediment delivery to the streams. The aquatic habitat of the North Fork and its fish species composition has been greatly altered. While a TMDL allocation and implementation plan must address the pollutant of concern, which in this case is sediment, it will not address these important factors. A more holistic approach is necessary to recover fish populations in the North Fork and many of its tributaries.

2.3.2.5.6.1 Stream Channelization

The North Fork, for a long reach between the Silver Bridge to the Enaville Bridge, is in a moderately constrained channel. The stream is isolated from its historic floodplain. Many oxbows of the river are isolated by the current road system. These locations of the floodplain

were sediment storage areas prior to development. The river and its increased bed load do not have access to these areas. Bed load that would have been stored in these areas remains in the main channel of the river, often filling pools.

2.3.2.5.6.2. Riparian Forest and Large Organic Debris Removal

The riparian forests that flanked the North Fork and the lower reaches of its tributaries were dominated by western red cedar. Even today, the stumps of individual trees that were ten feet thick at their bases can be found in the floodplain along the river. The riparian cedars were an important source of shade and long-enduring large organic debris (LOD). Western red cedar has been harvested from most of the riparian forests. Cottonwoods and young cedars remain along the streams. The source of LOD has been removed from large reaches of the river system.

When lodged in stream, the LOD created a series of sediment traps in the stream system. Sediment was metered through the many LOD sediment traps on its route downstream. The LOD created plunge and scour pools. Since western red cedar is very resistant to decay, its residence time in the stream was long.

The LOD of the streams interfered with their usefulness as routes for commerce. The river was the original route for travel into the North Fork watershed and removal of products from it. As the commercial export of logs on the river began in log drives, the LOD was removed from the river and its larger tributaries (Russell, 1985). Removal of LOD continued as riparian cedar were harvested and persisted until well after the era of log drives had concluded. After a 1974 flood, the USFS implemented a program of LOD removal as part of its timber harvest program. The purpose of the activity was to remove the interference of LOD with flood flows. It was only during the mid-1980s that the importance of LOD in-stream was recognized by managers and the removal practices ended.

The result of riparian cedar harvest and LOD removal is pervasive in the North Fork watershed. An important feature of the streams that created pool habitat and likely metered the movement of large sediment through the watershed has been effectively removed. The impact to the habitat of the fishery is dramatic. There is a parallel impact to sediment export. If its LOD component was intact, attenuation of the sediment loads may have been more efficient. More sediment yield reduction may be necessary under the current conditions than would have been with an intact system of LOD.

2.3.2.5.6.3. Introduction of Non-native Fish Species

Several fish species have been introduced to Coeur d'Alene Lake and River (DEQ, 1995), Most of these remain in the waters of the lake, river, and its lateral (chain) lakes, but introduced Chinook and some Kokanee salmon spawn in the tributary rivers. Chinook salmon spawn in the lower reaches of the North Fork. Kokanee minnows have been documented in the upper reaches of the South Fork (Hartz, 1993a). Although no presence of Kokanee in the North Fork has been documented, some Kokanee may spawn in some North Fork tributaries.

The important introduced fish species of the North Fork are rainbow and brook trout. Rainbow trout may be found in the river and some lower reaches of its tributaries. Rainbow populations appear to be low based on the existing fish census data. Brook trout appear restricted to the Beaver Creek and Prichard Creek watershed. Brook trout populations in Beaver Creek are quite high. Except for Beaver Creek, native cutthroat trout dominate the fish census data. Bull trout are nearly extirpated from the North Fork. A remnant population may spawn in Graham Creek. The impact of the non-native fish on the native populations in the streams of the North Fork is not understood.

2.3.2.5.6.4. Summary

Habitat alterations and introduction of non-native fish are in part related to the low populations of native fish in the streams. Channelization of the stream and removal of LOD not only remove the potential for habitats important to fish, but also the ability of the streams to attenuate increases in sediment yield. A TMDL can only address pollutants of concern, which, in this case, are metals and sediment. However, the implementation plan, drawn up to achieve the sediment allocations of the TMDL, can and should address these other problems in a more holistic manner. Investments in measures that would add LOD to the stream system and remove the constrictions of channelization would create a stream able to attenuate a higher sediment yield than the stream system depleted of these features. The result would likely be full support of the beneficial use at a higher level of sediment yield.

2.3.3 Beneficial Use Support Status

Water bodies were not assessed for flow or habitat alteration. Current DEQ policy does not recognize flow and habitat alteration as quantifiable and therefore allocatable parameters. The assessed support status of the water bodies based on the data available is provided in Table 19. For each water body, the reasons why certain TMDLs are needed are noted.

Sediment TMDLs are warranted for all segments listed, except Beaver Creek where fish density and residual pool volume are similar to the reference streams. Some segments requiring sediment TMDLs are located at the base of the watershed (1701030 3481). Since this is the case, sedimentation of the reach occurs as the result of sediment yields throughout the watershed. The sediment TMDL will address the entire North Fork Coeur d'Alene watershed.

Little evidence exists to suggest that bacteria, nutrients, dissolved oxygen, or oil and grease are impairing the water quality of Prichard Creek. Analyses of samples for bacteria, nutrients, and oil and grease have been below detection. Dissolved oxygen measurements have been well above the standard of 6 mg/L. Metals standards exceedances have been detected in the East Fork Eagle, Prichard, and Beaver Creeks. The Jack Waite mine and mill site in an upstream tributary of East Fork Eagle Creek is most likely responsible for the metals standards exceedances of this water body. The Paragon, Monarch, Terrible Edith, Bear, and Ione mine and mill sites are potentially responsible for the metals standards exceedances of Prichard Creek. The Ray Jefferson mill site appears to be responsible for the metals standards exceedances of Beaver Creek. Total maximum daily loads will be required to address metals standards exceedances in East Fork Eagle, Prichard, and Beaver Creeks. Beaver Creek is currently not listed. It should be listed in 2002.

Table 19: Results of Water Body Assessment Based on Application of the Available Data

Stream	HUC Number	Boundaries	Assessed Support Status	Reasons TMDL[1] not Required for Pollutant(s)
North Fork Coeur d'Alene River	17010301 3482	Tepee Creek to Yellowdog Creek	impaired by sediment	N/A[2]
Tepee Creek	17010301 3508	Headwaters to Big Elk Creek	impaired by sediment	N/A
Big Elk Creek	17010301 3511	Headwaters to Tepee Creek	impaired by sediment	N/A
Calamity Creek	17010301 5034	Headwaters to Jordan Creek	impaired by sediment	N/A
Cub Creek	17010301 5054	Headwaters to Lost Fork Creek	impaired by sediment	N/A
Yellowdog Creek	17010301 3506	Headwaters to North Fork Cd'A River	impaired by sediment	N/A
Shoshone Creek	17010301 3504	Sentinel Creek to North Fork Cd'A River	impaired by sediment	N/A
Lost Creek	17010301 5643	Headwaters to North Fork Cd'A River	impaired by sediment	N/A
Falls Creek	17010301 7504	Headwaters to Shoshone Creek	impaired by sediment	N/A
Beaver Creek	17010301 3499	Headwaters to North Fork Cd'A River	impaired by metals	fish / residual pool volume data indicated full support for sediment
Prichard Creek	17010301 3500	Barton Gulch to North Fork Cd'A River	impaired by sediment and metals	no evidence of bacteria, DO, nutrient and oil and grease exceedances
East Fork Eagle Creek	17010301 5617	Headwaters to Eagle Creek	impaired by sediment and metals	no support for pH impairment
Cougar Gulch	17010301 7501	Headwaters to Pritchard Creek	impaired by sediment	N/A
North Fork Coeur d'Alene River	17010301 3481	Yellowdog Creek to South Fork Cd'A River	impaired by sediment	N/A
Steamboat Creek	17010301 3495	Barrymore Creek to North Fork Cd'A River	impaired by sediment	N/A
Little North Fork Coeur d'Alene River	17010301 3485	Headwaters to Laverne Creek	impaired by sediment	N/A
Copper Creek	17010301 3487	Headwaters to Little North Fork Cd'A River	impaired by sediment	N/A
Burnt Cabin Creek	17010301 5032	Headwaters to Little North Fork Cd'A River	impaired by sediment	N/A

1. total maximum daily load; 2. not applicable

2.4. Pollution Control

2.4.1 Control Actions to Date

Metals control actions have begun in the Prichard and Beaver Creek watersheds. A consent decree has been developed between the USFS, ASARCO, and Jack Waite Mining Company to complete an environmental evaluation and cost analysis of the mine and mill site. The study should lead to a plan to clean up the site and remove the metals source. The USFS has developed plans to remove the Paragon Mill site on Prichard Creek. The clean-up plan is scheduled for implementation in summer 2002. The Monarch Mill site on private land has been targeted by DEQ for removal actions. Application has been made for funds to address the site. If funding efforts are successful, the site would be slated for remedial actions during summer 2003. The USFS and several cooperating agencies continue to study the sources of metals

contamination in the Prichard and Beaver Creek watersheds in an effort to identify these sources for remedial actions.

The primary land manager of the North Fork watershed is the USFS. The USFS has observed the deteriorating condition of the streams, documented the in-stream effects, and recognized the remedial actions needed to start the watersheds towards recovery. Road inventories have been developed in and around timber sale areas for several years. A detailed inventory has been developed for the Tepee Creek watershed. Since most of these inventories exist as a parts of project files and are difficult to access and use in this form, the USFS has placed the information in an interactive GIS format. In this form, the road inventory information is available to pinpoint and develop priorities for road removal and to identify crossings and approaches requiring remedial work.

The USFS has undertaken road rehabilitation work in the North Fork watershed. Intensive road rehabilitation and removal actions have been completed in the Autumn and Martin sub-watersheds of the Steamboat Creek watershed. Similar actions have occurred in Shoshone Creek watershed. These activities were supported by the Knutson-Vandermeir (KV) funds from timber sales or special appropriations. Appropriations for rehabilitation work are becoming more scarce as the federal budget is constrained, while KV funds may only be used in the immediate vicinity of the timber sale which develops them. These two factors have curtailed the extensive amount of watershed rehabilitation work needed to recover the beneficial uses of the North Fork. The USFS program has sought to obliterate entire roads. Recent analysis indicates roads cause sediment loading primarily near road crossings of streams and where roads are located within the stream floodplain causing gradient changes. The scarce funds obtained by the USFS are now targeted on the sediment yield areas rather than on obliterating the entire road. The USFS has budgeted $1.2 million per year to address road problems in the North Fork over the past few years.

2.4.2. Pollution Control Strategy

The metals pollution control strategy is based on the state's remedial plan for the Coeur d'Alene Basin. The state's alternative clean up plan (alternative 5) for the feasibility study included actions for Beaver, East Fork Eagle and Prichard Creeks. The North Fork Coeur d'Alene River tributaries have been included in the draft five-year clean up plan. Remedial work required in the North Fork watersheds should be complete in five to ten years and standards met within fifteen years.

The key to breaking the cycle of bed load delivery and channel instability, which impairs the beneficial uses of the North Fork and its tributaries, is removal of roads from flood plains and rehabilitation of the road crossings and approaches which deliver excess water and sediment to the streams. Roads encroaching on stream crossings require removal on abandoned roads where practical. Stream crossings generally require that the fill be removed from the stream corridor and from stream conveyance structures (culverts). Approaches need to be out-sloped to shed water to undisturbed soils where they may infiltrate, ripped to promote infiltration rather than runoff from the road surface, and covered with grass to prevent erosion. Where approaches have fills that could fail to the stream, the fill should be pulled back and stabilized. This work can be

completed with the road graders, earthmovers, and backhoes typically used for timber road construction.

The federal and state governments may have insufficient funding resources to adequately address the problem in the current budgetary climate. Based on the current USFS budget, it will take many years to address the backlog of abandoned road and stream crossing removals. Grants from environmental or corporate foundations and federal programs should be explored as alternate sources of funds. The section 319 CWA program is the largest source of funds for nonpoint source water pollution remedial projects. Annually, Idaho receives $3.5 million from the federal government for funding of nonpoint source improvement projects. In the past year, nearly $5.5 million in proposed projects competed for these funds statewide. The average grant, exclusive of the 40% local matching amount, is $150,000. This very large federal nonpoint source pollution control program would currently provide only a marginal boost to the current USFS appropriations.

The timber industry must operate at a profit to exist and is not likely to address the problem in a "pro bono" program. Neither government nor industry can address the problem alone, but working together cooperatively may be able to address the crossing and approach issue. The federal government does have the timber resource, which is the raw material needed to operate the timber industry. This pollution control strategy takes a position neither for or against the harvest of timber. These are decisions reserved to land managers and owners. However, if new timber harvest is approved and requires new access roads, these new roads will cross water bodies requiring approaches as well as a crossing structure. Construction of these crossings would be required to meet minimum state of the art specifications prescribed in the Idaho Forest Practices Rules and Regulations. In addition, a control strategy could require that a certain number of pollution credits would be required to construct any stream crossing. This number could be greater than one and be dependent on the burden of abandoned crossings and encroaching roads, which require remedial work in the sub-watershed. Credits could be earned by the rehabilitation of abandon stream crossings and encroaching roads in the sub-watershed unit. Only after sufficient credits were earned to permit the new road, could its construction be permitted.

Under this strategy, the USFS could provide the list and priority of the crossings and encroaching roads requiring remedial work and road removal in a sub-watershed. These lists could be made sufficiently broad to provide timber contractors with maximum flexibility. The timber contractors could complete the remedial work to the satisfaction of the USFS with the equipment they typically have on hand for forest road construction. As sufficient credits were developed, any required new roads would be developed and after harvest, retired. Over time, this operational strategy should move the impaired streams back toward stability and permit the recovery of the fishery uses. At some point, the backlog of abandoned road crossings requiring remedial work would be exhausted and the pollution credit ratio would collapse to one.

3. Total Maximum Daily Loads for Water Quality Limited Water Bodies of the North Fork Coeur d'Alene River Subbasin (17010301)

Section 303(d)(1) of the Clean Water Act requires states to prepare a list of waters not meeting state water quality standards in spite of technology-based pollution control efforts and the application of best management practices for nonpoint sources. This list must include a priority ranking "... taking into account severity of the pollution and the uses to be made of such waters." The prescribed remedies for these water quality limited waters is for states to determine the TMDL for pollutants "... at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety..." A margin of safety is included to account for any lack of knowledge about how limiting pollutant loads will affect water quality.

Section 303(d)(2) requires both the list and any TMDLs developed by a state be submitted to the EPA. The EPA is given 30 days to either approve or disapprove the state's submission. If the EPA disapproves, the state has another 30 days to develop a new list or TMDL. The list and all TMDLs, either approved or developed by the EPA, are incorporated into each state's continuing planning process as required by section 303(e).

3.1 Total Maximum Daily Load for the Sediment Limited Segments of the North Fork Coeur d'Alene River

3.1.1 Introduction

The North Fork Coeur d'Alene River has many segments and tributaries impaired by sediment including the lowest reach of the watershed: the North Fork between Yellowdog Creek and the North Fork's mouth. Even those segments not impaired most often contribute to sediment load. The most logical approach to a watershed so pervasively destabilized is to develop a TMDL that addresses stream sedimentation in the entire watershed.

3.1.2 Segments Addressed

The Subbasin assessment of the North Fork Coeur d'Alene River lists 17 segments as water quality limited by sediment. The 1996 303(d) list contained an additional 16 segments that were delisted in 1998, but contribute sediment to listed downstream segments (Tables 20 and 21).

Table 20: Sediment Impaired Stream Segments of the North Fork Coeur d'Alene Watershed

Stream	HUC[1] Number	Boundaries	Assessed Support Status
North Fork Coeur d'Alene River	17010301 3482	Tepee Creek to Yellowdog Creek	impaired by sediment
Tepee Creek	17010301 3508	Headwaters to Big Elk Creek	impaired by sediment
Big Elk Creek	17010301 3511	Headwaters to Tepee Creek	impaired by sediment
Calamity Creek	17010301 5034	Headwaters to Jordan Creek	impaired by sediment
Cub Creek	17010301 5054	Headwaters to Lost Fork	impaired by sediment
Yellowdog Creek	17010301 3506	Headwaters to North Fork Coeur d'Alene River	impaired by sediment
Shoshone Creek	17010301 3504	Sentinel Creek to North Fork Coeur d'Alene River	impaired by sediment
Lost Creek	17010301 5643	Headwaters to North Fork Coeur d'Alene River	impaired by sediment
Falls Creek	17010301 7504	Headwaters to Shoshone Creek	impaired by sediment
Prichard Creek	17010301 3500	Barton Gulch to North Fork Coeur d'Alene River	impaired by sediment and metals
East Fork Eagle Creek	17010301 5617	Headwaters to Eagle Creek	impaired by sediment and metals
Cougar Gulch	17010301 7501	Headwaters to Prichard Creek	impaired by sediment
North Fork Coeur d'Alene River	17010301 3481	Yellowdog Creek to South Fork Coeur d'Alene River	impaired by sediment
Steamboat Creek	17010301 3495	Barrymore Creek to North Fork Coeur d'Alene River	impaired by sediment
Little North Fork Coeur d'Alene River	17010301 3485	Headwaters to Lavern Creek	impaired by sediment
Copper Creek	17010301 3487	Headwaters to Little North Fork Coeur d'Alene River	impaired by sediment
Burnt Cabin Creek	17010301 5032	Headwaters to Little North Fork Coeur d'Alene River	impaired by sediment

[1] hydrologic unit code

Table 21: Streams Segments Delisted in the 1998 Process but Contributing Sediment to Downstream Sediment Impaired Segments

Stream	HUC[1] Number	Boundaries	Pollutants
Cinnamon Creek	17010301 5042	Headwaters to North Fork Coeur d'Alene River	sediment
Flat Creek	17010301 3507	Headwaters to North Fork Coeur d'Alene River	sediment
Lost Fork Creek	17010301 5115	Headwaters to Jordan Creek	sediment
Trail Creek	17010301 3510	Headwaters to Tepee Creek	sediment
West Fork Eagle Creek	17010301 3501	Headwaters to Eagle Creek	sediment
Wesp Gulch	17010301 7502	Headwaters to Prichard Creek	sediment
Tiger Gulch	17010301 7500	Headwaters to Prichard Creek	sediment
Ophir Gulch	17010301 7500	Headwaters to Prichard Creek	sediment
Idaho Gulch	17010301 7505	Headwaters to Prichard Creek	sediment
Barton Gulch	17010301 5008	Headwaters to Granite Gulch	sediment
Downey Creek	17010301 3505	Headwaters to North Fork Coeur d'Alene River	sediment
Barney Creek	17010301 5007	Headwaters to Little North Fork Coeur d'Alene River	sediment
Skookum Creek	17010301 3490	Headwaters to Little North Fork Coeur d'Alene River	sediment
Leiberg Creek	17010301 3489	Headwaters to Little North Fork Coeur d'Alene River	sediment
Lavern Creek	17010301 3488	Headwaters to Little North Fork Coeur d'Alene River	sediment
Bumblebee Creek	17010301 3486	Headwaters to Little North Fork Coeur d'Alene River	sediment

[1] hydrologic unit code

3.1.3 Points of TMDL Compliance

Mapping the segments in Table 20 demonstrates that the most downstream segments of the Middle North Fork, Shoshone-Lost, Prichard, and Lower North Fork sub-watersheds are sediment impaired. The Tepee Creek sub-watershed is impaired above the Independence Creek confluence, while the Little North Fork watershed is impaired above the Lavern Creek confluence. Mapping the segments in Table 21 shows these segments are tributaries to sediment-impaired downstream segments of all the sub-watersheds except for the Little North Fork sub-watershed. However, three segments are tributaries to the most downstream reach of the Little North Fork sub-watershed. Although this segment is not sediment limited, it contributes to the lower North Fork segment that is sediment limited.

The North Fork Coeur d'Alene River drains a large watershed. For convenience of monitoring compliance with the TMDL, points of compliance must be selected. Based on the discussion above, the points of compliance with the TMDL are:

- North Fork Coeur d'Alene River immediately above the Tepee Creek confluence
- Tepee Creek immediately above its the North Fork confluence
- North Fork Coeur d'Alene River immediately below the Yellowdog Creek confluence
- Shoshone Creek at its mouth
- Lost Creek at its mouth
- Prichard Creek at its mouth
- Beaver Creek at its mouth
- Little North Fork Coeur d'Alene River at its mouth
- North Fork Coeur d'Alene River at its mouth.

3.1.4 Loading Capacity

The load capacity for a TMDL designed to address a sediment-caused limitation to water quality is complicated by the fact that the state's water quality standard is a narrative rather than a quantitative standard. In the waters of the North Fork Coeur d'Alene River watershed, the sediment interfering with the beneficial use (cold water biota) is most likely large bed load particles. Fine sediment may interfere with the salmonid spawning beneficial use. Adequate quantitative measurements of the effect of excess sediment have not been developed. Given this difficulty, a sediment loading capacity for the TMDL is difficult to develop. This TMDL and its loading capacity is based on the following premises:

- sediment yield below 50% above background will fully support the beneficial uses of cold water biota and salmonid spawning,

- the stream system has some finite yet not quantified ability to process (attenuate through export and/or deposition) a sediment yield rate greater than 50% above background rates,

- beneficial uses (cold water biota and salmonid spawning) will be fully supported when the finite yet not quantified ability of the stream system to process (attenuate) sediment is met, and

- care must be taken to control factors, such as fish harvest, that may interfere with the quantification of beneficial use support.

The natural background sedimentation rate was calculated by multiplying the watershed acreage above a certain point by the sediment yield coefficient for coniferous forests (0.023 tons/acre/year). The estimate assumes the entire watershed is vegetated by coniferous forest. The calculated estimated value for the entire North Fork is 13,089 tons per year. Thus, the 50% above background sediment yield goal is 19,633 tons per year for the entire watershed. This goal is supported by the sediment yield rate of 42.8% above background modeled for the Upper North Fork Coeur d'Alene River Subbasin (See Table 18). The upper North Fork Subbasin contains the streams used as controls (Buckskin, Spruce, and the North Fork), which have high residual pool volumes (See Table 13) and fish densities (See Table 14). The goal of 19,933 tons per year is an estimated goal that will be replaced by the final sediment goal, when the criteria for full support of cold water biota and salmonid spawning designated in section 3.1.6 are met. The loading capacities based on the projected goal at each point of compliance are provided in Table

22. Loading capacities were developed by calculating background sedimentation based on acreage above the point of compliance. An additional 50% of the value was added to develop the loading capacity.

Table 22: Loading Capacity at the Points of Compliance

Location	Acreage of watershed	Loading Capacity at 50% above background (tons/year)
North Fork Coeur d'Alene River immediately above the Tepee Creek confluence	66,050	2,279
Tepee Creek immediately above the North Fork Coeur d'Alene River confluence	91,576	3,159
North Fork Coeur d'Alene River immediately below the Yellowdog Creek confluence	198,924	6,863
Shoshone Creek at its mouth	44,755	1,544
Lost Creek at its mouth	14,477	499
Prichard Creek at its mouth	63,254	2,182
Beaver Creek at its mouth	27,716	984
Little North Fork Coeur d'Alene River at its mouth	108,182	3,746
North Fork Coeur d'Alene River at its mouth	569,082	19,884

3.1.5 Margin of Safety

The model, employed to estimate sediment yield rates, has several conservative assumptions, which are documented in Appendix C. Applied to the Belt terrain of the North Fork Coeur d'Alene watershed, the model provides a margin of safety of 231%. This is a sufficient margin of safety.

3.1.6 Appropriate Measurements of Full Beneficial Use Support

Sediment load reduction from the current level toward the 50% above background sediment yield reduction goal is expected to attain a sediment load that is not yet quantified, but will fully support beneficial uses (cold water biota and salmonid spawning). This sediment load will be recognized by the following appropriate measures of full cold water biota support:

- three or more age classes of trout, including young of the year,
- trout density levels of 0.1-0.3 fish/square meter,
- presence of sculpin and tailed frogs, and
- a macro-invertebrate biotic index score of 3.5 or greater.

When the final sediment loading capacity is determined by these appropriate measures of full cold water biota and salmonid spawning support, the TMDL will be revised to reflect the established supporting sediment yield.

3.1.7 Sediment Waste Load Allocation

There are no point discharges of sediment to the North Fork Coeur d'Alene River watershed. No waste load allocation is necessary to address discrete sources.

3.1.8 Sediment Load Allocation

The load allocation is made to the numerous nonpoint sources to the North Fork watershed. These are cataloged on GIS files used to develop the sediment model. The entire loading capacity is applied at each tributary point of compliance. For those points, where upstream tributaries contribute to the loading capacity, the upstream allocations are removed from the loading capacity and the residual is allocated to the watershed immediate to the point of compliance. Allocations are based on management/ownership percentages for the immediate watershed.

3.1.8.1 Upper North Fork Coeur d'Alene River Subbasin

The sediment load allocation for the Upper North Fork Subbasin is shown in Table 23 and Figure 6.

Table 23: Upper North Fork Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	65,907	99.8	2,274
Private	143	0.2	5

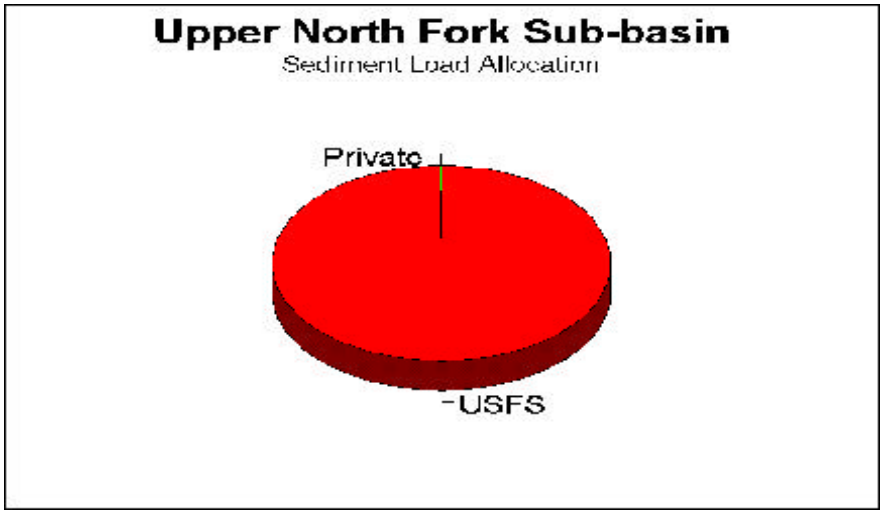


Figure 6 Sediment allocation for the Upper North Fork Coeur d'Alene River Subbasin

3.1.8.2 Tepee Subbasin Allocation

The sediment load allocation for the Tepee Creek Subbasin is shown in Table 24 and Figure 7.

Table 24: Tepee Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	90,980	99.3	3,137
Private	596	0.7	22

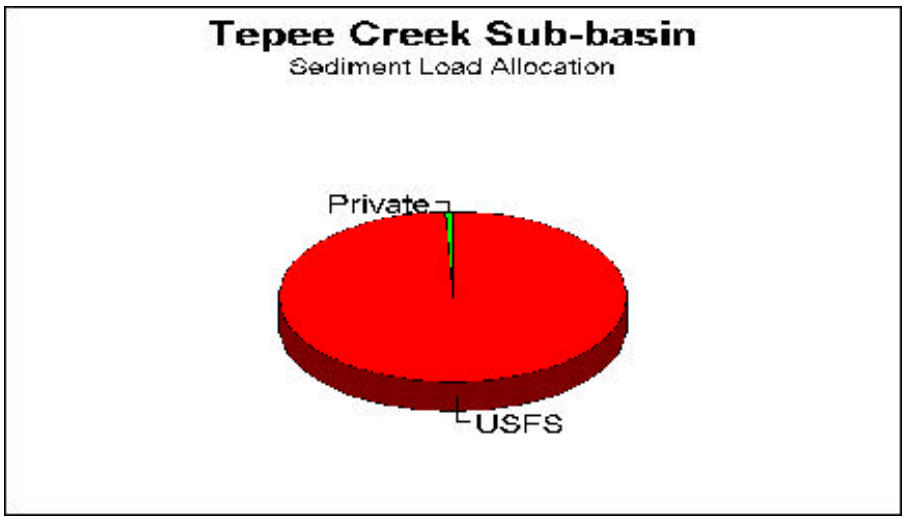


Figure 7 Sediment allocation for the Tepee Creek Subbasin

3.1.8.3 Middle North Fork Coeur d'Alene River Subbasin Allocation

The Middle North Fork Subbasin receives discharge and sediment from the Upper North Fork and Tepee Subbasins. The background or 50% above background loads previously allocated to these Subbasins must be subtracted from the respective goals at the Middle North Fork point of compliance. The allocatable load to the Middle North Fork sub basin is 1,425 (6,863-(2,279+3,159). The sediment load allocation for the Middle North Fork Subbasin is shown in Table 25 and Figure 8.

Table 25: Middle North Fork Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	41,138	99.6	1,419
Private	160	0.4	6

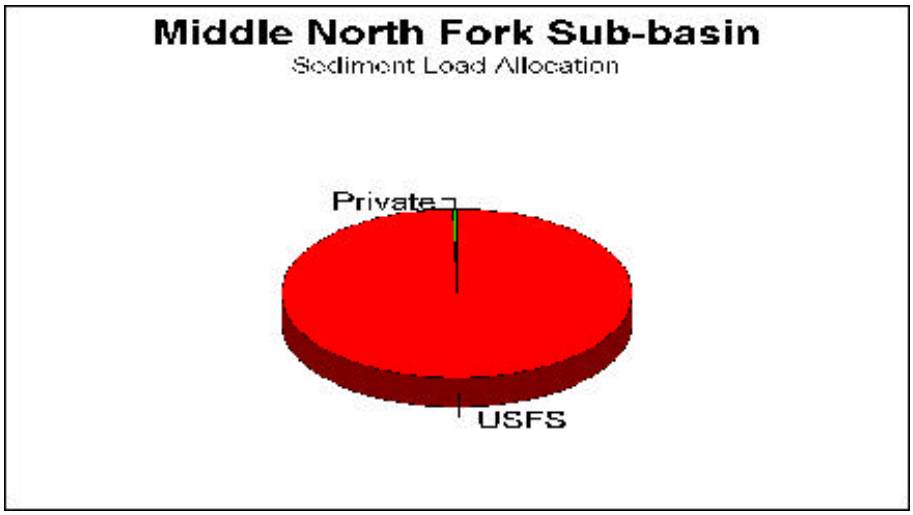


Figure 8 Sediment allocation for the Middle North Fork Coeur d'Alene River Subbasin

3.1.8.4 Shoshone and Lost Creek Sub-basins Allocations

The USFS manages the Shoshone and Lost Creek watersheds. The allocations of both subbasins are allocated to the single ownership. The sediment load allocations for the Shoshone and Lost Creek Subbasins are shown in Table 26 and Figures 9 and 10.

Table 26: Shoshone and Lost Subbasins Sediment Allocations

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
Shoshone Creek U.S. Forest Service	44,755	100	1,544
Lost Creek U.S. Forest Service	14,477	100	499

Figure 9 Sediment allocation for the Shoshone Creek Subbasin

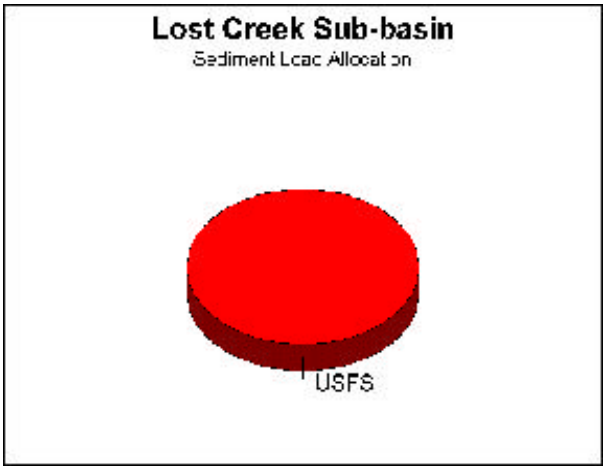


Figure 10 Sediment allocation for the Lost Creek Subbasin

3.1.8.5 Prichard Creek Subbasin Allocation

The sediment load allocation for the Prichard Subbasin is shown in Table 27 and Figure 11.

Table 27: Prichard Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	54,263	85.8	1,872
Private	5,957	9.4	206
U.S. Bureau of Land Management	2,574	4.1	89
Louisiana Pacific	460	0.7	15

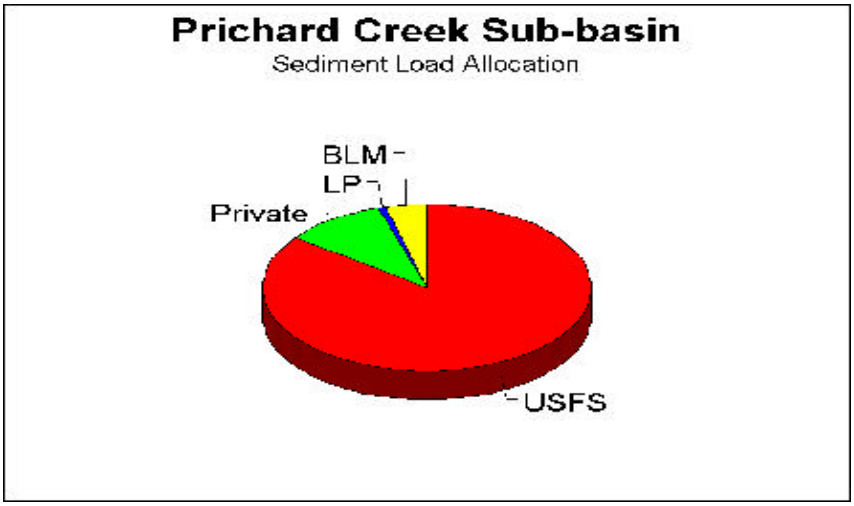


Figure 11 Sediment allocation for the Prichard Creek Subbasin

3.1.8.6 Beaver Creek Subbasin Allocation

The sediment load allocation for the Beaver Creek Subbasin is shown in Table 28 and Figure 12.

Table 28: Beaver Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	24,976	87.6	863
Private	2,740	4.8	48
Louisiana Pacific	1,360	4.6	45
U.S. Bureau of Land Management	805	2.8	28

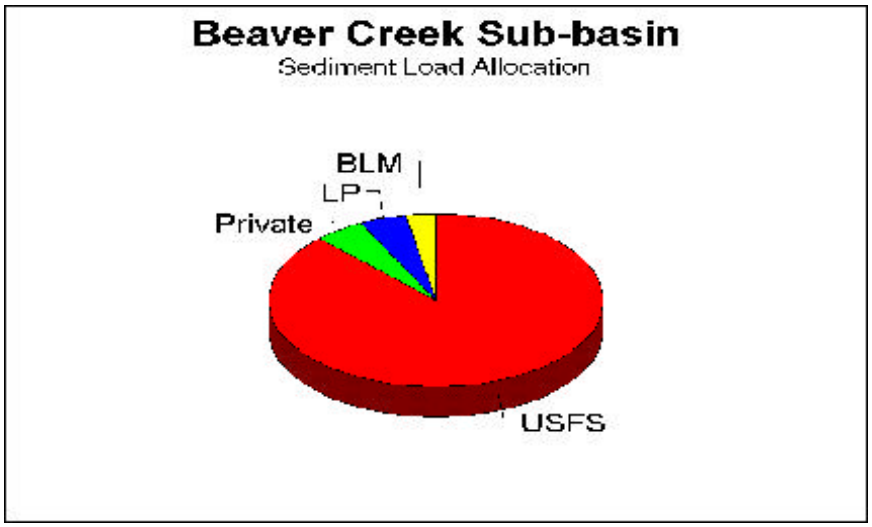


Figure 12 Sediment allocation for the Beaver Creek Subbasin

3.1.8.7 Little North Fork Coeur d'Alene River Subbasin Allocation

The sediment load allocation for the Little North Fork Coeur d'Alene River Subbasin is shown in Table 29 and Figure 13.

Table 29: Little North Fork Coeur d'Alene River Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	107,033	98.5	3,690
Private	1,545	1.4	53
Idaho Department of Lands	76	0.1	3

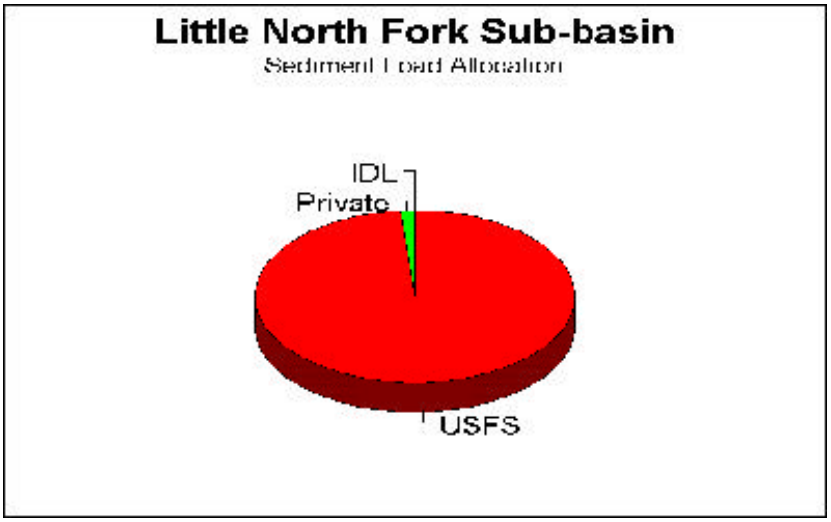


Figure 13 Sediment allocation for the Little North Fork Coeur d'Alene River Subbasin

3.1.8.8 Lower North Fork Coeur d'Alene River Subbasin Allocation

The lower North Fork Subbasin has several subbasins that discharge to it. The sediment allocations to these upstream subbasins are subtracted from the loading capacity of the lower North Fork. The resulting allocatable load is 4,063 tons per year for the goal 50% above background sediment yield goal (19,884 t/yr - (6,863 t/yr + 1,544 t/yr + 499 t/yr + 2,182 t/yr + 984 t/yr + 3,690 t/yr). The sediment load allocation for the Lower North Fork Coeur d'Alene River Subbasin is shown in Table 30 and Figure 14.

Table 30: Lower North Fork Coeur d'Alene River Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	93,979	79.8	3,242
Private	14,551	12.4	502
Idaho Department of Lands	9,233	7.8	319

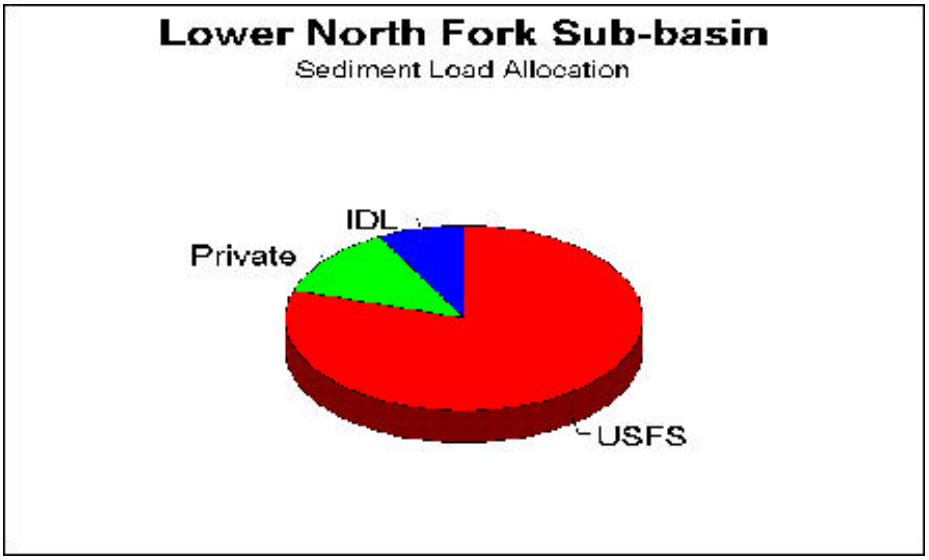


Figure 14 Sediment allocation for the Lower North Fork Coeur d'Alene River Subbasin

3.1.8.9 Summation North Fork Coeur d'Alene River Subbasin Allocation

The sediment load allocation summation for the North Fork Coeur d'Alene River Subbasin is shown in Table 31 and Figure 15.

Table 31: North Fork Coeur d'Alene River Subbasin Sediment Allocation

Owner Manager	Acreage	Percentage	Sediment Allocation (tons/year)
U.S. Forest Service	537,508	93.3	18,490
Private	26,152	4.5	900
Idaho Department of Lands	9,309	1.6	320
U.S. Bureau of Land Management	3,379	0.6	116
Louisiana Pacific	1,680	0.3	58

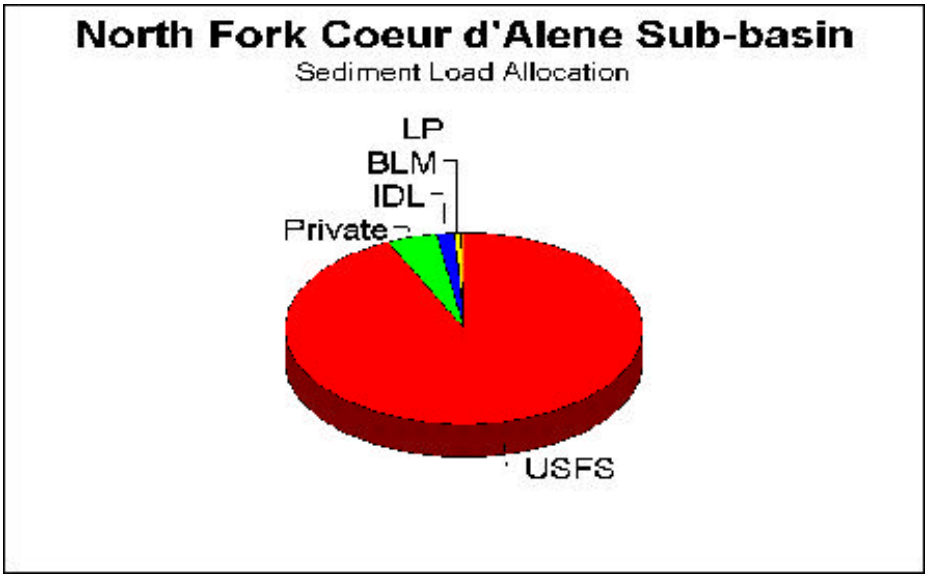


Figure 15 Sediment allocation for the North Fork Coeur d'Alene River Subbasin

3.1.9 Sediment Load Reductions Required

Management agencies and private owners are less interested in the sediment allocation than in the sediment reduction required from the lands they manage or own. The necessary sediment load reductions are based on the sediment model results and the sediment goals. Table 32 lists the necessary sediment reductions for each Subbasin to reach the goals of background sedimentation and 50% above background sedimentation. The level of reduction required by any individual management agency or landowner in any of the basins is governed by the percentage of land owned or managed. The table shows the reduction required in each subbasin with the numbers in parenthesis indicating the modeled load minus the sediment goal.

Table 32: Sediment Load Reductions Required to meet TMDL Goals for the Subbasins of the North Fork Coeur d'Alene River

Subbasin	Sediment Reduction Required (tons/year)
Upper North Fork Coeur d'Alene River	0 (2,257 - 2,279)
Tepee Creek	477 (3,636 - 3,159)
Middle North Fork Coeur d'Alene River	829 (2,254 - 1,425)
Shoshone Creek	624 (2,168 - 1,544)
Lost Creek	22 (521 - 499)
Prichard Creek	1,000 (3,182 - 2,182)
Beaver Creek	704 (1,688 - 984)
Little North Fork Coeur d'Alene River	2,899 (6,645 - 3,746)
Lower North Fork Coeur d'Alene River	3,856 (7,919 - 4,063)
Total Reductions	10,486 (30,370 - 19,884)

3.1.10 Monitoring Provisions

In-stream monitoring of the beneficial use (cold water biota and salmonid spawning) support status during and after implementation of sediment abatement projects will establish the final sediment load reduction required by the TMDL. In-stream monitoring, which will determine if the threshold values identified in section 3.1.4 have been met, will be completed every year on a randomly selected 1% of the watershed's Rosgen B and C channel types. Monitoring will assess stream reaches of at least 40 times bank full width in length. These reaches will be randomly selected from the total stream channel in B and C types until at least 5% of these channels have been assessed after five years. Identical measurements will be made in appropriate reference streams where beneficial uses are supported. Data will be compiled after five years. The yearly increments of random testing that sum to 5% of the stream after five years should provide a database not biased by transit fish and macroinvertebrate population shifts. Based on this database the beneficial use support status will be determined.

3.1.12 Reasonable Assurance of TMDL Implementation

The federal government manages 93.9% of the land in the North Fork Coeur d'Alene River Subbasin. The state manages an additional 1.6%. The USFS (Region 1) and the BLM have signed a memorandum of agreement with DEQ to lead the development of TMDL implementation plans in subbasins where the USFS and/or BLM are the primary land managers. State agencies have been directed by a gubernatorial executive order to implement state developed TMDLs on lands that they manage. The memorandum and executive order should assure implementation plan development. The plan will be implemented based primarily on the budgetary constraints of the federal and state agencies. Bank erosion in the lower North Fork Subbasin is primarily on private land. It may be more difficult to assure that this source of sediment is addressed, because management and regulatory frameworks currently do not exist. However, compared to the magnitude of the sediment sources on lands managed by the federal

and state government, this source is relatively small.

3.1.11 Feedback Provisions

Data from which the problem assessment and TMDL for the North Fork Coeur d'Alene Subbasin were developed are often crude measurements. As more exact measurements are developed during and after implementation plan development, these will be added to a revised TMDL as required.

When beneficial use (cold water biota and salmonid spawning) support meets the full attainment level, further sediment load reducing activities will not be required in the watershed. The interim sediment loading capacity will be replaced in a revised TMDL with the ambient sediment load. Best management practices for forest and agricultural practices will be prescribed by the revised TMDL with provisions to maintain erosion abatement structures. Regular monitoring of the beneficial use will be continued for an appropriate period to document maintenance of the full support of the beneficial use (cold water biota and salmonid spawning).

3.2 East Fork Eagle Creek Total Maximum Daily Load for Metals

3.2.1 Introduction

East Fork Eagle Creek exceeds Idaho water quality standards for cadmium, lead, and zinc. A TMDL is required to set metals discharge limits for point (mine adits) and nonpoint (waste piles and deposited sediments) pollutant sources in the stream's watershed.

3.2.2 Segments Addressed

The stream segment addressed by this TMDL is the East Fork Eagle Creek (HUC 17010301 5617) from its headwaters to Eagle Creek.

3.2.3 Point of Compliance

East Fork Eagle Creek is diluted below metals standards exceedances by West Fork Eagle Creek below the confluence of the two streams. Based on this pattern, the point of compliance was chosen as East Fork Eagle Creek at the Eagle Road Bridge.

3.2.4 Seasonality

To account for seasonal discharge by the streams, the 7Q10, 10th, 50th and 90th percentile discharges were established for the stream at the point of compliance (Table 33).

Table 33: Projected Discharges at the Point of Compliance for East Fork Eagle Creek

Stream and Point of Compliance	7Q10[1] (cfs)[2]	10th percentile (cfs)	50th percentile (cfs)	90th percentile (cfs)
East Fork Eagle Creek at Eagle Road Bridge	6.7	10.4	23.5	140.1

1. Seven day average low discharge over a ten year period; 2. cubic feet per second

3.2.5 Hardness Versus Discharge

A statistically significant relationship between water hardness (mg/L $CaCO_3$) and discharge was developed for the South Fork Coeur d'Alene River and most of its tributaries. East Fork Eagle Creek uniformly has low water hardness values. Water hardness is important because the Idaho cadmium, lead, and zinc standards are linked to the hardness of the receiving water. In the case of East Fork Eagle Creek, the default water hardness value of 25 mg/L $CaCO_3$, specified in the standards, was used.

3.2.6 Metals Loading Capacity

The Idaho water quality standards for dissolved cadmium, lead, and zinc at 25 mg/L$CaCO_3$ are provided in Table 34.

Table 34: Idaho Water Quality Standards for Dissolved Cadmium, Lead, and Zinc at 25 mg/L $CaCO_3$

Hardness (mg/L $CaCO_3$.)[1]	Cadmium (ug/L)[2]	Lead (ug/L)	Zinc (ug/L)
25.0	0.37	0.54	32.3

1. milligrams per liter calcium carbonate; 2. Micrograms per liter

Based on these standards, the loading capacities for East Fork Eagle Creek are provided in Table 35. East Fork Eagle Creek does not exhibit hardness levels above 25 mg/L $CaCO_3$.

Table 35: Metals Loading Capacities of Cadmiun (Cd), Lead (Pb) and Zinc (Zn) for East Fork Eagle Creek at the Point of Compliance

Point of Compliance	7Q10[1]			10th Percentile			50th Percentile			90th Percentile		
	Cd (lb/d)[2]	Pb (lb/d)	Zn (lb/d)	Cd (lb/d)	Pb (lb/d)	Zn (lb/d)	Cd (lb/d)	Pb (lb/d)	Zn (lb/d)	Cd (lb/d)	Pb (lb/d)	Zn (lb/d)
East Fork Eagle Creek at Eagle Road Bridge	0.013	0.019	1.17	0.021	0.030	1.81	0.047	0.068	4.09	0.279	0.408	24.39

1. seven day average low discharge over a ten year period; 2. pounds per day

3.2.7 Margin of Safety

The precision of measurement of metals in the water samples collected is plus or minus 5%, while the discharge measurements contain another error of plus or minus 5%. Therefore, the metals load measurements have an error of plus or minus 10%. A margin of safety of 10% was applied to conservatively account for these errors. The margin of safety is subtracted from the metals load capacities (Table 35) to develop the allocatable metals loads (Table 36).

Table 36: Metals Loads that can be Allocated to Sources in East Fork Eagle Creeks

Point of Compliance	7Q10[1]			10th Percentile			50th Percentile			90th Percentile		
	Cd (lb/d)[2]	Pb (lb/d)	Zn (lb/d)	Cd (lb/d)	Pb (lb/d)	Zn (lb/d)	Cd (lb/d)	Pb (lb/d)	Zn (lb/d)	Cd (lb/d)	Pb (lb/d)	Zn (lb/d)
East Fork Eagle at Eagle Road Bridge	0.012	0.017	1.05	0.019	0.027	1.63	0.042	0.061	3.68	0.251	0.367	21.95

1. seven day average low discharge over a ten year period; 2. pounds per day

3.2.8 Allocations to Point and Nonpoint Sources

The metals loads from the point discharges were established for the watershed. East Fork Eagle Creek has only one point source, the Jack Waite adit. The in-stream metals loads were established for the stream by monitoring. The metals load data were partitioned based on the discharge tiers . The percentage of the loads attributable to the point sources was developed for each level of discharge (Table 37). The nonpoint sources account for the remaining loads.

Table 37: Contribution of Point Discharges to Metals Loads of East Fork Eagle Creek

Discharge Tiers	7Q10-10th	10th - 50th	50th - 90th	90th+
Cadmium	13.8%	4.6%	28.2%	5.1%
Lead	7.5%	1.5%	9.0%	1.8%
Zinc	18.1%	5.9%	89%	23%

3.2.9 East Fork Eagle Creek

3.2.9.1 Waste Load Allocation

A single point discharge of metals was identified in the East Fork Eagle Creek Jack Waite Adit. The waste load allocated to the adit is provided in Table 38.

Table 38: Waste Load Allocated to the Jack Waite Adit in East Fork Eagle Creek

Discharge Tiers	7Q10-10th	10th - 50th	50th - 90th	90th+
Cadmium (pounds/day)	1.7E-03[1]	9.0E-04	1.2E-02	1.3E-02
Lead (pounds/day)	1.2E-03	4.0E-04	5.5E-03	6.5E-03
Zinc (pounds/day)	1.9E-01	9.7E-02	3.28	5.05

1. E is the Log base 10

3.2.9.2 Load Allocation

The nonpoint discharge sources to East Fork Eagle Creek are the Jack Waite mine waste piles including contaminated material eroded into Tributary Creek and deposited contaminated material further downstream along East Fork Eagle Creek. It is estimated the Jack Waite piles and the materials in Tributary Creek represents 80% of the nonpoint load, while the East Fork Eagle Creek deposits contribute 20%. Based on these estimates, the load allocation for East Fork Eagle Creek was developed by partitioning the remaining load not allocated to the point source between these two sources at the estimated percentages. Allocations are made at each discharge tier (Table 39).

Table 39: Load Allocations to the Nonpoint Sources of Metals in East Fork Eagle Creek

	Discharge Tiers	7Q10-10th	10th - 50th	50th - 90th	90th+
Cadmium (pounds/day)	Jack Waite Mill and Tributary Creek (80%)	8.3E-03[1]	1.45E-02	2.4E-02	1.9E-01
	Stream Sediment (20%)	2.1E-03	4.0E-03	6.0E-03	4.8E-02
Lead (pounds/day)	Jack Waite Mill and Tributary Creek (80%)	1.26E-02	2.13E-02	4.4E-02	2.88E-01
	Stream Sediment (20%)	3.2E-03	5.3E-03	1.1E-02	7.2E-02
Zinc (pounds/day)	Jack Waite Mill and Tributary Creek (80%)	6.88E-01	1.23	3.2E-01	13.52
	Stream Sediment (20%)	1.72E-01	3.07E-01	8.0E-02	3.38

1. E is the Log base 10

3.2.10 Reasonable Assurance of TMDL Implementation

The metals contamination of the Coeur d'Alene Basin has been a primary concern to both the EPA and DEQ. The metals sources of the North Fork Coeur d'Alene River tributaries have been assessed in a remedial investigation and feasibility study conducted by the EPA. The state has included the North Fork metals sources in its implementation plan. Both point and nonpoint sources will be addressed initially through Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) mechanisms. Point sources will be addressed with remedial studies, and, where necessary, with consent decrees between EPA and the responsible parties. After the consent decree remedy had defined the practical level of treatment and that treatment was installed, the EPA will issue National Pollutant Discharge Elimination System (NPDES) permits for these sources. Nonpoint sources will be addressed through removal actions sponsored by the state, EPA, or federal land management agencies (mainly BLM and USFS).

3.2.11 Feedback Provisions

Data from which the problem assessment and TMDL for the North Fork Coeur d'Alene sub-basin were developed are few in number. As more exact measurements are developed during implementation plan development, these will be added to a revised TMDL as required.

When metals standards meet the full attainment level, further metals load reducing activities will not be required in the watershed. Regular monitoring of the beneficial use will be continued for an appropriate period to document maintenance of the full support of the beneficial use (cold water biota and salmonid spawning).

4. Response to Public Comment

The Subbasin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River (17010301) was made available to the public for review and comment on November 20, 2000. Copies of the documents were placed in public document repositories at the DEQ Coeur d'Alene Regional Office, the Coeur d'Alene Public Library, and the Kellogg Public Library. The documents were available at DEQ's web site at www2.state.id.us/deq. The comment period was initially for 30 days to December 21, 2000. The Shoshone Natural Resource Coalition requested an extension of the comment period for an additional 30 days. The extension was granted. The comment period ended January 22, 2001.

Fourteen letters of comment were received. These letters contained 172 distinct comments. Some of these comments were identical or very similar, while others were unique. Where comments were identical or similar, a single response is provided in the responses below.

The responses to these comments are organized into four sections: general comments, comments concerning metals, comments concerning sediment, and miscellaneous comments. Letters of response were developed for each letter received. The comment letters and the responses to those letters are available in Appendix E.

4.1 General Comments

Comment 1: The TMDLs fail to comply with applicable federal and state laws & regulations.

Response 1: DEQ believes the TMDL meets the requirements of state and federal law. The TMDL contains all those elements required by Idaho Code section 39-3611, CWA section 303d and 40 CFR 130.7. A similar metals TMDL was approved by the EPA for the South Fork Coeur d'Alene River and similar sediment TMDLs, using the same model as was used for the North Fork TMDL, were approved for Wolf Lodge, Cougar, Kidd, Mica, and Latour Creeks.

Comment 2: Neither of the proposed TMDLs are required under CWA section 303(d)(1) because TMDLs are only required for waters impaired by point sources operating under technology based effluent limitations. The proposed TMDLs, if necessary at all are clearly intended to be TMDLs under CWA section 303(d)(3).

Response 2: DEQ disagrees that TMDLs are only required for waters impaired by point sources. TMDLs are a part of the water quality-based approach under section 303 of the CWA that is clearly not limited to point sources. For additional clarification see Pronsolino v. Browner, (2000) and Response to Comments regarding the TMDL for dissolved cadmium, lead and zinc in the Coeur d'Alene River Basin at pages 57 to 60 (EPA-DEQ 2000). In addition, Idaho law clearly requires TMDLs to address both point and nonpoint sources of pollution as can be seen in Idaho Code sections 39-3602(27) (defines TMDL to include load allocations for nonpoint sources) and 39-3611(directs development of TMDLs to control point and nonpoint sources of pollution). The water quality limited segments of the North Fork Coeur d'Alene River are listed on both the 1996 and 1998 Idaho 303(d) water quality limited segments list. The subbasin

assessment for the North Fork confirmed that the waters at issue do not meet state water quality standards. Therefore, TMDLs are required under CWA section 303(d).

Comment 3: Point source "impacts" have not been shown to be a "problem" in either TMDL and since 303d is limited to point sources, no TMDL is required.

Response 3: DEQ disagrees that 303(d) only requires TMDLs for point sources. See response to the comment 2 above. Moreover, the subbasin assessment (SBA) clearly indicates that adit discharges (discrete point sources) are well above 25% of the metals loads under the lowest discharge conditions. Some of these percentages approach 50% (see page 20). These data demonstrate that the adit discharges are a significant part of the metals standards exceedance.

Comment 4: Both DEQ and EPA have failed to comply with the CWA mandate of Section 304(a)(2)(D).

Response 4: DEQ is not mandated to take any action pursuant to 304(a)(2)(D). EPA, however, did publish information (December 28, 1978, Federal Register) that all pollutants are suitable for maximum daily load measurement and correlation with the achievement of water quality objectives.

Comment 5: DEQ cannot ignore the APA [Administrative Procedures Act] process.

Response 5: TMDLs are plans for the restoration of water bodies to the level of the water quality standards. Idaho Code section 39-3602 states, "Total maximum daily load (TMDL) means a plan for a water body not fully supporting designated beneficial uses…." TMDLs do not have the force and effect of law and are not required to follow the Idaho Administrative Procedures Act rule-making process.

Idaho Code section 39-3611 addresses the development of TMDLs and requires TMDLs be developed in accordance with those sections of law that provide for involvement of Basin Advisory Groups and Watershed Advisory Groups, and as required by the federal CWA. There is no requirement in this section that the TMDL be developed as a rule.

Idaho Code section 39-3612, on the other hand, addresses the integration of TMDLs, once completed, with other water quality related programs and provides that this integration is subject to the provisions of the Idaho Administrative Procedures Act. Thus, to the extent required by the Idaho Administrative Procedures Act, DEQ and other designated agencies must follow the Idaho Administrative Procedures Act provisions when TMDLs are implemented and enforced under applicable state programs.

Given the scope of the TMDL program and requirements of the court-approved schedule for development of TMDLs, it is clear the Idaho Administrative Procedures Act rulemaking provisions are not applicable. The schedule for development of TMDLs in Idaho is the product of federal court litigation. According to the TMDL schedule, from 1997 to 1999, DEQ was to develop 529 TMDLs. Under the Idaho Administrative Procedures Act, rules must be approved by the legislature before they become effective. Because of this and other rulemaking

requirements, rules typically take almost a year to promulgate. Idaho Code section 39-3601 et seq. was enacted in response to this federal TMDL litigation and the legislature certainly never intended DEQ to attempt to promulgate hundreds of required TMDLs as rules.

The federal administrative procedures does not require EPA adopt TMDLs as rules. Moreover, given the short deadlines in section 303d of the CWA, including the requirement that TMDLs be developed within 30 days of EPA disapproval of a state TMDL, the CWA clearly does not envision or require TMDLs be developed as rules.

Comment 6: TMDLs are incomplete, thus do not constitute a TMDL as required by regulation; not all point and nonpoint sources identified.

Response 6: To our knowledge all point sources of metals have been identified. The nonpoint sources have been identified to the state of the knowledge in these watersheds for both metals and sediment.

Comment 7: DEQ internal guidance documents not followed.

Response 7: The comment does not identify which internal DEQ guidance document(s) were not followed. In the opinion of the technical staff and internal reviewers, internal DEQ guidance was followed.

Comment 8: Fish surveys from seven years ago should not be used to make today's determinations, Table 14; page 25.

Response 8: DEQ is required to use the most current data when developing an SBA, and lack of information is not an excuse to delay TMDL development. These surveys are the most current data on many streams of the North Fork. The IDFG advises DEQ that they are most reflective of the fish populations of the North Fork Coeur d'Alene River watershed.

Comment 9: The SBA stated that unlisted water bodies contribute to listed water bodies and actions must be taken on the unlisted water bodies, page 54. The opinion is expressed that no legal authority exists to do this.

Response 9: Under both federal and state law, TMDLs must address all sources of a pollutant to a listed water body. Idaho Code section 39-3611 specifically directs DEQ to identify all sources within the watershed that are contributing pollutants to the listed water body. In addition, CWA section 303(d) requires that TMDLs be established at levels necessary to implement applicable water quality standards. Absent controls on upstream sources, DEQ would lack the assurance that the TMDL for downstream waters would result in the attainment of water quality standards. In the case of the North Fork Coeur d'Alene River, the segment from Yellowdog Creek to the mouth of the river is listed for sediment. Sediment sources exist throughout the watershed above this segment as well as in this segment. This situation and the evidence that sediment is a pollutant natural to all watersheds require that the North Fork Coeur d'Alene River TMDL address all watercourses of the watershed. The argument that a TMDL for sediment of all stream courses was further clarified on the pages 50 and 54.

Comment 10: Anti-degradation rules are misapplied.

Response 10: Anti-degradation does not apply to impaired waters. It applies only to waters that are below the standards thresholds. The TMDL does not mention anti-degradation nor does it misapply it. For further explanation the commenter is referred to section 3., page 54.

Comment11: The state is engaged in illegal rulemaking without following the proper procedures. The TMDL and subsidiary discharge limits are of no legal force or effect and cannot be applied to Beaver Creek or the North Fork Coeur d'Alene River Subbasin.

Response 11: TMDLs are plans for the restoration of water bodies to the level of water quality standards. Since they are plans, they do not have regulatory authority and are not required to follow the Idaho Administrative Procedures Act process. TMDLs are implemented at the state and federal level through regulatory programs. State regulatory programs and their component regulations must follow the proper rulemaking procedures prior to promulgation.

Comment 12: The SNRC [Shoshone Natural Resource Coalition] requests full disclosure of roads to be removed and public input in the process to include a 30-day comment period.

Response12: The sediment TMDL is a plan to recover the water quality of the North Fork Coeur d'Alene River. An implementation plan will be developed after the TMDL is approved. This implementation plan will contain details on actions to be taken, some of which could be road closures or, more likely, road replacements. In any case, the implementing agency, the USFS, would be required by federal law to give notice of any closure and provide for public input.

Comment 13: Some streams listed in the SBA are not listed on the most recent 303(d) list. These streams should be removed from the SBA.

Response 13: Section 2 lists those streams on the 1998 303(d) list and those that were on the 1996 list, but removed from the 1998 list. In the case of sediment, the entire watershed yields sediment to the most downstream sediment listed segment, the North Fork Coeur d'Alene River between Yellowdog Creek and the mouth. Since this is the case, the TMDL for this segment must address sediment from the entire North Fork watershed. This point is made clearly in the section 2; page 50.

Comment 14: KEA [Kootenai Environmental Alliance] did not agree with the waterbodies delisted from the 1996 list to create the 1998 list.

Response 14: EPA approved the 1998 list 303(d) list with some adjustments. Those EPA adjustments addressed temperature delistings and do not affect the North Fork Coeur d'Alene watershed.

Comment 15: The data indicates that the North Fork Coeur d'Alene River is fully supporting beneficial uses in accordance with WBAG [Water Body Assessment Guidance]. The data clearly indicates salmonid spawning is fully supported. No data indicates that sediment is impairing the beneficial uses.

Response 15: The WBAG determination is no longer DEQ policy. Prior to the adoption of WBAG, as revised, TMDL staff were instructed to use the WBAG determinations and for any segment taken off the 1998 list all other pertinent data. We respectfully disagree that no other data indicate that sediment is impairing the cold water biota and salmonid spawning. It is not reasonable to expect that a correlation can be developed between sediment impact surrogates such as residual pool volume and fish density. Such a correlation would presuppose that the electrofishing was completed at that exact time when that environmental factor was limiting. This is better stated by John M. Barthalow, who wrote, "If you think about it, fish populations are rarely directly related to the amount of habitat present at the time of measurement. The standing crop (biomass) and usable habitat values can be expected to be correlated only when measured at the time that the habitat is limiting and for the life stage that is habitat limited. Simultaneous measurement, however, is not sufficient. For a limitation to be operative, the population must be at 'carrying capacity', that is not reduced or altered in number by some non-habitat factor such as fishing pressure, a pollution-caused fish kill, stocking, etc." (Barthalow 2000, p. 15) DEQ believes it can use a weight of evidence approach to demonstrate sediment impact. RASI, residual pool, and model results all indicate sediment impacts.

Comment 16: Draft assessment does not adequately address metals.

Response 16: The comment was made on an earlier SBA draft. Metals issues are covered in section 2.3.2.2.1.

Comment 17: Segments de-listed from the 1996 list in the 1998 list must be re-assessed with an improved WBAG process when this has been developed.

Response 17: When WBAG2 is approved, streams could be re-evaluated. DEQ State Office personnel decide what data sets are used to re-evaluate streams and which streams are re-evaluated. These decisions will not likely affect the metals impaired streams since the exceedance of metals standards is clear-cut. They will also not affect the sediment TMDL since by necessity it must be written for the entire watershed to address the lowest segment of the watershed that is impaired, the North Fork Coeur d'Alene River from Yellowdog Creek to its mouth.

Comment 18: The 16 segments dropped from the 1998 303(d) list need to have the BURP data since 1993 reassessed with the improved WBAG (new) system.

Response 18: See the response to comment 17 above. When WBAG2 is approved, streams could be re-evaluated. DEQ State Office personnel decide what data sets are used to re-evaluate streams. In the case of the segments de-listed in the North Fork Coeur d'Alene River, this is a moot point. They are all listed for sediment. The sediment TMDL addresses all of these segments.

Comment 19: The TMDL should identify Shoshone Creek as water quality limited for unknown pollutants. What is the pollutant?

Response 19: The SBA did not show any evidence of an unknown pollutant in Shoshone Creek. Any pollution that exists is most likely from sediment. The stream is included in the sediment TMDL

Comment 20: Need to include data for Prichard and EF Eagle Creek on dissolved oxygen, bacteria, nutrients and oil and grease and pH.

Response 20: The SBA has been revised with this data now included.

Comment 21: Identify data gaps, if none so state.

Response 21: Data gaps are identified in section 2.3.2.5.3.

Comment 22: The SBA addresses only sediments with respect to loads. It needs to address metals and other pollutants.

Response 22: This comment is in response to an earlier draft of the SBA. The SBA addresses metals loads (section 2.3.2.2.1), and metals TMDL allocations are provided for the streams impaired by metals (section 3.2).

Comment 24: Section 3, Sediment and metals TMDLs, this section should be incorporated into the main body of the document.

Response 24: The format used in the package, (Section 1.0 Executive Summary, Section 2.0 SBA, Section 3.0 TMDL Allocations, Section 4.0 Responsiveness Summary, and Section 5.0 References) is the format required by DEQ. Section 5 will be completed on end a half years after the subbasin assessment and TMDL allocations are approved.

Comment 25: The word interim should be struck from the TMDL. TMDL actions are final actions.

Response 25: We disagree. Any TMDL is subject to revision as standards change or new information is developed. In the usage of "interim" in the text, it is clear that the proper level of sediment yield is to be established. This new information will be used to develop a refined TMDL. In this sense, any TMDL is interim. In addition, EPA uses the term “interim” in its own guidance.

4.2 Metals Assessment and TMDL Comments

Comment 26: [The] [d]raft TMDL circumvents [the] APA process by adding a pollutant and a segment for that pollutant.

Response 26: The TMDL is not a rule. The commenter is probably referring to the fact that monitoring in Beaver Creek showed it exceeds cadmium, lead, and zinc standards. However, Beaver Creek is currently listed for sediment. The policy of DEQ and the EPA is to address all pollutants of concern for 303(d) listed water bodies. The metals were found to be pollutants of concern because the levels violate state water quality standards. DEQ will go through the

required process, including public notice and participation, to list this water body. Prior to listing, the TMDL that has been developed and was included in the comment package is not required to be submitted to or reviewed by EPA.

A public comment period of 60 days was provided for the current SBA and TMDL. It is clear from the data that metals standards are exceeded. Public comment concerning metals in Beaver Creek has been taken and is being responded to at this time. Since the data is clear, DEQ has chosen to be thorough and prepare a TMDL for cadmium, lead, and zinc for Beaver Creek. DEQ will defer the Beaver Creek metals TMDL until the stream is listed for cadmium, lead, and zinc.

Comment 27: DEQ failed to fully consider the effect of natural background.

Response 27: The issue of natural mineralization was addressed in the Coeur d'Alene Basin metals TMDL and in the Natural Resource Damage Assessment process. Technical analyses of 40 sites in the mineralized zone of the Silver Valley demonstrate that metals background in water is somewhat higher than non-mineralized zones, but well below the metals standards. A further discussion of this point can be found on page 35 of the *Coeur d'Alene Basin Metals TMDL* (EPA-DEQ, 2000) response to comments and in its technical support document. DEQ assumes that this data is applicable to the mineralized zone of the North Fork Coeur d'Alene watershed. A further discussion of natural background metals concentrations has been placed in the SBA (section 2.3.2.2.1.5; page 19).

Comment 28: The proposed "margin of safety" is highly inappropriate.

Response 28: The rationale for the margins of safety are incorporated in the TMDLs. For metals, the margin of safety is based on the precision of stream discharge measurements and the analytical precision of metals measurements. The sediment TMDL incorporates the margin of safety into the conservative goal of 50% above background sediment yields. Below this level of sediment yield, the referenced studies indicate that water quality impairment is not observed.

Comment 29: The 90th percentile hardness is 20; it should be 25, page 69.

Response 29: The 90th percentile of the hardness data set for Beaver Creek is 20 mg/L $CaCO_3$. The metals standards, as applied in the TMDL, are cut off at a hardness of 25 with no application of a standard below this level.

Comment 30: Is table 7 (page 15) the TMDL for the stream at these flow tiers?

Response 30: Table 7 provided in-stream measurement of the metal loads in the four flow tiers for Beaver and East Fork Eagle. It is not the loading capacity; it is the current measured metals loads. Table 7 is Table 8 (page 19) in the current document.

Comment 31: Seasonal variability is not addressed by the TMDL (of reviewed document). (Page 15; table 7).

Response 31: Table 7 divides the metals loads measured in-stream into the various flow tiers based on the discharge when the measurement was taken. Table 7 specifically addresses seasonal variability. Table 7 is not, however, the TMDL (see comment response 30). Table 7 is Table 8 (page 19) (page 19) in the current document.

Comment 32: At these tiers are the criteria exceeded at each tier? (Page 15, Table 7)

Response 32: At these tiers the metals standards are exceeded in every case. Table 7 is Table 8 in the current document.

Comment 33: No actual data for the adits addressed in the TMDL; there is time to collect this data before 2003, page 15.

Response 33: The concentration data for the adit discharges is actual data from the EPA remedial investigation database. The discharges come from this database as well. They are weighted for annual discharge based on a synthetic hydrograph developed from the Gem adit discharge record. The database source should have been cited in the text. The adit discharge database source is now cited in the SBA text (section 2.3.2.2.1.5, page 19).

Comment 34: It is not clear how the weighted discharge is calculated, page 16, Table 8.

Response 34: The procedure was not sufficiently outlined in Appendix A. This change was made to Appendix A and referenced on page 19 of the SBA (section 2.3.2.2.1.5).

Comment 35: Are non-discrete discharges all monitored; there is time to monitor these discharges, page 17 section 2.3.2.2.1.6.

Response 35: The non-discrete (nonpoint) sources are based on the best professional judgement of USFS, USGS, and DEQ staff. Monitoring these sources would constitute a time consuming and expensive undertaking that could not be completed prior to the 2003 deadline.

Comment 36: Absence of sculpins indicates the presence of heavy metals. How are other factors ruled out?

Response 36: It is a common observation in the Natural Resource Damage Assessment documents, BURP data, and site-specific criteria preparatory inventories that sculpin are not found downstream of metals sources. They are found in streams where all other factors are present except metals. The interaction is likely not a water column quality factor because the site-specific studies have found sculpin relatively resistant to metals in the water column. The SBA text (section 2.3.2.4; page 23) was augmented to cover the points stated above.

Comment 37: The data is inadequate in respect to seasonality. Water quality, flow discharge and therefore calculated metals loadings are inaccurate. Example: EPA required ten (10) years of data for Coeur's Kensington Project in Alaska.

Response 37: The TMDL goals are based on 7Q10, 10th, 50th, and 90th percentile flows. These discharges are well established from nearby watersheds, and the SBA clarifies the method by which these discharges were developed. These flows account for the seasonality of the TMDL goals. The stream discharge data developed by DEQ provides seasonality that mirrors the calculated values. These same data included metals loads measured in-stream. The mine adit data is limited but is from the same database used to develop the *Coeur d'Alene Basin Metals TMDL* (EPA-DEQ, 2000). The Gem adit discharge data is the most extensive mine adit discharge record available. The rule of TMDL development is to use the best available data. The best available data was used to develop the North Fork metals TMDLs.

Comment 38: Data should reflect local conditions; designated uses should be determined attainable.

Response 38: The entire data set used to develop the SBA and TMDLs is a local database, which reflects local conditions. For example, data from the Silverton gauge station was used to develop the discharge seasonality. The Silverton station is located in the same mountain range, with the same general vegetation and the same climate. It reflects local conditions.

The designated uses for metals impaired streams are cold water biota and primary or secondary contact recreation as defined by the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02.101.01.a.) The SBA states these designations (section 2.2.2; page 11).

Comment 39: Gem adit discharge data limited to one-year.

Response 39: The Gem adit data is limited to a single year, but it is the best available data for adit discharge.

Comment 40: Data missing for August and September 2000 in Beaver and EF Eagle Creeks and January 2000 in Prichard Creek.

Response 40: The August and September 2000 data will be added to the record. These results were not available when the draft SBA and TMDLs were developed, but are now available. January 2000 Prichard Creek data was not collected by the USGS. This is a data gap that cannot be filled. DEQ continues to monitor Prichard Creek at Murray and will include these data as they become available.

Comment 41: Assessment assumes all dissolved metals from adits are point sources that are all delivered to the adjacent stream without attenuation.

Response 41: The North Fork metals TMDLs use the same conservative assumption that all metals are delivered to the stream as the *Coeur d'Alene Basin Metals* TMDL (EPA-DEQ, 2000). The assumption ignores attenuation of metals. As these adit discharges are addressed in the implementation of the TMDL plan the opportunity will be afforded to demonstrate and be credited with attenuation.

Comment 42: Attenuation in-stream is not accounted for in the TMDL. Loading capacities at higher flow do not reflect the higher attenuation only the higher flow.

Response 42: In-stream attenuation is accounted for in this TMDL. The load reductions required at each flow tier is the difference between the calculated TMDL goals based on the discharges and the metals standards and the metals loads measured in-stream by DEQ. The in-stream measurements themselves account for any metals that are attenuated by the stream.

Comment 43: Commenter supplies comments made by ASARCO (Appendix E) and notes these comments apply equally to Beaver Creek.

Response 43: Several of the comments and the responses to those comments are applicable to the Beaver Creek metals TMDL. The response to ASARCO's letter of comment was sent to the commenter (Appendix E).

Comment 44: DEQ should defer the metals TMDL until completion of the CERCLA initiated removal actions.

Response 44: The TMDL process is related to, but independent of, the CERCLA process. The TMDL process develops water quality applicable or relevant and appropriate regulatory requirements (ARARs) for the site by translating the water quality standards into daily permissible loads dependent on the season. The situation in the East Fork Eagle Creek is straightforward. The Jack Waite adit is the only point pollution source, while the Jack Waite mill complex, tailings ponds, and tailings washed downstream are the nonpoint sources. Since the TMDL provides a plan to respond to meet water quality standards, it is appropriate that the East Fork Eagle Creek TMDL precedes any CERCLA consent decrees.

Comment 45: If DEQ does not defer the TMDL then it should specifically phase the metals TMDL. Concern is stated that EPA will override the phasing of the TMDL implementation.

Response 45: The term "phasing" is not defined in this comment; however, EPA does not accept the phasing of TMDLs. This stated, TMDLs can be renewed and incorporate new data at any time. Should there be a shift in metals standards for the water body, or important new data becomes available, a new TMDL would be required to reflect this new data. This would be renewing the TMDL.

Comment 46: DEQ should defer or phase the metals TMDL to allow development and use of site-specific water quality criteria.

Response 46: Site-specific criteria for lead and zinc have been developed for the reach of the South Fork Coeur d'Alene River above Wallace. Work has been completed to extend these results to the metals contaminated segments of the South Fork Watershed below Wallace. A justification of this is in preparation. No plans have been developed to do the studies necessary to extend these results to the Beaver and Prichard Creek watersheds. Such work, if undertaken, may extend well past 2003 the due date of these TMDLs. When and if the site-specific standards were extended to the Beaver and Prichard Creek watersheds, the current TMDL and those

developed for Prichard and Beaver Creeks would be revised to reflect the current (new) metals standards.

Comment 47: Idaho code section 39:3611 limits controls on point discharges.

Response 47: The limits on point source controls in 39-3611 are not applicable to this TMDL under either state or federal law because Idaho Code section 39-3611 limits controls on point source discharges when these are less than 25% of the metals loads. Section 2.3.2.2.1.5 (table 10; page 20 of the SBA (page 19) clearly demonstrates that the single point discharge at the Jack Waite adit comprises 50% of the cadmium load under 7Q10 discharge conditions. In addition, Idaho Code 39-3611 applies to water bodies where the applicable water quality standard has not been met due to impacts that occurred prior to 1972. While there were significant impacts to the North Fork Coeur d'Alene River that occurred prior to 1972, there are also continuing and post-1972 discharges that have contributed and continue to contribute to the non-attainment of state water quality standards. Moreover, under both state and federal law, the TMDL must meet requirements of the CWA (See Idaho Code sections 39-3601 ["It is the intent of the legislature that the state of Idaho fully meet the goals and requirements of the federal clean water act.."] and 39-3611 ["For water bodies described in section 39-3609, Idaho Code, the director shall…as required by the federal clean water act, develop a total maximum daily load…"]. A TMDL that does not call for point source reductions would not meet the requirements of the CWA because the TMDL could not assure compliance with state water quality standards.

Comment 48: There should be greater emphasis that this is a phased TMDL.

Response: The TMDL is not phased and would not be approved by EPA as a phased TMDL. However, any TMDL is open to revision based on new information (see response to comment 45).

Comment 49: The calculation of discrete discharges of metals is indecipherable and erroneous.

Response 49: The calculation was difficult to follow. This has been remedied in the text of the revised document (section 2.3.2.2.1.5, page 19) and in Appendix A. DEQ respectfully disagrees that it is erroneous. The calculation of the adit discharge of metals was made more understandable in the text and Appendix A.

Comment 50: The waste load allocations should not decrease as creek flows increase. Hardness data provided.

Response 50: The waste load allocations decrease because the percentage of the load that is attributable to point discharges decreases as the discharge increases. This is a major difference between the *Coeur d'Alene Basin Metals TMDL* (EPA-DEQ, 2000) and these North Fork metals TMDLs. The Coeur d'Alene Basin TMDL gave the discrete sources a 25% allocation based on the mixing rule in the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02.06.01.e.iv.). The North Fork TMDL calculates the discrete load based on adit discharges and synthetic hydrographs based on the Gem adit discharge. The percentage point load was calculated by dividing the point load by the measured load at each flow tier.

The hardness data provided clearly indicate that the adit adds hardness to the stream. This hardness effect is diluted even in Tributary Creek and likely is very small at the point of compliance near the mouth of the East Fork Eagle Creek. The metals are detected at the point of compliance in the loads measured and at hardness levels all below 25mg/L $CaCO_3$. Thus the hardness data is not applicable to the point of compliance.

Comment 51: Lead should be deleted from the TMDL for the East Fork Eagle Creek. Use of one-half detection for non-detection increases a load that is trivial.

Response 51: The standard method data interpretation considers non-detection as the value one half of detection. However, we agree this approach may create a lead load where arguably none exits. The database was searched for detections of lead above the state standards. Exceedances occurred in eleven of thirteen samples. Use of one-half detection in the two remaining samples is warranted.

Comment 52: Dissolved to total recoverable metals ratios should be incorporated into the metals TMDL.

Response 52: Idaho's standards state the cadmium, lead, and zinc standards in terms of dissolved cadmium, lead, and zinc. Dissolved to total recoverable metals ratios are important translators for point discharges since their permits are based on total recoverable levels. The database is not sufficient to develop such translators where they are appropriate at the adit discharge. These translators will be developed as the adit discharge is better characterized in the CERCLA consent decree and NPDES programs that will implement the TMDL.

Comment 53: Within Tributary Creek the hardness from adit and seep flows adds to the loading capacity.

Response 53: The hardness from the adit and seeps discharged to Tributary Creek is not detectable at the point of compliance, while the metals are. The hardness must be diluted from the stream system (see response to comment 50).

Comment 54: The TMDL's assessment of point sources is inadequate.

Response 54: The assessment of the adit discharges is based on the database developed for the EPA remedial investigation. The database was developed originally by the Idaho Geologic Survey (University of Idaho) for the USFS. At the time it was the best available data. Additional data on the discharge and metals characterization of the Jack Waite adit was supplied to DEQ by ASARCO's consultants. It has been incorporated into the SBA and East Fork Eagle Creek metals TMDL.

Comment 55: Biological monitoring can be used to establish ecological goals for the basin.

Response 55: Biological goals are appropriate for pollutants such as sediment. In these cases, narrative standards govern the amount of sediment and these standards are tied directly to the full support of beneficial uses. Metals are governed by numeric standards that assume full support of the beneficial use. In the case of metals, the numeric standards must be attained.

Comment 56: Site-specific metals criteria will result in a technically superior TMDL.

Response 56: This may or may not be true. However, at this time and for the foreseeable future (next two years), the current state metals standards are expected to be the governing standards.

Comment 57: By using the EPA developed metals criteria, DEQ already has a sufficient margin of safety.

Response 57: Although conservative, the metals standards are not deemed by DEQ or EPA to eligible as a component of a TMDL's margin of safety.

Comment 58: The flow tier approach provides a margin of safety not acknowledged in the TMDL.

Response 58: The flow tier approach accounts for the seasonal stream discharge and is not a margin of safety factor.

Comment 59: DEQ should not impose metals TMDLs without knowing whether the source reductions will be technically or economically feasible.

Response 59: TMDLs are required by federal law and, in Idaho's case, a court order. These planning documents must be developed and issued by DEQ and EPA to meet the agencies' legal responsibilities. Should the source reductions not be technically or economically feasible, such that the TMDL cannot be met, the CWA contains mechanisms such as use attainability and standards changes to address such situations.

Comment 60: Need to provide information on the relationship between metals and sediments.

Response 60: The SBA indicates the only relationship between metals and sediment. Lead is particulate bound. There is no other relationship between metals (zinc and cadmium in the dissolved fraction and lead on fine particulate) and the sediment (cobble) filling pools in the North Fork. Sediment from mining sources is a very small component, even in the Prichard and Beaver Creek watersheds, when compared to sediment from other sources. On a North Fork-wide basis there is no comparison.

Comment 61: Need to discuss potential and variability of these sources with respect to metals and other pollutants.

Response 61: Variability of sediment discharge to the streams is discussed (see section 2.3.2.5.2; page 36-44) and its episodic nature noted. The variability of metals loads is addressed in the SBA and TMDLs by addressing flow tiers (seasonal discharge)(see section 2.3.2.2.1.4; page 19 and section 3.2.4; page 68).

Comment 62: Need additional information about pH and metals on East Fork Eagle Creek and metals data from the Jack Waite complex. Do Jack Waite or other mines have permitted discharges?

Response 62: The comment was made to an earlier draft of the TMDL. These data are provided in the current SBA (see section 2.3.2.2.1.1; page 16). The Jack Waite adit discharge and the discharge of all adits in Beaver, Prichard, and East Fork Eagle Creeks are not permitted under the National Point Discharge Elimination System program.

Comment 63: The SBA was missing discussion on pollution control efforts to control metals.

Response 63: This material was missing. Metals pollution control is taking shape in the Beaver and Prichard Creek watersheds. This information was added to the pollution control strategy section of the SBA (see section 2.4.2; page 52).

Comment 54: The SBA needs to provide the time frame for activities to achieve water quality standards for metals.

Response: A time line to address metals is provided in the pollution control strategy (see section 2.4.2; page 52).

4.3 Sediment Assessment and TMDL Comments

Comment 55: It is clear cutting that has affected the river causing bank erosion from the peak flows.

Response 55: The flood frequency of the North Fork is analyzed on page 14 (section 2.3.2.1.1). The analysis examines the peak discharge events over the past 62 years. It finds that the 1974 and 1996 high discharge events are the largest of record, and the 1933 event is likely the largest flood of historic times based on photographic evidence and data from the Post Falls and Cataldo gauges. The history of logging shows that clear cuts began in the 1940s and 1950s, intensified through the 1960s and 1970s, and decelerated into the 1980s. The flood history does not support the argument that clear cutting has caused greater flood discharges.

The riverbed is filled with cobble materials delivered by erosion. The presence of cobble bed load material has caused discharges of lesser magnitude to result in more over-bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear cutting.

The SBA was strengthened on page 14 to better describe the flooding affect.

Comment 56: Clearing of vegetation in the river valley and alterations to the banks (sand beach) is causing sedimentation.

Response 56: Clearing and harvesting riparian vegetation along the river has depleted the amount of LOD (tree trunks and stumps) in the river. In recent years, it has been learned that these materials store sediment and create desirable habitat in the river. Most bank alterations of which we are aware have armored the banks with large rock. Sediment input from eroding banks was inventoried and a model sediment yield from this source developed.

The SBA was strengthened to point out the role of LOD and its depletion from the river (section 2.3.2.5.6.2, page 49). This is a habitat concern that cannot be addressed by the TMDL process.

Comment 57: Small streams run clear while the North Fork runs muddy. Wouldn't the tributaries run muddy if logging roads were the cause?

Response 57: Visual observations of sediment in streams, especially based on stream color, can be misleading. Sediment, especially large sediment particles (gravel and cobble), is transported episodically. Often such episodes are missed. It is a common observation that heavily roaded watersheds such as Steamboat Creek evidence a large amount of sediment entrainment during high discharge events.

Comment 58: Forest Service remedial efforts where LOD was added to the stream did not work.

Response 58: We agree these efforts did not work. The approach failure because the streambeds of the North Fork and its tributaries are destabilized by the large amount of bed load in-stream and because of the general lack of very large cedars which likely stabilized the North Fork prior to development. The SBA was strengthened to explain the LOD interactions (section 2.3.2.5.6.2, page 49).

Comment 59: A major contributor is dust from the adjacent roads.

Response 59: Dust from adjacent roads probably contributes some sediment to the North Fork. Based on an air quality analysis of road dust, the assumption of 100 trips per day over a 120-day season, and 18 miles of road adjacent to the river, 32 tons of dust would be generated. If all the generated dust entered the river, then 32 tons of sediment would enter the river. Even with this very conservative assumption that over-estimates the contribution, this is only 0.1% of the sediment load modeled for the river.

Comment 60: A recent likely major contributor is soil removal.

Response 60: Soil removal is a concern in the floodplain and especially on slopes above the river (Teacup Ranch). Since most of the removal has to date occurred on relatively flat grounds and has left a residue of large particles, it is not likely to be a large source of sediment. Removal of soils on slopes will be of greater concern.

Comment 61: Failure to comply with Idaho regulations pertaining to sediments. DEQ used modeling and guidance not in IDAPA 58:01.02-200.08. All parts of subsection 350 are not met.

Response 61: Section 200.08 of the Idaho Water Quality Standards (IDAPA 58:01.02-200.08.) prohibits sediment in quantities that impair designated beneficial uses. DEQ acted in compliance with this section of the water quality standards by using in-stream BURP data to demonstrate that the beneficial uses were impaired and that sediment was filling pools required by the beneficial uses. The modeling was used to estimate the amount of sediment yielded to the watershed. Section 350 of the Water Quality Standards controls enforcement of the standards and the evaluation and modification of best management practices with respect to nonpoint sources

of pollution (Section 350.01.a ["Violations of water quality standards which occur in spite of implementation of best management practices will not be subject to enforcement action."], Section 350.01.b ["[F]ailure to meet general or specific water quality criteria, or failure to fully protect a beneficial use, shall not be considered a violation of the water quality standards for the purpose of enforcement."], and Section 350.02 [provides that if best management practices not met, enforcement actions can be pursued when narrative or numeric standards are violated]. Section 350 of the Idaho Water Quality Standards is not relevant to DEQ's determination of whether water quality meets the requirements of 200.08 or DEQ's development of a TMDL. Section 350, however, will be relevant to DEQ's implementation of the TMDL because it addresses the programs DEQ and other designated agencies will use to make those reductions from nonpoint sources necessary to meet water quality standards.

Comment 62: Use of models and guidance not appropriate in a regulatory context.

Response 62: See response to comment 61. The use of models and guidance to interpret water quality standards and develop TMDLs is clearly authorized by the CWA and state law. The Idaho Administrative Procedures Act allows agencies to develop and use written statements that pertain to an interpretation of a rule or to the compliance with a rule without going through formal rulemaking. Idaho Code section 67-5201(19).

Further it is DEQ’s position that a TMDL is a plan and not a regulation.

Comment 63: No direct monitoring of sediment inputs, yet time to complete this by 2003, page 10 [page 21 (section 2.3.2.3) in final document].

Response 63: Direct quantification of sediment is a most expensive and time-consuming undertaking. If carried out correctly, sediment monitoring should proceed through seven water years. The court schedule did not provide for a seven-year monitoring timeframe, nor does the state have the budget to monitor sediment in the numerous water bodies listed for sediment. The modeling approach was taken for this reason. These points will have been incorporated into the SBA at section 2.3.2.3 (page 21).

Comment 64: Explain "abundant evidence" page 17 section 2.3.2.3 [section 2.3.2.3.1, page 21 in the final document]. It is again noted that bed load is based on modeling not on monitoring. Is there any measure of current bed load not past? Important because current activities blamed for past activities.

Response 64: The “abundant evidence” is provided on pages 21-23 in terms of RASI and residual pool volume data. These data are supported by the model results.

Comment 65: Some discussion of the limitations of RASI should be provided, page 17 section 2.3.2.3.1 [section 2.3.2.3.1, page 22 in the final document].

Response 65: RASI is simply a method to estimate how much of the bed load of a stream is in motion during a two-year flow event. This method is explained in the text. Its limitations are based solely on the selection of point bars and measurements of particle sizes.

Comment 66: Limitations of residual pool volume should be discussed. page 19 section 2.3.2.3.2 [section 2.3.2.3.2, page 22 in the final document].

Response 66: The limitations of residual pool volume measurement are the number of stream feet assessed and the measurement of pool parameters. DEQ uses 20 times the bank full width, as explained in the text, as the number of stream feet assessed because hydrologic theory holds that a stream repeats itself in this reach length.

Comment 67: Many other factors listed could explain the difference in fish population densities between St. Joe and North Fork Coeur d'Alene River, there is time to explore these.

Response 67: The two factors believed by IDFG personnel to affect fish populations on a watershed-wide basis are fish harvest and habitat changes. In this case, the habitat change that the data points to is pool filling by sediment. Idaho Department of Fish and Game management personnel are of the opinion that fishing harvest regulations are better adhered to on the North Fork than on the St. Joe. This opinion points to the sedimentation. A SBA of the St. Joe River above the St. Maries River confluence has been completed by DEQ using a similar approach. This assessment found generally high fish densities and sufficient residual pool volume. The limited RASI data for this segment indicate a stable streambed. These results bolster the argument that sediment filling of pools in the North Fork Coeur d'Alene River is effecting fish populations adversely. Language was added describing the St. Joe River findings on page 26.

Comment 68: CWE method should be completely explained. What information is there on the condition of roads?

Response 68: The IDL, that developed the CWE, documents the method in full in its reports. These reports should have been referenced in the SBA. A reference to an IDL report documenting the CWE (IDL, 2000) has been added (section 2.3.2.5.1.2.1, page 35).

Comment 69: Problems are apparent with sediment model. 1) Cannot comment on applicability of the five reference watersheds 2) Why doesn't the Forest Service not know about failures? 3) Agricultural areas have no delivery route to the North Fork and should be zero. 4) It is hard to understand why burned areas have six times less sediment. 5) Road encroachment based on mean channel width; also fifty feet from the stream is not actual proof of stream in floodplain 6) Not appropriate to annualize events 7) Above shortcomings should be remedied with field surveys.

Response 69: 1) The five reference Belt rock watersheds were assessed in the Coeur d'Alene Lake and River (17010303) SBA (DEQ, 1999**)**. These watersheds all occur on similar Belt geology and in predominantly forested watersheds. Two, Wolf Lodge and Cedar Creeks, are across the ridge from the North Fork watershed. 2) These streams were assessed by CWE and constituted the best means to estimate the failures and CWE scores in the North Fork. The Panhandle National Forests have not developed a road failure survey. As the reference watersheds indicate, road failures are not a large factor on forested Belt terrain. This may be why the USFS has not invested in such a survey. 3) Agricultural lands are located next to the

river in the floodplain. Close inspection will find micro-drainages to the river. The RUSLE model assumes stream delivery when agricultural lands are adjacent to a water body. 4) Areas that were heavily burned were not assessed to yield six times less sediment. Rather, these values are a correction bringing acreage that is treated as fully stocked up to the level of non-stocked. The rationale for this is that large double burn areas yield sediment for many years to streams. Latour Creek is an example of a stream with this phenomenon. The adjustment was deemed necessary by the sediment Technical Advisory Group (TAG) advising DEQ as to the best means to take such cases into account by the model. 5) As demonstrated in Appendix C, the mean channel width is developed from a very large data set. The sediment TAG attempted to develop this value continuously using a GIS approach and relations between stream bank full width and watershed size. This approach is at the edge of GIS capability (students at University of Washington are working on software to do this). For this reason DEQ defaulted to the mean bank full width approach. The 50-feet estimation was the parameter agreed upon by the sediment TAG. This is an assumption that will be verified in any road removal implementation along with a host of other considerations. 6) TMDLs are stated in mass per unit time. Thus, annualization is necessary for a pollutant that loads episodically. 7) The funding and time are not available to study the many issues brought up. These will be studied on a site-by-site basis as the plan to implement the TMDL is executed. These seven points have been clarified further in the document text.

Comment 70: Stream's bank and bed owner is the state of Idaho. If sediment is a problem, DEQ must address the problem by sediment regulations.

Response 70: The format by which any water quality limitation is addressed is clearly outlined in sections 303(d) and 303(e) of the CWA. This is to assess the problem, set goals for allocation of the pollutant of concern, and develop an implementation plan to meet these goals and allocations. This TMDL process is the process the state is following to comply with the CWA and a judicial order.

Comment 71: [What is the (m)Method of USGS measurement at Harrison.

Response 71: USGS measured suspended and bed load at Harrison. However, more pertinent data, from Enaville, is in the feasibility study for the North Fork. This information was from bed load and suspended load collection. The North Fork Coeur d'Alene River at Enaville data was used in the revised SBA text. The feasibility study and the USGS method from the remedial investigation and feasibility study documents are referenced.

Comment 72: The Idaho proposal will worsen flooding. The SBA does not examine the relationship between clear cutting and floods. The SBA prescribes cutting to remedy the situation and assumes receipts from timber sales can be used to fix road problems.

Response 72: The subbasin assessment does examine clear cutting and flooding. The flood frequency of the North Fork is analyzed on page 14 of the SBA (section 2.3.2.1.1). The analysis examines the peak discharge events over the past 62 years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and data from the Cataldo and Post Falls gauges.

The history of logging shows that clear cuts began in the 1940s and 1950s, intensified through the 1960s and 1970s, and decelerated into the 1980s. The flood history does not support the argument that clear cutting has caused greater flood discharges.

The SBA does not take a position on timber harvest. It clearly states this fact on page 53. It simply states that if timber harvest is pursued (a decision of the USFS, BLM, IDL, Louisiana Pacific, and numerous private landowners), the pollution credit idea suggested might be instituted to make road remediation a part of doing business.

The SBA was revised to further clarify that the data of high discharge occurrence does not support the contention that clear cutting increases flood frequency or high discharge event size.

Comment 73: Idaho would damage fisheries. By cutting more trees flooding would be worsened and more sedimentation would occur.

Response 73: This comment is based on the erroneous assumption of the comment 72. The flood frequency analysis and flood data do not support the contention of increased discharge. The data in hand do not indicate that cutting trees necessarily increases sedimentation markedly.

Comment 74: Idaho would further pollute Washington with toxic floods. Floods from the North Fork carry metals contamination through Coeur d'Alene Lake and into the Spokane River and Washington.

Response 74: The comment assumes that the SBA advocates timber harvest and by clear cutting. The comment further assumes that clear cutting creates greater discharges to the Coeur d'Alene River where metals contaminated sediments are entrained.

The SBA does not take a position on timber harvest. It clearly states this position on page 53. It simply states that if timber harvest is pursued (a decision of the USFS, BLM, IDL, Louisiana Pacific, and numerous private landowners), the pollution credit idea suggested might be instituted to make road remediation a part of doing business.

The flood frequency of the North Fork is analyzed on page 14 of the SBA (section 2.3.2.1.1). The analysis examines the peak discharge events over the past 62 years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and data from the Cataldo and Post Falls gauges. The history of logging shows that clear cuts began in the 1940s and 1950s, intensified through the 1960s and 1970s, and decelerated into the 1980s. The flood history does not support the argument that clearcutting has caused greater flood discharges.

The riverbed is filled with cobble materials caused by erosion. The presence of this cobble material has caused discharges of lesser magnitude that have resulted in more over-bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear cutting.

We respectfully suggest that both assumptions upon which the comment was based are in error.

Comment 75: The support of fish is based on three narrow criteria in the TMDL. The TMDL does not take into account other factors such as how fish introductions affected fish populations in the North Fork.

Response 75: The TMDL is designed to address only the pollutant of concern, which in this specific case is sediment. We agree that many other factors affect fish populations. These include non-native fish introductions, habitat alteration, and fishing pressure, among others. The TMDL implementation plan will acknowledge these other factors and either make provision for them or set surrogate measures of sediment control that, once met, will meet the TMDL. This has been clarified in the SBA.

Comment 76: A TMDL should not be developed for excess sedimentation.

Response 76: The TMDL is developed for that sediment which is estimated to be in excess of the watershed's ability to attenuate the sedimentation. This value is set at 50% above background, because the upper basin, which is supporting its uses, is at 43% above background and the Washington Forest Practices Board guidelines (1995) find no deleterious effect to water quality under 50% above background.

Comment 77: Since the root parameter of concern is hydrologic modification, section 303(d)(1)(A) cannot be used as an authority to develop the TMDL for segments impacted by nonpoint sources and habitat alteration.

Response 77: The SBA finds that sediment is the pollutant of concern not hydrologic modification. Sediment is a pollutant that can be allocated on a mass per unit time basis in a TMDL.

Comment 78: None of the sedimentation mechanisms outlined on pages 43-44 [pages 45-48 in the final document] can be classified as point source pollution. Section 319 CWA should be used to address nonpoint sources.

Response 78: DEQ disagrees that TMDLs are only required for waters impaired by point sources. TMDLs are a part of the water quality-based approach under section 303 of the CWA that is clearly not limited to point sources. For additional clarification, see Pronsolino v. Browner (2000) and Response to Comments regarding the TMDL for dissolved cadmium, lead and zinc in the Coeur d'Alene River Basin at pages 57 to 60 (EPA-DEQ 2000).

In addition, Idaho law clearly requires TMDLs to address both point and nonpoint sources of pollution (Idaho Code sections 39-3602(27) [defines TMDL to include load allocations for nonpoint sources] and 39-3611[directs development of TMDLs to control point and nonpoint sources of pollution]). The segments of the North Fork Coeur d'Alene River are listed on both the 1996 and 1998 Idaho 303(d) water quality limited segments list. The SBA for the North Fork confirmed that the waters at issue do not meet state water quality standards. Therefore, TMDLs are required under CWA section 303(d).

Comment 79: The TMDL does not address the high volume of water discharge from the North Fork Coeur d'Alene River watershed. It is not explained how the discharge affects mitigation

efforts. It does not address how the large volumes of waters affect the fisheries. There is no indication of how fishery habitat will improve. These contentions are backed by USGS discharge data. This data covers the peak flow events between 1995 and 1999.

Response 79: The flood frequency of the North Fork is analyzed on page 14 of the SBA (section 2.3.2.1.1). The analysis examines the peak discharge events over the past 62 years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and data from the Cataldo and Post Falls gauges. The history of logging shows that clear cuts began in the 1940s and 1950s, intensified through the 1960s and 1970s, and decelerated into the 1980s. The flood history does not support the argument that clear cutting has caused greater flood discharges.

The riverbed has filled with cobble materials caused by erosion. The presence of this material has caused decreases in discharges that have resulted in more over-bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear cutting.

Although the flood frequency analysis does not support higher discharges due to vegetation removal (clear cuts) in the main river system, this may occur on first and possibly second order tributaries in the watershed. The effect is lost by the desynchronous snowmelt as watersheds become larger. Unfortunately, no long-term stream gauging has been completed on the first and second order tributaries as it has been at Prichard and Enaville.

The SBA was strengthened on page 14 to point out that peak discharges may be altered in the first and second order watersheds with the caveat that no direct data is available to support this suspicion.

Comment 80: Pulling culverts does not address and making roads infiltrating surfaces will not address the high discharges.

Response 80: We respectfully disagree. Any measure that causes water to infiltrate into the shallow ground water system rather than to run off will decrease discharge.

Comment 81: The assessment finds streambed instability and pool filling, yet DEQ's policy not to address flow alteration and habitat modification will not address this streambed instability.

Response 81: The issue that can be addressed by a TMDL is sedimentation of pools. The instability is, in our opinion, caused by sediment loadings in excess of 100% above background (in some watersheds up to 200% above background). Flood frequency analyses indicate that discharges are not remarkable higher or more frequent after clear cutting (see page 14).

Comment 82: Issues concerning the technical correctness of the WATSED model are raised by the comment.

Response 82: The WATSED model was not used as the sedimentation model. The coefficients that WATSED employs for forestland sediment yield were used. The assessment incorrectly identified these as WATSED coefficients which caused this confusion. These coefficients are

now correctly identified as mean coefficients developed from in-stream sediment measurements on Belt terrain of northern and north central Idaho.

Comment 83: Channels do not recover immediately after hill slope recovery. This lag applies to heavily logged portions of Shoshone, Yellowdog, Flat, Steamboat and the Little North Fork. The assessment does not take into account the time required for this recovery.

Response 83: The model used in the assessment does not deal with stream channels. The model considers the yield of the pollutant of concern (sediment) to the streams of the watershed only. We agree that impacts have occurred to stream channels and habitat; however, these are not impacts judged by EPA and the state to be applicable to TMDL treatment. Certainly, in any TMDL implementation plan to address excess sedimentation, the state will urge the USFS to adopt a holistic view to manage the landscape and stream continuum. However, the ability of the state to require habitat restoration is limited in the TMDL process.

It was clarified in section of the SBA (section 2.3.2.5.6.4, page 50) that factors other than sediment should be addressed holistically in any implementation plan.

Comment 84: The TMDL will not meet the "fishable" goal of the Clean Water Act or the NFMA [National Forest Management Act].

Response 84: The TMDL is designed to address the pollutant of concern, which is sediment. The fishability of a stream is dependent on excess sedimentation, but also on a number of other potential constraints such as fishing pressure, loss of habitat, loss of LOD, introduction of competitor or predator species, etc. Unfortunately, a TMDL can only deal with water quality pollutants of concern and not the many other factors that make streams "fishable." The fishable goal is fishable within the constraints of the CWA that addresses but a single component the complex habitat of fish.

A discussion was placed in the SBA (section 2.3.2.5.6.4, page 50) on the limitations of the CWA and TMDL in particular.

Comment 85: Logged watersheds have higher discharge during rain on snow events and the affect persists out to 68 years.

Response 85: This comment is a follow-up to a comment made on an earlier version of the SBA. The flood frequency analysis does not support this assertion as stated in response to an earlier comment (comment 55). The clear-cut acreage values, provided in your comment of May 2, 2000, clearly demonstrate that clear-cut acreage has increased for the 68 years since 1933. Yet the 1996 high discharge event did not have as large a discharge as the 1974 high discharge event, and that event is believed, based on photographic evidence and Post Falls and Cataldo gauge data, not to have been as large as the 1933 event. This pattern is contrary to the thesis that logged watersheds have higher discharge during rain on snow events.

Comment 86: Sentences on flow alteration provided for the record. From Section 1 page 2 of U.S. Forest Service Hydrologic Effects of Vegetation Manipulation Part II Haupt, H. F. et. al. 1976.

Response 86: This material is noted. The SBA has been altered to indicate that discharge alteration is possible, but unproven, in the first and possibly second order tributaries. However, the flood frequency analysis clearly indicates that this effect is soon diminished in the larger order streams and is not detectable at the USGS gauge sites.

Comment 87: RASI Indices located on pages 14 and 15 (page 22 in the final document). The interpretation of RASI is that bed particles move in high percentages is related to high flows and not road construction.

Response 87: RASI measurements indicate the percentage of the particle size distribution moving in-stream during the two-year flow event. The reason for that movement may be varied. It may be a function of stream power, but it may also be a function of increased sediment yield to the stream.

Comment 88: Land use data located on pages 21-27 (pages 27-33 in the final document). Tables leave out the number of acres that have been logged by Forest Service timber sales.

Response 88: DEQ was advised by its sediment technical advisory group that forest acres that had been harvested, but that were now fully stocked with young trees, seedlings, and saplings, do not yield sediment at any greater level than areas in coniferous forest. A model was run assigning land types in seedlings and saplings a higher sediment yield to verify the magnitude of the difference. The difference was found to be a small component of the sediment source. For these reasons, DEQ modeled land use contribution of sediment by assigning non-stocked areas the maximum value of the sediment yield range for coniferous forest on Belt geology, while all other forestland was assigned the mid-range value. These details of the modeling are described in Appendix C.

Comment 89: Forest Land sediment yield and export located on page 28 (page 34 in the final document). Comment on the correctness of the WATBAL model.

Response 89: The sediment yield coefficients were incorrectly referred to in the SBA as the WATSED coefficients. This has been corrected. The coefficients are the mean coefficients for Belt geology developed from in-stream sediment measurements in northern and north central Idaho. The mis-identification led to the mistaken idea that WATSED and WATBAL were used to estimate sediment yield. This is not true.

Comment 90: Sedimentation mechanisms located on page 38 [page 45 in the final document]. Sentence near bottom of page is not clear in that it ascribes channel instability to stream power and sedimentation. Regenerative logging is adding to stream power and is important in stream instability. It appears some sentences are missing.

Response 90: The missing sentences have been restored (section 2.3.2.5.4, page 45).

Comment: Vegetation alteration located on pages 39-48 [page 46 in the final document]. The federal and state laws that the Forest Service must comply with are listed. The assessment does not address watersheds the Forest Service classifies as nonfunctional or functioning at risk. Issues are stated with Forest Service NEPA [National Environmental Policy Act] documents. There is no discussion in the assessment of why the damage happened. Would not a literature search and review of Forest Service documents be appropriate? TMDLs that deal with sediment alone and do not address bed load sediment will not meet the requirements of the CWA.

Response 91: The SBA addresses the listed pollutants of concern. It does not delve into the many federal or even CWA requirements the USFS is required by federal law to adhere to. The SBA must remain focused on the pollutants of concern and it must make the case that the pollutants are impairing beneficial uses.

Comment 92: Pollution control strategy located on page 44 [page 52 in the final document]. Additional timber sales will not solve the water quality problems of the North Fork Coeur d'Alene watershed.

Response 92: The Pollution Control Strategy section (section 2.4.2, page 52) suggests two methods by which the sediment yield might be controlled. One of these would require timber harvest. The SBA has been modified to not take a position on timber harvest. It clearly states this position on page 53. It simply states that if timber harvest is pursued (a decision of the USFS, BLM, IDL, Louisiana Pacific, and numerous private landowners), the pollution credit idea suggested might be instituted to make road remediation a part of doing business.

Comment 93: Fish density measurements do not address sediment impacts. What other data was collected with the fish surveys? Several factors affect fish density.

Response 93: A SBA must assess all the available data concerning the watershed, including fisheries data. Fisheries data gathered by DEQ were collected separately from BURP program. The University of Idaho, IDFG, and USFS collected a considerable amount of the data as cited. The BURP data contain only fish tally data and a few other parameters concerning the electrofishing. Very little other data is collected with the fishery data in general.

Comment 94: Pollution sources such as splash dams, log drives, hydraulic and placer mining, LOD removal by riparian harvest and/or flood control and hydraulic modifications have not been addressed. These have added sediment to the stream that can take decades or centuries to route through the system (several papers cited).

Response 94: The sources listed above were mentioned but not adequately addressed. The SBA was modified to better address these influences (section 2.3.2.5.6, pages 48-50). However, none of these influences are adding the pollutant of concern, sediment, to the river at this point. The lack of LOD because of removal is affecting habitat, but the TMDL does not address habitat, or for that matter, the fate and transport of the pollutant of concern, sediment, in-stream. These influences have been noted more fully in the SBA, but the SBA must concentrate on sediment sources now not those of the past.

Comment 95: Rivers transport large volumes of sediment naturally. Pools are a transit feature of streams. Many features of the stream other than sediment control pool volume and frequency.

Response 95: We agree with the general statements of this comment; however, streams can receive too much sediment. Based on the best studies we have available, this threshold is between 50% and 100% above background. It is clear from observation of the Coeur d'Alene River at Kingston and comparison of the current situation with the historical descriptions (Russell, 1985) that the sediment load to the North and South Forks has increased markedly. The sediment yield model, used in the assessment and independently verified to be in the proper range with USGS measurements, indicates the increase is over 100% of background in most of the sub-watersheds of the North Fork. Increased sedimentation is a cause of pool filling. Since sediment is a pollutant of concern for which TMDLs must be developed, the assessment can come to but one conclusion.

Comment 96: Riffle armor stability (RASI) is not a published peer review method. RASI values provided do not correlate with residual pool volume measurements provided. RASI, pool volume and fish densities are compared indicating the three cannot be correlated with any strength. The data indicates an opposite trend. The data do not support the conclusions of the TMDL. The data is incorrectly interpreted, it is suggested the sediment TAG be reconvened to discuss the data.

Response 96: The RASI method is considered by DEQ to be a good technique for providing information about the streambed sediments. We have no guidance on the use of any method based on peer review. The correlation between RASI, residual pool volume, and fish population explains only a small percent of the variation in the North Fork data set or, for that matter, in the entire data set for the Coeur d'Alene Lake and River, Rathdrum-Spokane, North Fork, or St Joe HUCs. As stated in the response comment above, it cannot be expected that a significant correlation could be developed between sediment impact surrogates such as RASI, residual pool volume, and fish density. Such a correlation would presuppose that the electrofishing was completed at that exact time when that environmental factor was limiting (Barthalow, 2000) This is unlikely. DEQ believes it can use a weight of evidence approach to demonstrate sediment impact. The sediment TAG was formed to develop a sediment model, not to decide on the weight of evidence that a listed stream is impaired. Such final decisions are reserved for DEQ and EPA.

Comment 97: Residual pool volume is controlled by many factors. The TMDL does not address the many factors (listed), which affect pool volume in a stream. No correlation between fish density and pool volume can be found. The data presented in this TMDL does not properly or correctly address bed load transport process and sediment transport through gravel cobble river systems.

Response 97: As stated in the responses above, the TMDL addresses the pollutant of concern: sediment. Residual pool volume and fish density correlations are addressed in the response to comment 96. The TMDL addresses only sediment sources and does not address the fate and transport of the pollutant in the stream system. Adequate models are not available in our opinion to address the fate and transport of sediment, especially bed load sediment. The key to any

pollutant control is to control the source not the fate and/or transport. The TMDL addresses the pollutant sources, limiting these sources to yearly loads.

The SBA was changed to further clarify the pollutant addressed by the TMDL and the features of the stream that are not.

Comment 98: The SBA ignores basic principles of stream channel hydraulics and bed load sediment transport. The SBA ignores a century of impacts, ignores the introduction of fish species. The comment points out that Chinook salmon spawn successfully in the North Fork during the fall and winter.

Response 98: The comment on channel hydraulics and bed load sediment is addressed in comment 94. A TMDL addresses pollutant sources, not fate and transport. The level of sediment in this TMDL is addressed using the Washington Forest Practices Board guidelines as the best available knowledge (1995). Issues such as habitat alteration and fish introduction are not issues to which TMDLs are applicable. We agree that Chinook salmon appear to spawn successfully in the lower Coeur d'Alene River. It is not known if Chinook populations are affected by high flow events. Little is known about its relative spawning success in the Lower North Fork. The SBA was augmented to address the century of impacts (see section 2.3.2.5.6; page 48).

Comment 99: The SBA uses residual pool volume as an indicator, yet it is an indicator of habitat alteration that DEQ and EPA indicate is not applicable to TMDL treatment.

Response 99: The SBA uses residual pool volume as an indicator of the influence of the pollutant of concern, which is sediment. The TMDL does not attempt to allocate residual pool volume, but allocates the pollutant. The comment confuses the SBA with the TMDL allocations.

Comment 100: The data should be subjected to standard statistical analysis.

Response 100: This is an unrealistic standard because it pre-supposes that correlation is possible, when the measurements of fish density would be required at the exact time that a feature such as residual pool volume is limiting (Barthalow, 2000). DEQ uses a weight of evidence approach to identify the problem, then uses models to determine sedimentation rates. The sediment yield model results are verified using independent measurements known to be in the correct range.

Comment 101: The impacts of historical sedimentation have not been fully taken into account.

Response 101: As stated in response 94, historical sediment sources now have a fuller explanation in the SBA. However, the TMDL is not concerned with historic sediment sources. It is concerned with current sources that verified modeling demonstrate are well above the level expected to cause water quality problems. The TMDL addresses pollutant (sediment) sources, not history. This is a limitation of the TMDL approach.

Comment 102: Bed load monitoring should be instituted and monitored on an annual basis.

Response 102: DEQ does not have the resources to support bed load monitoring in a watershed as large as the North Fork Coeur d'Alene River. If sediment monitoring were required on all the sediment-impaired streams in Idaho, it strain financial resources. The North Fork is not special in this respect. To meet the court-imposed deadlines, a sediment modeling approach must be taken.

Comment 103: A sentence or two should be added (p3) that flood events may occur occasionally on individual low order tributary streams and these may add additional bed load.

Response 103: Language indicating that fist and second order watersheds may experience peak flows due to vegetation modification has been added to the flood frequency section (section 2.3.2.1.1; page 15) of the SBA.

Comment 104: The assessment focuses on sediment and does not address streambed movement and instability, peak flows from canopy removal and bed load movement.

Response 104: The SBA focuses on sediment because sediment is the pollutant of concern. Bed load movement and instability are habitat issues that may be exacerbated by excess sedimentation. Peak discharge alteration was not demonstrated by the flood frequency analysis, but is a matter of flow alteration. Canopy removal, like riparian logging impact on LOD recruitment, is an issue of habitat alteration. The issues raised are matters of either habitat or flow alteration, both of which have been deemed by DEQ and EPA beyond the scope of TMDLs because these effects cannot be allocated in mass or energy per unit time.

Comment 105: The assessment does not provide an explanation of how the damage occurred. The assessment needs to explain how new road construction will not cause additional damage. It is not clear that the stakeholders endorse the proposal.

Response 105: The SBA contains this information, but it is within the model interpretation (See pages 35 and 36). It is clear that roads that encroach on streams, and to a lesser extent stream crossings, are the major sediment contributors. This is not to say that non-stocked forest acres, mass failures, and other sources are not site specific problems, but these are minor sediment sources. The construction of new roads will be with methods and in locations that will solve these problems. In many cases, old roads must be removed. These issues are covered in the pollution control strategy. The stakeholder agreement was on sediment model development. That model was then applied and the sources identified. The SBA has been modified to further clarify the sources.

Comment 106: The SBA concludes that a sediment TMDL is not needed for Beaver Creek because fish density and residual pool volumes are similar to reference streams. Provide the reference stream studies.

Response 106: The reference stream data is provided in Tables 13 (residual pool volume) and 14 (fish density). These data for reference and listed streams are drawn from the BURP database and various fishery studies referenced in Tables 13 and 14, respectively. Buckskin Creek is the control stream of the most analogous size to Beaver Creek. Beaver Creek appears to have

adequate residual pool volume, while its fish density and composition are similar with control stream.

Comment 107: Section 2.3.1 fails to specifically identify active clear cut logging that continues in the North Fork. A Forest Service memo shows the clear-cut acres that have been logged. This information should be incorporated in the SBA.

Response 107: We disagree. Clear cut logging over 40 acres is rare in the forest. The contention is made that clear cuts add remarkably to sedimentation; however, modeling with all non-stocked, seedling and sapling cover types assigned the highest sediment yield coefficient for coniferous forest on a Belt geology demonstrated only marginally higher sediment discharge to the streams. The strongly held conviction that clear cuts themselves markedly increase sedimentation does not hold up to analysis. These points were expanded on in the SBA. The level of land treatment over the history of the forest is estimated in section 2.1.2 (page 7).

Comment 108: Section 2.3.2.3.2 indicates that poor residual pool volume is due to channel instability. What are the causes of the channel instability?

Response 108: The causes of channel instability can be stream power or excess sedimentation as explained in section 2.3.2.5.4 (page 45). The flood frequency analysis does not support higher than normal discharges based on existing data from the gauges and the flood history. The assessment has been revised to suggest that first and second order tributaries might have higher discharges after harvest but no data fully supports this. Such effects are de-synchronized in the larger watershed. The model clearly indicates excess sedimentation. The SBA comes to the conclusion excess sedimentation is the most likely cause of bed instability and pool filling, and the sediment TMDL addresses that sedimentation.

Comment 109: Section 2.3.2.4 indicates that trout densities have declined due to angler pressure while USFS EIS [Environmental Impact Statement] ascribes it to habitat alteration. Information from the EIS should be included in the SBA.

Response 109: The SBA considers fishing pressure as a possible cause of low densities; however, the SBA is clear in ascribing low trout density to sedimentation. DEQ would rather draw its own conclusions based on the data rather than to rely on others' interpretations of the data. Regardless, the SBA came to the same conclusion as the USFS EIS.

Comment 110: Suggest more information on vegetation manipulation and its impact on flows.

Response 110: The flood frequency analysis and flood data do not support the contention that vegetation manipulation has altered discharge on a large basin basis. The flood frequency of the North Fork is analyzed on page 14 of the SBA. The analysis examines the peak discharge events over the past 62 years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and data from the Cataldo and Post Falls gauges. The history of logging shows that clear cuts began in the 1940s and 1950s, intensified through the 1960s and 1970s, and decelerated into the 1980s. The flood history does not support the argument that clear cutting has caused greater flood discharges basin wide.

The riverbed is filled with cobble materials from erosion. The presence of this material has caused discharges of lesser magnitude that have resulted in more over-bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear cutting.

Higher discharge may occur in first and second order tributaries, but no data exist to support this contention. We have found the belief that clear cutting increases discharges in the Coeur d'Alene basin to be firmly held, but with little evidence to support it. The SBA was altered in many places to clarify this picture.

Comment 111: Would it be helpful to further describe the specific control efforts taken in the Steamboat Creek watershed?

Response 111: These controls were road removal actions. This fact was noted in the Control Actions to Date section (section 2.4.1; page 51). It was noted that the Autumn and Martin Creek actions were road removal actions.

Comment 112: To understand the cost of road removals it would be helpful to include additional details on the number of feet of roads to be removed and the costs.

Response 112: This assessment was not made directly for the SBA modeling, but estimates are available in the GIS coverages. It would be premature to make such an assessment at this time since the estimates require ground truthing. Such an estimate is much more reasonable as a part of the implementation plan.

Comment 113: Other pollutant control alternatives should be considered because this pollution control effort would not lead to attainment of water quality standards.

Response 113: We respectfully disagree that with the commenter's assertion that road removal pollution control strategy would not work. Model results based on the most current GIS databases clearly point to encroaching roads and road crossings as the major sediment source to the North Fork watershed. The record indicates, and is supported by model results, that if roads are properly sited and constructed, sediment yield from them is a small fraction of that from improperly sited and constructed roads. The USFS has demonstrated road removal is effective. The only outstanding question is how to pay for it. Road removal is a tested technology that must be paid for by some funding mechanism; two are mentioned in the SBA, including an innovative suggestion originally made by a Watershed Advisory Group member. However, it is not for DEQ or EPA to decide such funding issues directly.

Comment 114: Sediment impacts in the North Fork Coeur d'Alene are primarily bed load impacts to salmonid spawning through filling of habitat as well as physical injury to redds. Are sediment reductions, fines, bed load or total sediment yield?

Response 114: Sediment reductions in the TMDL are total sediment yield reductions. It should be clarified that the sediment impact is suspected to be pool filling. Fine sedimentation of redds does not appear to be a problem, as young of the year are detected in most tributaries, which is where spawning occurs.

Comment 115: The TMDL should consider using course sediment targets i.e. pool frequency targets, residual pool volume targets, depth fines target.

Response 115: We do not agree the allocation should use surrogates of sediment mass per unit time. We do agree that residual pool volume targets would be of value in the implementation plan. The SBA and TMDLs indicate that the implementation plan should contain residual pool volume targets.

Comment 116: On page 23, section 2.3.2.5 [page 26 in the final document], the sediment section should include a "front end" introductory piece that provides some background information and information on modeling assumptions.

Response 116: The model assumptions are laid out in section 2.3.2.5.1, pages 34 through 36. Since the model assumptions and its documentation are so important, we have expanded this discussion greatly in Appendix C. More discussion would burden the basic thrust of the SBA.

Comment 117: On page 31, section 2.3.2.5.1.1.1 [page 34 in the final document], agricultural land was not incorporated into the analysis. Yet grazing in the lower basin.

Response 117: In the case of the North Fork Coeur d'Alene River, the agricultural land is all grazing land. The RUSLE coefficients are applied to this land in the Little North Fork and the lower North Fork sub-watersheds. Grazing is not practiced elsewhere to any great extent.

Comment 118: On page 31, section 2.3.2.5.1.1.1 [page 34 in the final document], the TMDL should say where/why the agricultural sediment yield coefficients were applied.

Response 118: The agricultural coefficients are applied to the grazing land. This has been clarified in the SBA.

Comment 119: On page 31, section 2.3.2.5.1.1.3 [page 35 in the final document], the TMDL indicates paved roads were assigned a sediment yield coefficient at the low end for the Belt geologic type. The assessment should rationalize this coefficient and refer to table 15.

Response 119: This assumption is rationalized in Appendix C. Its use is clarified in the SBA.

Comment 120: On page 42, first paragraph and section 3.1.4, the TMDL fails to adequately define how background sedimentation was calculated. Natural and background sedimentation rates are confused.

Response 120: Natural and background sedimentation rates were used interchangeably as the amount of sediment yield expected from the fully forested watershed. We believe this was explained in the text; however, this point has been further clarified in the SBA and TMDL.

Comment 121: On page 42, first paragraph and section 3.1.4 [section 3.1.4, page 57 and 58 in the final document], the TMDL should provide an explanation of why 50% above background was selected as the goal when 50% is still in the chronically detectable range. The TMDL should show how 50% does not affect the beneficial uses.

Response 121: The TMDL cites the Washington Forest Practices Board guidelines (1995). These guidelines indicate clear water quality problems above the benchmark of 100% above background and the possibility of chronic effects between 100% and 50% above background. Below 50% above background they speak only to "detectable" sediment. To our knowledge, sediment is always detectable in streams, since it is a natural component of streams. DEQ reads the Washington Forest Practices Board guidelines (1995) to clearly indicate that water quality problems below 50% above background do not occur. These points are made clear in section 3.1.4.

The TMDL on page 57 was further expanded to show that the Upper North Fork subbasin supports its beneficial uses and is at 42.8% above natural background. This information is used to further support the goal of 50% above background.

Comment 122: On page 43, section 2.3.2.5.3 [section 2.3.2.5.2, page 45 in the final document], a residual pool volume target may be necessary.

Response 122: See the response to comment 115. We expect to recommend this for the implementation plan, but the allocation (TMDL) must address mass per unit time as is required in federal regulations.

Comment 123: The summary fails to identify timber extraction activities as a source of sedimentation in the watershed.

Response 123: Timber extraction is a fuzzy term. The assessment deals with all aspects of timber extraction. It provides higher yield coefficients for non-stocked forest acres (those not replanted and established) and it addresses roads on which timber is exported. Timber extraction, as the actual removal of the logs, has no identified, quantifiable impacts other than these. The summary was assessed to make clear the removal of vegetation from landmasses and the impacts of roads are addressed. It is unlikely the term timber extraction itself will be used.

Comment 124: In section 3.1.4, Loading capacity [page 57 in the final document], Table 3 [Table 4, page 12 in final document], Table 17 [Table 18, page 44 in final document] in Section 2, table 3 [Table 22, page 58 in final document] in Section 3 and table 13 [Table 32, page 66 in final document] in section 3 are all different. These tables should all be consistent.

Response 124: These tables are different for a reason. Table 17 [Table 18, page 44 in final document] is the model results for the major subbasins of the watershed. Table 3 [Table 22, page 58 in final document] is the loading capacity, the load allowable at the point of compliance in tons per year. Table 13 [Table 32, page 66 in final document] is the estimated reduction necessary upstream of the point of compliance in tons per year. Simple subtraction demonstrates the modeled sediment at the point of compliance minus the loading capacity. The tables and their distinctions are further clarified in the SBA and sediment TMDL.

Comment 125: In section 3.1.8, Table 13 [Table 32, page 66 in final document], subbasin sediment allocation Table 13 does not indicate how the existing sediment load was calculated. The TMDL should clearly state how the percentage load reduction was calculated.

Response 125: The table takes the modeled sediment yield from the watershed above the point of compliance and subtracts the loading capacity at the point of compliance. This point has been clarified in the TMDL.

Comment126: It is unfortunate that so little sediment delivery data has been developed for the North Fork Coeur d'Alene River. Background estimates are based on WATBAL and WATSED coefficients Has WATBAL or WATSED been validated? Neither model is considered to provide accurate estimates of sediment loading from roads and openings.

Response 126: The SBA and the TMDLs must be based on the best available data. It is unfortunate that more data is not available, but the TMDL must be developed on the data that exists.

The WATSED and WATBAL models were not used in the sedimentation model. The coefficients that WATSED employs for forestland sediment yield were used. The assessment incorrectly identified these as WATSED coefficients causing this confusion. The coefficients have been correctly identified as mean coefficients developed from in-stream sediment measurements on Belt terrain of northern and north central Idaho.

Comment 127: It's a hydrological fact that destruction of pool and other habitat and bed load movement are directly due to more frequent natural peak flows. A direct correlation has been established between higher more frequent flood events and canopy removal and road density.

Response 127: We respectfully disagree that "a direct correlation has been established between higher more frequent flood events and canopy removal and road density." The flood frequency analysis developed from the existing gauge data (page14) indicates that the 1974 and 1996 floods are the largest in the analysis of the Enaville and Cataldo gauges. The 1933 flood appears to have had a higher discharge based on photographs and Post Falls and Cataldo discharge data. Thus the three largest discharges were 1933, 1974, and 1996, in that order. The canopy removal and road construction in the North Fork have increased steadily since 1933, probably peaking in the early 1980s. If these factors increased discharge on a basin-wide basis, the opposite flood history would be expected. Flood discharge appears to be weather related and not a management related phenomenon based on the available data.

It is suspected that peak discharges may be altered by management actions in the first and second order tributaries of the watershed. Discharge is not de-synchronized in small watersheds as it is by the complex slopes and aspects of the larger watershed. Unfortunately these streams have no long-term stream discharge gauging covering large discharge events, so this suspicion cannot be proven.

The SBA has been strengthened on page 15 to point out that peak discharges may be altered in the first and second order watersheds with the caveat that no direct data is available to support this suspicion.

Comment 128: The commenter disagrees with the assumption that the impacts on water quality of canopy loss resulting from fire under natural conditions are equal to canopy loss from logging. Point out that WABAL and WATSED have not been verified; question coefficients used.

Response 128: The fire areas that were modeled to be equivalent to non-stocked areas are not typical fire areas as is pointed out in the Model Assumptions and Documentation (Appendix C). These are areas that have suffered double fire events within a decade or two of each other. Areas like these lose most woody material in the second fire. Pictures of this type of burned area may be viewed in Russell's *North Fork of the Coeur d'Alene River* (1985). It takes these areas many years to re-establish a forest cover and during this period have higher sediment yields. The model accounts for these areas loading to the stream over time by adjusting the yield coefficient to that of a non-stocked area.

The WATSED model was not used in the sedimentation model. The coefficients that WATSED employs for forestland sediment yield were used. The assessment incorrectly identified these as WATSED coefficients causing this confusion. These have been correctly identified as mean coefficients for Belt geology developed from in-stream sediment measurements in northern and north central Idaho.

The sediment yield adjustment for double burn areas and identified sediment yield coefficients as mean coefficients developed from in-stream sediment measurements on Belt terrain of northern and north central Idaho has been further clarified in the SBA.

Comment 129: The sediment TMDL deals with sediment sources but does not address the main problem of channel instability caused by peak flows.

Response 129: The sediment TMDL deals with the pollutant of concern, which is sediment. This is not to say that other factors do not affect the stream. Although the data does not support peak flow alteration on a basin-wide basis, elements such as LOD removal and lack of LOD recruitment clearly affect habitat and bed load mobility. These features are important but cannot be addressed under TMDLs. DEQ will urge development of a TMDL implementation plan that takes a broader view of these habitat issues that the narrow focus of the TMDL pollutants of concern.

The SBA was strengthened to point out the many habitat problems the TMDL itself does not address.

Comment 130: The commenter believes extrapolation of Washington State Forest Practices Board guidelines to Idaho watersheds is not warranted.

Response 130: The Washington Forest Practices Board guidelines (1995) are the published reference that both EPA and DEQ use to compare model results to the probability of water quality violation. It constitutes the best available information on which TMDLs must be based.

Comment 131: How will the "finite ability to process sediment" be determined?

Response 131: As stated in the TMDL, it will be determined by bio-monitoring the cold water biota. When the cold water biota meet the criteria stated in the TMDL, that finite ability to process sediment will be defined. This is further explained in the sediment TMDL (section 3.1.6, pages 58 and 59).

Comment 132: Why was the goal not set at 43% and what were the criteria for the reference streams? The choice of reference streams is not documented enough to confirm that they were scientifically based.

Response 132: The goal was set at 50% above background by the North Fork Watershed Advisory Group after being advised that above 50% above background sedimentation rate the Washington Forest Practices Board guidelines find a potential for chronic water quality problems (1995). Below 50% above background these guidelines do not show problems. Since these are all modeled numbers, there is likely not a large difference between 50% and 43% above background. The control streams are all located in the lightly roaded and lightly harvested Upper North Fork subbasin. These watersheds range from having no to little development owing to large fires that swept the area early in the twentieth century. It has been clarified in the SBA that the control streams and control areas are all in the Upper North Fork subbasin. The level of development in the upper North Fork has been further clarified in the SBA.

Comment 133: The criterion, three age classes one young of the year, is totally inadequate as a criterion for salmonid spawning.

Response 133: We respectfully disagree. This is criterion indicates population structure and that reproduction is occurring. It is one of the metrics used in the WBAG2 to develop the fish index. DEQ believes it is a sound indicator of salmonid spawning.

Comment 134: Explain why tailed frogs and sculpin are indicators of cold water biota.

Response 134: Tailed frogs and scuplins are the two cold water vertebrate species common in waters not impaired by chemical pollutants. The SBA better explains the status of tailed frogs and sculpin in these watersheds.

Comment 135: Macroinvertebrate biotic index of 3.5 is questioned as a measure of cold water biota.

Response 135: A macroinvertebrate biotic index score of 3.5 or greater is used by the WBAG to indicate a stream with healthy macroinvertebrate diversity. The WBAG2 uses a stream macrobiotic index (SMI) based on the percentile of reference streams with 3 as the highest rating. Comparison of the two methods indicates that a stream with a macroinvertebrate biotic index score of 3.5 would have a SMI of 3 indicating healthy macroinvertebrate diversity.

Comment 136: The criterion that needs to be added to judge success is habitat improvement.

Response 136: The TMDL can only address the pollutant of concern, which in this case is sediment. As explained in earlier comments, the TMDL process is not designed to address all the ills in streams. It is designed to address pollutants of concern that can be quantified in mass or energy per unit time. Habitat, which we agree is important to the biota, does not meet this criterion. DEQ and EPA have decided that habitat is not a characteristic for which TMDLs can be developed. The SBA clarifies that sediment, not habitat alteration, is the pollutant the TMDL must address.

Comment 137: Given the lack of a TMDL implementation plan there does not appear to be "reasonable assurance" that the TMDL will be implemented.

Response 137: The reasonable assurance language was requested by EPA. In the case of the North Fork, sediment implementation planning will be led by the USFS, the prime manager of the watershed. The federal land management agencies have agreed by memorandum of agreement to lead the development of implementation plans in watersheds where they manage the majority of the land. The sediment implementation plan is expected 18 months following approval of the TMDL. The metals TMDL implementation plan is the state of Idaho's cleanup plan. This plan currently exists.

4.4 Miscellaneous Comments

Comment 138: The hydrograph in section 2.1.1.2 is developed for data through 1997. Why not for data through 1999 or 2003?

Response 138: This hydrograph was updated through water year 2000 data in the final SBA.

Comment 139: Define or explain the term "multiple resource outputs" on page 5 [page 7 in the final document].

Response 139: Multiple resource outputs refers to the USFS multiple use policy under which federal forest lands that make up most of the watershed are managed for timber, recreation, wildlife, watershed, and other resource outputs. The meaning of multiple resource outputs has been clarified in the text of the SBA.

Comment 140: Hecla Mining Company is not familiar with the Raymond-Carlisle Mill; mill and mines known to Hecla as the Ray Jefferson and the Carlisle, page 5 [page 7 in the final document].

Response 140: The SBA was in error on the nomenclature of the Ray Jefferson Mill site. The Carlisle Mine is the name that the remedial investigation documents ascribe to the adit. DEQ staff consulted with Hecla staff and corrected the errors in naming in the SBA.

Comment 141: On page 8 [page 11 and 12 in the final document]; all regulatory citations should be updated, page.8 [page 11 in the final document].
onward.

Response 141: This was an oversight in the change of citations as DEQ became a Department. The corrections were made in the SBA.

Comment 142: On page 9 [page 11 in the final document] the quote of the sediment narrative standard is not correct.

Response 142: There were minor errors in the quote of the standard. These errors were corrected.

Comment 143: Turbidity criteria should be clarified as below mixing zones of point sources, page 9 [page 12 in the final document].

Response 143: The standard is applicable below mixing zones; however, it is based on salmomid sight feeding requirements. Since the standard has this technical basis, it is often used to interpret the narrative sediment standards as a deleterious impacts on the beneficial use. The clarification concerning the mixing zone was supplied as a footnote as well as clarification that this benchmark can be used to interpret the narrative sediment standard.

Comment 144: Disconnect between sentences, page 12.

Response 144: The disconnected sentences were not found.

Comment 145: Legend for map [Figure 4] on page 13 [page 18 in the final document] should clarify mines and mills.

Response 145: DEQ agrees that this will give the figure greater utility. The figure was re-plotted to mark the mills.

Comment 146: First table of Appendix A is not comprehensive; map sites are missing, most dates are missing, an explanation of acronyms and units is missing.

Response 146: DEQ agrees with this assessment of the table supplied by the USGS. The table was revised.

Comment 147: Gem discharge data does not show units.

Response 147: The units are gallons per minute. This change was made in Appendix A to better clarify how the synthetic hydrograph for the adits was developed.

Comment 148: The commenter does not believe that White Pine, Ponderosa and Western Larch were selectively logged, Page 4 [page 7 in the final document], SBA .

Response 148: Selectively logged was used here in the sense that these species were taken while most others were left ("high-graded") or the rest of the stand was slashed and burned. This was typical in the early logging days according to Russell (1985). This point has been clarified in the text of the SBA.

Comment 149: The description of the magnitude of logging does not give the true picture of the logging. This is followed by a list of intensive clear cutting since 1970.

Response 149: The magnitude of logging is described in the document and certainly the road density data indicates the level of watershed entry. This part of the SBA has been beefed up to explain the logging has been extensive in the basin.

Comment 150: Fish population data located on page 18. Statements from Forest Service documents provided indicate that cutthroat trout populations have declined.

Response 150: The data in the Table 13 on page 22 [Table 14 on page 25 in the final document] support and document this view. DEQ chooses to develop its own conclusions from the data and not rely on those of other agencies.

Comment 151: Trout densities in reference streams range from 0.021 to 0.4285. Value for Independence Creek is not diminished because many sites impaired are near roads or camps. Data should be stand-alone; fish densities can be variable.

Response 151: The Independence Creek population is interpreted by DEQ to be the result of the location of the electrofished reach near the popular campground at the base of Independence Creek. We believe such interpretations to be rational. The comment ignores the general pattern of the data. Except for Beaver Creek, which has predominantly brook rather than cutthroat trout, the heavily roaded watersheds of the North Fork have fish densities an order of magnitude or two lower than all the watersheds of low road density. The comment clings to one anomalous value and ignores the clear pattern. DEQ believes the weight of evidence favors its interpretation of the fish density data.

Comment 152: Mountain whitefish (MWF) are present in the North Fork, but are broadcast fall spawners. MWF are common in the North Fork, but their population trends are unknown. MWF are present in lower densities in the North Fork than in other rivers of Idaho. Mention MWF on page 4 [page 6 in the final document]. Mention life cycle on pages 18-20 [page 23 in the final document].

Response 152: Mountain whitefish, their life cycle, and IDFG's assessment of their populations in the North Fork are included on pages 6 and 23 of the SBA.

Comment 153: West slope cutthroat trout spawning has only been documented in tributary streams to the North Fork.

Response 153: It has been clarified in the SBA that west slope cutthroat spawning has only been documented in the North Fork tributaries.

Comment 154: Available data suggests bull trout also spawn in tributary streams used by cutthroats but not as many tributaries.

Response 154: It has been clarified in the SBA that bull trout spawning has only been documented in the tributaries to the North Fork and not even in many tributaries.

Comment 155: Below Yellowdog Creek in the North Fork and Laverne Creek in the Little North Fork the harvest was changed from six west slope cutthroat trout per day to two west slope cutthroat trout per day in 2000. No west slope cutthroat trout between 6 and 16" can be harvested.

Response 155: It was noted in the SBA that the fishing harvest rules changed in 2000 and the nature of those changes.

Comment 156: It should be noted in the vegetation section (page 4) [page 6 in the final document] that red cedar was a significant component of the riparian plant communities and not its importance as long lasting LOD.

Response 156: The importance of western red cedar is acknowledged and this point was made in the vegetation section (section 2.2.1.4.). In addition, the loss of red cedar and its impact on LOD recruitment is discussed in the Riparian Forest and Large Organic Debris Removal section (2.2.2.5.6.2)(page 49), which covers impacts that are not pollutants of concern.

Comment 157: Under the discussion of sediment data it would be useful to note that some reaches of the Little North Fork are intermittent as a result of excess bed load. This is recent since 1990.

Response 157: It was noted in the sediment data section (2.3.2.3; page 21) that the Little North Fork is intermittent over some reaches as a result of bed load.

Comment 158: Fishing pressure (may be) rather than (quite likely) is responsible for low fish density data from Independence Creek near the mouth(pages18-20) [page 23-26 in the final document].

Response 158: The language was changed from "quite likely" to "may be" in the discussion of low fish density in Independence Creek.

Comment 159: Data should be reported as fish per unit area without effort. IDFG has actual population estimates from the main stems eliminating the problems of catch per unit effort (pages18-20) [pages 23-26 in the final document].

Response 159: DEQ feels this change is not advisable in the SBA where several different data sets were used for fish population data. It was changed in the sediment TMDL where electrofishing methods will be controlled by a strict protocol.

Comment 160: Discussion on vegetation alteration (page 40) [page 46 in the final document] should be expanded to cover the impacts of riparian logging and canopy removal as these have effected LOD in the streams.

Response 160: The discussion on vegetation was expanded to address riparian logging and the loss of LOD recruitment and canopy shade in section 2.3.2.5.6.2 (page 49) of the SBA.

Comment 161: Vegetation alteration of the tributary watersheds should be included with reference to loss of riparian vegetation and canopy loss.

Response 161: See response to the comment 160. This discussion was extended to the tributaries in the SBA.

Comment 162: More demonstration or discussion of the Cross and Everest data was requested.

Response 162: The Cross and Everest data presented in their 1995 paper is referenced and the key points covered in the SBA. The reader can read the referenced paper to further understand the details.

Comment 163: Include any data information on current or historic beneficial use status.

Response 163: The available data is included on the historic and current beneficial use statuses [Table 19 in the final document]. Fisheries data is included in Table 14.

Comment 164: Table 1 [Table 2 in the final document] identifies Beaver Creek as impaired for sediment while Table 13 [Table 19 in the final document] identifies it as listed for metals. Which or are both correct?

Response 164: Table 13 is now Table 19. Beaver Creek was listed for sediment in 1998. Data in the SBA and noted in Table 19 do not support the sediment listing. Nevertheless, Beaver Creek is included in the basin-wide sediment TMDL making the point moot. DEQ further found clear exceedances of trace metals standards. Beaver Creek is clearly impaired by metals as clarified in Table 19, which summarizes the results of the assessment.

Comment 165: Table 3 [Table 4 in the final document]: is confusing not including standards for domestic water supply (DWS), agricultural water supply (AWS), and special resource water (SRW) and including standards for pollutants not of concern to the SBA.

Response 165: Table 4 is designed to be a general review of all the state water quality standards that affect the most sensitive and important beneficial uses of the North Fork and most forested watersheds. Domestic and agricultural water supplies do not have specific support standards in-stream in the Idaho water quality standards. Special Resource Water is a designation addressing the applicability of point discharges. The North Fork has no point discharges. For these reasons, these beneficial uses were not included in the short synopsis table of the most germane standards. No table in a SBA can replace a full reading of the Idaho Water Quality Standards and Wastewater Treatment Requirements, and this is not the intention of Table 4.

Comment 166: The SBA (page 10) [page 13 in the final document] identifies bacterial loading from human sources. Is this point or nonpoint sources?

Response 166: The SBA is discussing potential bacterial sources on page 13. The lack of in-stream bacteria detection indicates this is not an issue.

Comment 167: North Fork at a glance indicates temperature is a pollutant of concern. It should be addressed in the SBA. Section 2.0.

Response 167: This section was in error. Temperature is not listed as a pollutant of concern for any segment of the North Fork or its tributaries. Temperature was removed from the listing of pollutants of concern in section 2.0 (page 3).

Comment 168: On page 12, 2nd paragraph [page 16 in the final document], the section outlines all high and low event monitoring for bacteria, nutrients, oil and grease and dissolved oxygen on Prichard Creek. The section should end with a recommendation that these pollutants be delisted.

Response 168: We agree with this conclusion and it is stated elsewhere in the document. It is also stated on page 16.

Comment 169: On page 12, 2nd sentence, reference should be changed to Appendix D [Appendix B in the final document].

Response 169: We agree the reference was mislabeled. It has been changed.

Comment 170: On pages 18-19 [pages 23-26 in the final document], in using the St. Joe River as a reference watershed, the fisheries response in the St. Joe should be stated in the text.

Response 170: We believe the fishery response was stated in the text. However, this was further clarified and we now show by reference that the St Joe has health fish density numbers.

Comment 171: In section 3.1.4, Loading capacity, 3rd sentence [page 57-58 in the final document], the TMDL indicates that adequate quantitative measurements of the effects of excess sediment have not been developed. This is not entirely true. The comment cites work of the European Inland Fisheries Advisory Commission on suspended sediment concentrations.

Response 171: The European Fish Commission quantitative measurements are measurements of suspended sediment. Bed load sediment is clearly identified in the SBA as the pollutant of concern. The section was clarified by inserting the words "bed load" sediment.

Comment 172: In section 3.1.4, Loading Capacity, 1st and 2nd bullets [section 3.1.4, page 57-58 in the final document], the assumption used in this TMDL is that natural background is assumed to support beneficial uses, and that 80% above background is likely to support beneficial uses. The assumptions conflict with earlier assessment where Washington Forest Practices Board is cited: 50-100% above background is chronically detectable sediment and 100% above background is water quality violation. To resolve the problem the TMDL goal should be placed at background as shown in Table 17.

Response 172: The 80% was a typographical error and should have been 50%. The 80% was corrected to 50%.

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Appendix A: Metals Water Quality Data and Mine and Mill Site Data for Beaver and Prichard Creeks

MINENAME1	SOURCE	IGS_NO_	MINETYPE	AU_PROD_OZ	OREPROD
Badger	IGS, Vol 4	WL 56	Au	-1	
Buckeye Boy Mine	IGS, Vol 4	WL 48	Au		
Chester Consolidated Min	IGS, Vol 4	WL 70	Au		
Four Square Mine	IGS, Vol 1	WA 72	Au	11130	
Gold Coin	Shenon, 193		Au		
GOLDBACK	IGS, Vol 1	WA 64	Au		
Golden Chest	IGS, Vol 1	WA 75	Au	63000	
Golden Condor	IGS, Vol 4	WL 60	Au		
Golden Dream Claims	IGS, Vol 4	WL 34	Au		
Jenkins	Shenon, 193		Au		
King Mine	IGS, Vol 1	WA 65	Au	10000	
Mother Lode Mine	IGS, Vol 1	WA 89	Au	25000	
Mountain Lion Mine	IGS, Vol 4	WL 68	Au	3500	
Pilot Mine	IGS, Vol 1	WA 58	Au	15	
Pony Gulch	IGS, Vol 3	WA 125	Au		
Raven Group	IGS, Vol 1	WA 119	Au		
Wakeup Jim	Shenon, 193		Au	850	
Amazon - Manhattan	USGS		ZnPb		552
Bear Top Mine	IGS, Vol 1	WA 93	ZnPb		
Black Horse	IGS, Vol 1	WA 114	ZnPb		60
BLUE GROUSE-MOUNTAIN GOA	USGS		ZnPb		303
Anchor	IGS, Vol 4	WL 44	ZnPb		1450
Blue Sky	IGS, Vol 3	WA 197	ZnPb		
Carlisle Mine	IGS, Vol 3	WA 159	ZnPb		79
Consolidated Silver-Lead	IGS, Vol 1	WA 21	ZnPb		
Crystal Lead Mine	IGS, Vol 1	WA 4	ZnPb		11
Currency	IGS, Vol 1	WA 29	ZnPb		
Daisy-Volunteer	IGS, Vol 4	WL 45	ZnPb		
Giant Ledge Mine	IGS, Vol 1	WA 126	ZnPb		
Idora	USGS		ZnPb		6
Ione Mine	IGS, Vol 1	WA 100	ZnPb		
Jack Waite Mine	IGS, Vol 1	WA 28	ZnPb		342
Jewell Prospect	IGS, Vol 4	WL 117	ZnPb		
Kelly Prospect	IGS, Vol 4	WL 2	ZnPb		
Liberty	IGS, Vol 4	WL 51	ZnPb		
Lower Paragon	IGS, Vol 1	WA 120	ZnPb		
Lucky Strike	IGS, Vol 4	WL 74	ZnPb		
Monarch Lower workings	IGS, Vol 1	WA 123	ZnPb		
Monarch Mine Upper Worki	IGS, Vol 1	WA 128	ZnPb		
Nipsic	USGS		ZnPb		57
Orofino Mine	IGS, Vol 1	WA 85	ZnPb		
Upper Paragon Mine	IGS, Vol 1	WA 108	ZnPb		7
Phoenix Property	IGS, Vol 4	WL 127	ZnPb		
Porphyry Group	IGS, Vol 4	WL 25	ZnPb		
Red Monarch Mine	IGS, Vol 3	WA 179	ZnPb		
Silver Crystal Mine	IGS, Vol 1	WA 92	ZnPb		
Silver Scott Mine	IGS, Vol 1	WA 71	ZnPb		
Silver Strike Mine	IGS, Vol 1	WA 137	ZnPb		5
St. James Prospect	IGS, Vol 1	WA 167	ZnPb		
Sunrise Prospect	IGS, Vol 1	WA 164	ZnPb		
Sunset	USGS		ZnPb		256
Sunset-Portland	USGS		ZnPb		434
Terrible Edith	IGS, Vol 1	WA 46	ZnPb		7
Tiger Prospect	IGS, Vol 4	WL 90	ZnPb		
Vendetta Chief Mine	IGS, Vol 1	WA 124	ZnPb		
Washington Mining Co. Pr	IGS, Vol 3	WA 180	ZnPb		
Version 3/3/00--created					

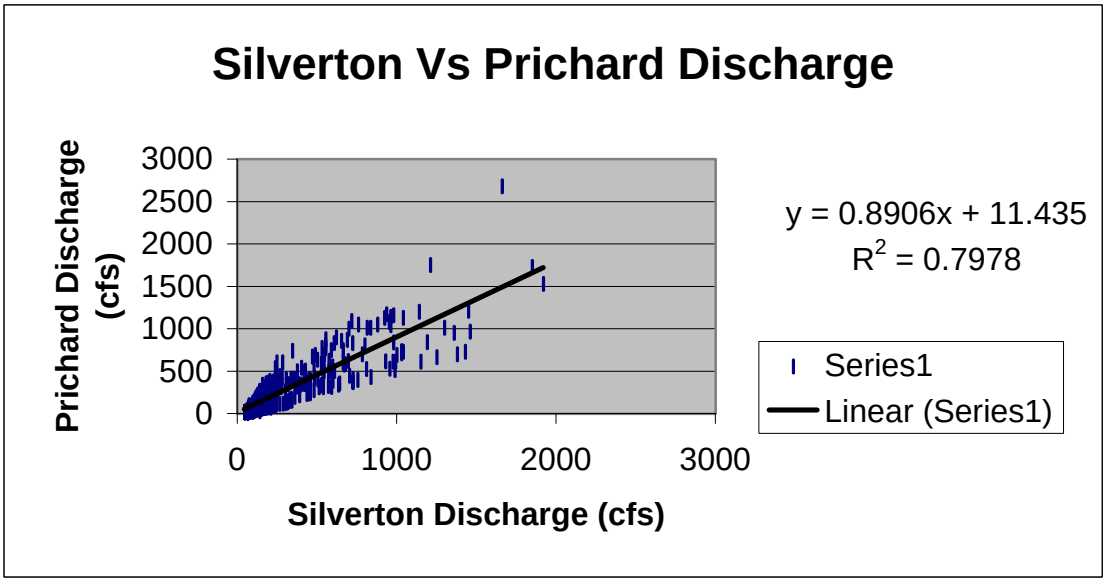
Silverton Vs Prichard Discharge

Regression Statistics	
Multiple R	0.89317196
R Square	0.79775616
Adjusted R Square	0.79740504
Standard Error	128.834197
Observations	578

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	37712007.79	37712008	2272.047	4.5973E-202
Residual	576	9560592.235	16598.25		
Total	577	47272600.03			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	11.4352651	7.035605124	1.625342	0.104637	-2.383297907	25.2538281
X Variable 1	0.89061255	0.018684442	47.666	4.6E-202	0.853914625	0.92731048



Lower 95.0%	*Upper 95.0%*
-2.38329791	25.25382808
0.853914625	0.927310485

Silverton Vs E. Fk Eagle Discharge

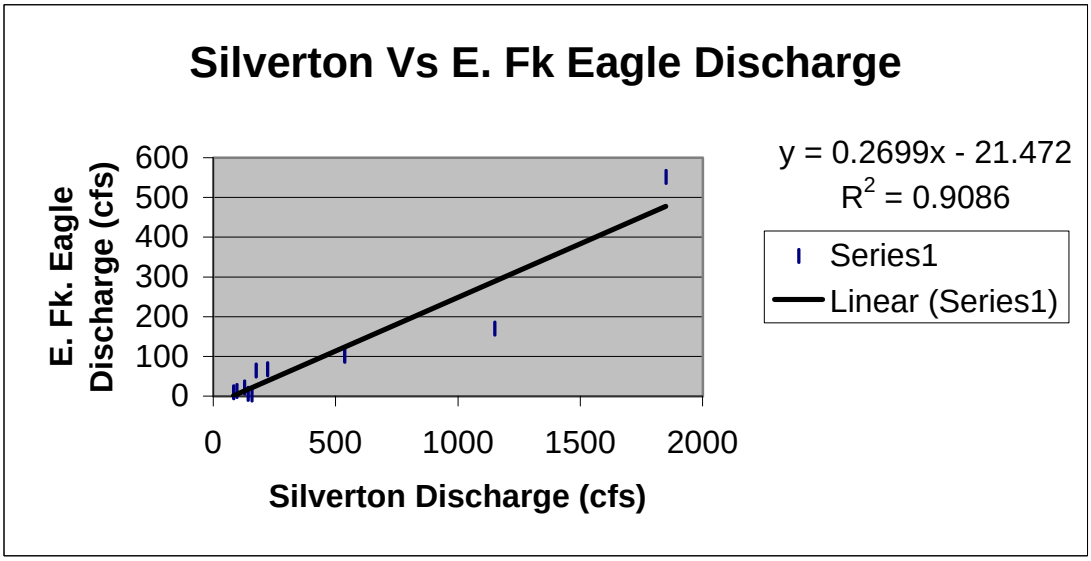
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.95322315
R Square	0.90863437
Adjusted R Square	0.89721367
Standard Error	53.5491948
Observations	10

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	228140.4059	228140.4	79.56028	1.97931E-05
Residual	8	22940.13014	2867.516		
Total	9	251080.536			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-21.4717889	21.79617821	-0.985117	0.353419	-71.73389845	28.790321
X Variable 1	0.26991133	0.030260281	8.919657	1.98E-05	0.200130953	0.3396917



Lower 95.0%	*Upper 95.0%*
-71.7338984	28.79032071
0.20013095	0.33969171

Silverton Vs Beaver Discharge

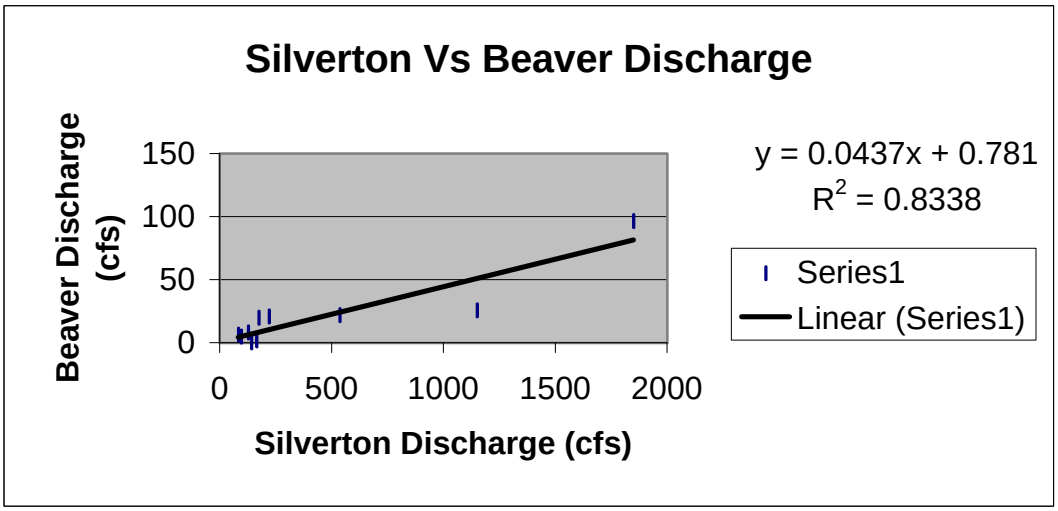
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.91310997
R Square	0.83376981
Adjusted R Square	0.81299104
Standard Error	12.1879573
Observations	10

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5960.574218	5960.574	40.12604	0.000224305
Residual	8	1188.370422	148.5463		
Total	9	7148.94464			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.78100909	4.965824015	0.157277	0.878924	-10.67020903	12.232227
X Variable 1	0.04366056	0.00689249	6.334511	0.000224	0.027766436	0.0595547



Lower 95.0%	*Upper 95.0%*
-10.670209	12.2322272
0.027766436	0.059554677

7Q10, 10Th, 50th and 90Th Percentile Results for NF CDA

Data:

	Silverton	EF Eagle	Beaver above CC	Prichard above M
Square mi (mi^2)	105	22.66	7.69	42.59
Acres	67199.7	14503.599	4922.201	27257.047
7Q10 (cfs)	31	6.690678217	2.270668336	12.57399151
10th percentile flow	48	10.35975982	3.515873553	19.4694062
50th percentile flow	109	23.52528793	7.98396286	44.21177659
90th percentile flow	649	140.0725859	47.53754033	263.2425964

Comments:
The above 7Q10, 10th, 50th, and 90th calculations are based upon the acre to acre ratio with Silverton.

Calculations:

Perameter	7Q10 (cfs)		10Th	
Ratios	Acres:Acres	Mi^2:Mi^2	Acres:Acres	Mi^2:Mi^2
EF Eagle	6.690678217	6.690095238	10.35975982	10.35885714
Beaver above Carbon Center	2.270668336	2.270380952	3.515873553	3.515428571
Prichard above Murrey	12.57399151	12.57419048	19.4694062	19.46971429

Comments:
The 7Q10, 10th, 50th, and 90th calculations have been computed using the acre to acre ratio, as well as th

Murrey

50th		**90th**	
Acres:Acres	Mi^2:Mi^2	Acres:Acres	Mi^2:Mi^2
23.52528793	23.5232381	140.0725859	140.060381
7.98396286	7.982952381	47.53754033	47.53152381
44.21177659	44.21247619	263.2425964	263.2467619

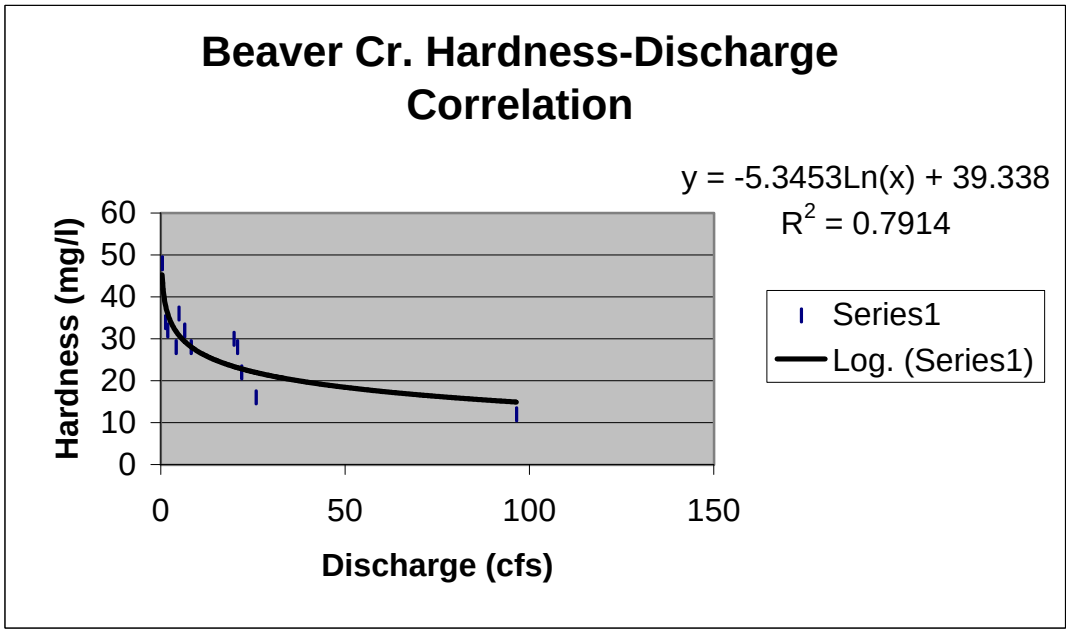
he mi^2 to Mi^2 ratio with Silverton.

Beaver
Date Range In File----
1999.05.25-2000.07.25

Date	Discharge (cfs)	Hardness (mg/l)
1999.05.25	96.45	12
1999.06.18	25.76	16
1999.07.26	1.84	32
1999.10.28	0.33	48
1999.11.18	4.85	36
1999.12.21	19.75	30
2000.01.20	6.4	32
2000.02.23	8.18	28
2000.03.23	20.74	28
2000.04.27	21.86	22
2000.06.28	4.1	28
2000.07.25	1.24	34

Min	0.33
Max	96.45

Flow Tiers	Flow	Ln (Flow)
7Q10	0.33	-1.108662625
10th	1.3	0.262364264
50th	7.29	1.986503546
90th	25.37	3.233567374



Gem Discharge WY 1999

Gem Adit OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
115.35	102.65	104.4	109.55	108.15	123.75	277.85	266.6	282.3
113.9	104.55	106	107.25	109	121.45	265.5	268.25	286.8
114.05	103.5	106.7	108.25	109.2	121.5	240	267.1	289.4
113.05	102.15	106.4	105.8	110.3	122.4	236.4	269.3	291.1
117.3	104.2	106.8	132.8	112.5	121.75	237.55	267.55	289.45
117.65	102.75	106.7	108.965	111.45	121.5	244.35	265.9	293.95
116.9	102.65	107.3	126	111.15	122.4	240.6	262.85	295.9
116.6	101.8	108	97.97	110.45	122.65	235.2	260.65	298.15
116.45	100.75	107.7	111.6	113.75	123.55	238.9	259.7	293.7
115.55	98.32	109.8	104.25	114.35	124.45	242.1	257.9	292.7
114	98.49	110	99.665	116.3	125.7	238.9	256.85	292.95
113.45	99.12	110.6	99.6	115.75	132.05	241.05	255.6	292.55
112.75	101.3	110	81.65	117.85	134.4	245.8	255.15	289.85
112.5	103.6	110.7	102.15	114.75	136.1	244.45	253.25	287.75
113.2	102.5	109.8	104.6	115.5	137.8	243.75	251.3	288.5
112.5	102.15	109.2	102.75	114.3	139.65	242.95	253.3	282.45
110.55	101.2	109.9	106.75	115.2	140.3	243.2	251.7	280.35
110.4	101.3	110.2	102.5	115.8	142.55	242.1	256.1	277.45
110.2	101.2	108.8	102.65	116.3	148.35	242.55	243.9	274
111.67	101.1	109.3	103.5	117.4	157.1	244.6	246.85	272.1
109.85	102	110.5	103.6	115.65	167.5	246.85	248.25	271.25
108.25	103.2	107.3	104.55	116.95	179	251.75	249.3	271.35
107	102.4	109.4	102.4	118.45	293	255.3	248.3	269.45
108.95		111.1	104.4	117.3	364.3	255.3	247.9	268.65
107.8		109.55	104.3	117.7	349.75	257.75	248.65	267.4
105.95		110.75	107.5	118.8	302.35	257.45	244.7	265.5
107.05		109.55	104.5		282.6	256.55	258.95	265
107.4		108.775	107.05			261.05	263.55	265.6
108.05		110.1	108.8			264.25	272.95	266.8
102.95								269.25
112	102	109	106	114	169	248	257	281
0.579016615	0.527989	0.563961	0.547879	0.592945	0.874992	1.285814	1.331981	1.456781

JUL	AUG	SEP
223.25	137.7	105.35
222.75	130.6	103.3
222.15	162.8	99.2
222.5	156.65	98.58
220.85	141.85	102.45
221.25	134.05	92.64
220.65	125.85	98.53
219.7	117.3	91.475
219.15	107.7	107
216.55	107.8	101.8
215.45	107.3	105.3
214.7	108.35	101.175
212.5	112.25	109.85
184.1	113.5	113.3
182.95	114.2	114.3
184.75	104.2	112.25
183.85	98.03	112.2
180.9	91.09	116.5
179.4	89.86	115.85
178.25	89.655	115.2
177.6	92.285	113.47
175.85	91.41	116.5
174.2	88.98	115
173.75	83.08	114.95
173.95	83.625	115
173.2	83.265	113.8
172.05	81.605	113.8
170.3		
169.15		
102.165		
193	109	108
1	0.567276	0.560324

Sum monthly % July Q	9.888959
Mean Monthly %	0.824080

Adit Name	**Discharge**
Mother Lode	0.002
Black Horse	0.011
Monarch (lower workings)	0.018
Orofino	0.016
Red Monarch	0.045
Silver Strike	0.011
Terrible Edith	0.028
Jack Waite	0.111
Carlisle	0.067

Note: Adit discharges were measured in
based on the Gem Adit discharge by calc
monthly discharge of the Gem Adit is of t
discharge percentages of the Gem Adit v
discharges of Beaver, East Fork Eagle a
the weighted average discharge, which is
on a given day.

159

0.824080 9.8889586

wt disch
0.0016
0.0091
0.0148
0.0132
0.0371
0.0091
0.0231
0.0915
0.0552

July. Adit discharge was weighted
culating the percentage that average
the average July discharge. The monthly
were averaged and applied to the adit
and Prichard watersheds to develop
s the best estimate of the adit discharge

Appendix B: Bacteria, Nutrient, and Oil and Grease Data Collected for Prichard Creek

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10300-7638/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8106 CDA Basin Restoration Project
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	PRICHARD ABOVE MURRAY
Type of Sample:	Surface
Sample Taken From:	Creek - C
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 03/23/00 Date Received in Lab: 03/23/00
Time Collected: 11:25 Time Received in Lab: 16:10

TEST CODE		RESULTS	COMPLE
EMFC	FECAL COLIFORM (STORET #31616)	<1 /100 ML	03/24/
EQM	E. COLI	<1 /100 ML	03/24/

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Boise Laboratory
2220 Old Penitentiary Road, Boise, Idaho 83712
WATER QUALITY REPORT - CHEMICAL REPORT

LAB: BOISE, Phone: (208) 334-2235
Section Manager, Inorganic Chemistry: Barry Pharaoh

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Coeur d'Alene Field Office

IDEQ-CDARO
GLEN PETTIT
2110 IRONWOOD PARKWAY
COEUR D'ALENE, ID 83814

Tracking Number: 40300-0397/
(Please Refer to this Tracking Number on any communications)

Grant/Project: 8106
CDA Basin Restoration Project
Survey Name:
Storet:
NPDES No.:
Sample Location: PRICHARD CR ABOVE MURRAY ID
Submitted by: GLEN PETTIT
Purpose:
Taken From: Creek - C
Type of Sample:
Composite: To
Preservation: H2SO4, Cooled 4° C

Date Collected: 03/23/00 Date Received in Lab: 03/30/00
Time Collected: 11:25

STORET	TEST PERFORMED	RESULTS	COMPLETED	A
00556	Oil and Grease	<<5 (mg/l)	04/14/00	

~~FUNAI LAKES~~ STUDY 8118 CDA Tank Non-Metals
Grant/Project# 3401
Water Quality 106 (Genral/Routine Samples, Not Projected)
Collected By: [illegible] Data Submitted 4/27/00

Lab #	Station	Location	Date	Reps.	h2so4	TP (mg/l)	TKN (mg/l)	NO2+NO3 (mg/l)	Stage (ft)	Temp. ©	Cond umho	pH
[redacted]												
0400 0657	[redacted]		4/27/00			0.043	0.22	0.182				
0658	[redacted] WPP QAQC		↓			0.040	0.20	0.173				
0659	Richard Creek Mouth		4/28/00			0.151	0.11	0.026				
0660	Richard Creek Murray		↓			0.010	0.05	0.016				
0661	DI Blank		4/27/00			<0.002	<0.05	<0.005				

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10400-8185/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8101 TMDL/Prog Mgmt/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	PRICHARD CRK MOUTH
Type of Sample:	Grab, Surface
Sample Taken From:	Creek - C
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate

Date Collected: 04/28/00 Date Received in Lab: 04/28/00
Time Collected: 13:00 Time Received in Lab: 15:49

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	<1 /100 ML	04/29/00

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
WATER QUALITY REPORT - CHEMICAL REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor: Mike Brodwater
Inorganic Chemistry Section: Peggy Albertson

DIV ENVIRONMENTAL QUALITY
DEQ/GLEN PETTIT
2110 IRONWOOD PKWAY
COEUR D'ALENE, ID 83814

Tracking Number: 10400-0659/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118
	CDA Lake Non Metals TMDL/EA
Survey Name:	PRICHARD CREEK
Storet:	
NPDES No.:	
Sample Location:	PRICHARD CREEK MOUTH
Submitted by:	PETTIT
Purpose:	Intensive Survey
Taken From:	Unknown - U
Type of Sample:	
Composite:	No
Preservation:	H2SO4, Cooled 4° C

Date Collected: 04/28/00 Date Received in Lab: 04/28/00
Time Collected:

STORET	TEST PERFORMED	RESULTS	COMPLETED	ANST
00625	Total Kjeldahl Nitrogen as N	0.11 (mg/l)	05/15/00	SR
00630	Total NO2 + NO3 as N	0.026 (mg/l)	05/15/00	SR
00665	Total Phosphorus as P (Low Conc.)	0.159 (mg/l)	05/08/00	DN

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
WATER QUALITY REPORT - CHEMICAL REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor: Mike Brodwater
Inorganic Chemistry Section: Peggy Albertson

DIV ENVIRONMENTAL QUALITY
DEQ/GLEN PETTIT
2110 IRONWOOD PKWAY
COEUR D'ALENE, ID 83814

Tracking Number: 10400-0660/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118
	CDA Lake Non Metals TMDL/EA
Survey Name:	PRICHARD CREEK
Storet:	
NPDES No.:	
Sample Location:	PRICHARD CREEK MURREY
Submitted by:	PETTIT
Purpose:	Intensive Survey
Taken From:	Unknown - U
Type of Sample:	
Composite:	No
Preservation:	H2SO4, Cooled 4° C

Date Collected: 04/28/00 Date Received in Lab: 04/28/00
Time Collected:

STORET	TEST PERFORMED	RESULTS	COMPLETED	ANST
00625	Total Kjeldahl Nitrogen as N	0.05 (mg/l)	05/15/00	SR
00630	Total NO2 + NO3 as N	0.016 (mg/l)	05/15/00	SR
00665	Total Phosphorus as P (Low Conc.)	0.010 (mg/l)	05/08/00	DN

State of Idaho, Department of Health and Welfare
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2195 Ironwood Court, Coeur d'Alene, Idaho 83814
WATER QUALITY REPORT - CHEMICAL REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor: Mike Brodwater
Inorganic Chemistry Section: Peggy Albertson

DIV ENVIRONMENTAL QUALITY
DEQ/GLEN PETTIT
2110 IRONWOOD PKWAY
COEUR D'ALENE, ID 83814

Tracking Number: 10400-0661/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118
	CDA Lake Non Metals TMDL/EA
Survey Name:	PRICHARD CREEK
Storet:	
NPDES No.:	
Sample Location:	DI BLANK
Submitted by:	PETTIT
Purpose:	Intensive Survey
Taken From:	Unknown - U
Type of Sample:	
Composite:	No
Preservation:	H2SO4, Cooled 4° C

Date Collected: 04/27/00 Date Received in Lab: 04/28/00
Time Collected:

STORET	TEST PERFORMED	RESULTS	COMPLETED	ANST
00625	Total Kjeldahl Nitrogen as N	<0.05 (mg/l)	05/15/00	SR
00630	Total NO2 + NO3 as N	<0.005 (mg/l)	05/15/00	SR
00665	Total Phosphorus as P (Low Conc.)	<0.002 (mg/l)	05/08/00	DN

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10400-8186/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8101 TMDL/Prog Mgmt/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	PRICHARD CRK @ MURRAY
Type of Sample:	Grab, Surface
Sample Taken From:	Creek - C
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate

Date Collected: 04/28/00 Date Received in Lab: 04/28/00
Time Collected: 14:00 Time Received in Lab: 15:49

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	1 /100 ML	04/29/00

1999 Beneficial Use Reconnaissance Project

Idaho Division of Environmental Quality

Bacteria Check Sheet

Stream Name: Pritchard Creek Site ID 97NIR00B02 Collection Date: 99/07/27

HUC #: 17010301

1	Is Primary Contact Recreation a Designated or Existing Use	Yes	No	If Yes collect 1 sample *****
				if No collect 1 sample *******
2	Are upstream land uses affecting recreation use **	Yes	No	if Yes collect 1 sample *******
3	Other reasons ***	Yes	No	if Yes collect 1 sample *******

explain other reasons

collect 1	
collect 5	

** include agriculture, grazing recreation, urban, cabins, septic

*** on 303d list for bacteria, etc

***** if fecal exceeds 500/100ml, or if e-coli exceeds 406/100ml, collect 5 samples over 30 days

******* if fecal exceeds 800/100ml, or if e-coli exceeds 576/100ml, collect 5 samples over 30 days

Sample Results

sample #	date	time	location	Fecal results	E-coli results
sample #1	99/07/27	1418	T50N R4E sec 29 NWNENE	2/100mL	1/100 mL
sample #2					
sample #3					
sample #4					
sample #5					
sample #6					
			geometric mean		

* if sample #1 exceed standards, collect remaining 4 samples

other notes

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10799-3437/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8112 BURP
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	PRITCHARD CREEK
Type of Sample:	Grab
Sample Taken From:	Creek - C
Collected by:	PETTIT/DOUGLAS
Preservation:	Sodium Thiosulfate

Date Collected: 07/27/99 Date Received in Lab: 07/28/99
Time Collected: 14:18 Time Received in Lab: 08:09

TEST CODE		RESULTS	COMPLETED
EMFC	FECAL COLIFORM (STORET #31616)	2 /100 ML	07/29/99
EQM	E. COLI	1 /100 ML	07/29/99

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Boise Laboratory
2220 Old Penitentiary Road, Boise, Idaho 83712
WATER QUALITY REPORT - CHEMICAL REPORT

LAB: BOISE, Phone: (208) 334-2235
Section Manager, Inorganic Chemistry: Barry Pharaoh

IDEQ-CDARO
GLEN PETTIT
2110 IRONWOOD PARKWAY
COEUR D'ALENE, ID 83814

Tracking Number: 40900-0096/
(Please Refer to this Tracking Number on any communications)

Grant/Project: 8101
State Water Quality
Survey Name:
Storet:
NPDES No.:
Sample Location: PRICHARD BRIDGE
Submitted by: GLEN PETTIT/B. ADAMS
Purpose:
Taken From: Unknown - U
Type of Sample:
Composite: No
Preservation: H2SO4, Cooled 4° C

Date Collected: 08/31/00 Date Received in Lab: 09/08/00
Time Collected: 12:00

STORET	TEST PERFORMED	RESULTS	COMPLETED	ANST
00556	Oil and Grease	<5 (mg/l)	09/26/00	SR

DEQ Project: 8118 - Nutrients **Date:** 9/1/00 9/13/00

Sampling Location	Lab # 10900	Date Collect	H_2SO_4		TP	NO_2+NO_3	TKN		
PWWTP	1824	8/31/00	✓		2.6	0.465	16.81		
Prichard Creek @ Prichard	1825	8/31/00	✓		0.004	0.038	0.09		
DI Blank	1826	8/31/00	✓		<0.002	<0.010	<0.05		
PWWTP	2013	9/12/00	✓		2.58	0.347	17.3		
Prichard @ Murray	2014	9/13/00	✓		0.006	0.023	0.08		
DI Blank	2015	9/12/00	✓		<0.002	<0.010	<0.05		

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10700-9329/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118 CDA Lake Non Metals TMDL/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	DI BLANK ALBERTS BRIDGE (#7)
Type of Sample:	Grab, Surface
Sample Taken From:	River - R
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 07/02/00 Date Received in Lab: 07/03/00
Time Collected: 18:00 Time Received in Lab: 08:00

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	<1 /100 ML	07/05/00

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10700-9328/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118 CDA Lake Non Metals TMDL/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	ALBERTS BRIDGE (#6)
Type of Sample:	Grab, Surface
Sample Taken From:	River - R
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 07/02/00 Date Received in Lab: 07/03/00
Time Collected: 18:00 Time Received in Lab: 08:00

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	3 /100 ML	07/05/00

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10700-9327/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118 CDA Lake Non Metals TMDL/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	ALBERTS BRIDGE (#5)
Type of Sample:	Grab, Surface
Sample Taken From:	River - R
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 07/02/00 Date Received in Lab: 07/03/00
Time Collected: 18:00 Time Received in Lab: 08:00

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	4 /100 ML	07/05/00

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

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2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10700-9326/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118 CDA Lake Non Metals TMDL/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	BUMBLEBEE (#4)
Type of Sample:	Grab, Surface
Sample Taken From:	River - R
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 07/02/00 Date Received in Lab: 07/03/00
Time Collected: 18:00 Time Received in Lab: 08:00

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	2 /100 ML	07/05/00

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10700-9325/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118 CDA Lake Non Metals TMDL/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	STEEL BRIDGE (#3)
Type of Sample:	Grab, Surface
Sample Taken From:	River - R
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 07/02/00 Date Received in Lab: 07/03/00
Time Collected: 17:10 Time Received in Lab: 08:00

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	1 /100 ML	07/05/00

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor, Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10700-9324/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118 CDA Lake Non Metals TMDL/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	PRICHARD BRIDGE PICNIC AREA #2
Type of Sample:	Grab, Surface
Sample Taken From:	River - R
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled, 4° C

Date Collected: 07/02/00 Date Received in Lab: 07/03/00
Time Collected: 16:55 Time Received in Lab: 08:00

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	1 /100 ML	07/05/00

State of Idaho, Department of Health and Welfare
Bureau of Laboratories - Coeur d'Alene Branch Lab
2195 Ironwood Court, Coeur d'Alene, Idaho 83814
NON DRINKING WATER - BACTERIAL DENSITY REPORT

LAB: COEUR D'ALENE, Phone: (208) 769-1432
Branch Laboratory Supervisor. Bacteriology: Mike Brodwater

DIV OF ENV QUALITY
GLEN PETTIT
2110 IRONWOOD PKWY
COEUR D'ALENE, ID 83814

Tracking Number: 10700-9323/
(Please Refer to this Tracking Number on any communications)

Grant/Project:	8118 CDA Lake Non Metals TMDL/EA
Storet:	
NPDES Number:	
Matrix:	WATER
Sample Location:	SHOSHONE WORK CENTER (#1)
Type of Sample:	Grab, Surface
Sample Taken From:	River - R
Collected by:	PETTIT
Preservation:	Sodium Thiosulfate AND Cooled. 4° C

Date Collected: 07/02/00 Date Received in Lab: 07/03/00
Time Collected: 16:30 Time Received in Lab: 08:00

TEST CODE		RESULTS	COMPLETED
EQM	E. COLI	2 /100 ML	07/05/00

Appendix C: Sediment Model Assumptions and Documentation

Sediment Model Assumptions and Documentation

Background:

Sediment is the pollutant of concern on the majority of the water quality limited streams of the Panhandle Region. The form the sediment takes is most often governed by the lithology or terrane of the region. Two major terranes dominate in northern Idaho. These are the meta-sedimentary Belt Supergroup and granitics present either in the Kaniksu batholith or in smaller intrusions as the Round Top Pluton and the Gem Stocks. In some locations Columbia River Basalt formations are important, but these tend to be to the South and West primarily on the Coeur d'Alene Reservation. Granitics weather to sandy materials with a lesser amount of pebbles or larger particle sizes. Pebbles and larger particle sizes with significant amounts of sand remain in the higher gradient stream bedload. The Belt terranes produce both silt size particles and pebbles and larger particle sizes. Silt particles are transported to low gradient reaches, while the larger sizes comprise the majority of the higher gradient stream bedload. Basalts erodes to silt size and particles similar to the Belt terranes, but the large basalt particles are less resistant, weathering to smaller particles.

Any attempt to model the sediment output of watersheds will provide, relative rather than exact, sediment yields. The model documented here attempts to account for all significant sources of sediment separately. This approach is used to identify the primary sources of sediment in a watershed. This identification of primary sources will be useful as implementation plans designed to remedy these sources are developed. The approach has the added advantage of identifying to the state of the technology all of the sources. If additional investigation indicates sources quantified as minor are not, the model input can be altered to incorporate this new information.

Model Assumptions:

Land use and sediment delivery:

RUSLE is the correct model for pasture. RUSLE accounts for production and delivery of sediment. Sediment modeled by RUSLE is fine.

Sediment yield coefficients measured in-stream on geologies of northern and north central Idaho covers production and delivery of sediment from forested areas. These sediment yield coefficients reflect both fine and course sediment.

Sparse and heavy forest of all age classes including seedling-sapling should be given mid range of the sedment yield coefficient for the geologies, while areas not fully stocked by Forest Practices Act standards are given the upper end of the range.

Sediment yield coefficients can be modified within the range observed to estimate highway corridor land use and the effects of repeated wild fires.

Double burned areas have eroded significantly to the stream channel but are not now eroding; a residual sediment load in the channels is possible from previous catastophic burns.

Erosion from stream bank lateral recession can be estimated with the direct volume method (Erosion and Sediment Yield in Channels Workshop, 1983).

Road sediment production and delivery:

Road erosion using the CWE approach should be limited to the 200 feet of road on either side of road crossings, not to total road mileage.

The use of the McGreer relationship between CWE score and road surface erosion is a valid estimate of road surface fines production and yield. In the case of Belt terrane, it is a conservative (overestimate) estimate.

CWE data collected for actual road fill failures and sediment delivery reflects the situation throughout the watershed. Since the great majority of road failures occur during episodic high discharge events with a 10 - 15-year return period, road failures reflect the actions of the last large event and must be divided by ten for an annualized estimate.

Fines and course loading can be estimated for stream reaches where roads encroach on the stream using estimated an erosion rate on defined model cross-section. Erosion resulting from encroachment occurs primarily during episodic high discharge events with a 10 - 15-year return period, road encroachment erosion must be divided by ten for an annualized estimate.

Failing road fill and eroding bank is composed of fines and course material. The proportions of fines and course material can be estimated from the soil series descriptions of the watershed.

Sediment Delivery:

100% delivery from forestlands with sediment yield coefficients measured in-stream on geologies of northern and north central Idaho.

100% delivery from agricultural lands estimated with RUSLE

100% delivery from all road miles up to 200 feet from a stream crossing as estimated by the McGreer relationship.

Fines and course materials are delivered at the same rate from fill failures and from erosion resulting from road encroachment and bank erosion.

Model Approach:

The sediment model attempts to account for all sources of sediment by partitioning these sources into broad categories.

Land use is a primary broad category. It is treated separate from other characteristics as stream bank erosion and roads. Land use types are divided into agricultural, forest, urban and highways.

Agriculture may be subdivided into working farms and ranches and small ranchettes, which currently exist on subdivided agriculture land. Sediment yields from agricultural lands which receive any tillage, even on an infrequent basis are modeled with the Revised Universal Soil Loss Equation (RUSLE). Sediment yields were estimated from agricultural lands (rangeland, pasture and dry agriculture) using the Revised Universal Soil Loss Equation (RUSLE) (equation 1)(Hogan, 1998).

Equation 1: A = (R)(K)(LS)(C)(D) tons per acre per year where:

: A is the average annual soil loss from sheet and rill erosion
: R is climate erosivity
: K is the soil erodibility
: LS is the slope length and steepness
: C is the cover management and
: D is the support practices.

RUSLE does not take into account stream bank erosion, gully erosion or scour. RUSLE applies to cropland, pasture, hayland or other land which has some vegetation improvement by tilling or seeding. Based on the soils, characteristics of the agriculture and the slope, sediment yields were developed for the agricultural lands of each watershed. RUSLE develops values which reflect the amount of sediment eroded and delivered to the active channel of the stream system annually.

Forestlands and some land in highway rights of way are modeled using the mean sediment export coefficients measured in-stream on geologies of northern and north central Idaho (USFS, 1994). The values developed by these sediment yield coefficients are sediment eroded and delivered to the stream courses annually. Forestlands that are fully stocked with trees are treated with the median coefficient for sediment yields ascribed to that terrane. Lands not fully stocked by Idaho Forest Practices Act standards are assigned the highest coefficient of the range. Paved road rights of ways are assigned the lowest coefficient of the range. Areas which were burned by two large wild fires as delineated in IPFIRES are adjusted by a coefficient which is the difference between the highest value of the coefficient for the geologic type and the median.

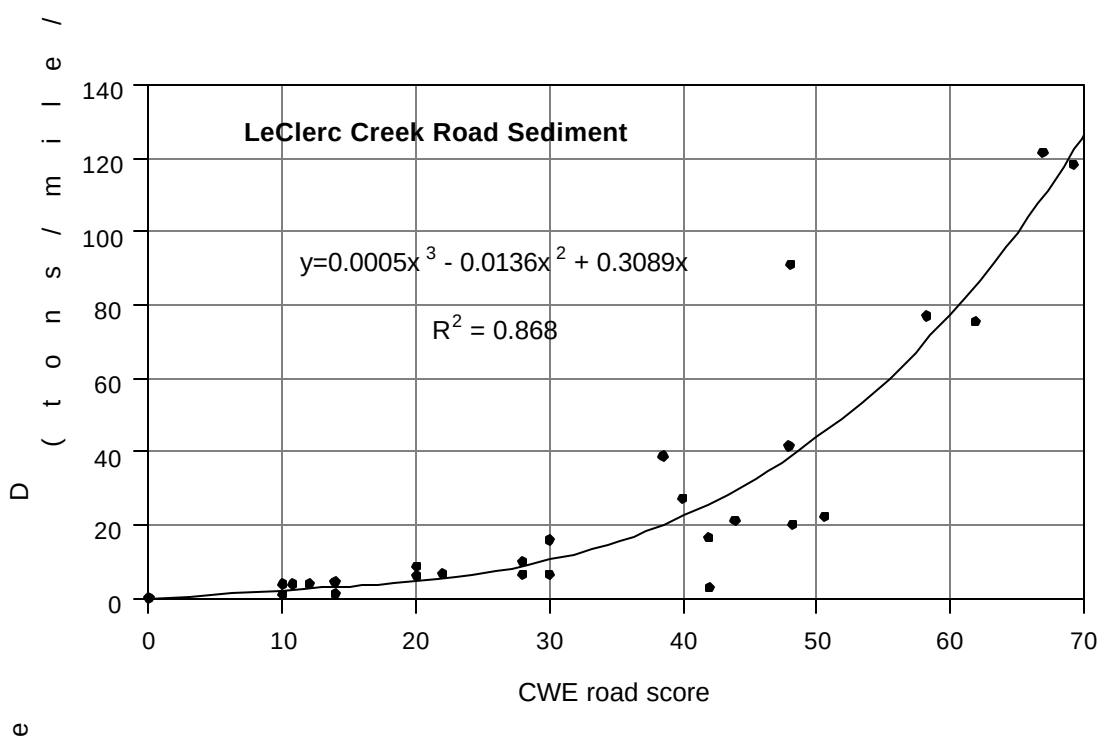
All coefficients are expressed on tons per acre per year basis and are applied to the acreage of each land type developed from Geographical Information System (GIS) coverages. All land uses are displayed with

estimated sediment delivery. Land use sediment delivery is totaled.

Roads are treated separately by the model. Forest haul roads are differentiated from county and private residential roads. County roads often have larger stream passage structures and are normally much wider and have gravel or pavement surfacing. Private residential roads are often limited in extent, but can have poor stream crossing structures. Sediment yields from county and private roads are modeled using a newer RUSLE model (Sandlund, 1999). Road relief, slope length, surfacing, soil material and width were the most critical factors. The sediment yield was applied only to the two hundred feet on either side of stream crossings. Failure of county and private road fills was assumed nonexistent, because such roads are often on more gentle terrain. As a consequence, road fill failures are rare.

Forest roads were modeled using data developed with the cumulative watershed effects (CWE) protocol. A watershed CWE score was used to estimate surface erosion from the road surface. Forest road sediment yield was estimated using a relationship between CWE score and the sediment yield per mile of road (Figure 1). The relationship was developed for roads on a Kaniksu granitic terrane in the LaClerc Creek watershed (McGreer, 1998). Its application to roads on Belt terrane conservatively estimates sediment yields from these systems. The watershed CWE score was used to develop a sediment tons per mile, which was multiplied by the estimated road mileage affecting the streams. In the case of roads, it was assumed that all sediment was delivered to the stream system. These are conservative estimates of actual delivery.

Figure 1: Sediment export of roads based on Cumulative Watershed Effects scores.



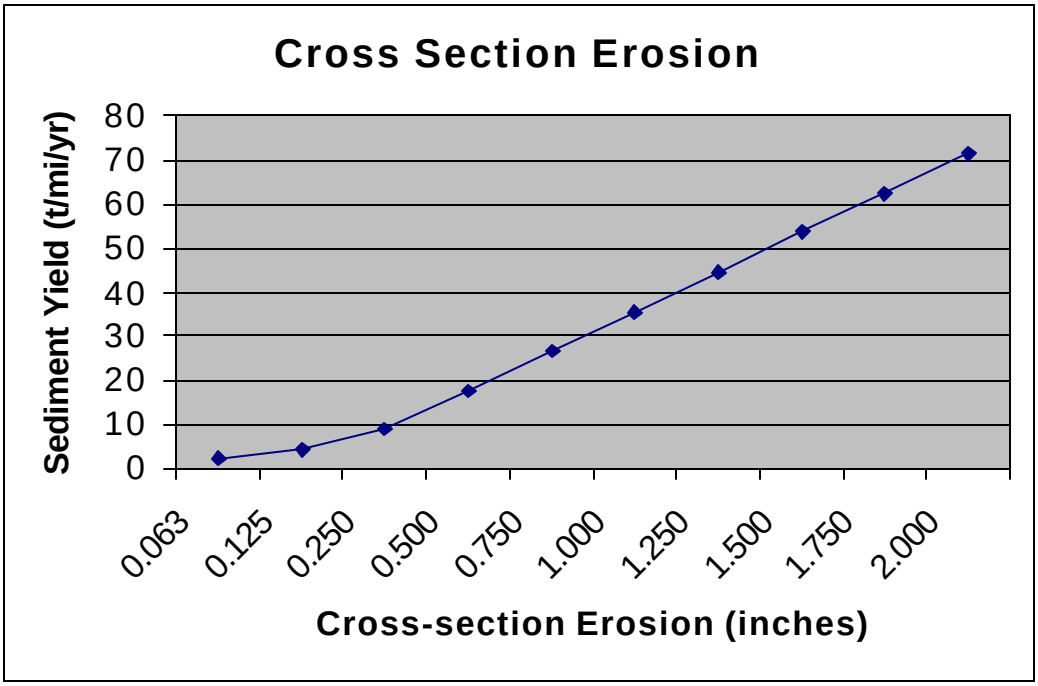
Forest road failure was estimated from actual CWE road fill failure and delivery data. These data were interpreted as primarily the result of large discharge events which occur on a 10 - 15-year return period (McClelland et. al, 1997). The estimates were annualized, by dividing the measured values by ten. The data are typically from a subset of the roads in a watershed. The sediment delivery value was scaled using a factor reflecting the watershed road mileage divided by the road mileage assessed. The sediments delivered through this mechanism contain both fine (material including and smaller than pebbles) and course material (pebbles and larger sizes). The percentages of fine and course particles were estimated using the described characteristics of the soils series found in the watershed. The weighted average of the fines and course composition of the B and C soil horizons to a depth of 36 inches was developed using the soils GIS coverage STATSGO, which contains the soils composition data provided by Soils Survey documents. The B and C horizons: composition was used because these are the strata from which forest roads are normally constructed. Based on the developed soil composition percentage and the estimated probable yield, the tons of fine and course material delivered to the streams by fill failure was calculated. This approach assumes equal delivery of fine and course materials.

Roads cause stream sedimentation by an additional mechanism. The presence of roads in the floodplain of a stream most often interferes with the streams: natural tendency to seek a steady state gradient. During high discharge periods, the constrained stream often erodes at the road bed, or if the bed is armored, erodes at the opposite bank or its bed. The erosion resulting from a road imposed gradient change results in stream sedimentation. The model assumes the roads causing gradient effects to be those within fifty (50) feet of the stream. The model then assumes one-quarter inch erosion per lineal foot of bed and bank up to three feet in height. The one-quarter inch cross-section erosion is assumed to be uniform over the bed and banks. The erosion rate was selected from a model curve of erosion in inches compared to modeled sediment yields from a channel ten feet in width (Figure 2). The stream cross-section used was based on the weighted bank full width for all measurements made of streams in the Beneficial Use Reconnaissance and Use Attainability programs. In the case of the North Fork the weighted mean was 54.9 feet (table appended). The erosion is from the soils types in the basin with the weighted percentages of fine and course material. A bulk soil density of 2.6 g/cc is used to convert soil volume into weights in tons. The tons of fine and course material are totaled for all road segments within 50 lineal feet of the stream. The bulk of this erosion is assumed to occur during large discharge events which occur on a 10 - 15-year return period (McClelland et. al, 1997). The estimates were annualized, by dividing the measured values by ten.

Estimates of bank recession are appropriate primarily along low gradient Rosgen B and C channels Rosgen , 1985). The Direct Volume Method as discussed in the Erosion and Sediment Yield Channel Evaluation Workshop (1983) was employed to make the estimates. The method relies on measurement of eroding bank length, lateral recession rate, soil type and particle size to make these estimates. These data were collected by a field crew. The fine and course material fractions of the bank material based on STATSGO

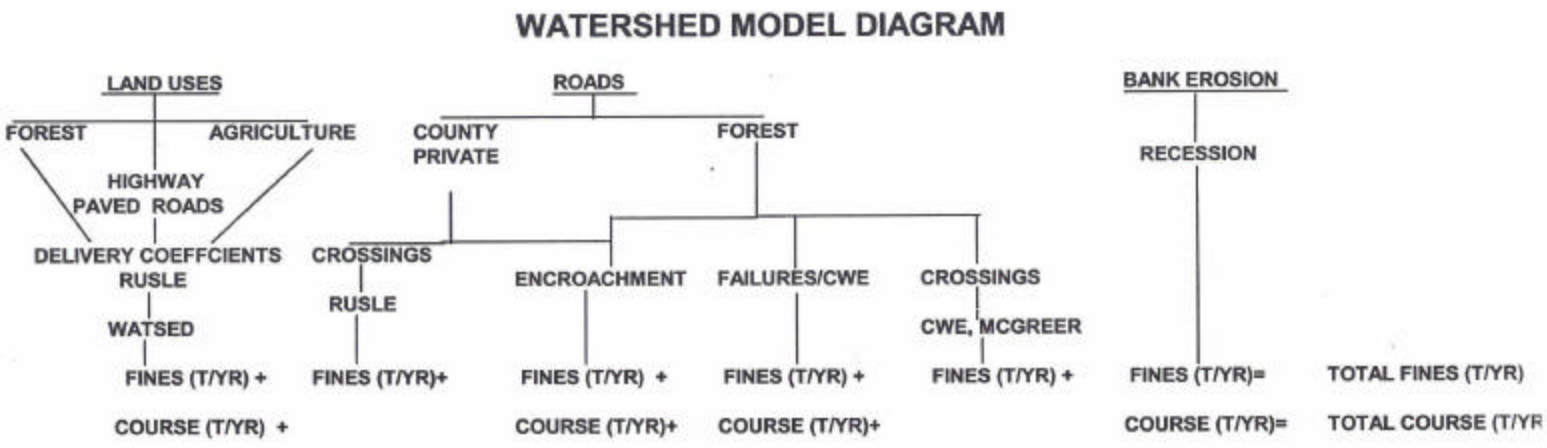
GIS coverage are used to estimate fine and course material delivery to the stream. These values are added into the watershed sediment load.

Figure 2: Modeled sediment yield from thickness of cross-section erosion.



The model does not consider sediment routing. The model does not attempt to estimate the erosion to stream beds and banks resulting from localized sediment deposition in the stream bed. The model does not attempt to measure the effects of additional water capture at road crossings. It is assumed, that on the balance, the additional stream power created by additional water capture over a shorter period would increase net export of sediment, even though some erosion would be caused by this watershed affect.

Model Diagram:



Model Operation:

The model is a simple Excel spreadsheet model composed of four spreadsheets. Key data as acreage and percentages are entered into sheets one and two of the model. County and private road data are supplied in sheet four. The total estimated sediment from the varied sources is calculated in spreadsheet three.

Assessment of Model's Conservative Estimate:

Several conservative assumptions are made in the model construction, which cause its development of conservatively high estimations of sedimentation of the streams modeled. These assumptions are listed in the following paragraphs and a numerical assessment of the magnitude of the conservatism is assigned.

The model uses RUSLE and forest sediment yield coefficients to develop land use sediment delivery estimates. The output values are treated as delivery to the stream. RUSLE assumes delivery if the slope assessed is immediately up gradient from the stream system. This is not the case on the majority of the agricultural land assessed. Estimates made in the Lake Creek Sediment Study indicate that at most 25% of the erosion modeled was delivered as sediment to the stream Bauer, Golden and Pettit, 1998). A similar local estimate has not been made with sediment yield coefficients, but it is likely this estimate would be 25% as well. The land use model component is 75% conservative.

The roads crossing component of the model assumes 100% delivery of fine sediment from the 200 feet on either side of a stream crossing. It is more likely that some fine sediment remains in ditches. A reasonable level of delivery is 80%. The model is likely 20% conservative in this component. On Belt terrane, use of the McGreer model is conservative. Since the sediment yield coefficients measured in-stream for Kaniksu granitic is 167% of the coefficient for Belt terrane, this factor is estimated to be 67% conservative.

Road encroachment is defined as 50 feet from the stream, primarily because this is near the resolution of commonly used GIS mapping techniques. Roads fifty feet from streams but on side hills would not affect the stream gradient. The model is likely incorrect on encroachment 20% of the time and is conservative by this factor.

Fill failure data is developed from the actual CWE field assessments. The CWE assessment does not assess all the roads in the watershed. The failure rate data is scaled up by the factor of the roads assessed divided into the actual watershed road mileage. The roads assessed are typically those remote from the stream system, which are very unlikely to deliver sediment to the stream. The percentage of watershed roads assessed varies, but it is commonly 60% or less of the watershed roads. The model is 40% conservative in this component.

Table 1 summarizes the conservative assumptions and assesses its numerical level of over-estimation.

Table 1: Estimation of the conservative estimate of stream sedimentation provided by the model.

Model Factor	**Kaniksu Granitic**	**Belt Supergroup**
100% RUSLE and forest land sediment yield delivery	75%	75%
Crossing delivery	29%	20%
McGreer Model	0%	67%
Road encroachment at 50 feet	20%	20%
Road Failure	40%	40%
Total Assessment of Over-estimate	164%	231%

The model provides an over estimate by factors of 1.6 and 2.3 for the Kaniksu and Belt terranes, respectively. This over estimation is a built in margin of safety 231% for the North Fork Coeur d'Alene River.

Model verification:

Some verification of the model can be developed by comparison of measured sediment load with those predicted by the model. The USGS measured sediment load at the Harrison Station on the Coeur d'Alene River during water year 1999. Based on this measurement the sediment load per square mile of the basin above this point was calculated to be 32 tons (EPA, 2000, draft). The middle value of the Belt geology sediment yield coefficient range is 14.7 tons per square mile. The model outputs for several watersheds of the North Fork Coeur d'Alene River are provided in Table 2.

Table 2: Modeled sediment output from selected North Fork Coeur d'Alene Watersheds.

Watershed	square miles	modeled sediment	tons/square mile
Deer	10.0	153.1	15.3
Alden	7.9	158.5	20.0
Independence	59.5	1,156.1	19.4
Trail	25.2	976.1	38.7
Flat	17.6	711.9	40.5
Prichard	53.6	1,636.5	30.6
Burnt Cabin	28.8	1,325.7	46.0
Skookum	7.1	191.2	27.0
Bumblebee	24.9	901.2	36.2
Streamboat	41.4	1,955.3	47.2
Graham	9.3	138.4	14.9
Little North Fork	169.0	6,769.2	40.0
North Fork Total	903.2	30.369.7	33.6

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Appendix D: Sediment Model Spreadsheets

North Fork Coeur d'Alene River
Upper North Fork Land Use

Sub-watershed	Upper NF	Mosquito	Buckskin	Spruce	Devil	Mid UNF	Deer	Alden	Jordan	Independ.	Lower UNF	
Pasture (ac)	0	0	0	0	0	0	0	0	0	0	0	
Forest Land (ac)	8984	3509	4361	6628	3242	5947	6107	4745	9756	36760	7966	
Unstocked forest (ac)	127	0	315	163	25	386	307	323	1547	1320	1350	
Double Fires (ac)	0	1	538	7	1494	1200	1074	4858	2844	14467	9316	
Highway (ac)	0	0	0	0	0	0	0	0	0	0	6	
Road Data												
Forest roads (mi)	41.2	18.3	23.3	32.1	10.5	13.1	4.9	6	29.8	110.9	21.2	311.3
Ave. road density (mi/sq mi)	2.9	3.3	3.2	3	2.1	1.3	0.5	0.8	1.7	1.9	1.4	
Road crossing number	5	5	8	7	1	4	0	1	11	25	4	
Road crossing freq.	0.3	0.6	0.8	0.6	0.2	0.4	0	0.1	0.5	0.3	0.2	
Encroaching Forest Roads (mi)	1.5	1	1.4	2.4	0.1	1.5	0	0.4	1.9	3.9	1.8	15.9
Roads on unstable lands (mi)	27.4	11.4	13.7	21.2	8.5	7.4	0	4.7	22.8	72.5	10.5	
CWE score	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	

Upper North Fork Sediment Yield

Watershed	Upper NF	Mosquito	Buckskin	Spruce	Devil	Mid UNF	Deer	Alden	Jordan	Independ.	Lower UNF
Conifer Forest (tons/yr)(fine)	72.3	28.2	35.1	53.4	26.1	47.9	49.2	38.2	78.5	295.9	64.1
(course)	134.3	52.5	65.2	99.1	48.5	88.9	91.3	70.9	145.9	549.6	119.1
Unstoched Forest (tons/yr)(fine)	1.2	0.0	3.0	1.5	0.2	3.6	2.9	3.1	14.6	12.5	12.8
(course)	2.2	0.0	5.5	2.9	0.4	6.8	5.4	5.7	27.1	23.2	23.7
Double Fires (tons/yr)(fine)	0.0	0.0	0.8	0.0	2.1	1.7	1.5	6.8	4.0	20.3	13.0
(course)	0.0	0.0	1.4	0.0	3.9	3.1	2.8	12.6	7.4	37.6	24.2
Highway (tons/yr) (fines)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(course)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Yield (tons/yr)(fine)	73.5	28.2	38.8	54.9	28.4	53.2	53.6	48.1	97.1	328.6	90.0
(Course)	136.5	52.5	72.1	102.0	52.8	98.8	99.5	89.2	180.4	610.3	167.1

County, Forest and Private Road Sediment Yield

Watershed	Upper NF	Mosquito	Buckskin	Spruce	Devil	Mid UNF	Deer	Alden	Jordan	Independ.	Lower UNF
Forest road											
Surface fine sediment (tons/yr)	1.9	1.9	3.0	2.7	0.4	1.5	0.0	0.4	4.2	9.5	1.5
Road failure fines (tons/yr)*	1.7	0.7	0.8	1.3	0.5	0.5	0.0	0.3	1.4	4.5	0.6
Road failure course (tons/yr)*	3.1	1.3	1.6	2.4	1.0	0.8	0.0	0.5	2.6	8.3	1.2
Encroachment fines (tons/yr)#	26.2	17.5	24.5	42.0	1.7	26.2	0.0	7.0	33.2	68.2	31.5
Encroachment course) (tons/yr)#	48.7	32.5	45.5	77.9	3.2	48.7	0.0	13.0	61.7	126.6	58.4
Total fine yield (tons/yr)	29.8	20.1	28.4	45.9	2.7	28.2	0.0	7.7	38.8	82.1	33.6
Total course yield (tons/yr)	51.8	33.8	47.0	80.4	4.2	49.5	0.0	13.5	64.3	134.9	59.6
Total sediment (t/yr)	291.7	134.6	186.3	283.1	88.1	229.7	153.0	158.5	380.6	1156.1	350.3

Yield Coeff. (tons/ac/yr)
0.023

0.027

0.004

0.019

5 Yield Coeff. (tons/mi/yr)

* Uses mass failure and delivery rates developed from CWE protocol pro-rated for road miles.
0.1767 (8.04 tons/ 10 yr/4.55 mi/10 yr or tons/yr/mi)
Soil Percent Fines^

0.35	Fines
0.65	Course

^ from weighted avearge of fines and stones in soils groups

Assume: one -quarter inch from three feet banks; density = 2.6 g/cc

0.020833	0.25"yr/12"
4.54E+08	I19*56*5280'*28317cc/ft3*2.6 g/cc = g/yr
9080000	454g/lb* 2000 lb/t*10 yr
49.94769	t/mile

Upper North Fork Watersheds Sediment Export

Sub-watershed	Upper NF	Mosquito	Buckskin	Spruce	Devil	Mid UNF	Deer	Alden	Jordan	Independ.	Lower UNF	Total
Land use fines export (tons/yr)	73.5	28.2	38.8	54.9	28.4	53.2	53.6	48.1	97.1	328.6	90	
Landuse course export (tons/yr)	136.5	52.5	72.1	102	52.8	98.8	99.5	89.2	180.4	610.3	167.1	
Road fines export (tons/yr)	29.8	20.1	28.4	45.9	2.7	28.2	0.0	7.7	38.8	82.1	33.6	
Road course export (tons/yr)	51.8	33.8	47.0	80.4	4.2	49.5	0.0	13.5	64.3	134.9	59.6	
Total fines export tons/yr)	103.3	48.3	67.2	100.8	31.1	81.4	53.6	55.8	135.9	410.7	123.6	1314.8
Total course export tons/yr)	188.3	86.3	119.1	182.4	57.0	148.3	99.5	102.7	244.7	745.2	226.7	2200.2
Total (tons/yr)	291.6	134.6	186.3	283.2	88.1	229.7	153.1	158.5	380.6	1155.9	350.3	3515.0
Natural Background	209.6	80.7	107.5	156.2	75.1	145.7	147.5	116.6	260.0	875.8	214.3	2389.0
												1126.0
												1.471349

North Fork Coeur d'Alene River
Tepee Creek Land Use

Sub-watershed	Big Elk	Upper TP	Trail	Lower TP	
Pasture (ac)	0	0	0	0	
Forest Land (ac)	7468	14,863	15801	13209	
Unstocked forest (ac)	35	516	347	1013	
Double Fires (ac)	0	250	1791	4942	
Highway (ac)	0	0	0		

Road Data

Forest roads (mi)	93.1	90.7	158.8	16.7	359.3
Ave. road density (mi/sq mi)	7.9	3.8	6.3	0.8	
Road crossing number	22	13	38	16	
Road crossing freq.	1.3	0.4	1.1	0.4	
Encroaching Forest Roads (mi)	4.8	3.8	11.2	3	22.8
Roads on unstable lands (mi)	75.1	49.3	126.1	16.1	
CWE score	16.5	16.5	16.5	16.5	

Tepee Creek Sediment Yield

Watershed	Big Elk	Upper TP	Trail	Lower TP	Yield Coeff. (tons/ac/yr)
Conifer Forest (tons/yr)(fine)	68.7	136.7	145.4	121.5	0.023
(course)	103.1	205.1	218.1	182.3	
Unstoched Forest (tons/yr)(fine)	0.4	5.6	3.7	10.9	0.027
(course)	0.6	8.4	5.6	16.4	
Double Fires (tons/yr)(fine)	0.0	0.4	2.9	7.9	0.004
(course)	0.0	0.6	4.3	11.9	
Highway (tons/yr)(fine)					0.019
(course)					
Bank Erosion (tons/yr)(fine)					
(course)					
Total Yield (tons/yr)(fine)	69.1	142.7	152.0	140.4	
(course)	103.6	214.1	228.0	210.6	

County, Forest and Private Road Sediment Yield

Watershed	Big Elk	Upper TP	Trail	Lower TP	5 Yield Coeff. (tons/mi/yr)
Forest road					
Surface fine sediment (tons/yr)	8.3	4.9	14.4	6.1	
Road failure fines (tons/yr)*	5.3	3.5	8.9	1.1	
Road failure course (tons/yr)*	8.0	5.2	13.4	1.7	
Encroachment fines (tons/yr)#	95.9	75.9	223.8	59.9	
Encroachment course) (tons/yr)#	143.8	113.9	335.6	89.9	
Total fine yield (tons/yr)	109.5	84.3	247.1	67.1	
Total course yield (tons/yr)	151.8	119.1	349.0	91.6	
Total sediment (t/yr)	434.1	560.2	976.0	509.7	

* Uses mass failure and delivery rates developed from CWE protocol pro-rated
0.1767 (8.04 tons/ 10 yr/4.55 mi/10 yr or

Soil Percent Fines^

0.4	Fines
0.6	Course

^ from weighted avearge of fines and stones in soils groups

Assume: one -quarter inch from three feet banks; density = 2.6 g/cc

0.020833	0.25"yr/12"
4.54E+08	I19*56*5280'*28317cc/ft3*2.6 g/cc = g/yr
9080000	454g/lb* 2000 lb/t*10 yr
49.94769	t/mile

Tepee Creek Watershed Sediment Export

Sub-watershed	Big Elk	Upper TP	Trail	Lower TP	Total (ton/yr)
Land use fines export (tons/yr)	69.1	142.7	152.0	140.4	
Landuse course export (tons/yr)	103.6	214.1	228.0	210.6	
Road fines export (tons/yr)	109.5	84.3	247.1	67.1	
Road course export (tons/yr)	151.8	119.1	349.0	91.6	
Total fines export tons/yr)	178.6	227.0	399.1	207.5	1012.2
Total course export tons/yr)	255.4	333.2	577.0	302.2	1467.8
Total (tons/yr)	434.0	560.2	976.1	509.7	2480.0
Natural Background	172.6	353.7	371.4	327.1	1224.8
					1255.2
					2.024827

North Fork Coeur d'Alene River
Middle North Fork Land Use

Sub-watershed	Cinnamon	Brett	Miners	Flat	Big Hank	Yellow Dog	
Pasture (ac)	0	0	0	0	0	0	
Forest Land (ac)	3552	4,945	3967	11238	9325	5090	
Unstocked forest (ac)	842	568	24	13	1018	5	
Double Fires (ac)	1007	3570	0	0	990	0	
Highway (ac)	3	15	11	19	10	0	

Road Data

Forest roads (mi)	13.7	25.6	50.4	161.8	77	74.5	403
Ave. road density (mi/sq mi)	2	3	8.1	9.2	4.8	9.4	
Road crossing number	3	17	8	34	29	19	
Road crossing freq.	0.3	1.2	1.2	1.6	1.1	1.6	
Encroaching Forest Roads (mi)	0.3	3.8	1.6	8.5	5.3	4.6	24.1
Roads on unstable lands (mi)	1.5	23.7	31.6	103.6	37	38.9	
CWE score	16.5	16.5	16.5	16.5	16.5	16.5	

Middle North Fork Sediment Yield

Watershed	Cinnamon	Brett	Miners	Flat	Big Hank	Yellow Dog	Yield Coeff. (tons/ac/yr)
Conifer Forest (tons/yr)(fine)	28.6	39.8	31.9	90.5	75.1	41.0	0.023
(course)	53.1	73.9	59.3	168.0	139.4	76.1	
Unstoched Forest (tons/yr)(fine)	8.0	5.4	0.2	0.1	9.6	0.0	0.027
(course)	14.8	10.0	0.4	0.2	17.9	0.1	
Double Fires (tons/yr)(fine)	1.4	5.0	0.0	0.0	1.4	0.0	0.004
(course)	2.6	9.3	0.0	0.0	2.6	0.0	
Highway (tons/yr) (fine)	0.0	0.1	0.1	0.1	0.1	0.0	0.019
(course)	0.0	0.2	0.1	0.2	0.1	0.0	
Total Yield (tons/yr)(fine)	38.0	50.3	32.2	90.7	86.1	41.0	tons extrapolated from Wolf Lodge Creek; better number Spring 2000.
(Course)	70.5	93.4	59.9	168.5	160.0	76.2	

Forest Road Sediment Yield

Watershed	Cinnamon	Brett	Miners	Flat	Big Hank	Yellow Dog	5 Yield Coeff. (tons/mi/yr)
Forest road							
Surface fine sediment (tons/yr)	1.1	6.4	3.0	12.9	11.0	7.2	* Uses mass failure and delivery rates developed from CWE protocol pro-
Road failure fines (tons/yr)*	0.1	1.5	2.0	6.4	2.3	2.4	rated for road miles
Road failure course (tons/yr)*	0.2	2.7	3.6	11.9	4.2	4.5	0.1767 (8.04 tons/ 10 yr/4.55 mi/10 yr or tons/yr/mi)
Encroachment fines (tons/yr)#	5.2	66.4	28.0	148.6	92.7	80.4	Soil Percent Fines^
Encroachment course) (tons/yr)#	9.7	123.4	51.9	276.0	172.1	149.3	0.35 Fines
Total fine yield (tons/yr)	6.5	74.3	33.0	167.9	105.9	90.0	0.65 Course
Total course yield (tons/yr)	9.9	126.1	55.6	287.9	176.3	153.8	^ from weighted avearge of fines and stones in soils groups
Total sediment (t/yr)	124.9	344.1	180.6	714.9	528.4	361.0	

Assume: one -quarter inch from three feet banks; density = 2.6 g/cc
0.020833 0.25"yr/12"
4.54E+08 I19*56*5280'*28317cc/ft3*2.6 g/cc = g/yr
9080000 454g/lb* 2000 lb/t*10 yr
49.94769 t/mile

Middle North Fork Watersheds Sediment Export

Sub-watershed	Cinnamon	Brett	Miners	Flat	Big Hank	Yellow Dog	Total (tons/yr)
Land use fines export (tons/yr)	38.0	50.3	32.2	90.7	86.1	41.0	
Landuse course export (tons/yr)	70.5	93.4	59.9	168.5	160.0	76.2	
Road fines export (tons/yr)	6.5	74.3	33.0	167.9	105.9	90.0	
Road course export (tons/yr)	9.9	126.1	55.6	287.9	176.3	153.8	
Total fines export tons/yr)	44.5	124.6	65.2	258.6	192.0	131.0	815.9
Total course export tons/yr)	80.4	219.5	115.5	456.4	336.3	230.0	1438.1
Total (tons/yr)	124.9	344.1	180.7	715.0	528.3	361.0	2254.0
Natural Background	101.1	127.1	92.0	259.2	238.1	117.2	934.8
							1319.2
							2.411121

North Fork Coeur d'Alene River
Shoshone-Lost Landuse

Sub-watershed	Upper Sho	Falls	Lower Sho	Lost	
Pasture (ac)	0	0	0	0	
Forest Land (ac)	25288	8,607	9967	13093	
Unstocked forest (ac)	637	70	152	1284	
Double Fires (ac)	66	0	0	0	

Road Data

Forest roads (mi)	232.6	149.7	131.3	65.6	579.2
Ave. road density (mi/sq mi)	5.7	5.1	4.5	2.9	
Road crossing number	54	21	18	21	
Road crossing freq.	1	2.6	1.2	1	
Encroaching Forest Roads (mi)	13.3	2.9	4.9	3.4	24.5
Roads on unstable lands (mi)	128.8	78.7	52.9	39.3	
CWE score	16.5	16.5	16.5	16.5	

Shoshone-Lost Sediment Yield

Watershed	Upper Sho	Falls	Lower Sho	Lost	Yield Coeff. (tons/ac/yr)
Conifer Forest (tons/yr)(fine)	203.6	69.3	80.2	105.4	0.023
(course)	378.1	128.7	149.0	195.7	
Unstoched Forest (tons/yr)(fine)	6.0	0.7	1.4	12.1	0.027
(course)	11.2	1.2	2.7	22.5	
Double Fires (tons/yr)(fine)	0.1	0.0	0.0	0.0	0.004
(course)	0.0	0.0	0.0	0.0	
Total Yield (tons/yr)(fine)	209.7	69.9	81.7	117.5	
(Course)	389.2	129.9	151.7	218.3	

tons extrapolated from Wolf Lodge Creek; better number Spring 2000.

Forest Road Sediment Yield

Watershed	Upper Sho	Falls	Lower Sho	Lost	5 Yield Coeff. (tons/mi/yr)
Forest road					
Surface fine sediment (tons/yr)	20.5	8.0	6.8	8.0	
Road failure fines (tons/yr)*	8.0	4.9	3.3	2.4	
Road failure course (tons/yr)*	14.8	9.0	6.1	4.5	
Encroachment fines (tons/yr)#	232.5	50.7	85.7	59.4	
Encroachment course) (tons/yr)#	431.8	94.2	159.1	110.4	
Total fine yield (tons/yr)	260.9	63.5	95.8	69.8	
Total course yield (tons/yr)	446.6	103.2	165.2	114.9	
Total Sediment (t/yr)	1306.4	366.6	494.3	520.5	

* Uses mass failure and delivery rates developed from CWE protocol pro-rated for road miles.

0.1767	(8.04 tons/ 10 yr/4.55 mi/10 yr or
Soil Percent Fines^	
0.35	Fines
0.65	Course

^ from weighted avearge of fines and stones in soils groups

Assume: one -quarter inch from three feet banks; density = 2.6 g/cc

0.020833	0.25"yr/12"
4.54E+08	I19*56*5280'*28317cc/ft3*2.6 g/cc = g/yr
9080000	454g/lb* 2000 lb/t*10 yr
49.94769	t/mile

Shoshone-Lost watersheds Sediment Export

Sub-watershed	Upper Sho	Falls	Lower Sho	Lost	Total (tons/yr)
Land use fines export (tons/yr)	209.7	69.9	81.7	117.5	
Landuse course export (tons/yr)	389.2	129.9	151.7	218.3	
Road fines export (tons/yr)	260.0	63.5	95.8	69.8	
Road course export (tons/yr)	446.6	103.2	165.2	114.9	
Total fines export tons/yr)	469.7	133.4	177.5	187.3	967.9
Total course export tons/yr)	835.8	233.1	316.9	333.2	1719.0
Total (tons/yr)	1305.5	366.5	494.4	520.5	2686.9
Natural Background	596.3	199.6	232.7	330.7	1359.3
					1327.6
					1.976746

North Fork Coeur d'Alene River
Prichard-Beaver Land Use

Sub-watershed	WF Eagle	EF Eagle	Eagle	Up Prich	Lower Pric	Up Beav	Low Beav	
Pasture (ac)	0	0	0	0	0	0	0	
Forest Land (ac)	12258	14187	1340	20,858	9637	12792	13673	
Unstocked forest (ac)	233	600	13	3759	19	869	491	
Double Fires (ac)	0	0	0	862	0	0	0	
Highway (ac)	0	0	5	41	35	22	23	
Road Data								
Forest roads (mi)	87.5	123.8	17.5	81.5	111.7	118.1	103.5	643.6
Ave. road density (mi/sq mi)	4.5	5.4	8.3	2.1	7.4	5.5	4.7	
Road crossing number	25	35	1	45	25	63	36	
Road crossing freq.	1.7	2.2	1	1.4	1.6	2.7	1.4	
Encroaching Forest Roads (mi)	6.2	10.3	0.2	12	3.7	13.3	6.3	52
Roads on unstable lands (mi)	55.2	82.6	7.1	47.1	52.2	79.5	66.6	
CWE score	16.5	16.5	16.5	16.5	16.5	16.5	16.5	

Prichard-Beaver Sediment Yield

Watershed	WF Eagle	EF Eagle	Eagle	Up Prich	Lower Pric	Up Beav	Low Beav	Yield Coeff. (tons/ac/yr)
Conifer Forest (tons/yr)(fine)	112.8	130.5	12.3	191.9	88.7	117.7	125.8	0.023
(course)	169.2	195.8	18.5	287.8	133.0	176.5	188.7	
Unstoched Forest (tons/yr)(fine)	2.5	6.5	0.1	40.6	0.2	9.4	5.3	0.027
(course)	3.8	9.7	0.2	60.9	0.3	14.1	8.0	
Double Fires (tons/yr)(fine)	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.004
(course)	0.0	0.0	0.0	2.1	0.0	0.0	0.0	
Highway (tons/yr) (fine)	0.0	0.0	0.0	0.3	0.3	0.2	0.2	0.019
(course)	0.0	0.0	0.1	0.5	0.4	0.3	0.3	
Total Yield (tons/yr)(fine)	115.3	137.0	12.5	234.2	89.1	127.2	131.3	tons extrapolated from Wolf Lodge Creek.
(Course)	172.9	205.5	18.8	351.3	133.7	190.9	196.9	

Forest Road Sediment Yield

Watershed	WF Eagle	EF Eagle	Eagle	Up Prich	Lower Pric	Up Beav	Low Beav	5 Yield Coeff. (tons/mi/yr)
Forest road								
Surface fine sediment (tons/yr)	9.5	13.3	0.4	17.0	9.5	23.9	13.6	* Uses mass failure and delivery rates developed from CWE
Road failure fines (tons/yr)*	3.9	5.8	0.5	3.3	3.7	5.6	4.7	protocol pro-rated for road miles.
Road failure course (tons/yr)*	5.9	8.8	0.8	5.0	5.5	8.4	7.1	
Encroachment fines (tons/yr)#	123.9	205.8	4.0	239.7	73.9	265.7	125.9	0.1767 (8.04 tons/ 10 yr/4.55 mi/10 yr or tons/yr/mi)
Encroachment course) (tons/yr)#	185.8	308.7	6.0	359.6	110.9	398.6	188.8	Soil Percent Fines^
Total fine yield (tons/yr)	137.2	224.9	4.9	260.1	87.1	295.2	144.2	0.4 Fines
Total course yield (tons/yr)	191.7	317.4	6.7	364.6	116.4	407.0	195.9	0.6 Course
								^ from weighted avearge of fines and stones in soils groups
Total Sediment (t/yr)	617.1	884.8	42.9	1210.2	426.3	1020.3	668.2	

Assume: one -quarter inch from three feet banks;density = 2.6g/cc 0.020833 0.25"yr/12"
4.54E+08 I19*56*5280'*28317cc/ft3*2.6 g/cc = g/yr
9080000 454g/lb* 2000 lb/t*10 yr
49.94769 t/mile

Prichard-Beaver Watersheds Sediment Export

Sub-watershed	WF Eagle	EF Eagle	Eagle	Up Prich	Lower Pric	Up Beav	Low Beav	Total (tons/yr)
Land use fines export (tons/yr)	115.3	137.0	12.5	234.2	89.1	127.2	131.3	
Landuse course export (tons/yr)	172.9	205.5	18.8	351.3	133.7	190.9	196.9	
Road fines export (tons/yr)	137.2	224.9	4.9	260.1	87.1	295.2	144.2	
Road course export (tons/yr)	191.7	317.4	6.7	364.6	116.4	407.0	195.7	
Total fines export tons/yr)	252.5	361.9	17.4	494.3	176.2	422.4	275.5	2000.2
Total course export tons/yr)	364.6	522.9	25.5	715.9	250.1	597.9	392.6	2869.5
Total (tons/yr)	617.1	884.8	42.9	1210.2	426.3	1020.3	668.1	4869.7
Natural Background	287.3	340.1	31.2	567.1	222.9	314.7	326.3	2089.7
								2780.0
								2.330374

North Fork Coeur d'Alene River
Lower North Fork Land Use

Sub-watershed	Downey	Ur-Creak	Grizzley	Browns	Steamboat	Graham	Cougar	Lower NF	
Pasture (ac)	0	1096	0	1023	0	0	0	1472	
Forest Land (ac)	5960	16998	10,120	11,405	25,922	5779	12222	19206	
Unstocked forest (ac)	75	276	306	304	582	184	99	237	
Double Fires (ac)	0	6	87	111	0	0	0	0	
Highway (ac)	0	61	13	20	0	1	0	50	

Road Data

Forest roads (mi)	79.6	186.7	68.2	125.5	423	0.2	170.1	219.5	1053.3
Ave. road density (mi/sq mi)	8.4	6.5	4.2	6.3	10.2	0	8.8	3	
Road crossing number	47	43	21	38	111	1	33	86	
Road crossing freq.	3.8	1.4	0.8	1.4	2.1	0.1	1.3	1.5	
Encroaching Forest Roads (mi)	6.4	9	5.8	7.1	25.3	0	6	17.7	59.6
Roads on unstable lands (mi)	52.8	118.6	50.1	67.5	213.6	0	88.1	100.2	
CWE score	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	

Lower North Fork Sediment Yield

Watershed	Downey	Ur-Creak	Grizzley	Browns	Steamboat	Graham	Cougar	Lower NF	Yield Coeff. (tons/ac/yr)
Pasture (tons/yr)	0.0	32.9	0.0	30.7	0.0	0.0	0.0	44.2	0.03
Conifer Forest (tons/yr)(fine)	54.8	156.4	93.1	104.9	238.5	53.2	112.4	176.7	0.023
(course)	82.2	234.6	139.7	157.4	357.7	79.8	168.7	265.0	
Unstoched Forest (tons/yr)(fine)	0.8	3.0	3.3	3.3	6.3	2.0	1.1	2.6	0.027
(course)	1.2	4.5	5.0	4.9	9.4	3.0	1.6	3.8	
Double Fires (tons/yr)(fine)	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.004
(course)	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	
Highway (tons/yr)(fine)	0.0	0.5	0.1	0.2	0.0	0.0	0.0	0.4	0.019
(course)	0.0	0.7	0.1	0.2	0.0	0.0	0.0	0.6	
Bank Erosion (tons/yr)(fine)									tons extrapolated from Wolf Lodge Creek.
(course)									
Total Yield (tons/yr)(fine)	55.6	192.7	96.6	139.2	244.8	55.2	113.5	223.8	
(Course)	83.5	239.8	145.0	162.8	367.2	82.7	170.3	269.5	

Forest Road Sediment Yield

Watershed	Downey	Ur-Creak	Grizzley	Browns	Steamboat	Graham	Cougar	Lower NF	5 Yield Coeff. (tons/mi/yr)
Forest road									
Surface fine sediment (tons/yr)	17.8	16.3	8.0	14.4	42.0	0.4	12.5	32.6	
Road failure fines (tons/yr)*	3.7	8.4	3.5	4.8	15.1	0.0	6.2	7.1	* Uses mass failure and delivery rates developed from
Road failure course (tons/yr)*	5.6	12.6	5.3	7.2	22.6	0.0	9.3	10.6	CWE protocol pro-rated for road miles.
Encroachment fines (tons/yr)#	127.9	179.8	115.9	141.9	505.5	0.0	119.9	353.6	0.1767 (8.04 tons/ 10 yr/4.55 mi/10 yr or tons/yr/mi)
Encroachment course) (tons/yr)#	191.8	269.7	173.8	212.8	758.2	0.0	179.8	530.4	Soil Percent Fines^
Total fine yield (tons/yr)	149.4	204.5	127.4	161.0	562.6	0.4	138.6	393.3	0.4 Fines
Total course yield (tons/yr)	197.4	282.3	179.1	219.9	780.9	0.0	189.2	541.1	0.6 Course
									^ from weighted avearge of fines and stones in soils
Total sediment (t/yr)	485.9	919.2	548.1	683.0	1955.4	138.3	611.5	1427.6	groups.
									# Assume: one -quarter inch from three feet banks;
									0.020833 0.25"yr/12" density = 2.6 g/cc
									4.54E+08 l19*56*5280'*28317cc/ft3*2.6 g/cc = g/yr
									9080000 454g/lb* 2000 lb/t*10 yr
									49.94769 t/mile

Lower North Fork Watersheds Sediment Export

Sub-watershed	Downey	Ur-Creak	Grizzley	Browns	Steamboat	Graham	Cougar	Lower NF	Total (tons/yr)
Land use fines export (tons/yr)	55.6	192.7	96.6	139.2	244.8	55.2	113.5	223.8	
Landuse course export (tons/yr)	83.5	239.8	145.0	162.8	367.2	82.7	170.3	269.6	
Road fines export (tons/yr)	149.4	204.5	127.4	161	562.6	0.4	138.6	393.3	
Road course export (tons/yr)	197.4	282.3	179.1	219.9	780.9	0	189.2	541.1	
Bank fines export (tons/yr)									
Bank course export (tons/yr)									
Total fines export tons/yr)	205.0	397.2	224.0	300.2	807.4	55.6	252.1	617.1	2858.6
Total course export tons/yr)	280.9	522.1	324.1	382.7	1148.1	82.7	359.5	810.7	3910.8
Total (tons/yr)	485.9	919.3	548.1	682.9	1955.5	138.3	611.6	1427.8	6769.4
Natural Background	138.8	423.9	240.1	293.3	609.6	137.2	283.4	482.2	2608.5
									4160.9
									2.595178

North Fork Coeur d'Alene River
Little North Fork Land Use

Sub-watershed	UpLtNF	Hudlow	Iron	Barney	Brt Cabin	Deception	Skookum	Lieberg	Laverne	Copper	Bumblebee	Low Lt NF	
Pasture (ac)	0	0	0	0	0	0	0	0	0	0	0	344.2	
Forest Land (ac)	10680	6,636	6,055	2,652	18404	3505	4371	15501	11314	12152	15448	0	
Unstocked forest (ac)	21	112	14	33	37	0	156	172	59	26	490	0	
Double Fires (ac)	0	0	0	0	0	0	0	0	0	0	0	0	

Road Data

Forest roads (mi)	142.4	77	116	30.6	308.8	68.4	61	210.1	127.6	145	170.4	0	1457.3
Ave. road density (mi/sq mi)	8.5	7.3	12.2	7.3	10.7	12.5	8.6	6.6	7.2	7.6	6.8	0	
Road crossing number	38	26	28	4	69	39	9	31	19	31	42	0	
Road crossing freq.	1.6	1.9	2.1	0.6	2	4.6	1.1	1.2	0.8	1.2	1.3	0	
Encroaching Forest Roads (mi)	7.9	6.4	7	0.9	17.1	7.4	1.9	8.7	4.4	6.2	9.9	0	122.7
Roads on unstable lands (mi)	79.8	51.3	89.2	15.2	119.7	45.7	24.1	155.9	47.1	72.4	126.4	0	
CWE score	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	0	

Little North Fork Sediment Yield

Watershed	UpLtNF	Hudlow	Iron	Barney	Brt Cabin	Deception	Skookum	Lieberg	Laverne	Copper	Bumblebee	Low Lt NF
Pasture (tons/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3
Conifer Forest (tons/yr)(fine)	98.3	61.1	55.7	24.4	169.3	32.2	40.2	142.6	104.1	111.8	142.1	0.0
(course)	147.4	91.6	83.6	36.6	254.0	48.4	60.3	213.9	156.1	167.7	213.2	0.0
Unstoched Forest (tons/yr)(fine)	0.2	1.2	0.2	0.4	0.4	0.0	1.7	1.9	1.0	0.3	5.3	0.0
(course)	0.3	1.8	0.2	0.5	0.6	0.0	2.5	2.8	1.0	0.4	7.9	0.0
Double Fires (tons/yr)(fine)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(course)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bank Erosion (tons/yr)(fine)												
(course)												
Total Yield (tons/yr)(fine)	98.5	62.3	55.9	24.8	169.7	32.2	41.9	144.5	105.0	112.1	147.4	10.3
(Course)	147.7	93.4	83.8	37.1	254.6	48.4	62.8	216.7	157.1	168.1	221.1	0.0

Forest Road Sediment Yield

Watershed	UpLtNF	Hudlow	Iron	Barney	Brt Cabin	Deception	Skookum	Lieberg	Laverne	Copper	Bumblebee	Low Lt NF
Forest road												
Surface fine sediment (tons/yr)	14.4	9.8	10.6	1.5	26.1	14.8	3.4	11.7	7.2	11.7	15.9	0.0
Road failure fines (tons/yr)*	5.6	3.6	6.3	1.1	8.5	3.2	1.7	11.0	8.7	5.1	8.9	0.0
Road failure course (tons/yr)*	8.5	5.4	9.5	1.6	12.7	4.8	2.6	16.5	5.0	7.7	13.4	0.0
Encroachment fines (tons/yr)#	157.8	127.9	139.9	18.0	341.6	147.8	21.9	173.8	87.9	123.9	197.8	0.0
Encroachment course) (tons/yr)#	236.8	191.8	209.8	27.0	512.5	221.8	56.9	260.7	131.9	185.8	296.7	0.0
Total fine yield (tons/yr)	177.9	141.3	156.8	20.6	376.2	165.8	27.0	196.6	103.8	140.7	222.6	0.0
Total course yield (tons/yr)	245.2	197.2	219.2	28.6	525.2	226.6	59.5	277.3	136.9	193.5	310.1	0.0
Total sediment (t/yr)	669.3	494.2	515.6	111.0	1325.7	473.1	191.2	835.0	502.8	614.4	901.3	10.3

Yield Coeff. (tons/ac/yr)
0.03
0.023

0.027

0.004

tons extrapolated from Wolf Lodge Creek; better number Spring 2000.

5 Yield Coeff. (tons/mi/yr)

* Uses mass failure and delivery rates developed from CWE protocol pro-rated for road miles.
0.1767 (8.04 tons/ 10 yr/4.55 mi/10 yr or
Soil Percent Fines^
0.4 Fines
0.6 Course
^ from weighted avearge of fines and stones in soils groups

Assume: one -quarter inch from three feet banks; density = 2.6 g/cc
0.020833 0.25"yr/12"
4.54E+08 I19*56*5280'*28317cc/ft3*2.6 g/cc = g/yr
9080000 454g/lb* 2000 lb/t*10 yr
49.94769 t/mile

Little North Fork Watersheds Sediment Export

Sub-watershed	UpLtNF	Hudlow	Iron	Barney	Brt Cabin	Deception	Skookum	Lieberg	Laverne	Copper	Bumblebee	Low Lt NF	Total (tons/
Land use fines export (tons/yr)	98.5	62.3	55.9	24.8	169.7	32.2	41.9	144.5	105.0	112.1	147.4	10.3	
Landuse course export (tons/yr)	147.7	93.4	83.8	37.1	254.6	48.4	62.8	216.7	157.1	168.1	221.1	0.0	
Road fines export (tons/yr)	177.8	141.3	156.8	21.1	376.2	165.8	27.8	196.6	103.8	140.7	222.1	0.0	
Road course export (tons/yr)	245.2	197.2	219.2	28.6	525.2	226.6	59.5	277.3	136.9	193.5	310.1	0.0	
Bank fines export (tons/yr)													
Bank course export (tons/yr)													
Total fines export tons/yr)	276.3	203.6	212.7	45.9	545.9	198.0	69.7	341.1	208.8	252.8	369.5	10.3	2734.6
Total course export tons/yr)	392.9	290.6	303.0	65.7	779.8	275.0	122.3	494.0	294.0	361.6	531.2	0.0	3910.1
Total (tons/yr)	669.2	494.2	515.7	111.6	1325.7	473.0	192.0	835.1	502.8	614.4	900.7	10.3	6644.7
Natural Background	246.1	155.2	139.6	61.8	424.1	80.6	104.1	360.5	261.6	280.1	366.6	7.9	2488.2
													4156.5
													2.670495

Appendix E: Letters of Comment and Letters of Response

Comment Log North Fork CDA River TMDL

Date Received	Name/Address
1/8/01	Carol Staley
1/17/01	Eric Klepfer, Director of Env Affairs The Coeur Mine, 595 Front Ave, POBox I, CDA 83816
1/19/01	William Booth Hecla Mining Co, 6500 Mineral Dr, CDA 83815
1/19/01	Mike Mihelich Kootenai Env Alliance, PO Box 1598, CDA 83816
1/20/01	ASARCO
1/22/01	Dean Johnson IDL, 3780 Industrial Ave S, CDA 83815
1/22/01	Timothy Butler HellerEhrman Attorneys, 701 Fifth Ave, Ste 6100, Seattle, WA 98104 (sent 3 faxed copies, original received 1/24/01, attached to copies)
1/22/01	Kathy Zanetti SNRC, PO Box 1027, Wallace 83873
1/22/01	John Osborn 2421 W Mission Ave, Spokane, WA 99201 (emailed copy, original received same day, attached)
1/22/01	Michael Branstetter PO Box 571, Osburn 83849
1/23/01	Liz Sedler Lands Council, PO Box 1203, Sandpoint 83864
1/29/01	Greg Tourtlotte Idaho Fish & Game, 2750 Kathleeen Ave, CDA 83815
2/01/01	Curry Jones EPA, Seattle

RECEIVED
JAN - 8 2001
IDHW-DEQ
Coeur d'Alene Field Office

To the Department of Environmental Quality
Subject matter: North Fork of the Coeur d'Alene River sediment problem.

I am writing regarding the article in the Spokesman Review dated 12-21-00 in which the DEQ claims the sediment problem is caused mainly from the logging roads. Well, from my observation I believe this to be the wrong conclusion. My husband and I have owned a home on the North Fork of the Coeur d'Alene River for twelve years. My observations are constant and personal, for it affects us personally.

When we first bought our home, the river in front of our house ran deep and swift. I loved to listen to the floaters laugh and whoop it up as they passed in front of the house. Now, twelve years later, the river in front of our home runs slow and lazy because it's shallow and by mid-summer most of the riverbed is dried up and out of the water. Now rafters have to pick up their rafts and carry them over the exposed rocks. This isn't a sediment problem exactly but the results of flood damage. Flood damage that increases each and every year. I believe the majority of the sediment in that river (or rather the sediment that's filling the lake bed) is coming from the destruction on the rivers own banks. Every year dozens of trees are undermined and fall into the river leaving the banks more and more unprotected. Tons of dirt and rock are washed down stream. The dirt washes away while the rock just fills up the riverbed leaving it shallower. The shallower it becomes the warmer the water is during the summer months. This, I'm positive, has more impact on the trout population than sediment from the logging roads. My mother and father live on Beaver Creek and every year they and their neighbors lose more and more land to the flooding of Beaver creek. The creek is eating away the banks leaving nothing but exposed rock. I believe this to be the results of over logging and clear cutting. With all the bare hillsides, there is nothing to stop or slow the runoff when a warm spell hits. The river can handle torrential rains for days but not during runoff. Clear cutting has impaired its ability to handle even the mildest of runoff due to a warming trend.

With every year the population along the river grows. People wanting to live on the river clear large sections of land of all its bushes and trees so it can be used for grazing horses and park like settings for camping. The grazing horses cause damage to the banks and increases the bank erosion during flooding. The clearing of vegetation along the banks, increase the risk of the banks washing away. One family with a large park like yard, even hauls in sand for its river bank so they have a sandy bank to play on. After the spring flood, someone else will have their sand and they will have to haul more for their bank.

I have seen this river during its peak flooding and yes it runs muddy. But oddly enough the small streams flowing into the river are running high and wild but mostly clear. Wouldn't the small streams that have adjacent logging roads, be the major contributor to the muddy water if the logging roads were in fact the major cause of the sediment.

Sometimes I truly have to wonder about government projects aimed at helping to improve trout runs. Several years ago Steamboat Creek was being "improved" with timber being piled across the streambeds to form deep pools for the fish. The timber was not secured with **anything,** just thrown across the creek. Well to no ones surprise, come spring and the water began to rise, the logs began to float down stream. They collected in major logjams that would continue to break free and float on down stream. Every log

took out bushes, grass and even standing trees along the creek. The destruction caused by the "half assed government fix" was unbelievable. The road was closed half the summer due to washout, and the bridge was washed out. There would have been damage along that creek even without the logjams, but the "fix" was not thought out and truly caused a lot of damaged that resulted in major bucks to repair. Not to mention a little extra sediment. Beware of quick fixes.

A major contributor to the sediment problem during the warmer months is the traffic on the unpaved roads next to the river. These are not logging roads but the main access river roads. Twelve years ago the Old River Road was paved the entire length. It wasn't a pretty road but it was still paved. After the roads were tore up to install new phone cables, most of the road was not repaved. The traffic on that short section of the river alone contributes an unbelievable amount of sediment into the river. While rafting the river one has an up close and personal view of the river bottom. There is a shocking difference in the sections that are paved and unpaved. The paved sections are clear and the rocks are clean along the bottom of the river, where as the unpaved sections are coated with a thick layer of sediment on the rocks and everything in the water.

Another major contributor to the sediment problem (and this just a recent occurrence but not one that promises to go away soon) is the mining of topsoil along the river. The dirt coating the river bottom adjacent to the top soil extraction process, and everything down stream from that point is unbelievable. If landowners are going to profit from selling their soil, then they should be held accountable for the damage to the rivers polluted because of it.

I'm not saying logging roads don't contribute to the problem, for I'm sure they do, but other, more serious problems should be looked into before the blame is placed. If the degradation of that river continues at the same rate it has in the last twelve years, there will be no way the trout will survive.

Thanks for listening to my opinion,

Carol Staley

May 23, 2001

Carol Staley
13421 N. Ferndale Drive
Hayden ID 83835

Dear Ms. Staley:

Thank you for the comment provided by you on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by you as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: It is clear cutting that has affected the river causing bank erosion from the peak flows.

Response 1: The flood frequency of the North Fork is analyzed on page 11 of the Sub-basin Assessment. The analysis examines the peak discharge events over the past sixty-two years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence. The 1974 and 1996 events are listed in their order of size. The history of logging is clear that clear-cuts began in the forty's and fifty's and intensified through the 1960's and 1970's and decelerated into the 1980's. The flood history does not support the argument that clear-cutting has caused greater flood discharges.

The riverbed has filled with cobble materials. This phenomena is related to erosion rates. The presence of this material in the channel has caused discharges of lower amounts to result in more over bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear-cutting.

The sub-basin assessment was strengthened on page 11 to better describe the flooding affect.

Comment 2: Clearing of vegetation in the river valley and alterations to the banks (sand beach) is causing sedimentation.

Response 2: Clearing and harvest of riparian vegetation along the river has depleted the amount of large organic debris (LOD)(tree trucks and stumps) in the river. These materials have been demonstrated in recent years to be beneficial in sediment storage and habitat creation in the river. Most bank alterations of which we are aware have armored the banks with large rock. Sediment input from eroding banks was inventoried and a model sediment yield from this source developed.

The assessment was strengthened to point out the role of LOD and its depletion from the river. This is a habitat concern which cannot be addressed by the TMDL process.

Comment 3: Small streams run clear while the North Fork runs muddy. Wouldn't the tributaries run muddy if logging roads were the cause?

Response 3: Visual observations of sediment in streams especially by stream color can be misleading. Sediment and especially large sediment particles (gravel and cobble) are transported episodically. Often such episodes are missed. It is a common observation that heavily roaded watersheds as Steamboat Creek evidence a large amount of sediment entrainment during high discharge events.

Comment 4: Forest Service remedial efforts where LOD was added to the stream did not work.

Response 4: DEQ agrees these efforts did not work, because the stream bed of the North Fork and its tributaries are destabilized by the large amount of bed load in-stream and the general lack of very large cedars which likely stabilized the North Fork prior to development.

The SBA was strengthened to explain the LOD interactions.

Comment 5: A major contributor is dust from the adjacent roads.

Response 5: Dust from adjacent roads probably contributes some sediment to the North Fork. Based on an air quality analysis of road dust, the assumption of 100 trips per day over a 120-day season and 18 miles of road adjacent to the river, 32 tons of dust would be generated. If all the generated dust entering the river, 32 tons of sediment would enter the river. Given the very conservative assumptions that would over-estimate the contribution this is only 0.1% of the sediment load modeled for the river.

Comment 6: A recent likely major contributor is soil removal.

Response 6: Soil removal is a concern in the floodplain and especially on slopes above the river (Teacup Ranch). Since most of the removal has to date occurred on relatively flat grounds and has left a residue of large particles, it is not likely to be a large source of sediment. Removal of soils on slopes will be of greater concern.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

COEUR
THE PRECIOUS METALS COMPANY

Coeur d'Alene Mines Corporation
505 Front Avenue, P.O. Box I
Coeur d'Alene, Idaho 83816-0316
Telephone 208.667.3511
Facsimile 208.667.2213

RECEIVED
JAN 17 2001
IDHW-DEQ
Coeur d'Alene Field Office

January 16, 2001

Mr.Geoff Harvey
Idaho Department of Environmental Quality
DEQ Coeur d'Alene Regional Office
2110 Ironwood Parkway
Coeur d'Alene, Idaho 83814

Dear State of Idaho:

Coeur d'Alenes Mines Corporation (Coeur) appreciates the opportunity to comment on the proposed Draft Sub-Basin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River (North Fork).

These comments specifically pertain to the proposed metals TMDL addressing cadmium, lead and zinc in Beaver, East Fork Eagle and Prichard Creeks. In general, an inadequate amount of data has been collected to properly assess the conditions of the North Fork sub-basins and sources of metals loading therein. Moreover, setting an appropriate TMDL for these watersheds requires more site-specific data collection, sampling frequency and seasonal variation to adequately set metals loading limits.

Coeur respectfully requests that more data be collected to develop an appropriate TMDL plan.

Best regards,

Eric Klepfer
Director Environmental Affairs

COMMENTS TO SUB-BASIN ASSESSMENT AND TOTAL MAXIMUM DAILY LOADS OF THE NORTH FORK COEUR D'ALENE RIVER

Coeur d'Alene Mines Corporation

January 16, 2001

Data limitation

The data used to develop the metals TMDL is very limited and does not adequately represent seasonality, natural metal levels, water quality, flow discharge, and therefore, the calculated metals loading. Specifically, the proposed metals TMDL does not have sufficient scientific information to draw appropriate conclusions and does not allow IDEQ to perform an adequate assessment of stream conditions to assess and develop appropriate TMDLs.

The Kensington Project in southeast Alaska, is a good example of the amount of baseline data that has been necessary from EPA to support issuance of an NPDES permit. It seems reasonable that setting a TMDL should take the same level of technical support required to issue a discharge permit. The Kensington Permit required baseline data including stream flow and quality (10 years of data), metallurgical pilot plant tests (effluent variability – 3 separate pilot plant runs), acid/base accounting and ore characterization (hundred of samples), and humidity cell test.

An alternative plan should be developed that incorporates good science, which includes all information necessary to provide basic information and data necessary to set TMDLs. These local conditions are important to not only establishing TMDLs but also determining whether designated uses are protected and attainable in all reaches of the Basin.

It appears that adits were assessed based on one water quality and discharge sample. While the Gem adit's discharge variability was used to model all other adits, its data is limited to only one year of data collection.

Additionally, only one year of data was collected from Beaver Creek, Prichard Creek and East Fork Eagle Creek to assess stream discharge flow and hardness. In fact, samples were not collected during the months of August and September for the East Fork of Eagle Creek and Beaver Creek. Nor were samples recorded in January for Prichard Creek. More data is needed to develop a proper TMDL plan.

Assessment assumes all dissolved metals introduced by adit drainage are point sources that deliver all of the measured metals load to the adjacent stream without attenuation.

Site specificity and water effects ratios are key elements in determining the attenuation capacity that does occur and should be considered in developing the TMDL. Also, it is overly conservative to assume that all water discharged from adits is delivered directly to the stream system without considering evaporation, plant take-up (evapo-transpiration), material infiltration, attenuation and other conditions that consume water. This is especially true for flows that enter via the alluvium where both quantity and chemical changes can occur improving water quality. Sufficient data should be collected at each site to quantify the true load added to the system. Natural attenuation was not considered, flow estimations are overly conservative, load allocations based on flows doesn't seem equitable or reasonable, non-point source contributions/allocations do not consider site-specific conditions. These areas need to be fully understood prior to setting TMDLs.

Total loading capacity

The assumption that all discharge pathways are delivered to the stream system without some level of attenuation of metal concentration is not scientifically supported. Some consideration should be given to the fact that some flows aren't delivered to the stream-creek and are partially or totally attenuated by soils in the area.

No consideration is given to natural attenuation that occurs in a water system. Sorption of metal ions with organic material, clays, suspended solids and other material that naturally occur in the stream system is not considered. This process reduces the amount of metal bioavailable to the system. Without some consideration to natural attenuation at each target site, complexing of metal ions will not be considered in allocation.

Water quality toxicity testwork that established the Federal Water Quality Criteria were developed using laboratory water. There was no way possible for EPA to develop representative water samples from around the country. Therefore, the tests are very conservative and do not account for natural attenuation. For this reason, using the water quality criteria to establish total loading capacities without consideration to attenuation is overly conservative. This river system, not unlike others, has a considerable amount of natural sediment, which reduces metal bioavailability, which is not being considered in the proposed TMDL. TMDLs should incorporate and/or expand the development of site specific criteria to establish the true total loading capacity for the river system using attenuation. More water quality data for each target site would help establish attenuation, which occurs in the river seasonally.

Higher flow conditions will likely allow higher concentrations because of the increased natural attenuation that is present (higher sediments, organic material etc.). However, the loading capacities do not reflect this condition and only proportion the loading allowed by the increase in flow.

Total loading considerations have been based on theoretical evaluations instead of site specific conditions that exist in the Basin and play an important role in determining appropriate water quality criteria for his stream system. The river water effect on chemistry, attenuation, and toxicity should be used to set appropriate TMDLs.

Antidegradation

Anti-degradation rules do not seem to be applied appropriately. If a reach of a stream is below applicable water quality criteria and enters another stream, which is above applicable water criteria, anti-degradation would only apply to discharges to the stream reach, which is of better quality. Natural background conditions will impact those streams as part of the drainage system. For example, drainages (Lake Creek and Shields Gulch) have been sampled above any historic or present mining activity. Data shows elevated levels of lead and zinc suggesting naturally higher levels of metals are and were present in the stream system. Anti-degradation does not seem applicable because of this natural metal loading, which does occur, would naturally degrade water as it flows down stream. TMDLs should be based on site-specific criteria and conditions not based on inappropriate anti-degradation rules.

Additionally, this background data should not be removed from the allocation but should be used to recognize that higher levels of metals do exist and do not necessarily impact the biological communities.

May 23, 2001

Eric Klepfer
Director of Environmental Affairs
Coeur d'Alene Mines
595 Front Avenue
P.O. Box 1
Coeur d'Alene ID83816-0316

Dear Eric:

Thank you for the comment provided by Coeur d'Alene Mines on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by Coeur as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: The data is inadequate in respect to seasonality. Water quality, flow discharge and therefore calculated metals loadings are inaccurate. Example: EPA required ten (10) years of data for Coeur's Kensington Project in Alaska.

Response 1: The TMDL goals are based on 7Q10, 10th, 50th and 90th percentile flows. These flows are well established from nearby watersheds and the sub-basin assessment (SBA) clarifies how these flows are developed. These flows account for the seasonality of the TMDL goals. The stream discharge data developed by DEQ provides seasonality that mirrors the calculated values. These same data included metals loads measured in-stream. The mine adit data is limited but is from the same database used to develop the Coeur d'Alene Basin Metals TMDL. The Gem adit discharge data is the most extensive mine adit discharge record available. The rule of TMDL development is to use the best available data. The best available data was used to develop the North Fork metals TMDLs.

Comment 2: Data should reflect local conditions; designated uses should be determined attainable.

Response 2: The entire data set used to develop the SBA and TMDLs is a local database, which reflects local conditions. This argument pertains most closely to the Silverton data used to develop the discharge seasonality. The Silverton station is located in the same mountain range, with the same general vegetation and the same climate. It reflects local conditions.

The designated uses for these streams are cold water biota and primary or secondary contact recreation as defined by the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02.101.01.a.) The SBA states these designations.

Comment 3: Gem adit discharge data limited to one-year.

Response 3: The Gem Adit data is limited to a single year but it is the best available data for adit discharge (see response to Coeur comment #1).

Comment 4: Data missing for August and September 2000 in Beaver and EF Eagle Creeks and January 2000 in Prichard Creek.

Response 4: The August and September 2000 data is added to the record. These results were not available as the draft SBA and TMDLs were developed, but are now available. The January 2000 Prichard record was not collected by the USGS. This is a data gap that cannot be filled. DEQ continues to monitor Prichard Creek at Murrey and will include these data as they become available.

Comment 5: Assessment assumes all dissolved metals from adits are point sources that are all delivered to the adjacent stream without attenuation.

Response 5: The North Fork metals TMDLs use the same conservative assessment as the Coeur d'Alene Basin Metals TMDL that all metals are delivered to the stream. As these adit discharges are addressed in the implementation of the TMDL plan the opportunity will be afforded to demonstrate and be credited with attenuation.

Comment 6: Attenuation in-stream is not accounted for in the TMDL. Loading capacities at higher flow do not reflect the higher attenuation only the higher flow.

Response 6: Attenuation is accounted for in-stream in this TMDL. The load reductions required at each flow tier is the difference between the calculated TMDL goals based on the discharges and the metals standards and the metals loads measured in-stream by DEQ. The in-stream measurements themselves account for any metals that are attenuated by the stream. Thus in-stream attenuation is accounted for in this TMDL.

Comment 7: Anti-degradation rules are misapplied.

Response 7: Anti-degradation does not apply to impaired waters. It applies only to waters that are below the standards thresholds. The TMDL does not mention anti-degradation nor does it misapply it. For further explanation the Coeur is referred to page 24 of the Coeur d'Alene Basin Metals TMDL.

Thank you for the comments that were developed on the North Fork Coeur d’Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

Hecla
MINING COMPANY

RECEIVED
JAN 19 2001
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Coeur d'Alene Field Office

January 19, 2001

TRANSMITTAL VIA HAND DELIVERY

Mr. Geoff Harvey
Idaho DEQ
DEQ Coeur d'Alene Regional Office
2110 Ironwood Parkway
Coeur d'Alene Idaho 83814

RE: Comments – DEQ Proposed TMDLs for Both Sediment and Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Selected Surface Waters of the North Fork of the Coeur d'Alene River ("TMDL(s)")

To Whom It May Concern:

Hecla Mining Company hereby submits its comments on the above-referenced TMDLs. Hecla's review of the draft TMDL finds, among others, the following concerns: 1) failure to comply with both federal and state laws and regulations applicable to TMDLs, 2) failure to comply with Idaho regulations pertaining to sediment, 3) failure to fully consider natural background in mineralized areas, 4) use of a highly inappropriate "margin of safety", and 5) use of numerous guidance documents and models, rather than monitoring data, for regulatory purposes. Hecla's specific comments are as follows:

I. EPA/DEQ Failure to Comply With Applicable Federal & State Laws & Regulations

1. Neither of the proposed TMDLs are required under Clean Water Act (CWA) Section 303(d)(1). The proposed TMDLs, if necessary at all, are clearly intended to be TMDLs under CWA Section 303(d)(3).

The Congressional intent of the "list" required at Clean Water Act (CWA) Section 303(d)(1), as supported by the legislative history, is for waters impaired by point sources operating under the technology-based effluent limitations of CWA Sec. 301. The law states:

> Each state shall identify those waters within its boundaries for which the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B) are not stringent enough to implement any water quality standard applicable to such waters. (emphasis added)

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The CWA defines "effluent limitation" at Sec. 502 as "any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters...."(emphasis added) CWA Sec. 303(d)(1) is clearly the mechanism developed by Congress to recognize those situations where the technology-based limitations of CWA Sections 301(b)(1)(A) & (B) are not stringent enough to meet instream standards, thus the reason Congress did not include the water quality-based point source limitations of CWA Sec. 301(b)(1)(C). This position also appears, on occasion, to be that of EPA's. The following statements are from EPA Federal Register notices:

> Section 303(d)(2) requires that states submit and EPA approve or disapprove lists of waters for which existing technology-based pollution controls are not stringent enough to attain or maintain state water quality standards and for which total maximum daily loads (TMDLs) must be prepared. (61 FR 36059)
>
> TMDLs are required in the CWA section 303(d)(1) for waters that will not achieve water quality standards after implementation of technology-based controls. (63 FR 1536)
>
> Section 303(d) of the CWA and its implementing regulations establish the TMDL process to provide a mechanism for allocating more stringent water quality-based requirements when technology-based controls are inadequate to achieve State water quality standards. (63 FR 10799)
>
> Section 303(d)(1) of the CWA requires States to identify and rank water-quality limited waters which will not meet State water quality standards after implementation of technology-based point source controls. (63 FR 63471)

It is clear from the law that Congressional intent under Sec. 303(d)(1) is for a list of waterbodies where point sources operating under technology-based effluent limitation guidelines are both present AND responsible for waters not meeting the "water quality standard applicable to such waters".

The conference report from the legislative history of Sec. 303(d) is also clear that Sec. 303(d)(1) is a list for waters impaired by point sources operating under the technology-based effluent limitations of Sec. 301(b)(1)(A) & (B). The conference report states:

> Subsection (d)(1) of section 303 requires each State to identify for the Administrator's approval those waters within its boundaries for which the effluent limitations required for non-publicly owned point sources and for publicly owned treatment works by January 1, 1976, are not stringent enough to implement any water standard applicable to such waters.

CWA Sec. 303(d)(1) is clearly a mechanism where Congress intended a transition from "technology-based" to "water quality-based" effluent limitations, *for point sources*. This

4. There appears to be a false presumption by DEQ for authority under CWA Sec. 303(d) to impose requirements on sources discharging into segments that are not 303(d) listed segments under the proposed TMDL. We can find absolutely no support for this position in either the law or the legislative history. In fact, the plain meaning of the law clearly addresses only "waters identified" (303(d)(1)(C)). If Congress had intended that TMDL restrictions be placed on sources not located on listed segments, the law would read "sources located on any waters within the watershed of the listed segment". This would have been simple for Congress to do if this was to be the intent – it clearly was not. Even EPA, in the Federal Register discussion of "proper technical conditions" discussed in comment 3 above, states "These elements [of proper technical conditions] will vary in their level of sophistication depending on the nature of the pollutant and the characteristics of the segment in question." (emphasis added)

5. The draft TMDL attempts to circumvent the applicable APA requirements by adding both pollutants and stream segments to the TMDL process. For example, Beaver Creek is on the current 303(d) due to "sediment", and not for any identified metal "pollutant". Please be clear at this point that we do not agree with the legitimacy of any existing 303(d)(1) listing due to either sediment or metals. As explained in comments above, such situations are intended to be addressed under other CWA sections. There is absolutely no authority in either federal or Idaho law for DEQ to add both stream segments and pollutants to an existing 303(d) list without complying with the APA.

6. The proposed TMDLs are incomplete, thus do not constitute a TMDL as required by regulation. Federal regulations at 40 CFR 130.2 define "total maximum daily load" as follows:

> The sum of the individual WLAs [waste load allocations] for point sources and LAs [load allocations] for nonpoint sources and natural background.

The proposed TMDLs identify neither all point sources nor all nonpoint sources, thus individual allocations for all sources are not made. The draft metals TMDL contains virtually no monitoring data, and certainly insufficient monitoring to reflect seasonal variations as required by law. The regulations do not define a TMDL as "a rough estimate" or "based upon an incomplete data set". Indeed the CWA, at Sec. 303(d)(1)(C), mandates that "Such load shall be established at a level necessary to implement the applicable water quality standards". (emphasis added) Since the law requires a definitive TMDL, and one is not presented in the draft TMDLs, action on the proposed TMDLs must be halted until required data is obtained. Indeed, the TMDLs for listed stream segments and pollutants in the North Fork are not scheduled until 2003, therefore DEQ has adequate time to complete the TMDLs as required by law and regulation. We do not believe, nor is it provided in the law, that either the United States Congress nor the Idaho Legislature intended development and implementation of a costly TMDL first and then worry about the legality and details at a later date.

uses, and water quality criteria for metals. These past comments will not be repeated but are attached and hereby incorporated by reference into these comments as applicable.

IV. The Proposed "Margin of Safety" is Highly Inappropriate

The so-called "margin of safety" in the proposed sediment TMDL is derived from overly conservative models that significantly overestimate what is believed to be a true value. According to the draft TMDL "This over estimation is a built in margin of safety 231% for the North Fork Coeur d'Alene River." Indeed, it appears that the actual margin of safety (MOS) is even higher than 231%. For example:

- Certain erosion events are admitted to occur only during extreme episodic events which occur only once every 10-15 years yet these estimates of eroded weight are "annualized" and attributed to all years even though the erosion does not occur! There are no water quality standards developed specifically for episodic events and these standards are not intended to be applied to such events. If this were not the case, what waters in the entire United States would not have "violated" some standard during an episodic event? Under this disturbed reasoning, shouldn't all waters in the United States be "303(d) listed"? This was not the intent of Congress in developing the CWA and is not the intent of the Idaho Legislature in implementing the CWA.

- The "road encroachment" sedimentation is allotted to roads within 50 feet of a stream regardless of real world conditions (i.e. there may be a 10 mile road stretch which is buffered by natural vegetation and well outside of the normal high water mark, thus adding nothing to the sediment load but guidance/model erroneously assumes in "loads" continually). DEQ only allows a 20% conservative factor for "road encroachment". What is the water quality "science" for the "50 feet" value? According to the draft TMDL, this is "primarily because this is near the resolution of commonly used GIS mapping techniques"!

The CWA is clear on what a MOS is limited to. A MOS is limited to 303(d)(1) TMDLs specifically to address "...any lack of knowledge concerning the relationship between effluent limitations and water quality." (CWA Sec. 303(d)(1)(C)) Here again, 303(d)(1) is clearly intended by Congress to be for point sources and a MOS is not required otherwise. We must point out that DEQ is specifically limited to the authorities of the CWA (IC 39-3601).

It is not clear from the draft TMDL exactly what MOS is applied to the metals TMDL. Hecla specifically addressed the MOS in past comments referenced above (and attached) and incorporate those comments as appropriate.

is why CWA Sec. 303(d)(1) specifically addresses only the "technology-based" effluent limitations of CWA Sec. 301(b)(1)(A) & (B) and not the "water quality-based" effluent limitations of 303(b)(1)(C). This fact is further clarified in the definition of "Wasteload allocation (WLA)" at 40 CFR 130.2(h) where it is clarified that "WLAs constitute a type of water quality-based effluent limitation".

Both the law and legislative history are quite clear that, in order for a water body to be listed under CWA Sec. 303(d)(1), point sources operating under the technology-based effluent limitations must be present and responsible for the water body failing to meet the "applicable standard". Under the misdirected implementation of 303(d)(1) by DEQ, a water segment could be listed here without any point source discharge at all. This incorrect interpretation finds no support at all in either the law or the legislative history.

Congress did not ignore those other situations where point sources operating under "the effluent limitations...are not stringent enough" and are not the source of the problem. Congress specifically addressed such TMDLs at CWA Sec. 303(d)(3) where the law states:

> For the specific purpose of developing information, each State shall identify all waters within its boundaries which it <u>has not identified under paragraph (1)(A) and (1)(B)</u> of this subsection and estimate for such waters the total maximum daily load. (emphasis added)

The report from the legislative history describes the 303(d)(3) TMDLs as follows:

> A maximum daily load shall also be developed by a State for all waters within its boundaries which are not identified as requiring more stringent effluent limitations to meet water quality standards. The committee recognizes that this is a time-consuming and difficult task. However, if effluent limitations which meet best applicable control technology currently available are to provide a water quality equal to or exceeding water quality standards such maximum daily load limits must be available for correlation.

The proposed TMDLs appear to circumvent Congressional intent by placing virtually all sources into the (d)(1) category rather than utilizing the (d)(3) category. We can speculate on two reasons for this approach: 1) a (d)(3) TMDL does not require federal approval and is for informational purposes only, thus no enforceability, and 2) avoidance of the Congressional intent for the voluntary application of the nonpoint source program of CWA Section 319.

2. Point source "impacts" have not been shown to be the "problem" in either of the proposed TMDLs. The "impacts" alleged for sediment are not based on data, but exclusively on both guidance and models, neither of which have any legal basis.

Due to complete absence of any sources operating under "...the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B)...", these TMDLs clearly belong under CWA Sec. 303(d)(3) and must be addressed at those specific sections of law, as intended by Congress. Indeed, Congress clearly directed both a point source list, at CWA Sec. 303(d)(1), and a nonpoint source list at CWA Sec. 319. The nonpoint source list mandated by Congress is stated at CWA Sec. 319(a)(1) as follows:

> The Governor of each State shall, after notice and opportunity for public comment, prepare and submit to the Administrator for approval, a report which (A) identifies those navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of this Act....

In addition to the direction of Congress relative to nonpoint sources as mandated at CWA Sec. 319, Congress further addressed the issue of contaminated sediments under the Water Resources Development Act (WRDA) of 1992 (at Title V). Congress specifically spells out EPA's tasks relative to contaminated sediments in WRDA Title V. EPA is to study the problem, report back to Congress on this specific issue, and make recommendations to Congress. Any actions by EPA relative to contaminated sediment must await further authorizing legislation from Congress.

In conclusion, and in concert with the Congressional intent, the appropriate TMDL for the basin, due to the nonpoint source aspects, must be: developed under CWA Sec. 303(d)(3); the nonpoint source impaired waters must be identified on the State's 319(a)(1)(A) list; and EPA must await specific authorization from Congress to further address any issues associated with contaminated sediment.

3. Both DEQ and EPA have failed to comply with the CWA mandate of Section 304(a)(2)(D). The law states:

> (2) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after the date of enactment of this title (and from time to time thereafter revise) information...(D) for the purpose of section 303, on and the identification of pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives.(emphasis added)

The response to compliance with this mandate is that DEQ and EPA believe they have already identified "all" pollutants as suitable for TMDL load measurement based upon some action taken in 1978 and, in EPA's opinion, this constitutes the end of the subject. Based upon the law and the 1978 Federal Register notice on this issue, the identification of pollutants as required by the CWA has not been completed.

First, the law clearly requires routine review of this "identification of pollutants" (i.e. "from time to time revise"). EPA defines "from time to time", for the purpose of 303(d)

listings, to mean "once every two years" (61 FR 36060). We find it difficult to believe that Congress intended this phrase to mean two years for the regulated community and once only for EPA. The fact is that the 1978 "identification" was based upon a very specific list of "pollutants" identified in a draft document published by EPA in October of 1973. Since the 1978 Federal Register notice, EPA has embarked upon rather preposterous assumptions that "pollutants" suitable for both 303(d)(1) listings and TMDL calculations could include such things as habitat, instream flow, atmospheric deposition, and even weather related instream conditions such as ambient water temperature as being "pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives". We find absolutely no support for this in either the plain reading of the law or in the legislative history of the CWA.

Based upon the speculative procedure using non-binding guidance and hypothetical models in developing the sediment TMDL (with only a resultant "guesstimate" of a TMDL with an admitted over estimate of 231%! (Appendix B, page 9)), this clearly shows "sediment" is not suitable for establishment of enforceable TMDLs. The rights of the regulated community under both state and federal APA have been ignored by the addition of pollutants NOT "suitable for maximum daily load measurement correlated with the achievement of water quality objectives" without public comment and legal recourse.

Second, TMDL calculations must be limited to "suitable" pollutants identified in the original 1973 list and also as limited in the 1978 Federal Register notice. This key limitation, conveniently ignored by current EPA actions, involves the concept of "proper technical conditions" described at 43 FR 60662 as follows:

> the availability of the analytical methods, modeling techniques and data base necessary to develop a technically defensible TMDL.

These "proper technical conditions" are requisite to meet both the "correlated with the achievement of water quality objectives" mandate of CWA Sec. 304(a)(2)(D) and the mandate at CWA Sec. 303(d)(1)(C) that "Such load shall be established at a level necessary to implement the applicable water quality standards". (emphasis added) As previously stated in our comments, the proposed TMDLs belong at 303(d)(3) and not 303(d)(1). The proposed TMDLs clearly fail to meet these requirements.

Third, DEQ cannot bypass the state APA requirements and legislative oversight on any subsequent review of the "identification of pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives". The identification of such "pollutants" clearly imposes costly legal obligations on the regulated community of Idaho, thus requiring both APA compliance and legislative oversight. There does not appear to be any evidence of compliance with state APA requirements and subsequent legislative action on EPA's 1978 "identification of pollutants". The state cannot assume some authority to strike a deal with EPA without such APA & legislative oversight.

The statutory requirements of Idaho Code Section 39-3611 also have not been met by DEQ in developing the draft TMDLs. For example, "An analysis of why current control strategies are not effective in assuring full support of designated beneficial uses" has not been accomplished. Had DEQ complied with the regulatory requirements described above at Subsection 350, this aspect would have been addressed.

The proposed TMDL does not constitute a TMDL as required by both law and regulation, therefore we believe the proposed TMDL is illegal and must be set aside.

8. The adoption by Idaho of TMDLs must follow the requirements of the Idaho Administrative Procedures Act for formal rulemaking. A TMDL is an agency action that implements or prescribes law or policy of general applicability.

Certain aspects of the above comments will also be addressed in Hecla's miscellaneous general comments. Based upon the above comments, we believe the proposed TMDL does not comply with applicable law and should be redone in accordance with applicable laws and regulations.

II. Failure to Comply With Idaho Regulations Pertaining to Sediment

The "GENERAL SURFACE WATER QUALITY CRITERIA" for sediment (IDAPA 58.01.02-200.08.) are specific in that "Determinations of impairment shall be based on water quality monitoring and surveillance AND the information utilized as described in Section 350."(emphasis added) As mentioned above, DEQ used guidance and hypothetical models, not the "monitoring and surveillance" and Section 350 information mandated in Idaho regulations, in developing the TMDL for sediment. In fact, DEQ tries to limit the application of Subsection 350 to 350.02.b.(draft TMDL Section 2.2.3, page 9) Hecla's copy of the regulations, as quoted in the first sentence of this paragraph, includes ALL of Subsection 350! This is a very important consideration because DEQ has obviously bypassed the BMP feedback loop provisions at Subsection 350 that are requisite to the determination of a water quality standard violation by nonpoint sources of sediment! Absent this, are these 303(d) "listings" for sediment valid at all? It is important to note that the Court, when establishing both the list of 962 streams and the schedule, did NOT rule on the validity of any individual listing.

III. DEQ Fails to Fully Consider Effect of Natural Mineralization on Water Quality

It is not clear at all from the proposed metals TMDLs that the possibility of natural conditions may not allow for the application of the designated use. Perhaps the stream segments in question should be placed in the "modified" use category. Hecla's comments to DEQ and EPA on the "EPA/DEQ Proposed TMDL for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene River Basin" discussed in detail the issues of natural background in mineralized areas, appropriate designated

V. Use of the Guidance Documents and Models Is Not Appropriate

The following list is of certain guidance & models used in the sediment TMDL:

- RUSLE
- WATSED
- McGreer Model
- RASI
- Washington Forest Practices Board Manual
- WATBAL Model

None of the above have any legal effect at all in Idaho and yet they are being utilized by DEQ in a regulatory context to justify the control of legal activities by the regulated community. For example, the sediment TMDL, with all of its uncertainty and reliance on materials not subjected to APA requirements, will be used as an excuse to close roads and restrict legal activities such as logging. As stated in the above comments, DEQ has ignored specific regulations relating to sediment while deferring to nonregulatory mechanisms. For example, the draft TMDL on page 42 states "Sedimentation rates in excess of 100% of natural sedimentation are likely sufficiently high to exceed water quality standards (Washington Forest Practices Board, 1995)." On this same page, "The percentage above background for each sub-basin ranges from 47 to 203%." This is incredible when the admitted overestimation due to the conservative nature of sediment TMDL is 231% and, in reality, may be even more (see above comment on MOS)! To further blur the necessity of a "sediment" TMDL, the following statement is made on page 43:

> The root parameter of concern for the North Fork is hydrologic modification. (emphasis added)

This is disturbing because under the "Executive Summary" on page 1 of the draft TMDL, the following statement is made:

> Habitat and flow alteration are not impacts amenable to development of TMDL allocations. (emphasis added)

It appears that a "problem" with sedimentation was developed to address the real problem of hydrologic modification to justify a TMDL! This is not appropriate.

Miscellaneous Comments

1. While we do not believe that internal guidance and policy are legal to use in a TMDL when these references exceed legal authority, DEQ nonetheless has both policy and guidance concerning TMDLs. From a brief review of these documents, it is clear these internal DEQ documents were not followed and we are curious as to why they were not followed if they are intended to direct DEQ's TMDL actions.

2. The draft sub-basin assessment (the assessment) on page 2 at 2.1.1.2 uses gauging station data through 1997. Since the TMDL is not "due" until 2003, additional years should be added to the analysis since this information is available.

3. On page 5 of the assessment, second paragraph, what are "multiple resource inputs" and what is the source of this term? We are familiar with the term "multiple use" which is the term intended to direct Forest Service activities.

4. Same page as above comment, we are not familiar with the "Raymond-Carlisle Mine". We know this mine as the "Ray Jefferson" and the "Carlisle".

5. Same page as above comment, last paragraph – fish surveys from over 7 years ago should not be considered in making today's determinations.

6. Page 8 of the assessment, second paragraph – it is stated that "...unlisted segments...are probably contributing to the water quality limitations of the listed segments. Remedial actions will be necessary in the watersheds of these unlisted tributaries..." As stated in comments above, there is no legal authority for this course of action. It is also quite of leap from "probably" a problem to "remedial actions will be necessary".

7. Beginning on page 8 of the assessment, all regulatory citations must be updated.

8. Page 9 of the assessment, first regulatory quote – the quote is not correct as described in above comments.

9. Page 9, Table 3 – the "turbidity" criteria should be clarified that this is for mixing zones below point sources (IDAPA 58.01.02-250.02.d.).

10. Page 10 of the assessment, last sentence under 2.3.1. – the statement is made that "Roads may yield sediment directly from their surfaces or bed through mass wasting or the location of the road may cause the adjacent stream to begin bank cutting." (emphasis added) The TMDL process demands that real world evidence of a problem exists (and indeed the sediment regulations require this) through monitoring and actual

surveillance. Actual monitoring is almost non-existent in both TMDLs. While the use of true reference streams and conditions may be allowed in certain circumstances, there is adequate time to conduct appropriate monitoring prior to the actual deadline of the TMDL in 2003.

11. Page 12 of the assessment, first sentence – "Some water column chemistry data was collected in water years 1993 and 1994." As stated in prior comments, there is adequate time to conduct current monitoring.

12. Page 12 of the assessment, first paragraph – there is a disconnect between sentences and we cannot tell what is meant here (i.e. "...Creek confluences. suspended solids, indicate...")

13. Page 13 of the assessment, Figure 4 – there is a legend for "Mine and mill type". The map should clarify, with different legends, which mines had mills (most did not).

14. Page 14 of the assessment, Table 6 – the 90th percentile hardness is 20. It should be noted that hardness, for the purposes of criteria calculation, cannot be below 25.

15. Page 15 of the assessment – for the "measured and calculated average metal loads" in Table 7, while we are sure there is method to derive these values, it is not clear how this was done. Is this the total maximum daily load for the stream at these flow tiers and if so, is this load for the entire volume of the stream?

    We assume the "n=" is number of samples. If this is correct, then seasonal variability is not addressed. Seasonal variability is not optional under a TMDL – it is mandated. Once again, there is sufficient time to collect necessary monitoring data prior to the 2003 official "deadline" of the TMDLs.

    At these flow tiers, are the criteria exceeded at each tier? If not, then an allocation should only apply for that tier.

16. Page 15, last paragraph – adit flows are presumed to be "similar to that of the Gem adit". We could not locate any actual monitoring data for all seasons for any of the adits addressed in the draft TMDL. Once again, there is time to collect actual data. While some discharges may exhibit similar characteristics, they also may vary markedly. It is given that the source of adit flow is the infiltration of area precipitation (i.e. if these adits were placed in the desert there would be no flow). Actual flow from any individual adit will depend upon a host of factors such as: extent of mining activity, fracture of the host rock, infiltration area overlying the site, fault zones, storage capacity of the overlying strata, etc. We cannot tell how loads attributable to the identified point sources can be substantiated without actual monitoring data for all seasons.

17. Page 16, Table 8 – it is not clear how the "Weighted Discharge" was calculated. For the listed adits were the flows based exclusively on assumptions from the Gem adit flow? Note: the Gem is a near stream-level adit; most adits are not

18. Page 17, section 2.3.2.2.1.6 – are the "nondiscrete discharges" all "estimated"? There is time to monitor as mentioned numerous times in above comments.

19. Page 17, section 2.3.2.3 – what is "abundant evidence suggesting bedload sediment"? As stated in the above comments, the TMDLs are based almost exclusively on nonregulatory guidance and models rather than on actual monitoring. Further, what do "historical descriptions" do for the science of the current situation? Has there been a study of current bedload to determine what percentage is due to past practices? This is an extremely important consideration since current activities inappropriately will be blamed for past legal activities.

20. Page 17, section 2.3.2.3.1 – there should be some discussion concerning the limitations of the "riffle armor stability index (RASI)". For example, it appears the RASI just involves measurements instream. Can a RASI score be used in reference situations where influences outside the stream channel are present? (i.e. if two streams have similar flows & bank widths but one stream is located in a valley floor 1 mile wide with porous alluvium and the other in a narrow valley with relatively low subsurface porosity?) Does the RASI account for stream gradients and watershed areas above the measurement location (when comparing RASI scores with "reference" streams)? Wouldn't a RASI score at the same site be different if the one measurement was taken during a drought year and the other where stream flow was above normal (this could be a foot or two difference is stream depth)? These considerations are important since the North Fork RASI scores are being compared to "un-managed streams of the upper St Joe River basin" (page 18). This area should not be termed "un-managed" if fire suppression activities have occurred. Besides, it is recognized that roads do impact stream hydrology and the upper St. Joe has "very few or no roads". It is not appropriate to compare the St. Joe area with the North Fork. While use of the RASI as an ongoing measure (of exact repeated measurement sites on the same stream) would be useful, a RASI score is only a snapshot in time specific to a location and should not be used to compare dissimilar situations.

21. Page 19, section 2.3.2.3.2 – the limitations of the measurement of "residual pool volume" should be discussed. For example, streams of differing gradient, valley floor width, and subsurface conditions would be expected to have different pool structures. Dissimilar sites should not be compared as "reference conditions". In addition, if the North Fork has a bedload largely attributable to past practices (which would reduce pool volume), this must not be used as an excuse to limit current activities that do not produce the same effect.

22. Page 21 of the assessment discusses fish population data. The second paragraph states that "The absence of sculpin in the East Fork of Eagle Creek is <u>likely</u> the result of the

presence of heavy metals." (emphasis added) How were other factors, such as stream gradient and habit or predators, ruled out? With essentially no studies or data, this is a giant leap.

The last paragraph talks of fish population studies in the 1970's that showed trout decline in both the North Fork and St. Joe rivers. The text states "As a result, Idaho Department of Fish & Game instituted stringent harvest regulations designed to recover trout populations. The St. Joe River trout populations have increased in response to these regulations while the North Fork populations have not." The assessment then only addresses one potential cause, that of compliance with harvest regulations which is alleged to be superior in the North Fork Then the draft assessment concludes that lower trout densities in the North Fork are due to "stream bed instability". The following are just a few compounding factors not addressed:

Harvest regulations are not the same in the North Fork & St. Joe – they are much more restrictive in the St. Joe and have been for some time.

- Are comparisons of fish densities made in areas of similar accessibility?
- Are comparisons made in areas of similar resident densities?
- Most of the St. Joe is catch-and-release; fishermen who favor this would frequent the St. Joe more than the North Fork.
- What is the percentage of adults vs. children fishing the two areas? Children do not require a license and are not as easily accounted for in the statistics. How many children reside in the different areas being compared?
- Do both rivers have the same proportions of different trout that are predators on one another?
- Wouldn't an area with less restrictive harvest regulations exhibit a higher proportion of spawning adult fish?

Clearly, fish population differences require a much more thorough study of all factors than is given in the draft TMDL. There is sufficient time to address these issues before 2003.

23. Tables 14a-g of the assessment give the same "Projected CWE Score" for all watersheds even though individual watershed factors vary significantly. The text must give a full explanation of the CWE and why this is so.

    What percent of the roads in these tables is open to traffic? How many of these road miles are overgrown with vegetation and not used? Why wouldn't different loads be

assigned to these different conditions?

24. Beginning on page 31, the assessment discusses models for sediment transport. Appendix B discusses the over estimation of these conservative models. Several problems are apparent:

    We cannot comment on the applicability of "five reference watersheds" (page 32, section 2.3.2.5.1.2.2.) without knowing exactly what these reference watersheds are and where they are located. What are they? Why doesn't the Forest Service know the "road failures" in the North Fork?

    For agricultural sources, there are clearly areas of such use in the North Fork that have no surface sediment route to the river and should be assigned a "zero" in reality but are assigned from 0.03-0.06 tons/acre/year. Sites visits could verify this and there is time to do this before 2003.

    It is hard to understand how wildfire burn areas are expected to yield almost 6 times LESS sediment per year than equivalent areas of conifer forest (Table 15, page 32). How can this be? It also is unfair to target human activities producing sediment while ignoring fire suppression activities by humans. How many acres in the North Fork would have burned under a "let burn policy"? What resultant sediment loads are avoided due to human activities to suppress these fires? How many acres are saved from burning due to road access? This should be netted out of alleged contributions due to roads.

    "Road encroachment" is a model "based on a set cross-section of 56 feet" that is "a weighted mean channel width of many channels" (page 33). How many watersheds in the North Fork system do not fit this model? Appendix B also uses a standard 50 foot distance to the stream to determine "road encroachment", regardless of the actual real world setting. At the most, the 50 foot distance (based on GIS map resolution and not a scientific analysis of true sediment loading) should be used as an office screening tool with site visits to verify how many miles truly qualify as sediment "road encroachment" sources. It is likely that the conservative nature of this approach is considerably more than the 20% assigned in Table 1 of Appendix B.

    It is not appropriate to annualize the results of episodic events which occur only once every 10-15 years (road failure) as commented previously. Is there any evidence that a 10 or 15 year event has resulted in road failures? If so, how many and what is the extent of the failure(s)?

    The above shortcomings could be addressed by actual field surveys. There is time to do this prior to 2003.

25. The issue of "Pollution Control" is addressed on pages 48 and 49 of the assessment. While the "primary land manager of the North Fork watershed is the U.S. Forest

May 23, 2001

William Booth
Hecla Mining Company
6500 Mineral Dr.
Coeur d'Alene ID 83815-8788

Dear Bill:

Thank you for the comment provided by Hecla Mining Company on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by Hecla as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: The TMDLs fail to comply with applicable federal and state laws & regulations.

Response 1: DEQ believes the TMDL meets the requirements of state and federal law. The TMDL contains all those elements required by Idaho Code section 39-3611, CWA section 303d and 40 CFR 130.7. A similar metals TMDL was approved by EPA for the South Fork of the CDA and similar sediment TMDLs, using the same model as was used for the North Fork TMDL, were approved for Wolf Lodge, Cougar, Kidd, Mica and Latour Creeks. DEQ believes the TMDL meets the requirements of state and federal law.

Comment 1a: Neither of the proposed TMDLs are required under CWA section 303(d)(1) because TMDLs are only required for waters impaired by point sources operating under technology based effluent limitations. The proposed TMDLs, if necessary at all are clearly intended to be TMDLs under CWA section 303(d)(3).

Response 1a: DEQ disagrees that TMDLs are only required for waters impaired by point sources. TMDLs are a part of the water quality-based approach under section 303 of the Clean Water Act that is clearly not limited to point sources. See Pronsolino v. Browner,91 F Supp 1337 (ND CA 2000) and Response to Comments regarding the TMDL for dissolved cadmium, lead and zinc in the CDA River Basin at 57 to 60. In addition, Idaho law clearly requires TMDLs to address both point and nonpoint sources of pollution. Idaho Code sections 39-3602(27) (defines TMDL to include load allocations for nonpoint sources);39-3611(directs development of TMDLs to control point and nonpoint sources of pollution). The segments of the North Fork Coeur d'Alene River are listed on both the 1996 and 1998 Idaho 303(d) water quality limited segments list. The sub-basin assessment for the North Fork confirmed that the waters at issue do not meet state water quality standards. Therefore, TMDLs are required under CWA section 303(d).

Comment 1b: Point source "impacts" have not been shown to be a "problem" in either TMDL and since 303d is limited to point sources, no TMDL is required.

Response 1b: DEQ disagrees that 303d only requires TMDLs for point sources. See response to comment 1a. Moreover, the SBA clearly indicates that adits discharges (discrete point sources) are well above 25% of the metals loads under the lowest discharge conditions. Some of these percentages approach 50% (page 16 SBA). These data demonstrate that the adit discharges are a significant part of the metals standards exceedence problem.

Comment 1c: Both DEQ and EPA have failed to comply with the CWA mandate of Section 304(a)(2)(D).

Response 1c: DEQ is not mandated to take any action pursuant to 304(a)(2)(D). EPA, however, did publish information (December 28, 1978 Federal Register) that all pollutants are suitable for maximum daily load measurement and correlation with the achievement of water quality objectives.

Comment 1d: DEQ cannot ignore the APA process.

Response 1d: TMDLs are plans for the restoration of water bodies to the level of the water quality standards. Idaho Code section 39-3602 ("Total maximum daily load (TMDL) means a plan for a water body not fully supporting designated beneficial uses…") TMDLs do not have the force and effect of law and are not required to follow the APA rule-making process.

Idaho Code section 39-3611 addresses the development of TMDLs and requires TMDLs be developed in accordance with those sections of law that provide for involvement of BAGs and WAGs, and as required by the federal Clean Water Act. There is no requirement in this section that the TMDL be developed as a rule.

Idaho Code section 39-3612, on the other hand, addresses the integration of TMDLs, once completed, with other water quality related programs and provides that this integration is subject to the provisions of the Idaho Administrative Procedures Act. Thus, to the extent required by the IDAPA, DEQ, and other designated agencies, must follow the IDAPA provisions when TMDLs are implemented and enforced under applicable state programs.

Given the scope of the TMDL program and requirements of the court-approved schedule for development of TMDLs, it is clear the IDAPA rulemaking provisions are not applicable. The schedule for development of TMDLs in Idaho is the product of federal court litigation. According to the TMDL schedule, from 1997 to 1999, DEQ was to develop 529 TMDLs. Under the IDAPA, rules must be approved by the legislature before they become effective. Because of this and other rulemaking requirements, rules typically take almost a year to promulgate. Idaho Code section 39-3601 et seq was enacted in response to this federal TMDL litigation and the legislature certainly never intended DEQ to attempt to promulgate hundreds of required TMDLs as rules.

The federal APA does not require EPA adopt TMDLs as rules. Moreover, given the short deadlines in section 303d of the CWA, including the requirement that TMDLs be developed within 30 days of EPA disapproval of a state TMDL, the CWA clearly does not envision or require TMDLs be developed as rules.

Comment 1e: Draft TMDL circumvents APA process by adding a pollutant and a segment for that pollutant.

Response 1e: The TMDL is not a rule. See response to comment 1d. Hecla is probably referring to the fact that Beaver Creek was demonstrated by monitoring to exceed cadmium, lead and zinc standards. However, Beaver Creek is currently listed for sediment. The policy of DEQ and EPA is to address all pollutants of concern for 303(d) listed water bodies. The metals were found to be pollutant of concern because the levels violate state water quality standards. DEQ will go through the required process,

including public notice and participation, to list this water body. Prior to listing, the TMDL developed will not be required to be submitted to or reviewed by EPA.

Public comment of sixty days was allowed in the current SBA and TMDL process. It is clear from the data that metals standards are exceeded. Public comment is then being taken and responded to at this time. Since the data is clear, DEQ has chosen to be thorough and prepare a TMDL for cadmium. Lead and zinc for Beaver Creek.

Action taken: DEQ will defer the Beaver Creek metals TMDL until the stream is listed for cadmium, lead and zinc.

Comment 1f: TMDLs are incomplete, thus do not constitute a TMDL as required by regulation; not all point and nonpoint sources identified.

Response 1f: To our knowledge all point sources of metals have been identified. The nonpoint sources have been identified to the state of the knowledge in these watersheds for both metals and sediment.

Comment 1g: Adoption by Idaho of TMDLs must follow the requirements of Idaho's APA for formal rule making.

Response 1g: See the response to comment 1d.

Comment 2: Failure to comply with Idaho regulations pertaining to sediments. DEQ used modeling and guidance not in IDAPA 58:01.02-200.08. All parts of subsection 350 are not met.

Response 2: Section 200.08 of the Idaho Water Quality Standards prohibits sediment in quantities which impair designated beneficial uses. DEQ acted in compliance with this section of the water quality standards by using in-stream beneficial use reconnaissance data to demonstrate that the beneficial use was impaired and that sediment was filling pools required by the beneficial use. The modeling was used to estimate the amount of sediment yielded to the watershed. Section 350 of the Water Quality Standards controls enforcement of the standards and the evaluation and modification of best management practices with respect to nonpoint sources of pollution. Section 350.01.a ("Violations of water quality standards which occur in spite of implementation of best management practices will not be subject to enforcement action."); Section 350.01.b ("[F]ailure to meet general or specific water quality criteria, or failure to fully protect a beneficial use, shall not be considered a violation of the water quality standards for the purpose of enforcement."); Section 350.02 (provides that if BMPs not met, enforcement actions can be pursued when narrative or numeric standards are violated). Section 350 is not relevant to DEQ's determination of whether water quality meets the requirements of 200.08 or DEQ's development of a TMDL. Section 350, however, will be relevant to DEQ's implementation of the TMDL because it addresses the program DEQ and other designated agencies will use to make those reductions from nonpoint sources necessary to meet Water Quality Standards.

Comment 3: DEQ failed to fully consider the effect of natural mineralization.

Response 3: The issue of natural mineralization was addressed in the Coeur d'Alene Basin Metals TMDL and in the Natural Resource Damage Assessment process. Technical analysis of forty sites in the mineralized zone of the Silver Valley demonstrate that metals background in water is somewhat higher than non-mineralized zones, but well below the metals standards. A further discussion of this point can be found on page 35 of the Coeur d'Alene Basin Metals TMDL response to comments and in the Technical Support Document. DEQ assumes that this data is applicable to the mineralized zone of the North Fork Coeur d'Alene watershed. A further discussion of natural background metals concentrations will be placed in the SBA.

Comment 4: The proposed "margin of safety" is highly inappropriate.

Response 4: The rationale for the margin of safety (MOS) is part of the TMDLs. For metals the MOS is based on the precision of stream discharge measurements and the analytical precision of metals measurements. The sediment TMDL incorporates the MOS into the conservative goal of 50% above background sediment yields. Below this level of sediment yield the referenced studies indicate that water quality impairment is not observed.

Comment 5: Use of models and guidance not appropriate in a regulatory context.

Response 5: See response to comment 1d. The use of models and guidance to interpret water quality standards and develop TMDLs is clearly authorized by the CWA and state law. The Idaho APA allows agencies to develop and use written statements which pertain to an interpretation of a rule or to the compliance with a rule without going through formal rulemaking. Idaho Code section 67-5201(19).

Miscellaneous Comments:

Comment: DEQ internal guidance documents not followed.

Response: The comment does not identify which internal DEQ guidance document(s) were not followed. In the opinion of the technical staff and internal reviewers, internal DEQ guidance was followed.

Comment: The hydrograph in section 2.1.1.2 is developed for data through 1997. Why not through 1999 or 2003?

Response: This hydrograph was updated through water year 2000 data and will be for the final SBA.

Comment: Define or explain the term "multiple resource outputs" on page 5.

Response: Multiple resource outputs refers to the USFS multiple use policy under which federal forest lands which make up most of the watershed are managed for timber, recreation, wildlife, watershed and other resource outputs. The meaning of multiple resource outputs will be clarified in the text of the SBA.

Comment: Hecla not familiar with the Raymond -Carlisle; mines known to Hecla as the Ray Jefferson and the Carlisle, page 5.

Response: The SBA is in error on the nomenclature of the Ray Jefferson Mill site. The Carlisle Mine is the name that the remedial investigation documents ascribe to the adit. DEQ staff consulted with Hecla staff and corrected the errors in naming in the SBA.

Comment: Fish surveys from seven years ago should not be used to make today's determinations, page 5.

Response: The SBA is required to use the most current data and lack of information is not an excuse to delay TMDL development. These surveys are the most current data on many streams of the North Fork. The Idaho Department of Fish & Game advises DEQ that they are most reflective of the fish populations of the North Fork Coeur d'Alene River watershed.

Comment: It is stated unlisted water bodies contribute to listed water bodies and actions must be taken on the unlisted water bodies, page 8 The opinion is expressed that no legal authority exists to do this.

Response: Under both federal and state law, TMDLs must address all sources of a pollutant to a listed water body. Idaho Code section 39-3611 specifically directs DEQ to identify all sources within the

watershed that are contributing pollutants to the listed water body. In addition, CWA 303(d) requires that TMDLs be established at levels necessary to implement applicable water quality standards. Absent controls

on upstream sources, DEQ would lack the assurance that the TMDL for downstream waters would result in the attainment of water quality standards. In the case of the North Fork Coeur d'Alene River, the segment from Yellow Dog Creek to the mouth of the river is listed for sediment. Sediment sources exist throughout the watershed above this segment as well as in this segment. This fact of geography and the fact that sediment is a pollutant natural to all watersheds requires that the North Fork Coeur d'Alene River TMDL address all water courses of the watershed. The point that a TMDL for sediment of all stream courses was further clarified in the SBA and sediment TMDL.

Comment: On page 8 all regulatory citations should be updated, P.8 onward.

Response: This was an oversight of the change of citations as IDEQ became a Department. The corrections were made in the SBA.

Comment: On page 9 quote of sediment narrative standard is not correct.

Response: This is correct. There are minor errors in the quote of the standard. These errors were corrected.

Comment: Turbidity criteria should be clarified as below mixing zones of point sources, page 9.

Response: The standard is applicable below mixing zones, however it is based on salmomid sight feeding requirements. Since the standard has this technical basis it is often used to interpret the narrative sediment standards as a deleterious impact on the beneficial use. The clarification concerning the mixing zone was supplied as a footnote as well as clarification that this benchmark can be used to interpret the narrative sediment standard.

Comment: No direct monitoring of sediment inputs, yet time to complete this by 2003, page 10.

Response: Direct quantification of sediment is a most expensive and time consuming undertaking. If carried out correctly, sediment monitoring should proceed through seven water years. The court schedule did not provide for a seven year monitoring time frame nor does the state have the budget to monitor sediment on the numerous water bodies listed for sediment. The modeling approach was taken for this reason. These points were incorporated into the SBA at section 2.3.2.3.

Comment: Disconnect between sentences, page 12. The disconnect was not found.

Response: The disconnected sentences were not found.

Comment: Legend for map on page 13 should clarify mines and mills.

Response: DEQ agrees that this would give the figure greater utility. The figure will be re-plotted to mark the mills.

Comment: The 90th percentile hardness is 20 it should be 25, page 14; Table 6.

Response: The 90th percentile of the hardness data set for Beaver Creek is 20 mg/L calcium carbonate. The metals standards as applied in the TMDL are cut off at a hardness of 25. There is no application of a standard below this level.

Comment: Is table 7 (page 15) the TMDL for the stream at these flow tiers?

Response: Table 7 provides in-stream measurement of the metal loads in the four flow tiers for Beaver and East Fork Eagle Creeks. It is not the loading capacity, it is the current measured metals loads.

Comment: Seasonal variability is not addressed by the TMDL. (page 15 table 7).

Response: Table 7 divides the metals loads measured in-stream into the various flow tiers based on the discharge when the measurement was taken. Table 7 specifically addresses seasonal variability. Table 7 is not however the TMDL (see comment response above).

Comment: At these tiers are the criteria exceeded at each tier? (page 15, Table 7)

Response: At these tiers the metals standards are exceeded in every case.

Comment: No actual data for the adits addressed in the TMDL; there is time to collect this data before 2003, page 15.

Response: The concentration data for the adit discharges is actual data from the EPA remedial investigation database. The discharges come from this database as well. They are weighted for annual discharge based on a synthetic hydrograph developed from the Gem adit discharge record. The data base source should have been cited in the text. The adit discharge database source is cited in the SBA text page 15.

Comment: It is not clear how the weighted discharge is calculated, page 16, Table 8.

Response: The procedure was not sufficiently outlined in Appendix A. This change was made to Appendix A and referenced on page 15-16 of the SBA.

Comment: Are non-discrete discharges all monitored; there is time to monitor these discharges, page 17 section 2.3.2.2.1.6.

Response: The non-discrete sources are based on the best professional judgement of USFS, USGS and DEQ staff. Monitoring these sources would again constitute a time consuming and expensive under taking which would not be completed prior to the 2003 deadline.

Comment: Explain "abundant evidence" page 17 section 2.3.2.3. It is again noted that bed load is based on modeling not on monitoring. Is there any measure of current bed load not past. Important because current activities blamed for past activities.

Response: The abundant evidence is provided in the following pages in terms of RASI and residual pool volume data. These data are supported by the model results.

Comment: Some discussion of the limitations of RASI should be provided, page 17 section 2.3.2.3.1.

Response: RASI is simply a method to estimate how much of the bed load of the stream is in motion during the two-year flow event. This method is explained in the text. Its limitations are based solely on selection of point bars and measurements of particle sizes. These limitations are self-evident.

Comment: Limitations of residual pool volume should be discussed., page 19 section2.3.2.3.2.

Response: The limitations of residual pool volume measurement are the number of stream feet assessed. DEQ uses 20 times bank full width as explained in the text, because hydrologic theory holds that a stream

repeats itself in this reach length. The other limitation is measurement of the pool parameters. These limitations are again self-evident.

Comment: Absence of sculpins indicates the presence of heavy metals. How are other factors ruled out?

Response: It is a common observation in the Natural Resource Damage Assessment documents, the beneficial use reconnaissance data, and the site specific criteria preparatory inventories that Sculpin are not found downstream of metals sources. They are found in streams where all other factors are present except metals. The interaction is likely not a column water quality factor because the site-specific studies have found sculpin relatively resistant to metals in the water column. The SBA text was augmented to cover the points stated above.

Comment: Many other factors listed could explain the difference in fish population densities between St. Joe and North Fork Coeur d'Alene River, there is time to explore these.

Response: The two factors believed by Fish & Game personnel that affect fish populations on a watershed wide basis are fish harvest and habitat changes. In this case the habitat change that the data points to is pool filling by sediment. Fish & Game management personnel are of the opinion that fishing harvest regulations are better adhered to the North Fork than in the St. Joe. This opinion points to the sedimentation. An SBA of the St. Joe River above the St. Maries River confluence has been completed by DEQ using a similar approach. This assessment found generally high fish densities, sufficient residual pool volume and the limited RASI data indicates more stable streambed. This result bolsters the argument that sediment filling of pools in the North Fork Coeur d'Alene River is effecting fish populations adversely. Language was added describing the St. Joe River findings at page 21 of the SBA.

Comment: CWE method should be completely explained. What information is there on the condition of roads.

Response: The CWE method is documented in full reports by IDL whose process it is. This report should have been referenced. It is now referenced in the SBA.

Comment: Problems are apparent with sediment model. 1) Cannot comment on applicability of the five reference watersheds; 2) Why doesn't the Forest Service know about failures? 3)Agricultural areas have no delivery route to the North Fork and should be zero. 4) It is hard to understand why burned areas have six times less sediment. 5) Road encroachment based on mean channel width; also fifty feet from the stream is not actual proof of stream in floodplain.6) Not appropriate to annualize events.7) above shortcomings should be remedied with field surveys.

Response: 1) The five reference belt rock watersheds were assessed in the 17010303 SBA. These watershed that are listed are all on a similar Belt geology and a predominantly forested watersheds. Two, Wolf Lodge and Cedar Creeks are across the ridge from the North Fork watershed. 2) These streams were assessed by CWE and constituted the best means to estimate the failures and CWE scores in the North Fork. The fact is that the Panhandle National Forests have not developed a road failure survey. As the reference watersheds indicate road failures are not a large factor on forested Belt terrain. This may be why the Forest Service has not invested in such a survey. 3) Agricultural lands are located next to the river in the floodplain. Close inspection will find micro-drainages to the river. The RUSLE model assumes stream delivery when agricultural lands are adjacent to a water body. 4) Areas that were heavily burned were not assessed to yield six times less sediment. Rather these values are a correction bringing acreage that is treated as fully stocked up to the level of non-stocked. The rationale is that large double burn areas yield for many years loading sediment to streams. Latour Creek is an example of a stream with this phenomena. The adjustment was deemed necessary by the sediment TAG advising DEQ as the best means to take such cases into account by the model. 5) As demonstrated in Appendix B the mean channel width is developed

from a very large data set. The sediment TAG attempted to develop this value continuously using s GIS approach and relations between stream bank full width and watershed size. This approach is at the edge of GIS capability (Students at University of Washington are working on software to do this). For this reason DEQ defaulted to the mean bank full width approach. The 50-meter estimation was a parameter agreed upon by the sediment TAG. It is an assumption, which will be verified in any road removal implementation along with a host of other considerations. 6) It may not be scientifically correct, however TMDL are stated in mass per unit time. Thus annualization is necessary for a pollutant that loads episodically. 7) The funding and time is not available to study the many issues brought up. These will be studied on a site by site basis as the plan to implement the TMDL is executed. These seven points were clarified further in the SBA and TMDL texts.

Comment: Thre stream's bank and bed owner is state of Idaho. If sediment is a problem, DEQ must address the problem by sediment regulations.

Response: The format by which any water quality limitation is addressed is clearly outlined in sections 303(d) and 303(e) CWA. This is to assess the problem, create goals and allocation of the pollutant of concern and an implementation plan to meet these goals and allocations. This TMDL process is the process the state is following to comply with the CWA and a judicial order.

Comment: First table of Appendix A is not comprehensive; map sites are missing, most dates are missing, an explanation of acronyms and units is missing.

Response: DEQ agrees with this assessment of the table supplied by the US Geological Survey. The table was revised.

Comment: Gem discharge data does not show units.

Response: The units are gallons per minute. This change was made in the table as part of the revision to better clarify how the synthetic hydrograph for the adits was developed.

Comment: Method of USGS measurement at Harrison.

Response: USGS was measuring suspended and bed load at Harrison. However, more pertinent data is in the feasibility study for the North Fork at Enaville. This information was from bed load and suspended load collection. The North Fork Coeur d'Alene River at Enaville data was used in the revised text. The feasibility study and the USGS method from the RI/FS documents were referenced.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

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JAN 19 2001
IDHW-DEQ
Coeur d'Alene Field Office

Kootenai Environmental Alliance

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Geoff Harvey
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January 18, 2001

Dear Mr. Harvey:

The following comments are in regards to the Draft sub-basin assessment and TMDL for the North Fork CDA River (17010301), dated November 15, 2000. On May 2, 2000, I submitted a 9-page letter with attachments for KEA to DEQ regarding the Draft assessment that had been released for public comment. The May 2 letter raised a number of issues, including acres of clearcut logging in a number of drainages in the sub-basin, computer models, bedload movement and impacts to fisheries, and Federal laws that relate to the management of National Forests, including the Coeur d'Alene National Forest.
The following comments are also being submitted for The Lands Council, 517 S. Division, Spokane, WA 99202-1365.

I am submitting for the record the following additional KEA comments, with data regarding the volume of water that is moving from the watersheds in the 895 sq mile drainage. The large flows of water should have been fully analyzed when discussing TMDL's for the sub-basin. The Assessment does not adequately explain the reasons why so much water volume is moving out of the watersheds each year. The Assessment does not examine how the high water volumes moving off the heavily logged watersheds and drainages and into streams and creeks will affect proposed mitigation work such as pulling some culverts and closing some roads.
The proposed TMDL's do not address fisheries issues relating to the large volume of water flowing into creeks and streams in the watersheds that are now Not Functioning Properly. There is no indication that the already damaged fisheries habitat will be improved by having new timber sales. The significant bedload movement related to the high stream power from the high water flows in a large number of watersheds within the 895 sq mile drainage will continue to degrade fisheries and fisheries habitat.

Additional comments are included regarding; fisheries impacts, the WATBAL and WATSED Models used in the Assessment, and historical data for the Shoshone Creek drainage.

A. Water volumes in the drainage:

The following data regarding cfs flows is from the U.S.G.S. documents Water Resources Data, Idaho, Volume 2, for Water Years 1995, 1996, 1997, 1998, and 1999. The following U.S.G.S data is from gauging station 4110, North Fork CDA River above Shoshone Creek, near Prichard.

The data indicates that there has been a large volume of water leaving the watersheds in the 335 sq mile drainage each of these years, and not just during February 1996. In order to indicate how much water is leaving the watersheds in this 335 sq mile drainage, I have included the following figures for a number of different cfs flows.

1,000 cfs is 448,830 gallons of water per minute or 26,929,800 gallons per hour.
5,000 cfs is 2,244,150 gpm or 134,649,000 gph.
10,000 cfs is 4,488,300 gpm or 269,298,000 gph.
15,000 cfs is 6,732,450 gpm or 403,947,000 gph.
20,000 cfs is 8,976,600 gpm or 538,596,000 gph.
25,000 cfs is 11,220,750 gpm or 673,245,000 gph
30,000 cfs is 13,464,900 gpm or 807,894,000 gph.
40,000 cfs is 17,953,200 gpm or 1,077,192,000 gph.
50,000 cfs is 22,441,500 gpm or 1,346,490,000 gph

1,548 cfs over a 24-hour period is approximately 1 billion gallons of water.
15,000 cfs over a 24-hour period is approximately 9.7 billion gallons of water.

WATER YEAR 1995:
Page 68 of the USGS document for gauging station 4110 indicates that for the month of Feb 1995, the Mean was 2,333 cfs. Feb 20 had a Daily Mean Value (dmv) of 7,890 cfs and Feb 21 had a dmv of 6,690 cfs. The figure of 7,890 cfs equals approximately 212,476,122 gallons of water per hour or 5,099,426,928 gallons of water in the 24-hour period on Feb 20.

The month of March 1995 had a Mean of 1,883 cfs. With March 20 having a dmv of 3,330 cfs, and March 21 had a dmv of 3,110 cfs. 3,330 cfs is approximately 89,676,234 gallons per hour or 2,152,229,616 gallons of water in the 24-hour period. April of 1995 had 12 days in which the dmv was greater than 1,548 cfs on each day. May of 1995 had 10 days in which the dmv for each day was also greater than 1,548 cfs.

WATER YEAR 1996:
Page 65 of the U.S.G.S. document indicates that during the month of Nov 1995 there were 16 days in which the dmv at gauging station 4110 was over 1,000 cfs on each day. The Mean for the month was 1,273 cfs. Nov 30 had a dmv of 7,290 cfs, which is approximately 196,318,242 gallons of water per hour or 4,711,637,808 gallons in the 24-hour period for Nov 30th.

For the month of Dec 1995 there were 22 days in which the dmv for cfs flow was 1,000 cfs or greater, with the Mean for the month being 1,777 cfs. Dec 1st and 2nd both had

dmv's over 5,850 cfs, which is greater than 3.8 billion gallons of water per each 24-hour period.

For the month of Feb of 1996, the Mean was 2,485 cfs, with there being 16 days that each had a dmv greater than 1,548 cfs. The Feb 9 dmv of 14,700 cfs equals approximately 395,868,060 gallons per hour that moved past gauging station 4110 or approximately 9,500,833,440 gallons of water that moved during the 24-hour period on Feb 9.

For the Month of April 1996 the Mean was 2,487 cfs. April 24 had a dmv 9,140 cfs. 9,140 cfs is approximately 5,907,320,928gallons of water in the 24-hour period. May of 1996 had 28 days in which the dmv for each day was greater than 1,000 cfs.

WATER YEAR 1997: Page 66 of the U.S.G.S. document indicates that during May of 1997, there were several days in which the cfs flows past gauging station 4110 were greater than 5,000 cfs on each day. These days were May 10 through May 18. The dmv's ranged from 5,280 cfs up to 8,150 cfs for these days.
5,280 cfs is approximately 142,189,344 gallons per hour or 3,412,544,256 gallons for the May 10th 24-hour period.
For May 14, the 8,150 cfs is approximately 219,477,870 gallons per hour or 5,267,468,880 gallons of water for that 24-hour period.
May 15 had a dmv of 7,990 cfs; May 16 had a dmv of 8,120 cfs; and May 17 had a dmv of 7,550 cfs.
For the 24-hour period on May 15, approximately 5,164,010,448 gallons of water moved passed the gauging station.
For May 16, approximately 5,248,079,424 gallons of water moved passed the gauging station, and for May 17, approximately 4,879,679,760 gallons of water moved passed the gauging station. For the four days of May 14th through May 17th, over 20 billion gallons of water moved from the watersheds and past the gauging station.

WATER YEAR 1998:
During March of 1998, there were 2 days in which the dmv was over 4,000 cfs, the 24th and 25th. The Mean for the month was 1,238 cfs.
During April of 1998, every day had a dmv greater than 1,000 cfs and for the month the Mean was 1,673 cfs. There were 16 days in which the dmv for each day was greater than 1,548 cfs or more than 1 billion gallons of water moving each of these days.
Page 3 of the USGS document for this water year indicates there was above normal precipitation for January, and below normal conditions during the Feb-April period.

WATER YEAR 1999:
March of 1999 had a Mean for the month of 1,231 cfs with there being 2 days in which the dmv was greater 3,100 cfs on each day.
April of 1999 had a Mean for the month of 2,055 cfs, with there being 9 days in which the dmv for each day was greater than 3,000 cfs.
May of 1999 had a Mean for the month of 2,856 cfs. Every day of the month also had a dmv figure that exceeded 1,548 cfs or more than 1 billion gallons of water moving every day of the month.

Page 3 of the USGS document for this water year indicates that the months of April and May were below normal for precipitation during those months and streamflow for the water year was considered to be near to slightly above average.

It appears from the U.S.G.S. data of the past 5 Water Years that there has been a very significant amount of water that moved from the watersheds not only in the 335 sq mile drainage but also in the entire 895 sq mile North Fork drainage.
Figures from the same USGS Water Year documents, for gauging station 4130, show that for the 895 sq mile drainage there have been high cfs flow figures in years other than the flood year of 1996.

Feb 20 of 1995 had a dmv figure of 23,200 cfs and Nov 30 of 1995 had a figure of 22,800 cfs. 23,200 cfs is approximately 15 billion gallons of water that moved from the watersheds in the 895 sq mile drainage during the 24 hour period on Feb 20.

Regarding the flooding during 1996, Feb 9 of 1996 had a dmv of 46,100 cfs and April 24 and 25 of 1996 had a dmv of 19,500 cfs and 19,400 cfs respectively.

During 1997, March 21,1997 had a dmv of 14,200 cfs. April 29, 1997 had a dmv of 21,700cfs.
For the month of April 1997, the Mean was 7,218 cfs with there being 8 days in which the dmv for each day was greater than 10,000 cfs.
During May of 1997 there were 15 days that each had a dmv of more than 10,000 cfs, and the Mean for the month was 10,370 cfs. 10,000 cfs is over 6.4 billion gallons of water moving in a 24-hour period.

For 1998, March 24 and 25 of 1998 each had a dmv of that was over 9,000 cfs. The Mean for the month was 3,254 cfs. The month of April 1998 had a Mean of 3,696 cfs.

For 1999, April 26 and 27 of 1999 each had a dmv of over 10,000 cfs and the Mean for the month was 5,082 cfs.
During the month of May 1999, every day had a dmv greater than 4,000 cfs, with 15 days each having a dmv greater than 6,000 cfs. The Mean for the month was 6,255 cfs. 6,000 cfs is approximately 3.9 billion gallons of water moving in a 24-hour period.

The sub-basin Assessment does not examine the issues relating to the large flows of water that are leaving the watersheds and drainages on National Forest lands. Pulling some culverts and closing some roads will not stop the large flows of water from the watersheds that have been clearcut, while at the same time new logging would open more of the canopy with new logging units. The 17, 287 acres that were clearcut between the years 1980 and 1989 on the CDA National Forest have not recovered hydrologically. The over 11,000 acres that were clearcut cut between the years 1990 and 1999 have not recovered hydrologically. The figure of 28,000+ acres equals approximately 44.2 sq miles being clearcut during the past 20 years. No evidence has been cited in the Assessment that refutes the findings stated in "Forest Hydrology, Hydrologic Effects of

Vegetation Manipulation" regarding logging and increases in streamflow. The USFS document was cited on page 3 of our May 2, 2000 letter.

The Assessment also does not address the issue of high water flows and culverts that would be removed. Pulling 18" or 24" culverts does not address the issues relating to the high flows of water that will continue into the streams and creeks in the watersheds after the culverts are removed. A 18" steel culvert can flow 6 cfs at full capacity; this is approximately 2,692.98 gallons of water per minute. A 24" culvert can flow 12 cfs at full capacity; this is approximately 5,385.96 gallons of water per minute. The large flows of water cited earlier that move past the two gauging stations are coming from watersheds that have been heavily logged during the past 20 years. Reducing a small amount of fine sediment by pulling some culverts continues to ignore the bigger problem of streambed instability in a large number of watersheds on National Forest lands. The streambed instability is being caused by the high and very high flows of water off of the heavily logged watersheds and the stream power contained in the high and very high flows of water. The Assessment does not contain data that would show that streambed instability is being caused by fine sediment coming from culverts or roads. There should be analysis with data in a Final Assessment, including stream power (N/m2) data that supports the contention that reducing fine sediment from culverts and roads will solve the streambed instability problems found throughout the 895 sq mile Coeur d'Alene River drainage.

B. Fisheries impacts:
Page 19 of the Assessment contains the following sentences "Excessive stream bed instability during the winter and spring months, when the eggs of fall spawning salmonids are incubating and the alevin life stage is using intergravel habitats, seriously disrupts their reproduction (Cross and Everest, 1995). Instability also causes the filling of pools with materials normally found on riffle gravel bars in a stream with a stable streambed. An additional and important result of bed instability is the loss of pool volume." Also from the bottom of page 19 "Some tributaries (Prichard, Shoshone, EF Eagle and Yellowdog) have values indicative of the loss of most of the pool volume. The values provided in Table 11 indicate a filling of pool volume, which is one result of stream channel instability."
The following sentence is found at the bottom of page 21 of the Assessment "The evidence indicates that stream bed instability may have lead to interference with trout recruitment and the loss of pools, a critical habitat to trout. As a result trout densities are low."
Page 43 of the Assessment also has the following sentences "The available data indicates that the stream channel of the North Fork and many of its tributaries has aggraded in the past few decades. The aggrading conditions have caused stream bed instability to rise to levels which permit in excess of 70% of the bed materials to move during altering discharge events (at least bank full or greater discharge)". Since DEQ policy "does not recognize flow and habitat alteration as a quantifiable and therefore allocatable parameters", page 46, the serious streambed instability problems in the North Fork drainage will continue in spite of the proposed TMDL's.

C. Computer Models:

Our May 2 letter raised a number of issues with the use of the WATBAL computer model in the Assessment and our letter of Dec 14, 1999 also raised questions about a number of flaws in the WATSED computer model.

The WATBAL model is referred to on page 31of the Assessment.The serious flaw in the model regarding sediment routing still exists. There is a draft- working copy revision to the 1989 WATBAL Technical User Guide that has been released by the Clearwater National Forest. The draft revision is dated November 29, 2000.
The statement we cited regarding the lack of accurate stream routing and insufficient recognition of stream dynamics has not been changed in the draft revision of the Guide, page 17. The model still exhibits the same serious flaws regarding accurate stream routing and insufficient recognition of stream dynamics.

Concerning the WATSED model, the following information is taken from Technical Bulletin No. 776, January 1999, "Scale Considerations and the Detectibility of Sedimentary Cumulative Effects", (Bunte, K., and L. H. MacDonald, Colorado State University). The National Council of the Paper Industry for Air and Stream Improvement, Inc. (NCASI) published the Technical Bulletin.

On page 7 of the document there is a discussion of short-term effects on water and sediment yield. The following sentences are included in the discussion. "A variety of models have been developed for predicting sedimentary CWEs, or the relative susceptibility to sedimentary CWEs. These include WRENSS (U.S.F.S. 1980), the R1-R4 sediment model (U.S.F.S. 1981), a modified version of Universal Soil Loss Equation for forest lands (Dissmeyer and Foster 1984), BOISED (Potyondy et al. 1991), and the R1-WATSED model (U.S.F.S. 1992). These models explicitly recognize some or most of the key erosion and sediment transport processes with a drainage basin, but it is extremely difficult to incorporate our understanding of all the various processes into a model that is to be used over a wide area with very limited input data. Water and sediment yields are calculated from general assumptions, a limited number of input variables and indices, and possibly a field survey combined with remote sensing data. None of these models have any algorithm or explicit procedure for addressing the likely lags in sediment transport and delivery, although they do typically consider the recovery of different sources over time. Thus these models cannot predict longer-term sedimentary CWEs."
The next paragraph on page 7 and continuing to page 8 contains the following sentences "Model makers repeatedly emphasize the need to gather a good data set that encompasses the interplay among site conditions, hydrologic regime, and stream channel processes. In most cases the models have not been fully calibrated, much less validated. The models are generally much more able to predict management-induced increases in water yields than increases in sediment yields. These models have even more difficulty in predicting sedimentary CWEs. Much of this rather poor predictive performance can probably be attributed to the nonlinear, interacting fluvial processes associated with CWEs, even though the prediction of CWEs was often the primary rationale for developing these models".

The Assessment assumes that the models do in fact work properly and have been continually calibrated and validated. The findings cited in the NCASI Technical Bulletin call into question the assumptions made in the Assessment regarding the models.

Appendix B of the Assessment in discussing WATSED does not address the following issues related to the model.
The model continues to lack the capability to account for rain-on-snow events, and the model does not have the capability to translate the results of these r-o-s events to bedload movement in the streams after the events take place.
The March 1997 Sandpoint Ranger District Packsaddle Supplement to the Final EIS, on page 12 contained the following statements regarding the WATSED model. "The landtype data, erosion rates, and land use variables used in the model are not refined enough to serve as accurate predictors of sediment increases. The value of the model is to allow the user to visualize the relative weightings of different land use practices and mitigation techniques in reducing **relative sediment loadings**. Consequently, determinations of "actual" sediment loadings based on modeled output are invalid." The next paragraph continues with the following sentences "Furthermore, the WATSED model calculates sediment yield primarily from road construction effects. Very small weightings of sediment production are attributed in the model to timber harvest. While it is true little "direct" sediment is produced by logging activities, timber harvest can increase water yield, which can cause channel bank erosion and thus indirectly increase sediment."
Page 1 of Appendix B of the Assessment indicates that both fine and coarse sediment is modeled by WATSED. The 1994 USFS document that describes the workings of WATSED does not contain specific pages that show how the model calculates both fine sediment (particle size < .6mm), larger coarse sediment from forested lands, and coarse bedload (1-25 cm in diameter and larger). The Final Assessment needs to supply the page number(s) of the WATSED document used by DEQ that indicate how the model calculates both fine and coarse sediment leaving forested lands.

There is also the issue of the model and the model spreadsheets in Appendix C of the Assessment that list the tons of course export from forestlands. The Sediment Yield spreadsheet that includes the Yellowdog watershed has a figure of 76.1 tons/yr for Conifer Forest portion of the Yellowdog watershed. The Sediment Yield spreadsheet for the Lost Creek watershed has a figure of 195.7 tons/yr for the Conifer Forest portion of the Lost Creek watershed. The 5,079-acre Yellowdog Creek watershed has an ECA of 24 percent, with 10% increased annual water yield, and a rain-on-snow risk of 1.59 (USFS 1994 Yellowdog Downey EA, page III-36).
The 14,477-acre Lost Creek watershed includes the 11,308-acre Lost Creek Roadless Area. It is difficult to understand how this watershed that includes the Roadless Area that has not been logged or roaded, can be producing over 119 more tons of coarse sediment than a watershed that has been heavily logged and roaded. The Final Assessment document should have an explanation of how the model calculated these figures for the Lost Creek watershed.

Page 6 of Appendix B contains the following sentence "The model does not consider sediment routing." Since both Models have difficulty with sediment routing, the Final Assessment needs to indicate the method that was used to calculate how the tons of sediment that leaves forestlands in the watersheds are being routed.

The IPNF 1987 Forest Plan required that the model be validated and that the frequency of measurement should be annually. The Forest Plan also called for adjustments of the model if the predictions are off by more than 20%. The model has not been validated on an annual basis, particularly in the smaller 1st, 2nd, and 3rd order watersheds on the CDA National Forest.
The models has been in existence for over 10 years, but there is no discussion in the Assessment or Appendix B as to why there are so many damaged watersheds on National Forest lands in the drainage after more than 10 years of use with the WATSED model and WATBAL model.

E. Shoshone Creek/hydrological recovery:
The IPNF has data for the 57.25 sq mile area from a gauging station on Shoshone Creek that indicates between Nov. 26, 1974 and March 12,1980, the maximum cfs flow recorded was 1,010 cfs. A review of IPNF data for the time period from 1980 through 1995 shows that there were a number of years that had much higher cfs flows, attachment #1.
The following sentences are from the Wallace Ranger District July 1995 Cougar Creek E.A. "Channels do not recover immediately in response to tree growth. There is a lag time between hillslope recovery time (tree growth) and channel recovery. The length of lag time is difficult to predict, but is probably on the order of several decades depending on the degree of disturbance, inherent channel stability, and size of the drainage area."(III-26 of the E.A.).
This lag time of several decades for hillslope recovery and channel recovery applies to the heavily logged Shoshone Creek watershed and other watersheds such as Yellowdog-Downey, Flat Creek, Steamboat Creek, as well as watersheds in the Little North Fork CDA River System.

Page 49 of the Assessment contains the following sentence that concerns removal of culverts and portions of roads "Over time, this operational strategy should move the impaired streams back toward stability and permit the recovery of fishery uses." We do not believe the sentence cited on page 49 is substantiated by the several decades that are needed for channel recovery in relation to recovery of fisheries and fisheries habitat in the damaged watersheds, and the high cfs flows that will continue in spite of any roadwork.

The cfs flow data clearly indicates that large volumes of water are moving in the 895 sq mile drainage. The peak flows are having the greatest impact to streambed instability, bedload movement, with the associated negative impacts to important Bull Trout and Westslope Cutthroat fisheries and fisheries habitat. The high and very high cfs flows will continue even if some culverts are removed and portions of certain roads are deep ripped or partially obliterated.

The requirements of the Clean Water Act relating to fish are not now being met on all waters of the National Forest lands, and will not be met with the proposed TMDL program.
The NFMA requirements at 36 CFR 219.19, fish and wildlife resource are not now being met on the National Forest lands in the drainage.
The 1987 IPNF Forest Plan has a number of goals, including goal #9 "Manage vertebrate wildlife habitat to maintain viable populations of all species". Goal #13 is "Manage fisheries habitat to provide a carrying capacity that will allow an increase in the Forest's trout population." Goal # 18 is "Maintain high quality water to protect fisheries habitat..." Goal #19 is "Manage resource development to protect the integrity of the stream channel system." None of these Goals are being met and will not be met with the proposed TMDLs. The peak flow problems, which contribute to streambed instability and related habitat alteration to the fisheries in the drainage, will continue because the TMDLs do not fix these problems.

The high flows of water from the heavily logged National Forest watersheds within the 895 sq mile drainage are directly related to snowpack in the watersheds that have been clearcut after 1960. The rain-on-snow events that occur add to the high flows from the watersheds that have a significant amount of clearcuts.
The following sentences are also from the Cougar Creek E.A. The Cougar Creek area is a tributary to the North Fork of the CDA River. Page III-27 of the E.A. has a discussion of the rain-on-snow zone and the equivalent clearcut area (ECA) model. "The rain-on-snow zone is an elevation band (2500-4500 feet) in which both the rate of snow accumulation and melt in harvested areas is greater than in similarly unharvested areas above and below this zone. The rain-on-snow analysis method (Kappesser, 1991) assigns the greatest risk to south, southwest, and southeast facing slopes. The model does not allow for any recovery of rain-on-snow risk until 40 years after harvest, at which point the stand is considered equivalent to a partial harvest until 68 years. The rain-on-snow recovery is premised on observations that existing clearcuts 40 years or older do not seem to be accumulating and retaining as much snow as do younger clearcuts (H. Logsdon and S. Russell; 1992, Idaho Panhandle National Forests) as well as information from technical literature (Harr and Coffin, 1991). The procedure assesses the relative vulnerability, or exposure of the snowpack to direct rainfall and warm moist winds that accompany rain-on-snow events. Snowpack melt rate increases with increasing vulnerability of the snow surfaces. Rapid melt of a large part of the snowpack can result in large instantaneous peak flows." The clearcuts in the drainage that are less than 40 years old likely exceed 50 sq miles, as there have been over 44 sq miles clearcut after 1980.

The statements that are cited from page III-27 of the E.A. reinforce our contention that the proposed TMDLs do not address the overriding problem, and that is the high water flows from the logged watersheds.

Significant long-term tree canopy recovery is required in the watersheds on National Forest lands in the 895 sq mile drainage if important fisheries and fisheries habitat are to be protected and restored as required by the CWA.

Sincerely,

Mike Mihelich

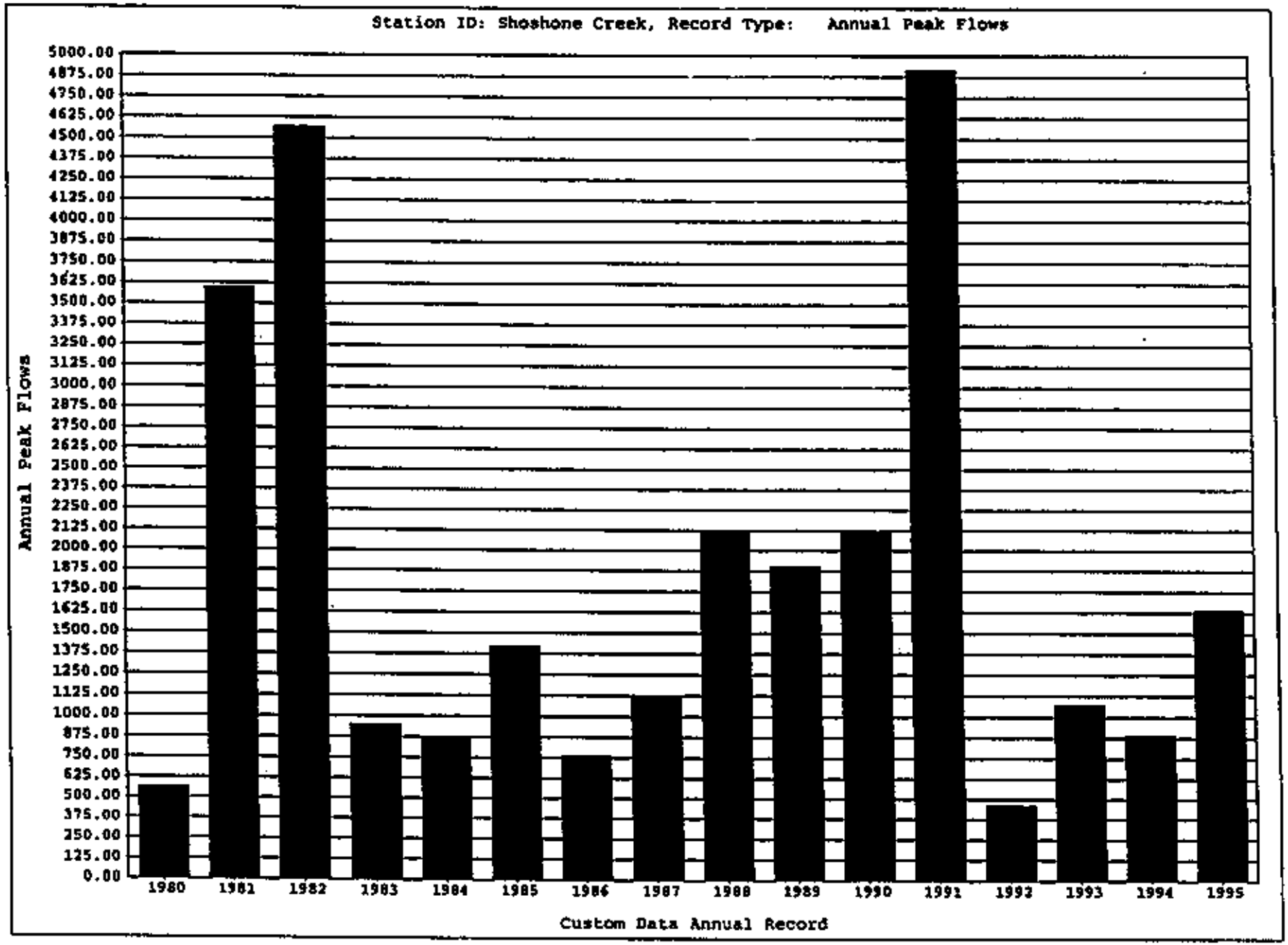
Mike Mihelich Forestry and Water Committee

Literature cited:

Coffin, B.A. and Harr, R.D. 1991. Effects of Forest Cover on Rate of Water Delivery to Soil During Rain-on-Snow. Final Report submitted to Sediment, Hydrology, and Mass Wasting Steering Committee, University of Washington.

Cc: Curry Jones, EPA Region 10

Enclosure: attachment #1


Station ID: Shoshone Creek, Record Type: Annual Peak Flows
Annual Peak Flows
5000.00
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Custom Data Annual Record

May 23, 2001

Mike Milhelich
Kootenai Environmental Alliance
P.O. Box 1598
Coeur d'Alene ID 83816-1598

Dear Mike:

Thank you for the comment provided by Kootenai Environmental Alliance (KEA) on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs) in you letter of January 19, 2001. A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by KEA as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: The TMDL does not address the high volume of water discharge from the North Fork Coeur d'Alene River watershed. It is not explained how the discharge affects mitigation efforts. It does not address how the large volumes of waters affect the fisheries. There is no indication of how fishery habitat will improve. These contentions are backed by USGS discharge data. This data covers the peak flow events between 1995 and 1999.

Response 1: The flood frequency of the North Fork is analyzed on page 11 of the Sub-basin Assessment. The analysis examines the peak discharge events over the past sixty-two years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and the Post Falls gauge. The 1974 and 1996 events are listed in their order of size. The history of logging is clear that clear cuts began in the forty's and fifty's and intensified through the 1960's and 1970's and decelerated into the 1980's. The flood history does not support the argument that clear cutting has caused greater flood discharges.

The river bed has filled with cobble materials. This phenomena which is related to erosion rates. The presence of this material has caused discharges of lower amounts to result in more over bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear-cutting.

Although the flood frequency analysis does not support higher discharges due to vegetation removal (clear cut) in the main river system, this may occur on first and possibly second order tributaries in the watershed. The effect is lost by the desynchronous snowmelt, as watersheds become larger. Unfortunately no long term stream gauging has been completed on the first and second order tributaries as it has been at Prichard and Enaville.

The SBA was strengthened on page 11 to point out that peak discharges may be altered in the first and second order watersheds with the caveat that no direct data is available to support this suspicion.

Comment 2: Pulling culverts does not address and making roads infiltrating surfaces will not address the high discharges.

Response 2: We respectfully disagree. Any measure that causes water to infiltrate into the shallow ground water system rather than to run off will decrease discharge.

Comment 3: The assessment finds stream bed instability and pool filling, yet the DEQ policy not to address flow alteration and habitat modification will not address this stream bed instability.

Response 3: The issue that can be addressed by a TMDL is sedimentation of pools. The instability is in the opinion of the assessment caused by sediment loadings in excess of 100% above background and in some watersheds ranging up to 200% above background. Flood frequency analysis indicates that discharges are not remarkable higher or more frequent (page 11).

Comment 4: Issues concerning the technical correctness of the WATSED model are raised by the comment.

Response 4: The WATSED model was not used in the sedimentation model. The coefficients that WATSED employs for forest land sediment yield were used. The assessment incorrectly identifies these as WATSED coefficients causing this confusion. These will be correctly identified as mean coefficients for Belt geology developed from in-stream sediment measurements in northern and north central Idaho.

Comment 5: Channels do not recover immediately after hill slope recovery. This lag applies to heavily logged portions of Shoshone, Yellowdog, Flat, Steamboat and the Little North Fork. The assessment does not take into account the time required for this recovery.

Response 5: The model used in the assessment does not deal with stream channels. The model considers the yield of the pollutant of concern (sediment) to the streams of the watershed, only. We agree that impacts have occurred to stream channels and habitat, however these are not impacts judged by EPA and the state to be applicable to TMDL treatment. Certainly in any TMDL implementation plan to address excess sedimentation, the state will urge the Forest Service to adopt a holistic view to management of the landscape and stream continuum. However, the ability of the state to require habitat restoration is limited in the TMDL process.

It was clarified in the implementation plan section of the SBA that factors other than sediment should be addressed holistically in any plan.

Comment 6: The TMDL will not meet the "fishable" goal of the Clean Water Act or the NFMA.

Response 6: The TMDL is designed to address the pollutant of concern, sediment. The fishability of a stream is dependent on excess sedimentation, but also on a number of other potential constraints. A partial list includes fishing pressure, loss of habitat, loss of LOD, introduction of competitor or predator species etc. Unfortunately, a TMDL can only deal with water quality pollutants of concern and not the many other factors that make streams "fishable". The fishable goal is fishable within the constraints of a Clean Water Act that addresses but a single component the complex habitat of fish.

A discussion was placed in the SBA on the limitations of the CWA and TMDL in particular.

Comment 7: Logged watersheds have higher discharge during rain on snow events and the affect persists out to 68 years.

Response 7: The flood frequency analysis does not support this assertion as stated in response to comment 1. The clear cut acreage values, provided in your comment of May 2, 2000, clearly demonstrate that clear cut acreage has increased for the 68 years since 1933. Yet the 1996 high discharge event did not have as large a discharge as the 1974 high discharge event and that event is believed from photographic and Post Falls gauge data not to be as large as the 1933 event. This pattern is contrary to the thesis that logged watersheds have higher discharge during rain on snow events.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

IDAHO DEPARTMENT OF LANDS

3780 Industrial Ave. South
Coeur d'Alene, ID 83815
Phone (208) 769-1525 Fax (208) 769-1524

STANLEY F. HAMILTON - DIRECTOR

January 22, 2001

Geoff Harvey
Idaho Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83815

Dear Geoff:

Attached is the department's response to the draft North Fork Coeur d'Alene River TMDL. We hope you will find the comments helpful in building the final TMDL for this drainage. The document was prepared primarily by Douglass Fitting with input from other Coeur d'Alene office, as well as our Area, personnel.

If you have questions or need additional input, please give us a call. Thank you for the opportunity to comment.

Sincerely,

Dean Johnson

Dean Johnson
Area Supervisor – St. Joe Area

RECEIVED
JAN 22 2001
IDHW-DEQ
Coeur d'Alene Field Office

C: Bill Love

attachment

IDAHO DEPARTMENT OF LANDS

Coeur d'Alene Offices
3780 Industrial Ave., S., Coeur d'Alene, ID 83815
Telephone (208) 666-8634
Fax No. (208) 769-1524

MEMORANDUM

TO: Dean Johnson, Area Supervisor
St. Joe Area

FROM: Douglass W. Fitting
Forest Hydrologist D.W.F

DATE: January 23, 2001

SUBJECT: Comments pertaining to the Draft North Fork Coeur d'Alene River TMDL

INTRODUCTION

The state of Idaho, Department of Environmental Quality is requesting comments pertaining to the draft North Fork of the Coeur d'Alene River Sub-basin Assessment and TMDL. The public comment period ends January 20, 2001, so it is imperative to submit a single response from both the Area level and appropriate staff. The comments compiled in this memo have been submitted and reviewed by Douglass Fitting (forest hydrologist), Joe DuPont (fish biologist), and Bill Love, (chief of forestry assistance), and are being sent to the St. Joe Area for their review and authorized comments. A unified response should be submitted directly to the Department of Environmental Quality by the closing date for public comments.

DISCUSSION

The Idaho Department of Lands appreciates this opportunity to comment on the draft Sub-basin Assessment and TMDL for the North Fork Coeur d'Alene River. The Idaho Department of Lands also appreciates the effort put forth by DEQ in preparing this document in a timely manner for meeting TMDL schedules. However, the Idaho Department of Lands does have some serious concerns pertaining to the methods, analyzation and conclusions presented in this report. Of particular concern are the narrative statements indicating that sediment is the only (major) pollutant of concern that is limiting fish densities in the Coeur d'Alene Basin. There are numerous references to evidence of sediment problems in the Coeur d'Alene Basin, but there is no published, scientifically accepted sediment monitoring data in this TMDL that can clearly demonstrate that sediment (bedload) by itself is the limiting factor affecting beneficial uses in the basin. The data presented in this report, (Table 12; Mean

residual pool volume and stream width), and (Table 13: Fish population per unit stream length), suggests that there is no statistically defensible relationship between the reference stream conditions and the proposed water quality limited segments conditions which can demonstrate that sediment and residual pool volume are the limiting factors negatively impacting fish densities on the sub-basin. In fact, the data presented in these tables clearly indicates that most of the supposed water quality limited segments identified in the sub-basin fall well within the range of residual pool volumes and fish densities found in the referenced streams. And the data presented in this report clearly does not support the narrative conclusions, which claim that streambed instability is reducing pool volumes, which in turn reduce fish densities.

As a land management agency we clearly understand those sediment issues associated with timber harvest activities have been and still are documented to have impacted water quality and beneficial uses. We recognize that historical logging practices such as splash dams, flumes; riparian harvest and road failures have significantly contributed to sediment loading, routing and direct channel stability problems in many water bodies.

However, we do feel that forest practices have changed substantially in the last 25 years. Historical impacts of splash dams, operating machinery in stream channels and floodplains, placer and hydraulic mining, and excessive riparian harvest are not occurring to the degree and extent of the past. Historic stream crossings were not engineered, often utilizing logs instead of culverts; fill material was not compacted, unconsolidated, filled with organic material prone to regular failures. More recently constructed stream crossings (post FPA) are engineered to address flood flows, debris passage, riparian encroachment, fish passage, fill construction and stabilization, approach design, etc., which have significantly reduced or eliminated failures. The current Forest Practices Rules and Regulations have substantially reduced and completely eliminated activities that historically have contributed to water quality problems. Many of the historical crossings that failed no longer contribute sediment; the material has been removed and is not available for annual contributions. The overall sediment load from pre-FPA, historic timber harvest practices has been greatly reduced in the last two decades.

<u>TMDL REVIEW</u>

2.2 Regulatory Requirements
2.2.1. Segments of Concern

In our experience, fish density surveys do not address sediment, hydrologic modification or fish habitat degradation. What they do measure is the density of fish in a defined area. What type of additional data was collected during the fish density surveys (Hunt and Bjornn, 1993; Dunnigan and Bennet) that indicate sediment, hydrologic modification, and fish habitat degradation have contributed to the decline of trout populations in the North Fork of the Coeur d'Alene River. If additional data, beyond fish surveys was collected and analyzed it should be clearly displayed in this document. Fish densities are dependent on many different factors such as the time of year the data was collected, the location and methods of data collection, fishing

regulations, introduced non-native species, fluvial and adfluvial spawning recruitment, migratory corridors, floodplain connectivity and weather conditions just to name a few. Fish density surveys measure fish density. They do not measure the factors affecting the densities. The surveys may indicate a decline in trout populations, but they do not measure sediment or hydrologic modifications.

2.2.2. Beneficial Uses

The North Fork Coeur d'Alene River has legislatively designated beneficial uses of domestic water supply, agricultural water supply, salmonid spawning, cold water biota, primary contact recreation, secondary contact recreation, and special resource water (IDAPA 16.01.02.11001.q).

Thousands of people fish, swim, and boat the North Fork of the Coeur d'Alene River annually. The limited data presented in this TMDL (pool volume and fish density surveys) indicate that most, if not all of the designated beneficial uses are fully supported in the basin according to criteria outlined in the Department of Environmental Quality Water Body Assessment. The fish survey data presented on Table 13 (pages 22 and 23) clearly indicate that the beneficial use of salmonid spawning is fully supported on most of the 303(d) listed streams in the basin. All the streams that have two or more salmonid age classes meet the state's criteria for salmonid spawning, and should be removed from the 303(d) list for sediment. There is no water quality data monitoring that indicates water quality in the Coeur d'Alene Basin is exceeding the state's standards for sediment.

2.3 Water Quality Concerns and Status
2.3.1. Pollutant Sources

This section attributes excess sedimentation on the North Fork to road surfaces and beds. Although this statement has credibility it tends to ignore huge historical sediment contributions from splash dams and log drives, hydraulic and placer mining, LOD removal by riparian harvest and for flood control, hydraulic modifications from channelization and reduction in channel length and floodplain accessibility.

Historic logging practices (pre-FPA) including splash dam construction, riparian LOD removal for saw timber and splash dam corridors, road encroachment, hydraulic and placer mining, construction of highways and railroad grades, have all contributed large amounts of sediment and the routing of these sediments in the river and its tributaries in the last century. In addition, large, naturally occurring events such as the repeated wildfires around the turn of the century have contributed to sediment in the Coeur d'Alene basin. The historic quantities of natural and anthropogenic sediment that has been introduced into the north fork since the turn of the century remains stored in the channel and is constantly being eroded and routed to downstream reaches. It has been well documented by standard bedload scour studies that sediment often takes decades, even centuries to be mobilized to downstream locations. (Andrews, E.D., 1983. , Ashworth, P.J., and R.I. Ferguson, 1989., Bagnold, R.B., 1980., Beschta, R.L., 1978, 1979, 1981, 1983, 1987., Carey, W.P., 1983, 1985, 1986, 1993., Emmett, W.W., 1975, 1976, 1980, 1984, 1985, 1995., etc.).

Changes in channel morphology are not only caused by sediment, but is highly controlled by hydraulic features such as LOD, rock nickpoints, sinuosity, gradient changes, and floodplain connectivity. Sediment by itself does not necessarily translate to reduced pool volumes, other factors that need to be addressed should include an inventory of hydraulic features such as quantities of LOD that effectively form obstruction pools and temporarily store sediment. Hydraulic modifications such as channel and floodplain constrictions from road and highway construction,

22.3.2.3. Sedimentation Data

Gravel, cobble, streams, and rivers transport large quantities of bedload naturally. Stream channel characteristics such as pool volumes are transient in nature for these types of systems. Pool volume and frequencies are controlled by many factors other than sediment. In fact, most gravel cobble streams can handle impulses of accelerated sediment load delivered to the stream channel if the stream displays proper hydraulic characteristics. Features such as woody debris jams, floodplain accessibility and meander configuration all contribute to channel sediment interactions. Without addressing all the mechanisms affecting channel shape and bedload distribution we may be forced to implement plans that do not address the major limiting factors to fish densities in the North Fork Coeur d'Alene River.

2.3.2.3.1. Riffle Armor Stability Indices

Unfortunately, I cannot locate any published literature pertaining to this procedure. Without having the documentation that explains the assumptions, relationships, and process utilized in the Riffle Armor Stability Index (Kappesser, 1993), we cannot properly comment on the procedure or the results. However, when comparing the RASI number to the residual pool volume and there is little correlation between high RASI values and pool volumes ($R2 = 0.0518$), in fact, when comparing the data it appears that those streams with higher RASI values (more instability) have higher pool volumes. This obvious discrepancy between RASI values and pool volumes seems to contradict the whole basis in which this sediment TMDL depicts.

We have suspicions that the Riffle Armor Stability Index (Kappesser, 1993) is not a published, peer-reviewed scientific procedure. This seems to be verified by the data presented in this TMDL. This RASI data does not support or correlate with the unsubstantiated statements relating to channel bedload stability and channel characteristics (pool volumes). According to the unpublished procedure, Riffle Stability Index (Kappesser 1993), data interpretations, index numbers less than 70 represent systems in equilibrium, index numbers greater than 90 indicates systems not in equilibrium, and index numbers between 70 and 90 require interpretation by a professional hydrologist. There are many index numbers for streams in this basin that fall in the range between 70 and 90, but nowhere is their documentation from a hydrologist as to how to interpret the index numbers.

In order to clearly demonstrate this I have combined the information from Table 10, Table 12 and Table 13 in the draft TMDL into one easily understood table for simple

data comparison. We have completed a linear regression between the RASI scores and pool volumes, which is presented in the graph below:

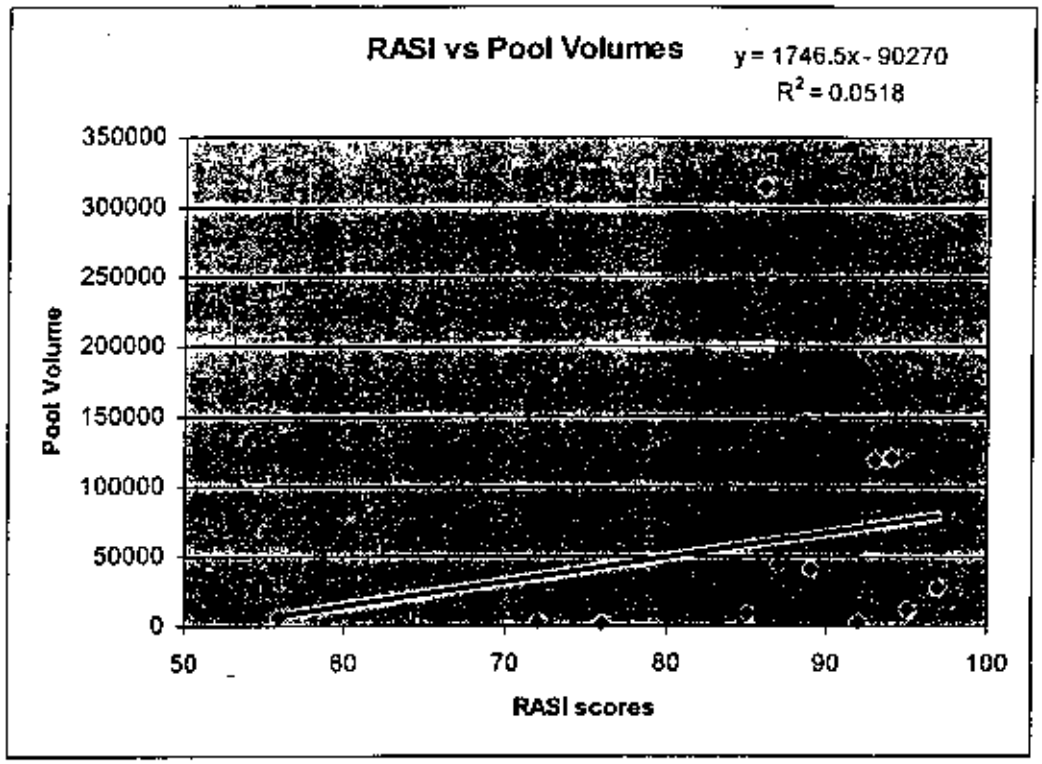


Table 1. High RASI Value = High pool volume

STREAM	HUC NUMBER	RASI MEAN	SALMONID DENSITY (fish/m²/hr)	RESIDUAL POOL VOLUME (ft³/mi)
Big Elk	1701030-13511	87		43,962
N.F. Cd'A	1701030-13481	93	0.0034	118,907
Little N.F. Cd'A River	1701030-13485	94	0.0528	119,540
Burnt Cabin	1701030-15032	97	0.0079	28,228
N.F. Cd'A	1701030-13482	86	0.0015	314,757
N.F. Cd'A	1701030-	89	0.3314	41,099
Copper	1701030-13487	95	0.0513	12,253
EF Eagle	1701030-15617	85	0.0830	9,235
Prichard	1701030-13500	92	0.0363	2,304

Table 2. Low RASI value = Low pool volume

STREAM	HUC NUMBER	RASI MEAN	SALMONID DENSITY (fish/m²/hr)	RESIDUAL POOL VOLUME (ft³/mi)
Tepee Creek	1701030-13508	56	0.2360	6,534[2]
Calamity Creek	1701030-15634	76	0.0860	1,314[2]
Yellow Dog	1701030-13506	72	0.0309	3,597

2 - Value high; possibly of small database

Obviously, the data does not support the claims that bedload movement or high rates of bed instability are reducing pool volumes. In fact, the data depicts the exact opposite; the higher the RASI value or more unstable the streambed according to RASI, the higher the pool volume by several magnitudes.

There appears to be something inherently wrong with the actual RASI procedure and/or the way the data was analyzed. It is very important to display and analyze data in a proper, statistically defensible, meaningful, and scientific procedure. The data should support the conclusions in the TMDL, and it appears that this preliminary data comparison analysis directly conflicts or contradicts the overall assumptions and arguments presented in this sediment TMDL.

It is imperative to the water quality and associated beneficial uses that impacts are correctly identified and remediated in order to effectively correct problems that may be suppressing the beneficial use. The sediment data presented in this TMDL needs to be reviewed and displayed in a meaningful manner, and it needs to be interpreted correctly for TMDLs to be successful. We suggest that the TAG for the North Fork Coeur d'Alene River TMDL reconvene to discuss these major discrepancies and try to interpret and display this data for what it really depicts.

2.3.2.3.2. Residual Pool Volume

Pool volumes for any given reach of stream is controlled by many factors. Some of these factors include sediment supply, hydraulic controls (i.e., LOD, rock nickpoints, grade breaks, etc.), and is not dependent on just one of these factors, but a combination of many factors. To properly address pool volumes and frequencies, mechanisms that allow pool formation should be identified.

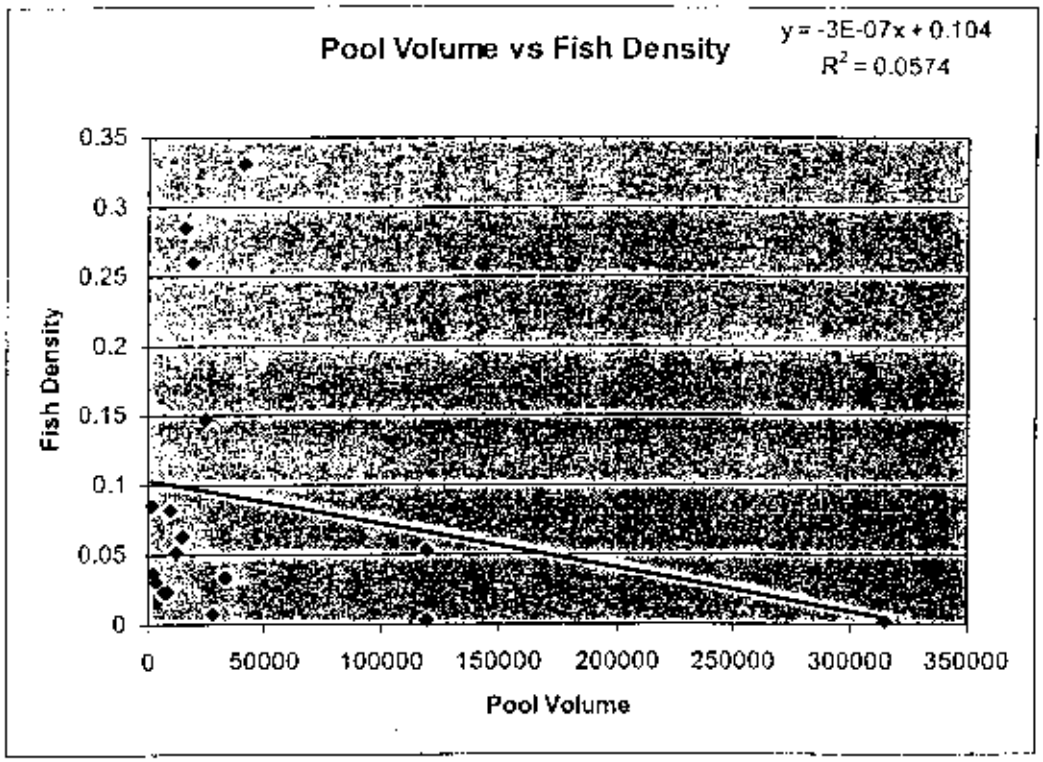
It has been well documented through numerous published scientific researches that component of stable, large, woody debris is a major control factor for sediment storage, routing, and obstruction pool formation in gravel-cobble stream channel. This research clearly identifies two to four-fold increases in inorganic bedload transport of bankful discharge. The increased rate was significantly greater than the pre-removal (LOD) rate. The increase in bedload rates was attributed to:

1. Elimination of woody debris buttressing of sediment storage sites in the channel bed and banks. Sediment destabilized by debris removed was more readily transported by stream flow.
2. Elimination of low energy, hydraulic environments associated with woody debris. These are commonly areas at the channel margins sheltered from the main flow by debris and backwater areas upstream of debris obstructions. Removal of debris increased local velocity, water surface slope and boundary shear stress, and enhancing sediment transport.
3. Delivery of sediment through bank erosion.
4. An inferred increase in boundary shear stress affecting grains on the streambed, resulting from removal of the woody debris component of flow resistance.

In streams where in-channel obstructions do not dominate, alternate bars and associated pools commonly migrate downstream if slopes are less than about 0.02 (Lewin, 1976; Leopold, 1982, Lisle etal, 1991). However, in-forest streams, pools, and bars are commonly stabilized by in-channel obstructions, including LWD and bedrock outcrops as well as channel bends. This sediment TMDL does not address some of the most important, scientifically published research on bedload and sediment transport. Nowhere in this sediment TMDL are these well-documented factors discussed or considered.

Decades of published research clearly demonstrate the relationship between LOD and sediment (bedload) movement and storage (Beschta, R.L., Estep, M.A., 1985, Schmidt, K.H., Hassan, M.A., Gintz, D., 1996, Smith, R.D., Sidle, R.C., Porter, P.E., Noel, J.R., 1993). Most of the lower North Fork of the Coeur d'Alene River and its associated tributaries has historically had the large riparian timber removed. The numerous, 3 to 4-foot diameter cedar stumps, present next to the stream banks and riparian areas can easily identify this. Most of the tributaries that had splash dams also had stream bank and riparian timber removed for log drive corridors. The large wildfires at the turn of the century burned large riparian timber in some of the streams. Flood control projects of the 1970s physically removed this LWD component from the river and tributary streams. Even today the occasional log jam that forms in the river is physically removed due to the danger to recreationists floating the river. The North Fork Coeur d'Alene River corridor from Prichard downstream has experienced complete riparian conversion from cedar habitat types to recreation lots comprised of Kentucky bluegrass and cottonwood. There are numerous large cedar stumps littered throughout this reach, but due to conversion, will never grow back and provide long-term LOD.

This TMDL states that those streams with lower pool volumes have lower fish densities, however when we completed a standard linear regression between pool volumes and fish densities which is presented in the graph below:



One can clearly see that there is very little statistical correlation between pool volume and fish density data presented in this report. Obviously there are other factors limiting fish populations in the North Fork other than pool volumes,

Basically, the data presented in this TMDL does not properly or correctly address bedload transport process and sediment routing through gravel-cobble river systems. The effects historic sediment delivery and the current hydraulic modification, including loss of LOD, reduced frequency of bedrock outcrops due to highway and road construction, and reduction in channel length (bends or meanders) will continue to be the major contributor of bedload movement even if all upstream sources of sediment are eliminated.

2.3.2.4. Fish Population Data

Once again, the basic principles of stream channel hydraulics and bedload movement are being ignored. The filling of pools is not caused by streambed instability, but by excess historical sediment that is being transported on top of a highly armored gravel-cobble bed surface.
This armored layer which has been scientifically documented in cobble-gravel streams found in Alaska, British Columbia, Oregon, Washington, Idaho, California, Colorado, Arizona, Europe, Asia, and South America, does not mobilize material that is armoring the channel bottom unless physically disturbed (Parker et.al. 1982a, Copp 1998, wilcock 1997a: 1997b, Parker and Klingman 1982, 1987, Devries 2000). Bull Trout a fall spawning fish are rare in the North Fork, but to attribute their demise to unstable stream beds and the filling of pools has not been documented. Ignoring a century unregulated logging and mining, land conversion, decades of heavy metal impacts to

fluvial and adfluvial populations, migratory corridor impacts, stream temperature increases and the introduction of nonnative species that have all contributed to the decline of Bull Trout. Fall spawning fish such as the introduced nonnative Chinook salmon are successfully spawning and rearing in the North Fork. There is no scientifically published research that demonstrates spawning redds are susceptible to bedload scour in fact recent research, Scour in Low Gradient Gravel Bed Streams: Patterns, Processes, and implications for the Survival of Salmonid Embryos, DeVries, P.E., Dept. of Civil Eng., Univ. of Washington, PHD Dissertation, which scientifically explains the physical processes of depth of scour and how salmonids place their eggs in the gravel's well below scour depths.

Trout densities found in the reference streams ranged from . 0021 to .4285 (fish/m2/hr). Trout densities found in the Listed water quality limited streams are all within this range. If the sample site is questioned on Independence Creek, then every other sample site should have qualifying statements as well. The majority of sample locations is located next to roads or camping areas and is easily accessible to the public. The data should stand-alone; ranges of variability should be expected in any watershed when completing fish density surveys. Fish densities can be variable and depend on many factors, including the time of year, methods utilized and weather conditions.

Conclusions

Consistency

We have had the privilege of reviewing and providing comments on several Different TMDL's throughout the state. We have noticed that TMDL assessments do not evaluate the support of Beneficial Uses the same way. Some use BURP data as directed by the Waterbody Assessment Guide to determine support status. Others use part of the Water Body Assessment Guide and other observations not supported by data. And some assessments ignore the Water Body Assessment Guide altogether, and use a reference stream approach. We have found inconsistencies between TMDL's for both temperature and sediment. All TMDLS I have reviewed state that habitat alteration will not be assessed yet this TMDL is clearly using pool volumes (habitat) as a indicator for sediment. If a reference approach is used then all data including macroinvertabrates, fish densities, pool volumes, etc. should be displayed in this report and analyzed against the entire range of conditions found in the reference streams.

Data Analysis

It is imperative to the creditability of the TMDL process that data presented in the document support the narrative statements and conclusions reached in this report. The data should be subjected to standard (statistical) analysis procedures. The data presented in this report does not support the rational pertaining to unstable streams reducing pool volume or a reduced pool volume reducing fish densities. What it does demonstrate is that there is little correlation between them. The data presented in this report raises more questions than it answers. Obviously there are many other factors

suppressing fish densities that this report and data do not identify. It is critical for implementation that the correct limiting factors is identified so that monies, time and energy can be directed towards the limiting factors so that the beneficial uses are supported.

We feel that sediment impacts associated with historical actives in the basin, is still to a large degree continuing to impact portions of the North Fork of the Coeur D'Alene River. The large quantities of sediment stored in the channel will probably take decades to be mobilized out of these areas. However due to hydraulic modifications some of these reaches will probably never fully recover. There has been no data presented that depicts a hydrologic modification (sed. and water), but rather a physical (hydraulic) modification from historic sediment inputs and channel modifications.

In order to properly demonstrate sediment (bedload) loads in the basin, standard bedload sampling procedures should be implemented and monitored on an annual basis. Data collection procedures for proper bedload sampling are documented in scientific research journals and are available for references.

It is our recommendation that the TAG be reconvened to discuss the data and any discrepancies that might arise from data interpretation.

DWF:vdb
c: Winston Wiggins, Acting Director
Ron Litz, AD-F&F
Bill Love, C-BFA
Jim Colla
Joe DuPont
Ed Warner
File

May 23, 2001

Dean Johnson
Idaho Department of Lands
3780 Industrial Avenue South
Coeur d'Alene ID 83815

Dear Dean:

Thank you for the comment provided by the Idaho Department of Lands (IDL) on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made the Idaho Department of Lands (IDL) as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: Fish density measurements do not address sediment impacts. What other data was collected with the fish surveys? Several factors affect fish density.

Response 1: A Sub-basin assessment (SBA) must supply all the available data concerning the watershed. The fisheries data is among this. Fisheries data gathered by IDEQ was collected separate from the BURP data on a particular stream. The University of Idaho, IDFG and USFS collected a considerable amount of the data as cited. The BURP files contain only fish tally data and a few other parameters concerning the electrofishing. Very little other data is collected with the fishery data.

Comment 2: The data indicates that the North Fork Coeur d'Alene River is fully supporting beneficial uses in accordance with WBAG. The data clearly indicates salmonid spawning is fully supported. No data indicates that sediment is impairing the beneficial uses.

Response 2: The WBAG determination is no longer DEQ policy. Prior to the adoption of WBAG2 as revised, TMDL staff is instructed to use the WBAG determinations (any segment on the 1998 list did not pass the WBAG filter) plus all other pertinent data. We respectfully disagree that no other data indicates that sediment is impairing the cold water biota. It is not reasonable to expect that correlation can be developed between sediment impact surrogates such as residual pool volume and fish density. Such a correlation would presuppose that the electrofishing was completed at that exact time when that environmental factor was limiting. This is better stated by John M. Barthalow "If you think about it, fish populations are rarely directly related to the amount of habitat present at the time of measurement. The standing crop (biomass) and usable habitat values can be expected to be correlated only when measured at the time that the habitat is limiting and for the life stage that is habitat limited. Simultaneous measurement, however, is not sufficient. For a limitation to be operative, the population must be at "carrying capacity", that is not reduced or altered in number by some non-habitat factor such as fishing pressure, a pollution-caused fish kill, stocking, etc." (from page 15 of John M. Barthalow's USGS Open-File Report 99-112 The Stream Segment and Stream Network Temperature Models: A Self-Study Course Version 2.0 March,

2000). DEQ believes it can use a weight of evidence approach to demonstrate sediment impact. RASI, residual pool and model results all indicate sediment impacts.

Comment 3: Pollution sources such as splash dams, log drives, hydraulic and placer mining, LOD removal by riparian harvest and/or flood control and hydraulic modifications have not been addressed. These have added sediment to the stream that can take decades or centuries to route through the system (several papers cited).

Response 3: The sources listed above were mentioned but not adequately addressed. The SBA was modified to better address these influences. None of these influences are however adding the pollutant of concern, sediment, to the river at this point. The lack of LOD because of removal is affecting habitat, but the TMDL does not address habitat or for that matter the fate and transport of the pollutant of concern, sediment, in-stream. These influences will be noted more fully in the SBA, but the SBA must concentrate on sediment sources now not those of the past.

Comment 4: Rivers transport large volumes of sediment naturally. Pools are a transit feature of streams. Many features of the stream other than sediment control pool volume and frequency.

Response 4: We agree with the general statements of this comment, however, streams can receive too much sediment. This threshold is between 50 and 100% above background based on the best studies we have available. It is clear from observation of the Coeur d'Alene River at Kingston and comparison of the current situation with the historical descriptions (Russell, 1985) that the sediment loaded to the North and South Forks has increased markedly. The model used in the assessment and independently verified to be in the proper range with USGS measurements, indicates the increase is over 100% of background in most of the sub-watersheds of the North Fork. Increased sedimentation is a cause of pool filling. Increased sedimentation has occurred in the North Fork. Since sediment is a pollutant of concern for which TMDLs must be developed, the assessment can come to but one conclusion.

Comment 5: Riffle armor stability (RASI) is not a published peer review method. RASI values provided do not correlate with residual pool volume measurements provided. RASI, pool volume and fish density are compared indicating the three cannot be correlated with any strength. The data indicates an opposite trend. The data do not support the conclusions of the TMDL. The data is incorrectly interpreted, it is suggested the sediment TAG be reconvened to discuss the data.

Response 5: The RASI method is considered by DEQ to be a technique providing information about the stream bed sediments. We have no guidance on the use of a method based on peer review. The correlation between RASI, residual pool volume and fish population explain only a small percent of the variation in the North Fork data set or for that matter for the entire data set for the Coeur d'Alene Lake and River, Rathdrum-Spokane, North Fork or St Joe HUCs. As stated in the response to IDL comment 2, it can not be expect that a significant correlation could be developed between sediment impact surrogates such as RASI, residual pool volume and fish density. Such a correlation would presuppose that the electrofishing was completed at that exact time when that environmental factor was limiting (Barthalow, 2000) This is unlikely. DEQ believes it can use a weight of evidence approach to demonstrate sediment impact. The sediment TAG was formed to develop a sediment model not to decide on the weight of evidence that a listed stream is impaired. Such final decisions are reserved to IDEQ and EPA.

Comment 6: Residual pool volume is controlled by many factors. The TMDL does not address the many factors (listed) which affect pool volume in a stream. No correlation between fish density and pool volume can be found. The data presented in this TMDL does not properly or correctly address bed load transport process and sediment transport through gravel cobble river systems.

Response 6: As stated in comments 3, 4 & 5, the TMDL addresses the pollutant of concern, sediment. Residual pool volume and fish densities correlation is addressed in the response to comment 5. The TMDL addresses only sediment sources and does not address the fate and transport of the pollutant in the stream system. Adequate models are not available in our opinion to address the fate and transport of sediment especially bed load sediment. The key to any pollutant control is to control the source not the fate and/or transport. The TMDL addresses the pollutant sources, limiting these sources to yearly loads.

The SBA further clarifies, the pollutant addressed by the TMDL and the features of the stream that are not.

Comment 7: The SBA ignores basic principles of stream channel hydraulics and bed load sediment transport. The SBA ignores a century of impacts, ignores the introduction of fish species. The comment points out that Chinook salmon spawn successfully in the North Fork during the fall and winter.

Response 7: The comment on channel hydraulics and bed load sediment is addressed in comment 6. A TMDL addresses pollutant sources, not fate and transport. The level sediment in this TMDL is addressed using the Washington Board of Forestry Guidelines as the best available knowledge. Issues such as habitat alteration and fish introduction are not issues to which TMDLs are applicable. We agree that Chinook salmon appear to spawn successfully in the lower Coeur d'Alene River. It is not known if its populations are affected by high flow events. Little is known about its relative spawning success in the Lower North Fork. The SBA was augmented to address the century of impacts.

Comment 8: Trout densities in reference streams range from 0.021 to 0.4285. Value for Independence Creek is not diminished because many sites impaired are near roads or camps. Data should be stand-alone; fish densities can be variable.

Response 8: The Independence Creek population is interpreted by DEQ to be the result of the location of the electrofished reach near the popular campground at the base of Independence Creek. We believe such interpretations to be rational. The comment ignores the general pattern of the data. Except for Beaver Creek, which has predominantly brook rather than cutthroat trout, the heavily roaded watersheds of the North Fork have fish densities an order of magnitude or two lower than all the watersheds of low road density. The comment clings to one anomalous value and ignores the clear pattern. DEQ believes the weight of evidence favors its interpretation of the fish density data.

Comment 9: The SBA uses residual pool volume as an indicator, yet it is an indicator of habitat alteration, that DEQ and EPA indicate is not applicable to TMDL treatment.

Response 9: The SBA uses residual pool volume as an indicator of the influence of the pollutant of concern, sediment. The TMDL does not attempt to allocate residual pool volume. The TMDL allocates the pollutant, sediment. The comment confuses the SBA with the TMDL allocations.

Comment 10: The data should be subjected to standard statistical analysis.

Response 10: This is an unrealistic standard because it pre-supposes that correlation is possible, when the measurements of fish density would be required at the exact time that a feature such as residual pool volume is limiting (Barthalow, 2000). DEQ uses a weight of evidence approach to identify the problem. It moves on to develop model results that demonstrate sedimentation rates well above levels expected to cause water quality degradation. The model is demonstrated from independent measurements to be in the correct range. It is doubtful that IDL manages completely based on standard statistical analysis and correlation. It is disingenuous for it to require the same of DEQ.

Comment 11: The impacts of historical sedimentation have not been fully taken into account.

Response 11: As stated in response to IDL comment 3, historical sediment sources now have a fuller explanation in the SBA. However, the TMDL is not concerned with historic sediment sources. It is concerned with current sources that verified modeling demonstrate are well above the level expected to cause water quality problems. The TMDL addresses pollutant (sediment) sources, not history. This is the limitation of a TMDL approach.

Comment 12: Bed load monitoring should be instituted and monitored on an annual basis.

Response 12: DEQ does not have the resources to support bed load monitoring in a watershed as large as the North Fork Coeur d'Alene River. If sediment monitoring were required on all the sediment impaired streams in Idaho, it would easily bankrupt the state. The North Fork is not special in this respect. To meet the court imposed deadlines, a sediment modeling approach must be taken.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

HellerEhrman
ATTORNEYS

January 22, 2001

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16004/0104

Mr. Geoff Harvey
Idaho Department of Environmental Quality
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Coeur d'Alene, ID 83814

RECEIVED
JAN 24 2001
IDHW-DEQ
Coeur d'Alene Field Office

Re: Draft Sub-basin Assessment and Total Maximum Daily Load of the North Fork Coeur d'Alene River

Dear Mr. Harvey:

The attached comments pertaining to the above referenced draft TMDL are submitted on behalf of Asarco. If you have any questions or need further information, do not hesitate to call me.

Very truly yours,

Timothy H. Butler

cc: Douglas Parker (w/encl.)
Christopher Pfahl (w/encl.)

COMMENTS OF
ASARCO INCORPORATED
ON THE DRAFT SUB-BASIN ASSESSMENT
AND TOTAL MAXIMUM DAILY LOAD
OF THE NORTH FORK COEUR D'ALENE RIVER

Submitted January 20, 2001

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COMMENTS OF
ASARCO INCORPORATED
ON THE DRAFT SUB-BASIN ASSESSMENT
AND TOTAL MAXIMUM DAILY LOAD
OF THE NORTH FORK COEUR D'ALENE RIVER

Asarco Incorporated ("Asarco") appreciates the opportunity to submit comments on the proposed TMDL for cadmium, lead and zinc in the East Fork of Eagle Creek

I. SUMMARY OF COMMENTS

Throughout the following comments Asarco will refer to the *Draft Sub-Basin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River* as the "SBA" and the metals TMDL within the SBA as the "metals TMDL." The *Total Maximum Daily Load for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene Basin* is referred to as the "SFCDR TMDL". A *Draft Field Sampling and Data Report* by McCulley, Frick and Gillman will be released in February 2001 and is generally referred to as "data obtained by McCulley, Frick and Gilman."

Based on Asarco's review of the draft SBA and metals TMDL, Asarco believes that the metals TMDL is premature, is based on inadequate information and needs to be deferred. Asarco notes that there is no urgency for doing the TMDL because improvements will be occurring under the existing and planned remedial activities. The risks of promulgating a final metals TMDL include:

- the use of more stringent metals standards than necessary to protect water quality,
- the assignment of inappropriate waste load allocations ("WLAs") to specific point sources,
- the implementation of the assigned WLAs by EPA in NPDES permits regardless of cost, feasibility or ultimate benefit, and in spite of DEQ's intention to impose only a "practical level of treatment,"
- the limitation to just a 5 year NPDES permit cycle to achieve the WLA based limits, and
- the additional burden of anti-backsliding requirements on those permits, where such limits, once attained, must continue even if the standards themselves are relaxed through mechanisms such as site-specific criteria.

Asarco is concerned that an excessive focus on stringent limits for point sources will detract from the ongoing remedial activities that seek to address the more significant non-point sources. Asarco is also concerned that the metals TMDL, with all of its short-

comings, could become an ARAR driving the remedial activities, instead of simply allowing them to occur and then evaluating their effectiveness.

For all of the above reasons, Asarco urges that the metals TMDL be deferred. Should DEQ not defer the metals TMDL, then DEQ should make the metals TMDL a phased TMDL in which the first phase will be to focus on the remedial actions and the gathering of more and better data to assess the effects of those actions. The first phase should not identify specific WLAs, but should stress that the data gathered in the first phase will be used to determine whether or not site specific criteria development is needed. Only after such evaluation, and after site specific criteria development should a second phase metals TMDL be considered.

The crux of these recommendations is that much better information is needed before the metals TMDL should advance to establishing WLAs for point sources. Part of Asarco's concern is because of the inherent inaccuracy in the present draft, and part is because EPA writes the permits to implement WLAs. EPA has shown elsewhere in Idaho that they will implement WLAs in absolute fashion, with short compliance times, regardless of DEQ's stated intentions. The metals TMDL actually acknowledges the scarcity of data and the need to revise the metals TMDL in the future as more exact measurements are developed. That provides little comfort as EPA implements the published WLAs. The scarcity of data also provides little comfort if the metals TMDL is treated as an ARAR driving the remedial activities in the subbasin.

Asarco questions DEQ's authority under state law to prepare TMDLs for water bodies that are dominated by nonpoint sources. Asarco also notes that under state law, TMDL development must be conducted through rulemaking.

Asarco notes that new data collected by McCulley, Frick and Gillman[1] shows that within Tributary Creek, hardness associated with both the point and nonpoint sources is significant and the metals TMDL will need to factor in hardness. (See comment II.C.6) Asarco also notes that site-specific criteria development in the South Fork of the Coeur d'Alene River provides strong evidence that it is inappropriate to use existing state metals standards for a metals TMDL in the North Fork of the Coeur d'Alene River. Similar changes are likely to result from any site specific criteria development in the North Fork.

Asarco notes that the draft metals TMDL includes a number of faulty assumptions or calculations. These include 1) indecipherable means of defining the discrete discharges of metals, 2) inappropriate comparisons of a very small adit discharge from

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[1] McCulley, Frick and Gillman, (release date in February, 2001) *Draft Field Sampling and Data Report.*

the Jack Waite mine to a very large adit discharge from the Gem mine, and 3) establishment of waste load allocations that decrease as the creek flow increases.

Asarco notes that the flow tier system provides a substantial margin of safety that DEQ has not discussed, and that the 10% margin of safety imposed by DEQ is not needed. Asarco questions the imposition of a metals TMDL when it is not yet known whether the source reductions will be technically or economically feasible.

Asarco concludes that DEQ should defer promulgation of the metals TMDL. In the event that DEQ does not defer the metals TMDL, then DEQ should instead develop a phased metals TMDL where the first phase does not include defining specific WLAs and the second phase remains to be determined after evaluation of the effects of actions under the first phase. Asarco believes that the phased approach is compatible with DEQ's stated intentions for implementation.

II. GENERAL AND SPECIFIC COMMENTS

A. Deferral or phasing of the metals TMDL

1. DEQ should defer the metals TMDL until completion of the CERCLA initiated removal actions.

Idaho does not have unlimited resources, so it needs to ensure that those resources are spent wisely. The order of the federal district court for the State of Washington in Idaho Sportsmen's Coalition v. Browner, C93-943-WD (W.D. Wash.), allows the State to reorder its development of TMDLs. The order states,

> The sequencing of TMDL development in Idaho's schedule may change as additional information becomes available concerning impacts or potential impacts to beneficial uses within particular subbasins, as resources become available to complete development on TMDLs on a particular subbasin, or as priorities and activities of other state and federal agencies change.

Schedule to Stipulation and Proposed Order on Schedule Required by Court, Idaho Sportsmen's Coalition v. Browner, at 5 n.1 C93-943WD (W.D. Wash. Apr. 9, 1997).

Under the court's order in Idaho Sportsmen's Coalition v. Browner, the State of Idaho has the authority to revise the schedule and order for developing and implementing TMDLs on Section 303(d) listed waters. DEQ should exercise this discretionary authority and defer developing a metals TMDL for the East Fork Eagle Creek and other waters in the North Fork Coeur d'Alene River until the nonpoint sources are addressed initially through CERCLA mechanisms and removal actions are completed. Only then will there be data sufficient to show that the condition requiring a TMDL persists. The sediment TMDL portion of the SBA can stand alone, without the metals TMDL.

2. If DEQ does not defer the metals TMDL then it should specifically phase the metals TMDL

As the metals TMDL implementation is described in the SBA, it appears that DEQ does intend to use a phased approach:

> "....Both point and nonpoint sources would be addressed initially through CERCLA mechanisms. Point sources would be addressed with remedial studies and where necessary consent decrees between EPA and the responsible parties. After the consent decree remedy had defined the practical level of treatment and that treatment was installed, the NPDES program will issue permits for these sources. Nonpoint sources will be addressed through removal actions sponsored by the state, EPA or the federal land management agencies, BLM and USFS. A removal action is currently under consideration by the Forest Service at the Paragon Mill site."

(SBA at Section 3.2.13)

The above wording implies that DEQ will implement the metals TMDL in phases. Although Asarco generally agrees with the intent of this section, Asarco believes that a deferral of the metals TMDL is still necessary. If DEQ does not defer the metals TMDL then the phasing of the metals TMDL must be described in more detail and steps taken to assure that EPA does not override it and prematurely implement the Waste Load Allocations (WLAs) in permits. Specific WLAs should not even be defined in the first phase of the metals TMDL and the metals TMDL should only present the first phase at this time.

Asarco makes this request for the following reasons. DEQ cannot know how much load reduction from point sources will be necessary until DEQ understands the amount of load reduction that can be achieved through cleanup of non-point sources. DEQ cannot at this time predict what a "practical level of treatment" will be for point sources such as the adit from the Jack Waite mine. DEQ cannot at this time evaluate how possible site-specific criteria development might change the metals TMDL. Defining specific WLAs for point sources at this time could "lock in" permit requirements that later would prove to be unnecessary and/or unfounded.

In spite of DEQ's stated intentions to only impose a practical level of treatment, there is no assurance that the NPDES permit writers will adhere to such an approach. Idaho is not a NPDES delegated state. EPA Region X, not DEQ, writes the NPDES permits. Recent experience has shown that EPA permit writers will impose water quality based effluent limits ("WQBELs") in NPDES permits to meet waste load allocations that are specified in a TMDL. The metals TMDL in the SBA define specific waste load allocations and EPA permit writers will impose the WLA based limits from the metals

TMDL. EPA permit writers' interpretations of the metals TMDL may well require that WLA based limits beyond the "practical level of treatment" envisioned in the metals TMDL be met within the five year time span covered by an NPDES permit, regardless of DEQ's intentions.[2]

It makes no sense to impose overly stringent load reductions on the types of point sources in the SBA when the possibility exists that the cleanup of non-point sources will obviate the need for such stringent point source load reductions. Similarly it makes no sense to impose such reductions when site-specific criteria development may reduce the amount of reductions required.

As an alternative, DEQ may strongly state that this is a phased metals TMDL emphasizing remedial actions and evaluation in the first phase. DEQ may state that the second phase of the metals TMDL will be developed later based on evaluation of the effects of the actions taken in the first phase and new data. Specific WLAs for point sources should not be included in the first phase, but may be in the second phase if necessary.

3. DEQ should defer or phase the metals TMDL to allow development and use of site-specific water quality criteria

The comments pertaining to site-specific water quality criteria development provided by Asarco regarding the SFCDR TMDL[3] are relevant to the SBA[4]. The terrain and the water in Tributary Creek and the East Fork of Eagle Creek are similar to the area for which site-specific criteria are being developed in the South Fork of the Coeur d'Alene River.

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[2] In implementing a TMDL prepared by DEQ for Paradise Creek, EPA imposed a point source WLA based limit for phosphorous on the City of Moscow with the requirement that they be met within the 5 year span of the permit, even though DEQ provided EPA with a 401 certification that called for a step-wise approach and a longer compliance schedule. In response to comments EPA said they were required to impose the TMDL based limits and they could not go beyond the 5 year term of the NPDES permit to achieve the limits.

[3] See Comment II.A.2 in Asarco's comments on the SFCDR TMDL dated August 13, 1999. DEQ has a copy of those comments.

[4] On motion of the government, the North Fork Coeur d'Alene River has been excluded from the Coeur d'Alene lawsuit involving the U.S. Government claim for natural resource damages and response costs.

It makes no sense to impose stringent load reductions on point sources when elsewhere in a similar basin, the development of site-specific water quality standards for metals provide a strong likelihood that site-specific standards within the North Fork Coeur d'Alene River and/or its tributaries would result in a less stringent requirement.

4. DEQ should defer or phase the metals TMDL to allow development of sufficient site-specific data

Inadequacies of the site-specific data are described in the comments under the heading of II.D, (below). Essentially,

- There are inadequate data to characterize adits and non-point sources and it is not appropriate to compare adits in the SBA with the Gem adit because the Gem adit flow is several orders of magnitude greater than the Jack Waite adit. (See discussion at II.D.1, below.)

- Site-specific criteria being developed in the South Fork of the Coeur d'Alene River will have relevance even if the North Fork is a different water body. The ongoing site-specific criteria development in the similar, nearby water body provides a strong basis to believe that site-specific criteria should be developed within the North Fork as well, before developing a metals TMDL. Site specific criteria, when developed, give a different outcome.

B. DEQ Authority

1. Idaho Code § 39-3611 limits controls on point sources

Asarco believes that the statute is clear. It prohibits Idaho from imposing further restrictions through a TMDL unless the point source contribution of the pollutant of concern is more than 25%:

> For water bodies where an applicable water quality standard has not been attained due to impacts that occurred prior to 1972, no further restrictions under a total maximum daily load process shall be placed on a point source discharge unless the point source contribution of a pollutant exceeds twenty-five percent (25%) of the total load for that pollutant.

I.C. §Ê39-3611. The non-attainment status of the East Fork of Eagle Creek and other affected tributaries in the North Coeur d'Alene River sub-basin pre-dates 1972 and the point source contributions are less than 25%; therefore, DEQ cannot write a TMDL and impose additional restrictions on point sources. DEQ must follow Idaho state law.

2. The State of Idaho and Idaho DEQ are required to conduct rulemaking under the Idaho APA in order to promulgate TMDLs

The requirements of Idaho law regarding promulgation of TMDLs by the Idaho DEQ are quite clear. I.C. § 39-3612 states:

> **Integration of total maximum daily load processes with other programs.**—Upon completion of total maximum daily load processes as set forth in section 39.3611, Idaho Code, the director shall, subject to the provisions of chapter 52, title 67, Idaho Code, adopt such processes as part of the state's water quality management plan developed pursuant to the federal clean water act. Upon such adoption, the provisions of these processes shall be enforced through normal enforcement practices of designated agencies as set forth in the state's waster quality management plan. [I.C., § 39-3612, as added by 1995, ch. 352, § 1, p. 1165.]

The statute is plain on its face that the TMDL processes provided for in IC § 39-3611 must be "adopted" pursuant to the Idaho APA. A complete discussion of this issue is contained in briefing supporting a challenge to the IDEQ/EPA promulgation of the TMDL for listed stream segments in the Coeur d'Alene basin on August 14, 2000. That briefing is available to IDEQ.

C. Loading Allocation

1. There should be a greater emphasis that this is a phased TMDL.

The North Fork of the Coeur d'Alene River is clearly a situation where it is most appropriate to have no metals TMDL or to develop a phased metals TMDL. A phased TMDL is appropriate when there is much uncertainty. A phased metals TMDL would focus on CERCLA mechanisms, particularly removal actions that will first address the non-point loadings. To the extent that CERCLA actions lead to reasonable or feasible actions on some point sources, such actions may also occur in the first phase. However, the first phase of the TMDL should not be the regulatory mechanism to impose requirements for point source controls.

The phased approach allows the development of additional data to better document the conditions as they improve and also allows time for the development of site-specific metals standards if that appears necessary. A phased metals TMDL should emphasize that as removal actions occur and new data become available that the data will be reviewed to evaluate trends, and the possible need for any additional actions. Additional actions, including specifying any WLAs for point sources would be developed, if needed, in the second phase of the metals TMDL. The first phase of the metals TMDL should not derive specific metals WLAs because data are insufficient and because EPA permit writers will implement WLAs within a single 5 year permit cycle, contrary to DEQ's intent.

Note that these recommendations appear to agree with section 3.2.13 of the SBA. See Asarco comment II.A.2 for additional discussion.

2. The calculation of Discrete Discharges of Metals is indecipherable and erroneous.

Section 2.3.2.2.1.5 of the SBA states that

> "[t]he point discharges of metals cadmium, lead and zinc are listed in Table 8. Based on estimates discharge weighted for seasonal flow (Appendix A), the daily load of each source is calculated."

The wording is unclear.

The same section says that the discharge patterns of these adits are assumed to be similar to that of the Gem adit.[5] Details on the Gem adit discharges are included in Appendix A of the SBA. There is only one flow observation of 0.091 cfs for the Jack Waite adit presented in the SBA Appendix A and it is three orders of magnitude lower than the Gem adit. Additional data obtained by McCulley, Frick and Gilman include observations of adit flow of 0.129 and 0.19 cfs in the fall and 1.8 cfs in the Spring, indicating an order of magnitude seasonal range, a much greater percent change between seasons than exists for the Gem adit. The Gem adit should not be used for any purposes of estimation for the Jack Waite adit.

Section 2.3.2.2.1.5 includes Table 8 showing discrete metals discharges for various point sources (including the Jack Waite adit) and also includes tables showing the contributions of those sources to the various creeks under the different flow tiers. The SBA apparently used mean metal concentrations for the creek for flow tiers and a single value for the Jack Waite adit (perhaps adjusted somehow by variability with the Gem adit data) in order to compute percentages attributable to the Jack Waite adit. The method appears to lead to illogical results, as explained below (see Comment II.C.3 below). The methodology is not well illustrated, not documented and appears to result in inappropriate

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[5] Note that it is not at all evident in the SBA or its Appendix A as to just how this assumption of comparability to the Gem adit is used. There really is no basis for comparison, but nevertheless, the Gem adit flow data show a certain variability. For Jack Waite there is only a single observation of flow. No information is provided as to whether that flow is made to vary like the flow from Gem adit, or vary in any other way for purposes of the calculations.

conclusions. Asarco can identify these errors but due to the data limitations Asarco finds that it is not possible to identify what the corrections should be. The SBA needs much more data and analyses. Clearly the metals TMDL is premature and based on inadequate data.

3. The waste load allocations should not decrease as creek flows increase.

Section 3.2.11 of the SBA provides the following waste load allocation for the Jack Waite Adit.

	7Q10-10%	10%-50%	50%-60%	>90%
Cd (lb/da)	0.006	0.003	0.001	0.001
Pb (lb/da)	0.0004	0.0001	0.00006	0.00007
Zn (lb/da)	0.231	0.147	0.085	0.088

These waste load allocations actually **decrease** as the creek flow **increases**. Such an approach appears to be illogical because the assimilative capacity of the creek increases with flow. This is probably the result of the combination of inappropriate methods used in the metals TMDL, including trying to compare adits in the SBA to the Gem adit and making judgements based on an inadequate data base (one adit measurement in the case of Jack Waite). Without a more detailed explanation of how these calculations were performed, it is not possible for the public to accurately assess the validity of the methods or the results.

The above waste load allocation is in pounds per day. Using the assumptions of from the metals TMDL, the mass loads equate to the following concentration limits.

	7Q10-10%	10%-50%	50%-60%	>90%
Cd (ug/l)	12.28	6.14	2.05	2.05
Pb (ug/l)	0.82	0.20	0.12	0.14
Zn (ug/l)	472.6	300.75	173.90	180.04

As with the pounds per day allocation, the concentration equivalents show limits that decrease with increasing stream flow. This makes no sense. As noted earlier, the Jack Waite adit is a significant contributor of hardness to Tributary Creek. Two hardness observations of the adit discharge were obtained by McCulley, Frick and Gilman in low flow conditions and these were 318 and 378 mg/l. McCulley, Frick and Gilman obtained one hardness observation of 147 mg/l in high flow conditions. Some of the above limits are set lower than the water quality standards for the adit's hardness. This is unnecessary.

4. Lead should be deleted from the TMDL for the East Fork of Eagle Creek.

Within the East Fork of Eagle Creek lead could be deleted from the metals TMDL. Measures implemented to address zinc will achieve improvements for lead as well. As such, zinc would be a surrogate for lead. The lead data include non-detect values. DEQ in turn used half the detection limit in their evaluations. The lead data for the East Fork of Eagle Creek considered dissolved values, but the description of the loadings from the limited point source data used total. Table 9(b) in section 2.3.2.2.1.5 of the SBA illustrate a trivial percent contribution of lead from the point discharge to the East Fork of Eagle Creek.

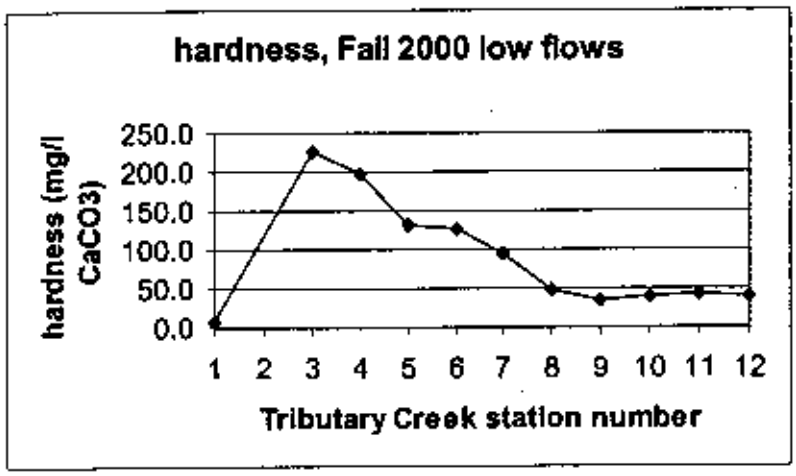
5. Dissolved to Total Recoverable metals ratios should be incorporated into the metals TMDL.

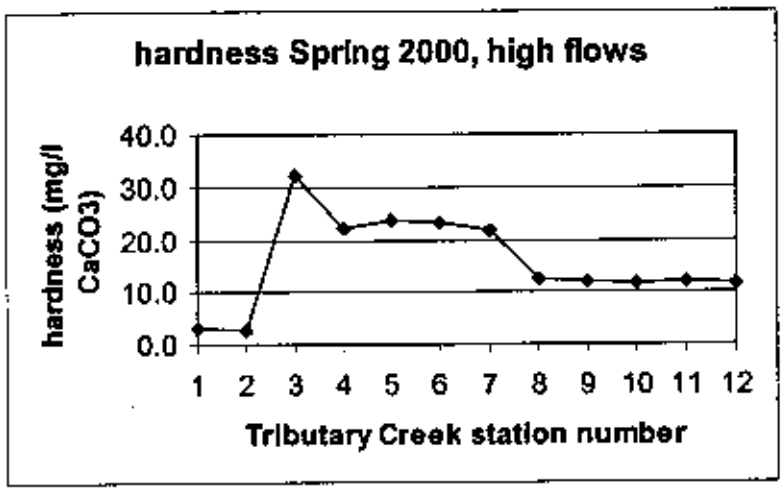
Data collected by McCulley, Frick and Gilman for Tributary Creek illustrate that there are differences between the dissolved and total recoverable metals. The metals TMDL should evaluate and utilize appropriate ratios, specific to the different flow tiers, and possibly even specific to the location and gradient in the basin. Hence, additional data will still need to be collected before a final metals TMDL should be developed, in order to implement metals standards consistent with their dissolved basis. Note that this is one manner of making an easy site-specific adjustment to the water quality standards. Other methods should also be considered.

6. Within Tributary Creek the hardness from adit and seep flows add to the loading capacity

The metals TMDL in the SBA fails to consider the hardness of drainage from adits or seeps. Although the hardness for the East Fork of Eagle Creek does appear to be consistently below 25 mg/l, the same is not true for Tributary Creek nor the adit or seep drainages to Tributary Creek.

As was recognized in Washington State's Spokane River TMDL and incorporated into the SFCDA TMDL (for some but not all point sources), the hardness contribution from a discharge is a beneficial factor to consider when evaluating assimilative capacity and the effects of a source. Because of hardness added to Tributary Creek, the hardness assumptions used in the SBA are not applicable within Tributary Creek. The TMDL needs to recognize this difference. McCulley, Frick and Gilman has collected hardness data for Tributary Creek for the Fall of 1999, the Spring of 2000 and the Fall of 2000. These data will be provided to DEQ in February in a Draft Field Sampling and Data Report. The following figures illustrate the hardness differences for the Spring and Fall of 2000 for Tributary Creek. Station 1 is in the headwaters upstream of the Jack Waite adit. Station 12 is near the mouth just before the Creek joins the East Fork of Eagle Creek. Upstream of the Jack Waite adit the water in Tributary Creek is soft regardless of the flow. The Jack Waite adit is a very significant source of hardness to Tributary Creek.





7. Within Tributary Creek there is an inverse relationship between flow and hardness

The inverse relationship results from the fact that ground water or adit and seep flows contribute different percentages of the total stream flow during low flow times than high flow times. It is also noteworthy that upstream from the Jack Waite adit, the stream has very low hardness regardless of high or low flow. The inverse relationship between hardness and flow for Tributary Creek as well as the low hardness upstream of the adit are evident in the above figures.

D. Adequacy of Technical Information

The SBA acknowledges the scarcity of data.

> "Data from which the problem assessment and TMDL for the North Fork Coeur d'Alene sub-basin were developed are few in number. As more exact measurements are developed during implementation plan development or subsequent to its development these will be added to a revised TMDL as required."

(SBA Section 3.2.14)

This admission applies to stream flow characterization, adit characterization, hardness characterization, and the likelihood that site-specific criteria could be developed that would be significantly different.

Such an acknowledgment further supports the need to not adopt a metals TMDL at this time or to use a phased metals TMDL with no WLAs determined in the first phase. The material presented in the SBA will be useful as a starting point for evaluating water quality after remedial actions have been implemented and data collected to evaluate their effectiveness. At that point, the necessity of a metals TMDL can be re-evaluated and one may be developed based on a much more adequate data base.

1. The TMDL's assessment of point sources is inadequate

For example, a single data point was all that was available for the Jack Waite adit. The same is true for many of the other adits. Somehow that was then compared to more data points for metals in the East Fork of Eagle Creek and different flows and was a factor in the derivation of point source waste load allocations that decrease as the stream flows increase. The inadequate data contributes to an illogical allocation.

2. Biological monitoring can be used to establish ecological goals for the Basin.

Asarco supports the use of biological assessment as the means for evaluating the improvements in the sediment TMDL. The same methods implemented under the sediment TMDL will prove useful if incorporated into a phased metals TMDL. Site-specific criteria development may also relate to biological evaluations. In some tributaries with waterfalls that block fish passage, biological assessments might determine that fish can not even get there and this has relevance to site-specific criteria.

3. Site-specific metals criteria will result in a technically superior TMDL.

Based on the ongoing development of site-specific criteria in the South Fork Coeur d'Alene system, site specific criteria development for zinc and lead are likely to

produce higher site specific metals criteria within the SBA. Site-specific criteria will be more relevant and are critical to any metals TMDL.

E. Margin of Safety

1. By using the EPA developed metals criteria, DEQ already has sufficient margin of safety.

The development of site-specific criteria in the South Fork of the Coeur d'Alene River illustrate that some of EPA's criteria are more stringent than necessary and therefore provide a sizeable, unaccounted for margin of safety. No margin of safety is needed in the metals TMDL when using EPA's criteria. A margin of safety might be needed when using site-specific criteria. The margin of safety inherent in the flow tier methodology is more than sufficient.

2. The flow tier approach provides a margin of safety not acknowledged in the TMDL.

While it is more appropriate to use flow tiers than to simply establish a single allocation for a worst case flow, it is important to realize that whenever flow tiers are limited in number (as opposed to having separate TMDL allocations for each and every flow), then a significant margin of safety evolves. This margin of safety is associated with the range of flows incorporated into each tier. Essentially, the allocations for each tier are based on the loading capacity for the bottom flow value in each tier. Without any other margin of safety applied, this would mean that there is no margin of safety only when the flow was exactly equal to the bottom flow in the range, and there is a very substantial margin of safety when the flow was just below the flow that marks the top of the range. For example, when the flow in the East Fork of Eagle Creek is 21 cfs, it is more than twice the 10th percentile flow of 10.4 cfs and the Creek could accept twice the allowed loading and still meet the standards. When the flow is 100 cfs the Creek could accept four times the loading for the 50th percentile flow and still meet the standards. The margin of safety inherent in the flow tiering is quite extreme and there is no need for additional margins of safety. If the metals TMDL retains the 10% margin of safety, then additional flow tiers should be included to reduce the excessive margin of safety with the present tiers.

F. Technical and Economic Feasibility

1. DEQ should not impose a metals TMDL without knowing whether the source reductions will be technically or economically feasible.

Asarco recognizes that Section 3.2.13 considers that practical levels of treatment would be defined and installed for point sources. "Practical" actually implies some determination of technical or economical feasibility. However DEQ has no idea what these requirements will be, nor whether such undefined "practical" levels of treatment

will be able to meet water quality based limits implicit in any TMDL assigned waste load allocations. Asarco is concerned that once waste load allocations are described, EPA may view them as water quality based effluent limits to be imposed regardless of technical or economic feasibility.

G. Editorial Corrections

Table of Contents Appendix A. spelling error

Second paragraph in section 2.2.1. remove "(" before "303(d)". A citation to IDEQ 1996b is made but no such document is listed in the references.

Figures 1 and 4. These figures should identify the compliance points that form the basis of the TMDL. From the text it isn't clear.

Third paragraph in section 2.2.3. Change "criterium" to "criterion" or "criteria"

Second paragraph in section 2.3.1. A citation to DEQ 1999a is made but no such document is listed in the references.

First paragraph in section 2.3.2.2.1.2. Change "90thb" to "90th"

First paragraph and Table 7 in section 2.3.2.2.1.4. It represents that the data cover four flow tiers. However, it actually covers five tiers since some of the data were for flows that were less than the 7Q10. Table 7 has some computational errors as well for Eagle Creek. The footnote to Table 7 needs a space between "lead" and "and".

First paragraph in section 2.3.2.2.1.5. The first sentence makes no sense.

Tables 14a, 14b, 14c, 14d and 14e in section 2.3.2.5.1. These tables include rows for projected CWE scores and calculated CWE scores. All the values presented are identical, which makes no sense.

The first table in Appendix A. This table is not suitable for inclusion in the assessment. The contents of some fields exceeded the size and consequently were replaced by Excel with "######". The data in the table include some metals concentrations that are negative, with no explanation. Column headings do not carry over to all pages, making it very difficult to read.

Section 3.2.11.1. This section refers to Beaver Creek when it should refer to East Fork of Eagle Creek. The WLA values for cadmium and lead for the 90th percentile flow in Table 9 are incorrect based on the methods used in the TMDL. The WLA values also make no sense (as a result of the method used) because they decrease as the stream flow increases. (Similar concerns exist for the metals TMDLs for the other creeks.)

Section 3.2.12.2. The word "associates" should be "associated".

CONCLUSION

For the reasons set forth in these comments, DEQ should defer promulgation of the metals TMDL for the East Fork of Eagle Creek and possibly the other tributaries within the North Fork of the Couer d'Alene River basin.

If DEQ proceeds with the metals TMDL notwithstanding all of the compelling reasons for deferral, DEQ should clearly state that the metals TMDL will be a phased one, and the first phase should not identify any waste load allocations for point sources. Phase one will address both point and nonpoint sources only through CERCLA mechanisms emphasizing primarily removal actions for the nonpoint sources. Point sources would only be addressed through CERCLA mechanisms in phase one if a practical level of treatment is determined. Phase one will also include requirements to obtain more data and to evaluate changes resulting from the phase one actions. The evaluations during and following completion of the removal actions will help to determine if site-specific criteria need to be developed and ultimately will fill the gaps in understanding necessary to develop the second phase of the metals TMDL.

Either deferral of the metals TMDL or explicitly phasing of the metals TMDL is necessary in order to prevent a premature application of waste load allocations to point sources. Possibly the remedial actions to correct nonpoint source contributions, site-specific criteria development and some practical level of treatment for point sources will individually or in combination be sufficient to restore the affected creeks in the North Fork of the Coeur d'Alene River. Time is needed to implement these and assess their effects.

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1/22/01 2:23 PM (16004.0104)

May 23, 2001

ASARCO
c/o Timothy Butler
Heller Ehrman
701 Fifth Avenue Suite 6100
Seattle WA 98104-7098

Dr. Mr. Butler:

Thank you for the comment provided by ASARCO on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by ASARCO as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: DEQ should defer the metals TMDL until completion of the CERCLA initiated removal actions.

Response 1: The TMDL process is related to but independent of the CERCLA process. Its relationship is that it develops the water quality applicable or relevant and appropriate regulatory requirements (ARARs) for the site more fully by translating the water quality standards into daily permissible loads dependent on the season. The situation in the East Fork Eagle Creek is straightforward. The Jack Waite adit is the only discrete source while the Jack Waite mill complex, tailings ponds and tailings washed downstream are the nonpoint sources. Since the TMDL provides a plan to respond to meet water quality standards it is appropriate that the East Fork Eagle Creek TMDL proceeds any CERCLA consent decrees.

Comment 2: If DEQ does not defer the TMDL then it should specifically phase the metals TMDL. Concern is stated that EPA will override the phasing of the TMDL implementation.

Response 2: The term phasing is not defined, however, EPA does not accept the phasing of TMDLs. This fact stated; TMDLs can be renewed and incorporate new data at any time. Should there be a shift in metals standards for the water body, or important new data became available a new TMDL would be required to reflect this new data. Although not phasing, this is renewal.

Comment 3: DEQ should defer or phase the metals TMDL to allow development and use of site-specific water quality criteria.

Response 3: Site specific criteria for lead and zinc have been developed for the reach of the South Fork Coeur d'Alene River above Wallace. Work has been completed to extend these results to the metals contaminated segments of the South Fork Watershed below Wallace. A justification of this is in preparation. No plans have been developed to do the studies necessary to extend these results to the Beaver and Prichard Creek watersheds. Such work if undertaken may extend well past 2003 the due date of these

TMDLs. When and if the site specific standards were extended to the Prichard Creek watershed the current TMDLs would be revised to reflect the current (new) metals standards.

Comment 4: DEQ should defer or phase the metals TMDL to allow development of sufficient site specific data.

Response 4: See response to ASARCO, comment 3.

Comment 5: Idaho code section 39:3611 limits controls on point discharges.

Response 5: The limitations on point source controls in 39-3611 are not applicable under either state or federal law to this TMDL for the following reasons: Idaho code section 39-3611 limits controls on point source discharges when these are less than 25% of the metals loads. The sub-basin assessment (SBA) on page 16 clearly demonstrates that the single point discharge (Jack Waite Adit) is 50% of the cadmium under 7Q10 discharge conditions. In addition, 39-3611 applies to water bodies where the applicable water quality standard has not been met due to impacts that occurred prior to 1972. While there were significant impacts to the NFCDA river that occurred prior to 1972, there are also continuing and post-1972 discharges that have contributed and continue to contribute to the non-attainment of state water quality standards. Moreover, under both state and federal law, the TMDL must meet requirements of the Clean Water Act. See Idaho Code sections 39-3601 ("It is the intent of the legislature that the state of Idaho fully meet the goals and requirements of the federal clean water act.."); 39-3611 ("For water bodies described in section 39-3609, Idaho Code, the director shall…as required by the federal clean water act, develop a total maximum daily load…"). A TMDL that does not call for point source reductions would not meet the requirements of the Clean Water Act because the TMDL could not assure compliance with state water quality standards.

Comment 6: The State of Idaho and Idaho DEQ are required to conduct rulemaking under the Idaho APA in order to promulgate TMDLs.

Response 6: TMDLs are plans for the restoration of water bodies to the level of the water quality standards. Idaho Code section 39-3602 ("Total maximum daily load (TMDL) means a plan for a water body not fully supporting designated beneficial uses…") TMDLs do not have the force and effect of law and are not required to follow the APA rule-making process.

Idaho Code section 39-3611 addresses the development of TMDLs and requires TMDLs be developed in accordance with those sections of law that provide for involvement of BAGs and WAGs, and as required by the federal Clean Water Act. There is no requirement in this section that the TMDL be developed as a rule.

Idaho Code section 39-3612, on the other hand, addresses the integration of TMDLs, once completed, with other water quality related programs and provides that this integration is subject to the provisions of the Idaho Administrative Procedures Act. Thus, to the extent required by the IDAPA, DEQ, and other designated agencies, must follow the IDAPA provisions when TMDLs are implemented and enforced under applicable state programs.

Given the scope of the TMDL program and requirements of the court-approved schedule for development of TMDLs, it is clear the IDAPA rulemaking provisions are not applicable. The schedule for development of TMDLs in Idaho is the product of federal court litigation. According to the TMDL schedule, from 1997 to 1999, DEQ was to develop 529 TMDLs. Under the IDAPA, rules must be approved by the legislature before they become effective. Because of this and other rulemaking requirements, rules typically take almost a year to promulgate. Idaho Code section 39-3601 et seq was enacted in response to this federal

TMDL litigation and the legislature certainly never intended DEQ to attempt to promulgate hundreds of required TMDLs as rules.

The federal APA does not require EPA adopt TMDLs as rules. Moreover, given the short deadlines in section 303d of the CWA, including the requirement that TMDLs be developed within 30 days of EPA disapproval of a state TMDL, the CWA clearly does not envision or require TMDLs be developed as rules.

Comment 7: There should be greater emphasis that this is a phased TMDL.

Response 7: See response to ASARCO comment 2. The TMDL is not phased and would not be approved by EPA as a phased TMDL. However, any TMDL is open to revision based on new information.

Comment 8: The calculation of discrete discharges of metals is indecipherable and erroneous.

Response 8: The calculation is difficult to follow. This was remedied in the revised SBA in the text and in Appendix A. We respectfully disagree that it is erroneous. The calculation of the adit discharge of metals was made more understandable in the text and Appendix A.

Comment 9: The waste load allocations should not decrease as creek flows increase. Hardness data provided.

Response 9: The waste load allocations decrease because the percentage of the load that is attributable to discrete discharges decreases as the discharge increases. This is a major difference between the Coeur d'Alene basin Metals TMDL and these North Fork metals TMDLs. The Coeur d'Alene Basin document gave the discrete sources a 25% allocation based on the mixing rule in the Idaho Water Quality Standards and Wastewater Treatment requirements. The North Fork TMDL calculates the discrete load based on adit discharges and synthetic hydrographs based on the Gem Adit discharge. The percentage discrete load is calculated by dividing the discrete load by the measured load at each flow tier.

The hardness data provided clearly indicates that the adit adds hardness to the stream. This hardness effect is diluted even in Tributary Creek and likely is very small at the point of compliance near the mouth of the East Fork Eagle Creek. The metals are detected at the point of compliance in the loads measured and at hardness levels all below 25mg calcium carbonate. Thus the hardness data is not applicable to the point of compliance.

Comment 10: Lead should be deleted from the TMDL for the East Fork Eagle Creek. Use of one-half detection for non-detection increases a load that is trivial.

Response 10: It is standard method to consider non-detection as one half of detection. However, we agree this approach may create a lead load where arguably none exits. The database was searched for detection of lead above the state standards. Exceedence occurred in eleven of thirteen samples. Use of one-half detection in the two cases is warranted.

Comment 11: Dissolved to total recoverable metals ratios should be incorporated into the metals TMDL.

Response 11: The state standards state the cadmium, lead and zinc standards in terms of dissolved cadmium, lead and zinc. These ratios are important translators for point discharges since these permits are based on total recoverable levels. The database is not sufficient to develop such translators where they are appropriate at the adit discharge. These will be developed as the adit discharge is better characterized in the CERCLA consent decree and NPDES programs that will implement the TMDL.

Comment 12: Within Tributary Creek the hardness from adit and seep flows add to the loading capacity.

Response 12: See response to part 2 of ASARCO comment 9. The hardness from the adit and seeps discharged to Tributary Creek is not detectable at the point of compliance, while the metals are. The hardness must be diluted from the stream system.

Comment 13: The TMDL's assessment of point sources is inadequate.

Response 13: The assessment of the adit discharges is based on the database developed for the EPA remedial investigation. These were developed originally by the Idaho Geologic Survey (University of Idaho) for the US Forest Service. At the time its was the best available data. Additional data on the discharge and metals characterization of the Jack Waite Adit was supplied to DEQ by ASARCO's consultants. It was incorporated into the SBA and East Fork Eagle TMDL.

Comment 14: Biological monitoring can be used to establish ecological goals for the basin.

Response 14: Biological goals are appropriate for pollutants as sediment. In these cases narrative standards govern the amount of sediment and these standards are tied directly to the full support of the beneficial use. Metals are governed by numeric standards that assume full support of the beneficial use. In the case of metals the numeric standards must be attained.

Comment 15: Site specific metals criteria will result in a technically superior TMDL.

Response 15: This may or may not be true. However, at this time and for the foreseeable future (next two years) the current state metals standards are expected to be the governing standards.

Comment 16: By using the EPA developed metals criteria, DEQ already has sufficient margin of safety.

Response 16: Although conservative, the metals standards are not deemed by DEQ or EPA to eligible as a component of a TMDL's margin of safety.

Comment 17: The flow tier approach provides a margin of safety not acknowledged in the TMDL.

Response 17: The flow tier approach accounts for the seasonal stream discharge and is not a margin of safety factor.

Comment 18: DEQ should not impose metals TMDLs without knowing whether the source reductions will be technically or economically feasible.

Response 18: TMDLs are required by federal law and in Idaho's case a court order. These planning documents must be developed and issued by DEQ and EPA to meet the agencies' legal responsibilities. Should the source reductions not be technically or economically feasible, such that the TMDL cannot be met, the Clean Water Act contains mechanisms such as use attainability and standards changes to address such situations should these arise.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

Shoshone Natural Resources Coalition
A Voice for Responsible Resource Management

January 17, 2001

Dr. Geoff Harvey
Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814

Dear Dr. Harvey,

Please find attached, a copy of Shoshone Natural Resources Coalition's comments on the North Fork TMDLs. We thank you for the time extension on the comment period and the chance to comment on the document.

Sincerely,

Kathy Zanetti
Facilitator, Shoshone Natural Resources Coalition

Shoshone Natural Resources Coalition
P.O. Box 1027 Wallace, ID 83873 – (208) 753-6022 – FAX: (208) 556-2025
Shonatrsc@nidlink.com

The Shoshone Natural Resources Coalition (SNRC) appreciates the opportunity to comment on the proposed TMDL's for the North Fork Coeur d' Alene River (TMDL). The SNRC is a broad-based local organization comprised by citizens of North Idaho who live, work, and play in this region.

1. In general, the sediment portion of the North Fork TMDL is very narrow in scope; basically relying on the following three (3) factors when evaluating stream health: 1) fish density per mile, 2) the presence or absence of various age classes of fish, and 3) macroinvertebrate population density and diversity. According to the TMDL supporting documentation, the macroinvertebrate population and density are within expected limits; however, the fish density and age class abundance are less than what would be expected. There are a variety of other factors that could affect fish abundance in the North Fork that were not fully evaluated. For instance, how do fish limits and their changes affect fish populations. Has the introduction of Northern Pike and Salmon in Lake Coeur d Alene adversely impacted the North Fork trout population? These other factors need to be considered and evaluated in determining the overall fish health of the North Fork.

2. This TMDL classifies excess sedimentation as a form of habitat alteration. Page 10 of the TMDL states that "Habitat alteration can occur in several actions. An incomplete list of these actions would include nearby road construction, removal of riparian vegetation, channelization or <u>excess sedimentation</u>. (emphasis added) Since TMDLs cannot and are not developed for segments impaired by flow or habitat alterations and the TMDL classifies excess sedimentation as habitat alteration, a TMDL should not be developed for excess sedimentation.

3. Page 43 of the TMDL states that "...the root parameter of concern for the North Fork is hydrologic modification". Section 303(d)(1)(A) of the Clean Water Act clearly indicates that TMDL development be reserved for those waters for which effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) are not stringent enough to implement the applicable water quality standard. A review of Clean Water Act sections 1311(b)(1)(A) and section 1311(b)(1)(B) indicates that these sections of the Clean Water Act are not applicable to roads or other habitat modifications; therefore, section 303(d)(1)(A) of the Clean Water Act cannot be used as authority to develop a TMDL for those segments of the North Fork impacted by non-point sources or habitat alteration.

4. None of the Sedimentation Mechanisms outlined on pages 43-44 can be classified as point sources; therefore, an enforceable TMDL cannot be developed. Furthermore, the Sedimentation Mechanisms should be classified as habitat alteration not suitable for TMDL development. Section 319 of the Clean Water Act specifically address non-point sources of pollution and should be used to address all non-point source pollution that has been shown to cause an exceedance of applicable water quality standards.

5. Section 2.4 - Pollution Control, page 48 of the TMDL apparently summarizes DEQ's general pollution control strategy. A key component of this strategy seems to be the removal of roads from flood plains with the Forest Service providing lists and priorities of roads slated for removal. While the SNRC supports efforts made to improve fish habitat in the North Fork system, we believe that a through and public evaluation needs to be completed before any roads are removed from the North Fork system. Although there may be existing roads in the North Fork sub-basin that the DEQ and USFS considers abandoned not everyone may agree with the DEQ and USFS; therefore, all interested persons need to have input into the selection process. Before any final lists of roads scheduled for reclamation or closure are published, SNRC requests that the public have a chance to review any draft lists and be given at least 30 days to comment and provide feedback. SNRC also requests that any comments received by the DEQ and USFS regarding any road closure list be given serious considerations and incorporated into any pollution control strategy whenever possible.

6. Some of the stream segments listed in the TMDL are not included in the latest version of the State's 303(d) list of impaired waters. Those stream segments not listed on the 303(d) list should be removed from this TMDL.

The SNRC generally supports the DEQ's efforts to improve on the already excellent fishery in the North Fork Coeur d' Alene River sub-basin. DEQ must recognize that the North Fork sub-basin is a multiple use area whose continued multiple use is vital to the residence of Shoshone County. SNRC recognizes the importance of protecting and enhancing the fish habitat in the North Fork; however, we cannot overlook the importance of continued recreational and timber harvest use. SNRC supports those efforts by the DEQ and other stakeholders that improve the North Fork fishery habitat while continuing to fully support the other current and future uses throughout the North Fork sub-basin. Once again, thank you for providing SNRC with the opportunity to comment on the draft North Fork TMDL's.

May 23, 2001

Kathy Zanetti
Shoshone Natural Resource Coalition
P.O. Box 1027
Wallace ID 83873

Dear Kathy:

Thank you for the comment provided by the Shoshone Natural Resource Coalition (SNRC) on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made the Shoshone Natural Resource Coalition, as we understood them, and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: The support of fish is based on three narrow criteria in the TMDL. The TMDL does not take into account other factors such as fish introductions affected fish populations in the North Fork.

Response 1: The TMDL is designed to address only the pollutant of concern, which in this case is sediment. We agree that many other factors affect fish populations. These include non-native fish introductions, habitat alteration fishing pressure among others. The TMDL implementation plan will be required to acknowledge these other factors and either make provision for them or set surrogate measures of sediment control that once met will meet the TMDL.

It is clarified in the SBA that the implementation plan for sediment will need to acknowledge other factors affecting fish and either make provision for them or set surrogate measures of sediment control that once met will meet the TMDL.

Comment 2: A TMDL should not be developed for excess sedimentation.

Response 2: The TMDL is developed for that sediment which is estimated to be in excess of the watershed's ability to attenuate the sedimentation. This value is set at 50% above background, because the upper basin, which is supporting its uses is at 43% above background and the Washington Board of Forestry guidelines find no deleterious effect to water quality under 50% of background.

Comment 3: Since the root parameter of concern is hydrologic modification, section 303(d)(1)(A) which cannot be used as an authority to develop the TMDL for segments impacted by nonpoint sources and habitat alteration.

Response 3: The sub-basin assessment finds that sediment is the pollutant of concern. Sediment is a pollutant that can be allocated on a mass per unit time basis in a TMDL.

Comment 4: None of the sedimentation mechanisms outlined on pages 43-44 can be classified as point source pollution. Section 319 CWA should be used to address nonpoint sources.

Comment 4: DEQ disagrees that TMDLs are only required for waters impaired by point sources. TMDLs are a part of the water quality-based approach under section 303 of the Clean Water Act that is clearly not limited to point sources. See Pronsolino v. Browner,91 F Supp 1337 (ND CA 2000) and Response to Comments regarding the TMDL for dissolved cadmium, lead and zinc in the CDA River Basin at 57 to 60.

In addition, Idaho law clearly requires TMDLs to address both point and nonpoint sources of pollution. Idaho Code sections 39-3602(27) (defines TMDL to include load allocations for nonpoint sources);39-3611(directs development of TMDLs to control point and nonpoint sources of pollution). The segments of the North Fork Coeur d'Alene River are listed on both the 1996 and 1998 Idaho 303(d) water quality limited segments list. The sub-basin assessment for the North Fork confirmed that the waters at issue do not meet state water quality standards. Therefore, TMDLs are required under CWA section 303(d).

Comment 5: The SNRC requests full disclosure of roads to be removed and public input in the process to include a 30-day comment period.

Response 5: The sediment TMDL is a plan to recover the water quality of the North Fork Coeur d'Alene River. An implementation plan will be developed as after the TMDL is approved. This implementation plan will contain details on actions to be taken some, of which could be road closures or more likely replacements. In any case the implementing agency, the Forest Service, would be required by federal law to give notice of any closure and provide for public input.

Comment 6: Some streams listed in the SBA are not listed on the most recent 303(D) list, These streams should be removed from the SBA.

Response 6: The SBA lists those streams on the 1998 303(d) list and those that were on the 1996 list, but removed from the 1998 list. In the case of sediment, the entire watershed yields sediment to the most downstream sediment listed segment, the North Fork Coeur d'Alene River between Yellow Dog Creek and the mouth. Since this is the case the TMDL for this segment must address sediment from the entire North Fork watershed. This point is made clearly in the SBA.

Thank you for the comments that were developed on the North Fork Coeur d’Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

RECEIVED
JAN 22 2001
IDHW-DEQ
Coeur d'Alene Field Office

John Osborn, MD
2421 W. Mission Ave.
Spokane, Washington 99201

January 20, 2001

Geoff Harvey
Idaho Department of Environmental Quality
Coeur d'Alene Regional Office
2110 Ironwood Parkway, Suite 100
Coeur d'Alene, Idaho 83814-2648

Dear Mr. Harvey,

On behalf of The Lands Council, Sierra Club, and Idaho Wildlife Federation, I wish to submit the following comments on Idaho State government's proposed TMDL (Draft Sub-basin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River) for a watershed of extraordinary importance to Washington State: the Coeur d'Alene River's North Fork.

The TMDL required under the Clean Water Act would seem to provide Idaho State an opportunity to protect and restore the North Fork. Indeed we wish to thank Idaho State for proposing in the TMDL the "removal of roads from flood plains and rehabilitation of the road crossings and approaches which deliver excess waters and sediment to the streams." [p. 48] Idaho State, however, advocates a strategy that can be summarized as "logging watersheds to health": cutting remaining forest canopies in order to pay for limited and speculative restoration efforts.

Idaho's proposal can be expected to (1) worsen the flooding problems on the North Fork, (2) damage fisheries, and (3) wash more toxic mine waste downstream into the city of Spokane.

(1) IDAHO WOULD WORSEN FLOODING

To the casual observer, flying over the forests of the Coeur d'Alene's North Fork reveals the full extent of the clearcuts and logging roads that are mostly hidden behind the "beauty strips" strategically left along the major roads.

Comparing historic photographs from the 1930s to the 1990s underscores the dramatic change in this watershed. (Such photos currently are on display at the Spokane

International Airport, and we encourage Idaho State officials to look at them.) These photographs reveal hundreds of clearcuts that were not present during the 1930s. Many clearcuts are located up high on mountain sides and mountain tops.

Aerial photographs also reveal logging roads stacked one upon another. These are the so-called Idaho "jammer roads". Average road densities, a measure for unhealthy forests, exceed 11 road miles per square mile of forest on the Coeur d'Alene National Forest. This is an astounding figure, the highest logging road densities in the entire United States National Forest System.

The Coeur d'Alene River's North Fork has become a "poster child" for the national debate over forest practices in the National Forests. *The New York Times*, for example, published an aerial photograph of clearcuts and roads in the North Fork, and an accompanying article featuring the Coeur d'Alene, "Quiet Roads Bringing Thundering Protests: Congress to Battle Over Who Pays to Get to National Forest Trees." [May 23, 1997]

The relationship between cutting forests and resultant flooding has been long recognized. Protecting watersheds is the foundation for the National Forest System. Gifford Pinchot, Chief of the Forest Service under President Theodore Roosevelt, testified before Congress on this matter. In one hand Pinchot would hold a picture of a mountainside denuded of its forests; in his other hand, a sponge representing an intact forest. When the forester poured water on the clearcut, it ran off on the floor. Not so the sponge: the intact forest held the water.

During the 1970s US Forest Service hydrologists articulated their concerns publicly about the impact of logging and road-building on worsening floods of the North Fork. [See for example, Fred Rabe and David Flaherty. The River of Green and Gold, Idaho Research Foundation, 1974.] During the 1980s hydrologists continued their criticism of the North Fork logging practices. [See, for example, Clearcutting hurts streams, Jeff Sher, *Spokesman-Review* June 23, 1983.] The result? Logging continued. These hydrologists were removed from the Idaho Panhandle National Forests.

Compacted road surfaces increase water delivered to streams. So, too, are peak flows increased by the impact of road cutting into mountain sides, piercing and draining perched water tables.

The Coeur d'Alene forest is remarkable for large areas that are in "rain-on-snow" elevation ranges of 3,300 to 4,500 feet (TMDL, p. 3). Snow accumulates. Warm winter storms can cause a rapid melt of the snow pack. In areas denuded of trees such as clearcuts, increased amounts of water are released into the river system. As noted by U.S. Forest Service hydrologist Gary Kappesser in "A Procedure for Evaluating Risk of Increasing Peak Flows from Rain on Snow Events by Creating Openings in the Forest Canopy":

> Some of the largest and most damaging flood events in north Idaho have occurred in November through February from "rain on snow" events. Warm pacific maritime air masses moving into the area provide the moisture and energy to rapidly melt existing snowpacks. Latent heat of condensation is liberated as the water vapor in the warm moist air condenses at the snow surface. Rate of heat liberation is a function of wind velocity at the snow surface to provide a continuing source of water vapor. Large openings in the forest canopy created by timber harvest can result in significantly increased wind velocities at the snow surface. This will produce an altered hydrologic response with higher flood peaks, shorter times to rise, and shorter recession. The result may be destabilized stream channels with increased bedload transport. The risk of increasing peak flows through timber harvest may be evaluated in terms of significant causal factors. These include elevation range, size of opening created in the canopy, percent crown cover removed, and a combination of aspect and slope. [USFS. Idaho Panhandle National Forests. March, 1991.]

The relationship between stream flow and energy is logarithmic: as stream flow doubles, stream energy increases 10 times. Increased peak flows in the upper watershed damage stream structures, producing bedload sediment. Like dominos falling, streams high up in the watershed begin to unravel, producing the bedload sediment causing damage all the way through the system. The North Fork is unraveling from the top of the watershed all the way down.

The hydrology of the Coeur d'Alene River's North Fork has been profoundly changed by Idaho jammer roads stacked one upon another, and massive clearcutting in rain-on-snow zones.

What is an appropriate intervention to restore this watershed? Idaho State, as the author of this TMDL, proposes more logging as the fix. Idaho proposes the very treatments that inflicted such grave injury on this forest watershed. Idaho blithely assumes that receipts from logging can be used to pull some culverts and remove some roads. (It is worthwhile noting that similar rosy assumptions by the USFS about receipts used to "improve" the forest proved incorrect when timber markets declined in the region.)

As noted in the comments by the Kootenai Environmental Alliance submitted to Idaho State on January 18:

> The sub-basin Assessment does not examine the issues relating to the large flows of water that are leaving the watersheds and drainages on National Forest lands. Pulling some culverts and closing some roads will not stop the large flows of water from the watersheds that have been clearcut, while at the same time new logging would open more of the canopy with new logging units. The 17, 287 acres that were clearcut between the years 1980 and 1989 on the CDA National Forest have not

recovered hydrologically. The over 11,000 acres that were clearcut cut between the years 1990 and 1999 have not recovered hydrologically. The figure of 28,000+ acres equals approximately 44.2 sq miles being clearcut during the past 20 years. No evidence has been cited in the Assessment that refutes the findings stated in "Forest Hydrology, Hydrologic Effects of Vegetation Manipulation" regarding logging and increases in streamflow. The USFS document was cited on page 3 of our May 2, 2000 letter.

The Idaho proposal, by cutting away even more forest canopy, will worsen flooding.

IDAHO WOULD DAMAGE FISHERIES

In the Inland Northwest, fisheries are an important issue. Fisheries contribute significantly to quality of life and a growing and robust economy based on high quality outdoor recreation.

The Coeur d'Alene River's North Fork was once the region's most important fishery. Deep pools supported a healthy trout fishery that was a short drive from large population centers in Coeur d'Alene and Spokane.

All that has changed.

Deep pools needed by fisheries for overwintering habitat have been filled in by bedload sediment, destroying the fishery. As acknowledged in Idaho's TMDL, "The evidence indicates that stream bed instability may have lead to interference with trout recruitment and the loss of pools, a critical habitat to trout. As a result trout densities are low." (TMDL, p. 14.)

The Idaho proposal, by cutting away even more forest canopy, will worsen flooding. This already unstable watershed will further unravel, mobilizing even more bedload sediment into the system, and further damaging habitat for fish.

IDAHO WOULD FURTHER POLLUTE WASHINGTON WITH TOXIC FLOODS

There is a direct connection between Idaho's toxic mine waste washing onto the beaches of Spokane, Washington, and the clearcuts and logging roads of the Coeur d'Alene forest.

The mining pollution comes from the Coeur d'Alene's South Fork; the floods, the North Fork. Combing these two problems results in "toxic floods".

The Coeur d'Alene River's South Fork is the source of mine waste. Over a century, mining companies used the South Fork as an industrial sewer, dumping 70 million tons of

toxic mine waste directly into the waters of the South Fork. The pollution flowed downstream

If you are standing at the confluence of these two rivers you can see the South Fork's stream bed and banks discolored by upstream mining. You can then turn and look at the North Fork: the river is shallow with large rocks lacking moss, indicating an unravelling river system choked with bedload sediment. When these two rivers converge, their waters bring together two separate histories (mining and logging): toxic mine wastes such as lead, zinc, cadmium and arsenic, and the floods. Combining these two rivers and their separate pathologies results in the Coeur d'Alene's toxic floods.

About 100 million tons of toxic soils now temporarily rest in the floodplain between the confluence and the lake, vulnerable to the North Fork's floods. The paramount importance of this toxic floodplain to the region is noted in the Feasibility Study:

> [T]he impacted floodplain sediments are the major source of metals in basin waters, the major source of metal exposure risk to ecological receptors and a major source to humans, and a major source of potential future recontamination of downstream areas that are cleaned up. The estimated mass and extent of impacted site media-primarly sediments-exceeds 100 million tons dispersed over thousands of acres. (." [Draft Feasibility Study Report for the Coeur d'Alene Basin Remedial Investigation/Feasibility Study. Dec. 20, 2000. hereafter "RIFS". Part 1, Overview/Preface p. iv)

Restoring the hydrologic integrity of the watersheds of the Spokane River—Lake Coeur d'Alene region is paramount because of mine waste pollution. As noted by EPA, "Past mining practices have resulted in the broad distribution of mine wastes throughout much of the upper and lower [Coeur d'Alene] basins. Metal contamination associated with this material continues to move within the hydrologic/hydrogeologic system from the upper and lower basins downstream into Coeur d'Alene Lake and the Spokane River. [RIFS, overview, 2.6. The relationship between watersheds and mining pollution is illustrated in RIFS Figure 2.1-1, "Conceptual Model of Fate and Transport Coeur d'Alene River and Watershed."]

In the flood of February 1996 in the Spokane River—Lake Coeur d'Alene watershed, USGS estimated that in just a single day the floodwaters carried over a million pounds of lead into Lake Coeur d'Alene. The floods sweep across a floodplain between Cataldo and Harrison that is covered with millions of tons of mine waste that has washed down from the Coeur d'Alene mining district.

Lake Coeur d'Alene, Idaho's second largest lake, is an inefficient trap for the mine waste, although the lake bottom is covered with about 70 million tons of toxic sediments. The RIFS notes that "little sediment is transported through Coeur d'Alene Lake except during flood events." (Section 2.0)

As USGS discovered, the toxic metals move with the runoff plume surprisingly often, through Lake Coeur d'Alene, and into the Spokane River and Washington State.

Pollution of fish and beaches has prompted the issuing of Health Advisories by the Spokane Regional Health District, the Washington State Department of Health, and Washington State Department of Ecology.

The critical importance between Coeur d'Alene floods and the toxic-covered floodplain perched above Lake Coeur d'Alene is revealed in some of the "Key Technical Issues" pertaining to the proposed clean-up of the mine waste:

> *Impacted sediments--Large-scale cleanup of impacted sediments would be difficult and costly, presenting major technical and administrative challenges as well as significant adverse short-term impacts to the local communities and natural enviroment.
>
> *Recontamination–Periodic flooding can recontaminate previously remediated areas where storm, snow melt, or flood waters have caused erosion and subsequent redeposition of contaminated sediments. This is a particular concern for community recontamination in smaller basin communities....For residents living in or near flood plains, uncontrolled surface water runoff, especially during flood events, has a high likelihood of recontaminating properties where remediation has previously been conducted.
>
> *Long-term management and associated costs--Required periodic cleanups of remediated areas that are recontaminated by subsequent flood events would add to long-term management costs, as would required long-term monitoring and periodic site reviews. [RIFS, page vi, vii]

Because of clearcuts above toxic mine waste, the future of the Coeur d'Alene River's badly damaged forests is also the future of Lake Coeur d'Alene and the Spokane River. Any comprehensive proposal to clean-up the heavy metal pollution must necessarily include forest protection and restoration.

Idaho, already polluting Washington waters, would worsen this injury by cutting away even more forest canopy and worsening the flooding.

In closing, Idaho State does not address the overriding problem of increased flooding from forests damaged by past road-building and logging. Idaho State actually proposes to "log the river back to health." Idaho's proposal can be expected to worsen the flooding problems on the North Fork, damage fisheries, and wash more toxic mine waste downstream into the city of Spokane.

Idaho continues to act in a way that threatens public health and environmental quality for its own citizens, as well as the citizens of Washington State.

Sincerely,

John Osborn, MD
founder, The Lands Council
conservation chair, Northern Rockies Chapter Sierra Club
Pacific time zone Rep, Idaho Wildlife Federation

cc:
Governor Gary Locke
Attorney General Christine Gregoire.
Asst Attorney General Owen F. Clarke
Tony Grover, Dept of Ecology
Sen. Patty Murray
Sen. Maria Cantwell
Michael Gearheard, EPA
Clifford Villa, EPA
Ernest Stensgar, Chair, Coeur d'Alene Indian Nation
Bruce Wynne, Chair, Spokane Indian Nation

May 23, 2001

John Osborn, M.D.
The Land Council
2421 W. Mission Avenue
Spokane WA 99201

Dear Dr. Osborn:

Thank you for the comment provided by The Land Council on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by The Lands Council as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: The Idaho proposal will worsen flooding. The SBA does not examine the relationship between clear cutting and floods. The SBA prescribes cutting to remedy the situation and assumes receipts from timber sales can be used to fix road problems.

Response 1: he sub-basin assessment does examine clear cutting and flooding. The flood frequency of the North Fork is analyzed on page 11 of the Sub-basin Assessment. The analysis examines the peak discharge events over the past sixty-two years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and the Cataldo and Post Falls gauges. The 1974 and 1996 events are listed in their order of size. The history of logging is clear that clear cuts began in the forty's and fifty's and intensified through the 1960's and 1970's and decelerated into the 1980's. The flood history does not support the argument that clear cutting has caused greater flood discharges.

The SBA does not take a position on timber harvest. It clearly states this fact on page 49. It simply states that if timber harvest is pursued (a decision of the Forest Service, BLM, IDL, Louisiana Pacific and numerous private landowners) the pollution credit scheme suggested might be instituted to make road remediation a part of doing business.

The SBA was revised to further clarify that the data of high discharge occurrence does not support the contention that clear cutting increases flood frequency or high discharge event size.

Comment 2: Idaho would damage fisheries. By cutting more trees flooding would be worsened and more sedimentation would occur.

Response 2: This comment is based on the erroneous assumption of comment 1. The flood frequency analysis and flood data does not support the contention of increased discharge. The data in hand does not indicate that cutting trees necessarily increases sedimentation markedly.

Comment 3: Idaho would further pollute Washington with toxic floods. Floods from the North Fork carry metals contamination through Coeur d'Alene Lake and into the Spokane River and Washington.

Response 3: The comment assumes that the sub-basin (SBA) assessment advocates timber harvest and timber harvest by clear cutting. The comment further assumes that clear cutting creates greater discharges to the Coeur d'Alene River where metals contaminated sediments are entrained.

The SBA does not take a position on timber harvest. It clearly states this position on page 49. It simply states that if timber harvest is pursued (a decision of the Forest Service, BLM, IDL, Louisiana Pacific and numerous private landowners) the pollution credit scheme suggested might be instituted to make road remediation a part of doing business.

The flood frequency of the North Fork is analyzed on page 11 of the Sub-basin Assessment. The analysis examines the peak discharge events over the past sixty-two years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and the Cataldo and Post Falls gauges. The 1974 and 1996 events are listed in their order of size. The history of logging is clear that clear cuts began in the forty's and fifty's and intensified through the 1960's and 1970's and decelerated into the 1980's. The flood history does not support the argument that clear cutting has caused greater flood discharges.

The riverbed has filled with cobble materials. This phenomenon is related to erosion rates. The presence of this material has caused discharges of lower amounts to result in more over bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear cutting.

We respectfully suggest that both assumptions upon which the comments were based are in error.

Thank you for the comments that were developed on the North Fork Coeur d’Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

MICHAEL K. BRANSTETTER

P.O. BOX 571, OSBURN, ID 83849
(208) 753-3701

RECEIVED
JAN 22 2001
IDHW-DEQ
Coeur d'Alene Field Office

January 19, 2001

Geoff Harvey
Idaho Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814

RE: TMDL - North Fork Coeur d'Alene River #17010301

Dear Mr. Harvey:

Please accept these comments on the above matter. I am a property owner in Beaver Creek.

It appears to me the State is engaged in rulemaking without following the proper procedures. Therefore, the TMDL's and subsidiary discharge limits, if implemented, are of no legal force and effect and cannot be applied in Beaver Creek or the North Fork Coeur d'Alene River Sub-Basin.

Sincerely,

Michael K. Branstetter

MKB:mkb

COMMENTS OF
ASARCO INCORPORATED
ON THE DRAFT SUB-BASIN ASSESSMENT
AND TOTAL MAXIMUM DAILY LOAD
OF THE NORTH FORK COEUR D'ALENE RIVER

Submitted January 20, 2001

I. SUMMARY OF COMMENTS

II. GENERAL AND SPECIFIC COMMENTS

A. Deferral or Phasing of metals TMDL

1. DEQ should defer the metals TMDL until completion of the CERCLA initiated removal actions

2. If DEQ does not defer the metals TMDL, then it should specifically phase the metals TMDL

3. DEQ should defer or phase the metals TMDL to allow development and use of site-specific water quality criteria

4. DEQ should defer or phase the metals TMDL to allow development of sufficient site-specific data

B. DEQ Authority

1. Idaho Code § 39-3611 limits controls on point sources

2. The State of Idaho and Idaho DEQ are required to conduct rulemaking under the Idaho APA in order to promulgate TMDLs

C. Loading Allocation

1. There should be a greater emphasis that this is a phased TMDL

2. The calculation of discrete discharges of metals is indecipherable and erroneous

3. The waste load allocations should not decrease as creek flows increase

4. Lead should be deleted from the TMDL for the East Fork of Eagle Creek

5. Dissolved to Total Recoverable metals ratios should be incorporated into the metals TMDL

6. Within Tributary Creek the hardness from adit and seep flows add to the loading capacity

7. Within Tributary Creek there is an inverse relationship between flow and hardness

D. Adequacy of Technical Information

1. The TMDL's assessment of point sources is inadequate

2. Biological monitoring can be used to establish ecological goals for the Basin

3. Site-specific metals criteria will result in a technically superior TMDL

E. Margin of Safety

1. By using the EPA developed metals criteria, DEQ already has sufficient margin of safety.

2. The flow tier approach provides a margin of safety not acknowledged in the TMDL.

F. Technical and Economic Feasibility

1. DEQ should not impose a metals TMDL without knowing whether the source reductions will be technically or economically feasible.

G. Editorial Corrections

CONCLUSION

COMMENTS OF
ASARCO INCORPORATED
ON THE DRAFT SUB-BASIN ASSESSMENT
AND TOTAL MAXIMUM DAILY LOAD
OF THE NORTH FORK COEUR D'ALENE RIVER

Asarco Incorporated ("Asarco") appreciates the opportunity to submit comments on the proposed TMDL for cadmium, lead and zinc in the East Fork of Eagle Creek

I. SUMMARY OF COMMENTS

Throughout the following comments Asarco will refer to the *Draft Sub-Basin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River* as the "SBA" and the metals TMDL within the SBA as the "metals TMDL." The *Total Maximum Daily Load for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene Basin* is referred to as the "SFCDR TMDL". A *Draft Field Sampling and Data Report* by McCulley, Frick and Gillman will be released in February 2001 and is generally referred to as "data obtained by McCulley, Frick and Gilman."

Based on Asarco's review of the draft SBA and metals TMDL, Asarco believes that the metals TMDL is premature, is based on inadequate information and needs to be deferred. Asarco notes that there is no urgency for doing the TMDL because improvements will be occurring under the existing and planned remedial activities. The risks of promulgating a final metals TMDL include:

- the use of more stringent metals standards than necessary to protect water quality,
- the assignment of inappropriate waste load allocations ("WLAs") to specific point sources,
- the implementation of the assigned WLAs by EPA in NPDES permits regardless of cost, feasibility or ultimate benefit, and in spite of DEQ's intention to impose only a "practical level of treatment,"
- the limitation to just a 5 year NPDES permit cycle to achieve the WLA based limits, and
- the additional burden of anti-backsliding requirements on those permits, where such limits, once attained, must continue even if the standards themselves are relaxed through mechanisms such as site-specific criteria.

Asarco is concerned that an excessive focus on stringent limits for point sources will detract from the ongoing remedial activities that seek to address the more significant non-point sources. Asarco is also concerned that the metals TMDL, with all of its short-

comings, could become an ARAR driving the remedial activities, instead of simply allowing them to occur and then evaluating their effectiveness.

For all of the above reasons, Asarco urges that the metals TMDL be deferred. Should DEQ not defer the metals TMDL, then DEQ should make the metals TMDL a phased TMDL in which the first phase will be to focus on the remedial actions and the gathering of more and better data to assess the effects of those actions. The first phase should not identify specific WLAs, but should stress that the data gathered in the first phase will be used to determine whether or not site specific criteria development is needed. Only after such evaluation, and after site specific criteria development should a second phase metals TMDL be considered.

The crux of these recommendations is that much better information is needed before the metals TMDL should advance to establishing WLAs for point sources. Part of Asarco's concern is because of the inherent inaccuracy in the present draft, and part is because EPA writes the permits to implement WLAs. EPA has shown elsewhere in Idaho that they will implement WLAs in absolute fashion, with short compliance times, regardless of DEQ's stated intentions. The metals TMDL actually acknowledges the scarcity of data and the need to revise the metals TMDL in the future as more exact measurements are developed. That provides little comfort as EPA implements the published WLAs. The scarcity of data also provides little comfort if the metals TMDL is treated as an ARAR driving the remedial activities in the subbasin.

Asarco questions DEQ's authority under state law to prepare TMDLs for water bodies that are dominated by nonpoint sources. Asarco also notes that under state law, TMDL development must be conducted through rulemaking.

Asarco notes that new data collected by McCulley, Frick and Gillman[1] shows that within Tributary Creek, hardness associated with both the point and nonpoint sources is significant and the metals TMDL will need to factor in hardness. (See comment II.C.6) Asarco also notes that site-specific criteria development in the South Fork of the Coeur d'Alene River provides strong evidence that it is inappropriate to use existing state metals standards for a metals TMDL in the North Fork of the Coeur d'Alene River. Similar changes are likely to result from any site specific criteria development in the North Fork.

Asarco notes that the draft metals TMDL includes a number of faulty assumptions or calculations. These include 1) indecipherable means of defining the discrete discharges of metals, 2) inappropriate comparisons of a very small adit discharge from

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[1] McCulley, Frick and Gillman, (release date in February, 2001) *Draft Field Sampling and Data Report.*

the Jack Waite mine to a very large adit discharge from the Gem mine, and 3) establishment of waste load allocations that decrease as the creek flow increases.

Asarco notes that the flow tier system provides a substantial margin of safety that DEQ has not discussed, and that the 10% margin of safety imposed by DEQ is not needed. Asarco questions the imposition of a metals TMDL when it is not yet known whether the source reductions will be technically or economically feasible.

Asarco concludes that DEQ should defer promulgation of the metals TMDL. In the event that DEQ does not defer the metals TMDL, then DEQ should instead develop a phased metals TMDL where the first phase does not include defining specific WLAs and the second phase remains to be determined after evaluation of the effects of actions under the first phase. Asarco believes that the phased approach is compatible with DEQ's stated intentions for implementation.

II. GENERAL AND SPECIFIC COMMENTS

A. Deferral or phasing of the metals TMDL

1. DEQ should defer the metals TMDL until completion of the CERCLA initiated removal actions.

Idaho does not have unlimited resources, so it needs to ensure that those resources are spent wisely. The order of the federal district court for the State of Washington in Idaho Sportsmen's Coalition v. Browner, C93-943-WD (W.D. Wash.), allows the State to reorder its development of TMDLs. The order states,

> The sequencing of TMDL development in Idaho's schedule may change as additional information becomes available concerning impacts or potential impacts to beneficial uses within particular subbasins, as resources become available to complete development on TMDLs on a particular subbasin, or as priorities and activities of other state and federal agencies change.

Schedule to Stipulation and Proposed Order on Schedule Required by Court, Idaho Sportsmen's Coalition v. Browner, at 5 n.1 C93-943WD (W.D. Wash. Apr. 9, 1997).

Under the court's order in Idaho Sportsmen's Coalition v. Browner, the State of Idaho has the authority to revise the schedule and order for developing and implementing TMDLs on Section 303(d) listed waters. DEQ should exercise this discretionary authority and defer developing a metals TMDL for the East Fork Eagle Creek and other waters in the North Fork Coeur d'Alene River until the nonpoint sources are addressed initially through CERCLA mechanisms and removal actions are completed. Only then will there be data sufficient to show that the condition requiring a TMDL persists. The sediment TMDL portion of the SBA can stand alone, without the metals TMDL.

2. If DEQ does not defer the metals TMDL then it should specifically phase the metals TMDL

As the metals TMDL implementation is described in the SBA, it appears that DEQ does intend to use a phased approach:

> "....Both point and nonpoint sources would be addressed initially through CERCLA mechanisms. Point sources would be addressed with remedial studies and where necessary consent decrees between EPA and the responsible parties. After the consent decree remedy had defined the practical level of treatment and that treatment was installed, the NPDES program will issue permits for these sources. Nonpoint sources will be addressed through removal actions sponsored by the state, EPA or the federal land management agencies, BLM and USFS. A removal action is currently under consideration by the Forest Service at the Paragon Mill site."

(SBA at Section 3.2.13)

The above wording implies that DEQ will implement the metals TMDL in phases. Although Asarco generally agrees with the intent of this section, Asarco believes that a deferral of the metals TMDL is still necessary. If DEQ does not defer the metals TMDL then the phasing of the metals TMDL must be described in more detail and steps taken to assure that EPA does not override it and prematurely implement the Waste Load Allocations (WLAs) in permits. Specific WLAs should not even be defined in the first phase of the metals TMDL and the metals TMDL should only present the first phase at this time.

Asarco makes this request for the following reasons. DEQ cannot know how much load reduction from point sources will be necessary until DEQ understands the amount of load reduction that can be achieved through cleanup of non-point sources. DEQ cannot at this time predict what a "practical level of treatment" will be for point sources such as the adit from the Jack Waite mine. DEQ cannot at this time evaluate how possible site-specific criteria development might change the metals TMDL. Defining specific WLAs for point sources at this time could "lock in" permit requirements that later would prove to be unnecessary and/or unfounded.

In spite of DEQ's stated intentions to only impose a practical level of treatment, there is no assurance that the NPDES permit writers will adhere to such an approach. Idaho is not a NPDES delegated state. EPA Region X, not DEQ, writes the NPDES permits. Recent experience has shown that EPA permit writers will impose water quality based effluent limits ("WQBELs") in NPDES permits to meet waste load allocations that are specified in a TMDL. The metals TMDL in the SBA define specific waste load allocations and EPA permit writers will impose the WLA based limits from the metals

TMDL. EPA permit writers' interpretations of the metals TMDL may well require that WLA based limits beyond the "practical level of treatment" envisioned in the metals TMDL be met within the five year time span covered by an NPDES permit, regardless of DEQ's intentions.[2]

It makes no sense to impose overly stringent load reductions on the types of point sources in the SBA when the possibility exists that the cleanup of non-point sources will obviate the need for such stringent point source load reductions. Similarly it makes no sense to impose such reductions when site-specific criteria development may reduce the amount of reductions required.

As an alternative, DEQ may strongly state that this is a phased metals TMDL emphasizing remedial actions and evaluation in the first phase. DEQ may state that the second phase of the metals TMDL will be developed later based on evaluation of the effects of the actions taken in the first phase and new data. Specific WLAs for point sources should not be included in the first phase, but may be in the second phase if necessary.

3. DEQ should defer or phase the metals TMDL to allow development and use of site-specific water quality criteria

The comments pertaining to site-specific water quality criteria development provided by Asarco regarding the SFCDR TMDL[3] are relevant to the SBA[4]. The terrain and the water in Tributary Creek and the East Fork of Eagle Creek are similar to the area for which site-specific criteria are being developed in the South Fork of the Coeur d'Alene River.

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[2] In implementing a TMDL prepared by DEQ for Paradise Creek, EPA imposed a point source WLA based limit for phosphorous on the City of Moscow with the requirement that they be met within the 5 year span of the permit, even though DEQ provided EPA with a 401 certification that called for a step-wise approach and a longer compliance schedule. In response to comments EPA said they were required to impose the TMDL based limits and they could not go beyond the 5 year term of the NPDES permit to achieve the limits.

[3] See Comment II.A.2 in Asarco's comments on the SFCDR TMDL dated August 13, 1999. DEQ has a copy of those comments.

[4] On motion of the government, the North Fork Coeur d'Alene River has been excluded from the Coeur d'Alene lawsuit involving the U.S. Government claim for natural resource damages and response costs.

It makes no sense to impose stringent load reductions on point sources when elsewhere in a similar basin, the development of site-specific water quality standards for metals provide a strong likelihood that site-specific standards within the North Fork Coeur d'Alene River and/or its tributaries would result in a less stringent requirement.

4. DEQ should defer or phase the metals TMDL to allow development of sufficient site-specific data

Inadequacies of the site-specific data are described in the comments under the heading of II.D, (below). Essentially,

- There are inadequate data to characterize adits and non-point sources and it is not appropriate to compare adits in the SBA with the Gem adit because the Gem adit flow is several orders of magnitude greater than the Jack Waite adit. (See discussion at II.D.1, below.)

- Site-specific criteria being developed in the South Fork of the Coeur d'Alene River will have relevance even if the North Fork is a different water body. The ongoing site-specific criteria development in the similar, nearby water body provides a strong basis to believe that site-specific criteria should be developed within the North Fork as well, before developing a metals TMDL. Site specific criteria, when developed, give a different outcome.

B. DEQ Authority

1. Idaho Code § 39-3611 limits controls on point sources

Asarco believes that the statute is clear. It prohibits Idaho from imposing further restrictions through a TMDL unless the point source contribution of the pollutant of concern is more than 25%:

> For water bodies where an applicable water quality standard has not been attained due to impacts that occurred prior to 1972, no further restrictions under a total maximum daily load process shall be placed on a point source discharge unless the point source contribution of a pollutant exceeds twenty-five percent (25%) of the total load for that pollutant.

I.C. §Ê39-3611. The non-attainment status of the East Fork of Eagle Creek and other affected tributaries in the North Coeur d'Alene River sub-basin pre-dates 1972 and the point source contributions are less than 25%; therefore, DEQ cannot write a TMDL and impose additional restrictions on point sources. DEQ must follow Idaho state law.

2. The State of Idaho and Idaho DEQ are required to conduct rulemaking under the Idaho APA in order to promulgate TMDLs

The requirements of Idaho law regarding promulgation of TMDLs by the Idaho DEQ are quite clear. I.C. § 39-3612 states:

> **Integration of total maximum daily load processes with other programs.**—Upon completion of total maximum daily load processes as set forth in section 39.3611, Idaho Code, the director shall, subject to the provisions of chapter 52, title 67, Idaho Code, adopt such processes as part of the state's water quality management plan developed pursuant to the federal clean water act. Upon such adoption, the provisions of these processes shall be enforced through normal enforcement practices of designated agencies as set forth in the state's waster quality management plan. [I.C., § 39-3612, as added by 1995, ch. 352, § 1, p. 1165.]

The statute is plain on its face that the TMDL processes provided for in IC § 39-3611 must be "adopted" pursuant to the Idaho APA. A complete discussion of this issue is contained in briefing supporting a challenge to the IDEQ/EPA promulgation of the TMDL for listed stream segments in the Coeur d'Alene basin on August 14, 2000. That briefing is available to IDEQ.

C. Loading Allocation

1. There should be a greater emphasis that this is a phased TMDL.

The North Fork of the Coeur d'Alene River is clearly a situation where it is most appropriate to have no metals TMDL or to develop a phased metals TMDL. A phased TMDL is appropriate when there is much uncertainty. A phased metals TMDL would focus on CERCLA mechanisms, particularly removal actions that will first address the non-point loadings. To the extent that CERCLA actions lead to reasonable or feasible actions on some point sources, such actions may also occur in the first phase. However, the first phase of the TMDL should not be the regulatory mechanism to impose requirements for point source controls.

The phased approach allows the development of additional data to better document the conditions as they improve and also allows time for the development of site-specific metals standards if that appears necessary. A phased metals TMDL should emphasize that as removal actions occur and new data become available that the data will be reviewed to evaluate trends, and the possible need for any additional actions. Additional actions, including specifying any WLAs for point sources would be developed, if needed, in the second phase of the metals TMDL. The first phase of the metals TMDL should not derive specific metals WLAs because data are insufficient and because EPA permit writers will implement WLAs within a single 5 year permit cycle, contrary to DEQ's intent.

Note that these recommendations appear to agree with section 3.2.13 of the SBA. See Asarco comment II.A.2 for additional discussion.

2. The calculation of Discrete Discharges of Metals is indecipherable and erroneous.

Section 2.3.2.2.1.5 of the SBA states that

> "[t]he point discharges of metals cadmium, lead and zinc are listed in Table 8. Based on estimates discharge weighted for seasonal flow (Appendix A), the daily load of each source is calculated."

The wording is unclear.

The same section says that the discharge patterns of these adits are assumed to be similar to that of the Gem adit.[5] Details on the Gem adit discharges are included in Appendix A of the SBA. There is only one flow observation of 0.091 cfs for the Jack Waite adit presented in the SBA Appendix A and it is three orders of magnitude lower than the Gem adit. Additional data obtained by McCulley, Frick and Gilman include observations of adit flow of 0.129 and 0.19 cfs in the fall and 1.8 cfs in the Spring, indicating an order of magnitude seasonal range, a much greater percent change between seasons than exists for the Gem adit. The Gem adit should not be used for any purposes of estimation for the Jack Waite adit.

Section 2.3.2.2.1.5 includes Table 8 showing discrete metals discharges for various point sources (including the Jack Waite adit) and also includes tables showing the contributions of those sources to the various creeks under the different flow tiers. The SBA apparently used mean metal concentrations for the creek for flow tiers and a single value for the Jack Waite adit (perhaps adjusted somehow by variability with the Gem adit data) in order to compute percentages attributable to the Jack Waite adit. The method appears to lead to illogical results, as explained below (see Comment II.C.3 below). The methodology is not well illustrated, not documented and appears to result in inappropriate

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[5] Note that it is not at all evident in the SBA or its Appendix A as to just how this assumption of comparability to the Gem adit is used. There really is no basis for comparison, but nevertheless, the Gem adit flow data show a certain variability. For Jack Waite there is only a single observation of flow. No information is provided as to whether that flow is made to vary like the flow from Gem adit, or vary in any other way for purposes of the calculations.

conclusions. Asarco can identify these errors but due to the data limitations Asarco finds that it is not possible to identify what the corrections should be. The SBA needs much more data and analyses. Clearly the metals TMDL is premature and based on inadequate data.

3. The waste load allocations should not decrease as creek flows increase.

Section 3.2.11 of the SBA provides the following waste load allocation for the Jack Waite Adit.

	7Q10-10%	10%-50%	50%-60%	>90%
Cd (lb/da)	0.006	0.003	0.001	0.001
Pb (lb/da)	0.0004	0.0001	0.00006	0.00007
Zn (lb/da)	0.231	0.147	0.085	0.088

These waste load allocations actually **decrease** as the creek flow **increases**. Such an approach appears to be illogical because the assimilative capacity of the creek increases with flow. This is probably the result of the combination of inappropriate methods used in the metals TMDL, including trying to compare adits in the SBA to the Gem adit and making judgements based on an inadequate data base (one adit measurement in the case of Jack Waite). Without a more detailed explanation of how these calculations were performed, it is not possible for the public to accurately assess the validity of the methods or the results.

The above waste load allocation is in pounds per day. Using the assumptions of from the metals TMDL, the mass loads equate to the following concentration limits.

	7Q10-10%	10%-50%	50%-60%	>90%
Cd (ug/l)	12.28	6.14	2.05	2.05
Pb (ug/l)	0.82	0.20	0.12	0.14
Zn (ug/l)	472.6	300.75	173.90	180.04

As with the pounds per day allocation, the concentration equivalents show limits that decrease with increasing stream flow. This makes no sense. As noted earlier, the Jack Waite adit is a significant contributor of hardness to Tributary Creek. Two hardness observations of the adit discharge were obtained by McCulley, Frick and Gilman in low flow conditions and these were 318 and 378 mg/l. McCulley, Frick and Gilman obtained one hardness observation of 147 mg/l in high flow conditions. Some of the above limits are set lower than the water quality standards for the adit's hardness. This is unnecessary.

4. Lead should be deleted from the TMDL for the East Fork of Eagle Creek.

Within the East Fork of Eagle Creek lead could be deleted from the metals TMDL. Measures implemented to address zinc will achieve improvements for lead as well. As such, zinc would be a surrogate for lead. The lead data include non-detect values. DEQ in turn used half the detection limit in their evaluations. The lead data for the East Fork of Eagle Creek considered dissolved values, but the description of the loadings from the limited point source data used total. Table 9(b) in section 2.3.2.2.1.5 of the SBA illustrate a trivial percent contribution of lead from the point discharge to the East Fork of Eagle Creek.

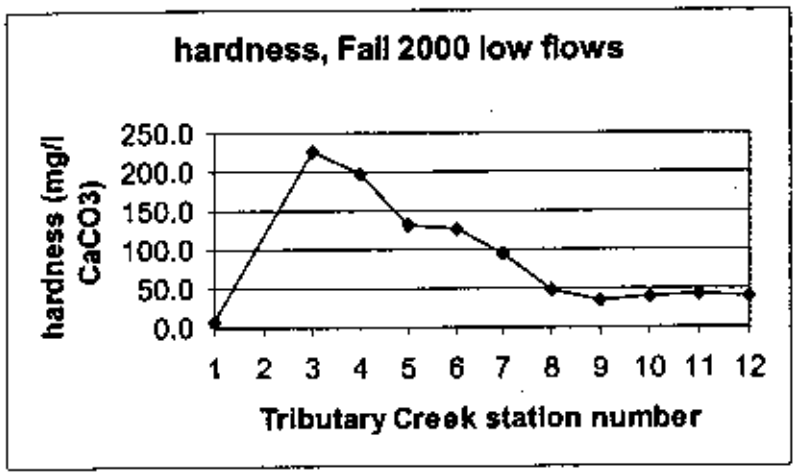
5. Dissolved to Total Recoverable metals ratios should be incorporated into the metals TMDL.

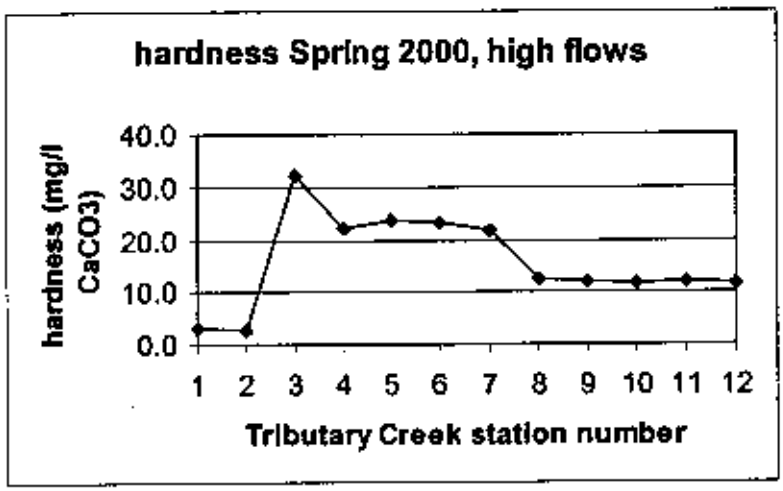
Data collected by McCulley, Frick and Gilman for Tributary Creek illustrate that there are differences between the dissolved and total recoverable metals. The metals TMDL should evaluate and utilize appropriate ratios, specific to the different flow tiers, and possibly even specific to the location and gradient in the basin. Hence, additional data will still need to be collected before a final metals TMDL should be developed, in order to implement metals standards consistent with their dissolved basis. Note that this is one manner of making an easy site-specific adjustment to the water quality standards. Other methods should also be considered.

6. Within Tributary Creek the hardness from adit and seep flows add to the loading capacity

The metals TMDL in the SBA fails to consider the hardness of drainage from adits or seeps. Although the hardness for the East Fork of Eagle Creek does appear to be consistently below 25 mg/l, the same is not true for Tributary Creek nor the adit or seep drainages to Tributary Creek.

As was recognized in Washington State's Spokane River TMDL and incorporated into the SFCDA TMDL (for some but not all point sources), the hardness contribution from a discharge is a beneficial factor to consider when evaluating assimilative capacity and the effects of a source. Because of hardness added to Tributary Creek, the hardness assumptions used in the SBA are not applicable within Tributary Creek. The TMDL needs to recognize this difference. McCulley, Frick and Gilman has collected hardness data for Tributary Creek for the Fall of 1999, the Spring of 2000 and the Fall of 2000. These data will be provided to DEQ in February in a Draft Field Sampling and Data Report. The following figures illustrate the hardness differences for the Spring and Fall of 2000 for Tributary Creek. Station 1 is in the headwaters upstream of the Jack Waite adit. Station 12 is near the mouth just before the Creek joins the East Fork of Eagle Creek. Upstream of the Jack Waite adit the water in Tributary Creek is soft regardless of the flow. The Jack Waite adit is a very significant source of hardness to Tributary Creek.





7. Within Tributary Creek there is an inverse relationship between flow and hardness

The inverse relationship results from the fact that ground water or adit and seep flows contribute different percentages of the total stream flow during low flow times than high flow times. It is also noteworthy that upstream from the Jack Waite adit, the stream has very low hardness regardless of high or low flow. The inverse relationship between hardness and flow for Tributary Creek as well as the low hardness upstream of the adit are evident in the above figures.

D. Adequacy of Technical Information

The SBA acknowledges the scarcity of data.

> "Data from which the problem assessment and TMDL for the North Fork Coeur d'Alene sub-basin were developed are few in number. As more exact measurements are developed during implementation plan development or subsequent to its development these will be added to a revised TMDL as required."

(SBA Section 3.2.14)

This admission applies to stream flow characterization, adit characterization, hardness characterization, and the likelihood that site-specific criteria could be developed that would be significantly different.

Such an acknowledgment further supports the need to not adopt a metals TMDL at this time or to use a phased metals TMDL with no WLAs determined in the first phase. The material presented in the SBA will be useful as a starting point for evaluating water quality after remedial actions have been implemented and data collected to evaluate their effectiveness. At that point, the necessity of a metals TMDL can be re-evaluated and one may be developed based on a much more adequate data base.

1. The TMDL's assessment of point sources is inadequate

For example, a single data point was all that was available for the Jack Waite adit. The same is true for many of the other adits. Somehow that was then compared to more data points for metals in the East Fork of Eagle Creek and different flows and was a factor in the derivation of point source waste load allocations that decrease as the stream flows increase. The inadequate data contributes to an illogical allocation.

2. Biological monitoring can be used to establish ecological goals for the Basin.

Asarco supports the use of biological assessment as the means for evaluating the improvements in the sediment TMDL. The same methods implemented under the sediment TMDL will prove useful if incorporated into a phased metals TMDL. Site-specific criteria development may also relate to biological evaluations. In some tributaries with waterfalls that block fish passage, biological assessments might determine that fish can not even get there and this has relevance to site-specific criteria.

3. Site-specific metals criteria will result in a technically superior TMDL.

Based on the ongoing development of site-specific criteria in the South Fork Coeur d'Alene system, site specific criteria development for zinc and lead are likely to

produce higher site specific metals criteria within the SBA. Site-specific criteria will be more relevant and are critical to any metals TMDL.

E. Margin of Safety

1. By using the EPA developed metals criteria, DEQ already has sufficient margin of safety.

The development of site-specific criteria in the South Fork of the Coeur d'Alene River illustrate that some of EPA's criteria are more stringent than necessary and therefore provide a sizeable, unaccounted for margin of safety. No margin of safety is needed in the metals TMDL when using EPA's criteria. A margin of safety might be needed when using site-specific criteria. The margin of safety inherent in the flow tier methodology is more than sufficient.

2. The flow tier approach provides a margin of safety not acknowledged in the TMDL.

While it is more appropriate to use flow tiers than to simply establish a single allocation for a worst case flow, it is important to realize that whenever flow tiers are limited in number (as opposed to having separate TMDL allocations for each and every flow), then a significant margin of safety evolves. This margin of safety is associated with the range of flows incorporated into each tier. Essentially, the allocations for each tier are based on the loading capacity for the bottom flow value in each tier. Without any other margin of safety applied, this would mean that there is no margin of safety only when the flow was exactly equal to the bottom flow in the range, and there is a very substantial margin of safety when the flow was just below the flow that marks the top of the range. For example, when the flow in the East Fork of Eagle Creek is 21 cfs, it is more than twice the 10th percentile flow of 10.4 cfs and the Creek could accept twice the allowed loading and still meet the standards. When the flow is 100 cfs the Creek could accept four times the loading for the 50th percentile flow and still meet the standards. The margin of safety inherent in the flow tiering is quite extreme and there is no need for additional margins of safety. If the metals TMDL retains the 10% margin of safety, then additional flow tiers should be included to reduce the excessive margin of safety with the present tiers.

F. Technical and Economic Feasibility

1. DEQ should not impose a metals TMDL without knowing whether the source reductions will be technically or economically feasible.

Asarco recognizes that Section 3.2.13 considers that practical levels of treatment would be defined and installed for point sources. "Practical" actually implies some determination of technical or economical feasibility. However DEQ has no idea what these requirements will be, nor whether such undefined "practical" levels of treatment

will be able to meet water quality based limits implicit in any TMDL assigned waste load allocations. Asarco is concerned that once waste load allocations are described, EPA may view them as water quality based effluent limits to be imposed regardless of technical or economic feasibility.

G. Editorial Corrections

Table of Contents Appendix A. spelling error

Second paragraph in section 2.2.1. remove "(" before "303(d)". A citation to IDEQ 1996b is made but no such document is listed in the references.

Figures 1 and 4. These figures should identify the compliance points that form the basis of the TMDL. From the text it isn't clear.

Third paragraph in section 2.2.3. Change "criterium" to "criterion" or "criteria"

Second paragraph in section 2.3.1. A citation to DEQ 1999a is made but no such document is listed in the references.

First paragraph in section 2.3.2.2.1.2. Change "90thb" to "90th"

First paragraph and Table 7 in section 2.3.2.2.1.4. It represents that the data cover four flow tiers. However, it actually covers five tiers since some of the data were for flows that were less than the 7Q10. Table 7 has some computational errors as well for Eagle Creek. The footnote to Table 7 needs a space between "lead" and "and".

First paragraph in section 2.3.2.2.1.5. The first sentence makes no sense.

Tables 14a, 14b, 14c, 14d and 14e in section 2.3.2.5.1. These tables include rows for projected CWE scores and calculated CWE scores. All the values presented are identical, which makes no sense.

The first table in Appendix A. This table is not suitable for inclusion in the assessment. The contents of some fields exceeded the size and consequently were replaced by Excel with "######". The data in the table include some metals concentrations that are negative, with no explanation. Column headings do not carry over to all pages, making it very difficult to read.

Section 3.2.11.1. This section refers to Beaver Creek when it should refer to East Fork of Eagle Creek. The WLA values for cadmium and lead for the 90th percentile flow in Table 9 are incorrect based on the methods used in the TMDL. The WLA values also make no sense (as a result of the method used) because they decrease as the stream flow increases. (Similar concerns exist for the metals TMDLs for the other creeks.)

Section 3.2.12.2. The word "associates" should be "associated".

CONCLUSION

For the reasons set forth in these comments, DEQ should defer promulgation of the metals TMDL for the East Fork of Eagle Creek and possibly the other tributaries within the North Fork of the Couer d'Alene River basin.

If DEQ proceeds with the metals TMDL notwithstanding all of the compelling reasons for deferral, DEQ should clearly state that the metals TMDL will be a phased one, and the first phase should not identify any waste load allocations for point sources. Phase one will address both point and nonpoint sources only through CERCLA mechanisms emphasizing primarily removal actions for the nonpoint sources. Point sources would only be addressed through CERCLA mechanisms in phase one if a practical level of treatment is determined. Phase one will also include requirements to obtain more data and to evaluate changes resulting from the phase one actions. The evaluations during and following completion of the removal actions will help to determine if site-specific criteria need to be developed and ultimately will fill the gaps in understanding necessary to develop the second phase of the metals TMDL.

Either deferral of the metals TMDL or explicitly phasing of the metals TMDL is necessary in order to prevent a premature application of waste load allocations to point sources. Possibly the remedial actions to correct nonpoint source contributions, site-specific criteria development and some practical level of treatment for point sources will individually or in combination be sufficient to restore the affected creeks in the North Fork of the Coeur d'Alene River. Time is needed to implement these and assess their effects.

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May 23, 2001

Michael K. Branstetter
P.O. Box 571
Osburn ID 83849

Dear Mr. Branstetter:

Thank you for the comment provided on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: Mr. Branstetter supplies comments made by ASARCO and notes these comments apply equally to Beaver Creek.

Response 1: Several of the comments and the responses to those comments are applicable to the Beaver Creek metals TMDL. The response to ASARCO's letter of comment is attached.

Comment 2: The state is engaged in illegal rulemaking without following the proper procedures. The TMDL and subsidiary discharge limits are of no legal force or effect and cannot be applied to Beaver Creek or the North Fork Coeur d'Alene River Sub-basin.

Response 2: TMDLs are plans for the restoration of water bodies to the level of the water quality standards. Since they are plans, they do not have regulatory authority and are not required to follow the APA process. TMDLs are implemented at the state and federal level through regulatory programs. State regulatory programs and their component regulations must follow the APA process prior to promulgation.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

Enclosure

May 23, 2001

ASARCO
c/o Timothy Butler
Heller Ehrman
701 Fifth Avenue Suite 6100
Seattle WA 98104-7098

Dr. Mr. Butler:

Thank you for the comment provided by ASARCO on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by ASARCO as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: DEQ should defer the metals TMDL until completion of the CERCLA initiated removal actions.

Response 1: The TMDL process is related to but independent of the CERCLA process. Its relationship is that it develops the water quality applicable or relevant and appropriate regulatory requirements (ARARs) for the site more fully by translating the water quality standards into daily permissible loads dependent on the season. The situation in the East Fork Eagle Creek is straightforward. The Jack Waite adit is the only discrete source while the Jack Waite mill complex, tailings ponds and tailings washed downstream are the nonpoint sources. Since the TMDL provides a plan to respond to meet water quality standards it is appropriate that the East Fork Eagle Creek TMDL proceeds any CERCLA consent decrees.

Comment 2: If DEQ does not defer the TMDL then it should specifically phase the metals TMDL. Concern is stated that EPA will override the phasing of the TMDL implementation.

Response 2: The term phasing is not defined, however, EPA does not accept the phasing of TMDLs. This fact stated; TMDLs can be renewed and incorporate new data at any time. Should there be a shift in metals standards for the water body, or important new data became available a new TMDL would be required to reflect this new data. Although not phasing, this is renewal.

Comment 3: DEQ should defer or phase the metals TMDL to allow development and use of site-specific water quality criteria.

Response 3: Site specific criteria for lead and zinc have been developed for the reach of the South Fork Coeur d'Alene River above Wallace. Work has been completed to extend these results to the metals contaminated segments of the South Fork Watershed below Wallace. A justification of this is in preparation. No plans have been developed to do the studies necessary to extend these results to the Beaver and Prichard Creek watersheds. Such work if undertaken may extend well past 2003 the due date of these

TMDLs. When and if the site specific standards were extended to the Prichard Creek watershed the current TMDLs would be revised to reflect the current (new) metals standards.

Comment 4: DEQ should defer or phase the metals TMDL to allow development of sufficient site specific data.

Response 4: See response to ASARCO, comment 3.

Comment 5: Idaho code section 39:3611 limits controls on point discharges.

Response 5: The limitations on point source controls in 39-3611 are not applicable under either state or federal law to this TMDL for the following reasons: Idaho code section 39-3611 limits controls on point source discharges when these are less than 25% of the metals loads. The sub-basin assessment (SBA) on page 16 clearly demonstrates that the single point discharge (Jack Waite Adit) is 50% of the cadmium under 7Q10 discharge conditions. In addition, 39-3611 applies to water bodies where the applicable water quality standard has not been met due to impacts that occurred prior to 1972. While there were significant impacts to the NFCDA river that occurred prior to 1972, there are also continuing and post-1972 discharges that have contributed and continue to contribute to the non-attainment of state water quality standards. Moreover, under both state and federal law, the TMDL must meet requirements of the Clean Water Act. See Idaho Code sections 39-3601 ("It is the intent of the legislature that the state of Idaho fully meet the goals and requirements of the federal clean water act.."); 39-3611 ("For water bodies described in section 39-3609, Idaho Code, the director shall…as required by the federal clean water act, develop a total maximum daily load…"). A TMDL that does not call for point source reductions would not meet the requirements of the Clean Water Act because the TMDL could not assure compliance with state water quality standards.

Comment 6: The State of Idaho and Idaho DEQ are required to conduct rulemaking under the Idaho APA in order to promulgate TMDLs.

Response 6: TMDLs are plans for the restoration of water bodies to the level of the water quality standards. Idaho Code section 39-3602 ("Total maximum daily load (TMDL) means a plan for a water body not fully supporting designated beneficial uses…") TMDLs do not have the force and effect of law and are not required to follow the APA rule-making process.

Idaho Code section 39-3611 addresses the development of TMDLs and requires TMDLs be developed in accordance with those sections of law that provide for involvement of BAGs and WAGs, and as required by the federal Clean Water Act. There is no requirement in this section that the TMDL be developed as a rule.

Idaho Code section 39-3612, on the other hand, addresses the integration of TMDLs, once completed, with other water quality related programs and provides that this integration is subject to the provisions of the Idaho Administrative Procedures Act. Thus, to the extent required by the IDAPA, DEQ, and other designated agencies, must follow the IDAPA provisions when TMDLs are implemented and enforced under applicable state programs.

Given the scope of the TMDL program and requirements of the court-approved schedule for development of TMDLs, it is clear the IDAPA rulemaking provisions are not applicable. The schedule for development of TMDLs in Idaho is the product of federal court litigation. According to the TMDL schedule, from 1997 to 1999, DEQ was to develop 529 TMDLs. Under the IDAPA, rules must be approved by the legislature before they become effective. Because of this and other rulemaking requirements, rules typically take almost a year to promulgate. Idaho Code section 39-3601 et seq was enacted in response to this federal

TMDL litigation and the legislature certainly never intended DEQ to attempt to promulgate hundreds of required TMDLs as rules.

The federal APA does not require EPA adopt TMDLs as rules. Moreover, given the short deadlines in section 303d of the CWA, including the requirement that TMDLs be developed within 30 days of EPA disapproval of a state TMDL, the CWA clearly does not envision or require TMDLs be developed as rules.

Comment 7: There should be greater emphasis that this is a phased TMDL.

Response 7: See response to ASARCO comment 2. The TMDL is not phased and would not be approved by EPA as a phased TMDL. However, any TMDL is open to revision based on new information.

Comment 8: The calculation of discrete discharges of metals is indecipherable and erroneous.

Response 8: The calculation is difficult to follow. This was remedied in the revised SBA in the text and in Appendix A. We respectfully disagree that it is erroneous. The calculation of the adit discharge of metals was made more understandable in the text and Appendix A.

Comment 9: The waste load allocations should not decrease as creek flows increase. Hardness data provided.

Response 9: The waste load allocations decrease because the percentage of the load that is attributable to discrete discharges decreases as the discharge increases. This is a major difference between the Coeur d'Alene basin Metals TMDL and these North Fork metals TMDLs. The Coeur d'Alene Basin document gave the discrete sources a 25% allocation based on the mixing rule in the Idaho Water Quality Standards and Wastewater Treatment requirements. The North Fork TMDL calculates the discrete load based on adit discharges and synthetic hydrographs based on the Gem Adit discharge. The percentage discrete load is calculated by dividing the discrete load by the measured load at each flow tier.

The hardness data provided clearly indicates that the adit adds hardness to the stream. This hardness effect is diluted even in Tributary Creek and likely is very small at the point of compliance near the mouth of the East Fork Eagle Creek. The metals are detected at the point of compliance in the loads measured and at hardness levels all below 25mg calcium carbonate. Thus the hardness data is not applicable to the point of compliance.

Comment 10: Lead should be deleted from the TMDL for the East Fork Eagle Creek. Use of one-half detection for non-detection increases a load that is trivial.

Response 10: It is standard method to consider non-detection as one half of detection. However, we agree this approach may create a lead load where arguably none exits. The database was searched for detection of lead above the state standards. Exceedence occurred in eleven of thirteen samples. Use of one-half detection in the two cases is warranted.

Comment 11: Dissolved to total recoverable metals ratios should be incorporated into the metals TMDL.

Response 11: The state standards state the cadmium, lead and zinc standards in terms of dissolved cadmium, lead and zinc. These ratios are important translators for point discharges since these permits are based on total recoverable levels. The database is not sufficient to develop such translators where they are appropriate at the adit discharge. These will be developed as the adit discharge is better characterized in the CERCLA consent decree and NPDES programs that will implement the TMDL.

Comment 12: Within Tributary Creek the hardness from adit and seep flows add to the loading capacity.

Response 12: See response to part 2 of ASARCO comment 9. The hardness from the adit and seeps discharged to Tributary Creek is not detectable at the point of compliance, while the metals are. The hardness must be diluted from the stream system.

Comment 13: The TMDL's assessment of point sources is inadequate.

Response 13: The assessment of the adit discharges is based on the database developed for the EPA remedial investigation. These were developed originally by the Idaho Geologic Survey (University of Idaho) for the US Forest Service. At the time its was the best available data. Additional data on the discharge and metals characterization of the Jack Waite Adit was supplied to DEQ by ASARCO's consultants. It was incorporated into the SBA and East Fork Eagle TMDL.

Comment 14: Biological monitoring can be used to establish ecological goals for the basin.

Response 14: Biological goals are appropriate for pollutants as sediment. In these cases narrative standards govern the amount of sediment and these standards are tied directly to the full support of the beneficial use. Metals are governed by numeric standards that assume full support of the beneficial use. In the case of metals the numeric standards must be attained.

Comment 15: Site specific metals criteria will result in a technically superior TMDL.

Response 15: This may or may not be true. However, at this time and for the foreseeable future (next two years) the current state metals standards are expected to be the governing standards.

Comment 16: By using the EPA developed metals criteria, DEQ already has sufficient margin of safety.

Response 16: Although conservative, the metals standards are not deemed by DEQ or EPA to eligible as a component of a TMDL's margin of safety.

Comment 17: The flow tier approach provides a margin of safety not acknowledged in the TMDL.

Response 17: The flow tier approach accounts for the seasonal stream discharge and is not a margin of safety factor.

Comment 18: DEQ should not impose metals TMDLs without knowing whether the source reductions will be technically or economically feasible.

Response 18: TMDLs are required by federal law and in Idaho's case a court order. These planning documents must be developed and issued by DEQ and EPA to meet the agencies' legal responsibilities. Should the source reductions not be technically or economically feasible, such that the TMDL cannot be met, the Clean Water Act contains mechanisms such as use attainability and standards changes to address such situations should these arise.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

January 16, 2001

Liz Sedler
Alliance for the Wild Rockies
The Lands Council
PO Box 1203
Sandpoint, ID 83864

Geoff Harvey
DEQ Coeur d'Alene Regional Office
2110 Ironwood Parkway, Suite 100
Coeur d'Alene, ID 83814-2648

RE: Comments on Draft Sub-Basin Assessment and TMDL for the North Fork Coeur d'Alene River

Dear Geoff,

I am submitting these comments on behalf of the Alliance for the Wild Rockies ("AWR"), a regional non-profit conservation organization with it's main office in Missoula, MT and The Lands Council ("TLC"), also a regional non-profit organization, based in Spokane. Both groups and their members have a keen interest in implementation of the Clean Water Act and the restoration of water quality in Idaho. We appreciate the effort that went into pulling together the Draft Sub-Basin Assessment ("SBA") and TMDL for the North Fork Coeur d'Alene River ("NF") and its tributaries.

The Draft Sub-basin Assessment

The SBA estimates that sediment being delivered to the NF Coeur d'Alene and its tributaries has increased 131.9% over natural (from 13,094.3 tons/yr to 30,369.7). We wonder about the accuracy of the estimates due to their heavy reliance on sediment models and the extrapolation of sediment load estimates from distant watersheds. It is unfortunate that so little sediment delivery data has been collected in the NF. The estimate of background sediment production is based on the coefficient for forest land sediment yield rate in the USFS WATBAL model. Has the WATBAL ever been re-calibrated or validated? Neither it nor the WATSED are considered able to provide accurate estimates of sediment loading from roads and openings.

According the SBA, the North Fork and most of its tributaries suffer from extreme streambed instability and bedload movement, resulting in low residual pool volumes, which the SBA ties to low salmonid densities in most of the drainage (SBA at 17 - 21). In fact bedload movement is the major problem in the NF and its tributaries according to the SBA, "...available water quality data clearly indicates that stream bed instability [i.e., hydrologic modification] is at the root of the water quality limitation." The SBA also ties timber harvest and roads to adverse hydrologic modification, stating that logging and roads "can cause imbalance over significant periods." (SBA at 43)

It is a hydrological fact that high levels, e.g. destructive of pool and other habitat components, of bedload movement are directly due to more frequent and higher than natural peak flows. A direct correlation has been established between higher, more frequent flood events and increased canopy removal and road densities within watersheds.

The **Vegetation Alteration** sub-section explains in some detail how canopy removal causes higher and/or desynchronized water yields within a watershed. (Id.) The conclusion regarding the NF however, is that in spite of 15.5% of the drainage (88,840 acres) being in functional openings as a result of timber harvest, "it is unlikely that vegetation alteration itself is contributing significantly to hydrologic modification." (SBA at 44) This is based on a Forest Service guesstimate that historical, pre-human intrusion fires caused an average of 18% (and as high as 36%) of the NF drainage to be in openings.

What the SBA (and the Forest Service) fail to consider is that clearcuts cannot be equated to natural openings caused by wildfire. Except for somewhat rare stand replacing fires, most forest fires tend to burn in a mosaic pattern creating small rather than large openings. The presence of standing and down fire killed timber after a fire prevents soil erosion as well as the extreme hydrologic changes that occur as a result of mechanical removal of virtually all vegetation in large areas, e.g. clearcutting with its associated road building and soil disturbance. There is ample scientific literature that compares the detrimental impacts of canopy removal through logging with the lessor impacts of natural fire. We disagree with the assumption that the impacts on water quality of canopy loss resulting from fire under natural conditions are equal to canopy loss from logging.

The **Extended Stream Channel Network** sub-section explains how roads contribute to increased water yields/peak flows. Basically the discharge rate is greatly increased by the more efficient channeling of water flowing through the system via roads and ditches. The SBA acknowledges that the road system in the NF is "extensive and intensive". Indeed Tables 14a-g indicate that some sub-watersheds in the NF have extraordinarily high road densities. For example the watersheds draining to the Middle North Fork have road densities as high as 8.1, 9.2 and 9.4 mi/sq.mi. (Table 14c)

The SBA also explains, in **Rain on Snow Response**, how and why rain on snow discharge events result in increased peak flows and acknowledges that the NF is very susceptible to these events. It also acknowledges that rain on snow events exacerbate the increase in peak flows caused by roads. The SBA should also acknowledge that the potential for rain on snow events is driven by the amount of openings in a watershed as well as elevation and climate. The higher the percent of openings, the higher the potential for increased peak flows resulting from rain on snow events.

In the **Summary** the role of vegetation alteration/loss of canopy removal is again downplayed: "[a]lthough vegetation alteration possibly has some transient effect on the hydrology, it is probably small and temporary." (SBA at 45) We disagree. Clearly the loss

of canopy due to extensive logging has been a major factor in increasing peak flows, which in turn have caused the destabilization of channels in the NF.

Under **Pollution Control Strategy** the SBA states that the "key to breaking the cycle of bedload delivery and channel instability... is removal of roads from flood plains and rehabilitation of the road crossings and approaches which deliver excess water and sediment to the streams." (SBA at 48) Removal of roads in the flood plain would be a positive benefit to the water quality and would help restore damaged habitat, as would rehabilitation of stream crossings. However, it would not address the major problems in the NF caused by excessive, unnaturally high peak flows.

A distinction needs to be made between sediment delivery to streams (from roads, stream crossings, stream banks and mass failures) and channel instability which is the movement of instream bedload sediment, e.g., the cobble and boulders that comprise the existing geomorphologic structure of the river/stream bottom. The way to reverse the trend toward disequilibrium in the drainage, of which channel instability is a symptom, is to lower road densities where they are excessive, avoid further canopy removal for the time being, and allow the canopy to re-establish in current openings.

While the pollution control strategy does "not taking a position either for or against the harvest of timber," the suggested solution certainly would not lead to any reduction of future logging. Citing a lack of available funding as a major stumbling block to watershed restoration, the proposed solution is to require pollution credits when new roads and stream crossings are needed to access timber. The timber industry could earn credits by agreeing to do some unspecified amount of road and stream crossing rehabilitation. Theoretically the reduction of impacts due to stream crossing rehabilitation would outweigh the impacts of new construction. Eventually the huge backlog of restoration projects in the NF that the Forest Service is unable to find funding for would be completed, assuming the pollution credit program continuously fixed more problems than it created.

The Draft TMDL

The Draft TMDL proposes to reduce sediment delivery from roads, stream crossings, etc., which will help reduce the impacts of fine sediment on fish habitat. However, the major problem of channel instability and bedload movement due to increased peak flows is not addressed. While we understand that DEQ "does not recognize flow and habitat alteration as quantifiable and therefore allocatable parameters" (SBA at 46), the SBA has clearly placed the massive amount of bedload being moved in the NF system in the category of sediment, and identified it as the major problem in the drainage: "the sediment interfering with the beneficial use (cold water biota) is most likely large bedload particles" (Draft TMDL at 4). Therefore the TMDL should deal with it. In the absence of measures to reduce (and prevent further) increases in peak flows in the NF, channel and bedload instability problems will continue to impair beneficial uses.

Loading Capacity. The determination of the appropriate loading capacity (or load allocation) is based on several assumptions that raise concerns.

1) The statement, "natural background levels are assumed to be fully supportive of beneficial uses..." is based on a logical deduction, i.e., that prior to development the beneficial uses were undoubtedly fully supported/not impaired. However, the possibly erroneous assumption underlying the determination of loading capacity is that the background and current levels of sediment delivery have been accurately calculated. (See concerns with the accuracy of sediment load estimates above.

2) The statement that "sedimentation levels below 80% [above] background are likely to support water quality standards" is based on the SBA's conclusions concerning the level of sediment reduction necessary to fully support beneficial uses. The SBA refers to the Washington State Forest Practices Board conclusion that, "[s]ediment rates in excess of 100% of natural sedimentation are likely sufficiently high to exceed water quality standards (WA Forest Practices Board, 1995)." (SBA at 42) We feel that it requires quite a leap of faith to extrapolate this conclusion to Idaho watershed problems and Idaho water quality standards.

The next two statements, 3) "the stream system has some finite yet unquantified ability to process (attenuate through export and/or deposition) a sedimentation rate greater than background rates" and 4) "the beneficial uses ...will be fully supported when the finite yet unquantified ability of the stream to process sediment is met." raise the question of how will this "finite ability to process sediment" will be determined.

DEQ has arrived at an interim sediment TMDL goal of 50% above background (which presumably includes the margin of safety required by the Clean Water Act, since one of the assumptions in the pollution control strategy is that sediment levels below 80% over natural are likely to support water quality standards). The 50% level is supported by the 42.8% above background sedimentation rate in the upper NF where the reference streams are located. This raises two questions. Why not set the interim goal at 43%? And what were the criteria for reference streams?

In any case, the interim goal "will be replaced by the final sediment goal, when the final criteria for full support of cold water biota and salmonid spawning... are met." (Id.)

The sub-section, *Appropriate measurements of Full beneficial Use Support* lists four criteria for determining full support of cold water biota: 1) "three or more age classes of trout with one young of year", which has been DEQ's standard criteria for determining full support for salmonid spawning ("SS") in the listing process. (We assume this was intended as a criteria for SS rather than cold water biota?) As we have repeatedly pointed out in previous comments on the adequacy of the WBAG process relative to generating 303(d) lists (which we hereby incorporate by reference), it is totally inadequate as a criteria for determining whether SS is fully supported.

2) the trout density level criteria (0.1 -0.3 fish/yd2) is based on "reference" streams within the NF drainage. Again we ask what criteria were used to select reference streams. The information presented in the SBA is not sufficient to confirm that the choice of reference streams was scientifically based and therefore appropriate.

3) Please explain why sculpin and tailed frogs are key indicators that cold water biota is fully supported.

4) The Macro invertebrate Biotic Index score of 3.5 was of course the primary and often sole criteria used to determine full support of cold water biota for the1998 303(d) listing process. Many streams were eliminated from the list based on this as a sole criteria. As discussed in previous comments on the WBAG, etc., we don't believe that it scientifically defensible as a single or major criteria for determining full support. Granted, in this case it is applied in combination with other criteria, but unfortunately the other criteria are also questionable and the combination as a whole is inadequate.

The *Monitoring Provisions* describe the timeline for collecting data based on the above listed criteria and concluding whether the beneficial uses are fully supported. A total of 5% of the watershed would theoretically be monitored over 5 years. The assumption, according to *Feedback Provisions*, is that if the 5 year/5% monitoring database indicates that the criteria are being met, further efforts to reduce sediment loading in the watershed will not be required. The sediment load allocation would be frozen at whatever reduction in sediment loading had been reached at that point. One assumes that the reduction in sediment load at the point of full support would be calculated by the same methodology (modeling, etc.) that generated it to begin with. Monitoring would continue to make sure the beneficial uses continued to be fully supported.

All of this might be acceptable if the criteria for determining full support were adequate. The most important component of aquatic systems is missing from the criteria, i.e., habitat. Indicators that habitat is healthy are at least as important as fish count data in determining aquatic life beneficial use support. In the absence of designating habitat alteration as a pollutant, the least DEQ can do is utilize it as an indicator of improved (or impaired) conditions for aquatic life beneficial uses in the TMDL monitoring process.

Reasonable Assurance of TMDL Implementation. Based on the prior discussion regarding the lack of federal funding for restoration projects (and hence the need to rely on pollution credits), the reliance in this section on a memorandum of agreement between the federal agencies and DEQ, and the lack of an implementation plan for these TMDLs, there appears to be no reasonable assurance of TMDL implementation at this time.

Thank you for the opportunity to comment.

Sincerely,

Liz Sedler

May 23, 2001

Liz Sedler
Alliance for the Wild Rockies
The lands Council
P.O. Box 1203
Sandpoint ID 83864

Dear Liz:

Thank you for the comment provided by the Alliance for the Wild Rockies and The lands Council on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made the Alliance for the Wild Rockies and The lands Council as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: It is unfortunate that so little sediment delivery data has been developed for the North Fork Coeur d'Alene River. Background estimates are based on WATBAL and WATSED coefficients. Has WATBAL or WATSED been validated? Neither model is considered to provide accurate estimates of sediment loading from roads and openings.

Response 1: The sub-basin assessment (SBA) and the TMDLs must be based on the best available data. It is unfortunate that more data is not available but the TMDL must be developed on the data that exists.

The WATSED and WATBAL models were not used in the sedimentation model. The coefficients that WATSED employs for forest land sediment yield were used. The assessment incorrectly identifies these as WATSED coefficients causing this confusion. These were correctly identified as mean coefficients for Belt geology developed from in-stream sediment measurements in northern and north central Idaho.

Comment 2: Its a hydrological fact that destruction of pool and other habitat and bed load movement are directly due to more frequent natural peak flows. A direct correlation has been established between higher more frequent flood events and canopy removal and road density.

Response 2: We respectfully disagree that "a direct correlation has been established between higher more frequent flood events and canopy removal and road density". The flood frequency analysis developed from the existing gauge data (p.11) indicates that the 1974 and 1996 floods are the largest in the analysis of the Enaville and Cataldo gauges. The 1933 flood appears to have had a higher discharge based on photographic and Post Falls discharge data. Thus the three largest discharges are 1933, 1974 and 1996 in that order. The canopy removal and road construction in the North Fork have increased steadily since 1933 probably peaking in the early 1980's. If these factors increased discharge on a basin wide basis, the opposite flood history would be expected. Flood discharge appears to be weather related and not a management related phenomenon based on the available data.

It is suspected that peak discharges may be altered by management actions in the first and second order tributaries of the watershed. Discharge is not de-synchronized in small watersheds by the complex slopes and aspects of the larger watershed. Unfortunately these streams have no long-term stream discharge gauging covering large discharge events, so this suspicion cannot be proven.

The SBA has been strengthened on page 11 to point out that peak discharges may be altered in the first and second order watersheds with the caveat that no direct data is available to support this suspicion.

Comment 3: The commentator disagrees with the assumption that the impacts on water quality of canopy loss resulting from fire under natural conditions are equal to canopy loss from logging. Point out that WABAL and WATSED have not been verified; question coefficients used.

Response 3: The fire areas that were modeled to be equivalent to non-stocked areas are not typical fire areas as is pointed out in the Model Assumptions and Documentation (Appendix B). These are areas that have suffered double fire events within a decade or two of each other. Areas like these lose most woody material in the second fire. Pictures of this type of burned area may be viewed in Russell's book North Fork of the Coeur d'Alene River. These areas take many years to re-establish a forest cover and during this period have higher sediment yields. The model accounts for these areas loading to the stream over time by adjusting the yield coefficient to that of a non-stocked area.

The WATSED model was not used in the sedimentation model. The coefficients that WATSED employs for forest land sediment yield were used. The assessment incorrectly identifies these as WATSED coefficients causing this confusion. These will be correctly identified as mean coefficients for Belt geology developed from in-stream sediment measurements in northern and north central Idaho.

The sediment yield adjustment for double burn areas and identified sediment yield coefficients as mean coefficients developed from in-stream sediment measurements on Belt terrain of northern and north central Idaho has been further clarified in the SBA.

Comment 4: The SBA should point out that rain on snow events are made worse by vegetation removal. Loss of canopy to extensive logging has a dramatic effect on peak flows.

Response 4: As explained in response to comment 2, the flood frequency and history for the basin does not support the contention that canopy removal causes higher discharge events.

Comment 5: Removal of roads would not address the major problem in the North Fork caused by extensive unnatural peak flows.

Response 5: See response to comment 2. The existing data does not support this contention on a basin wide scale.

Comment 6: The sediment TMDL deals with sediment sources but does not address the main problem channel instability caused by peak flows.

Response 6: The sediment TMDL deals with the pollutant of concern, sediment. This is not to say that other factors do not effect the stream. Although the data does not support peak flow alteration on a basin wide basis, elements such as large organic debris (LOD) removal and lack of LOD recruitment clearly affect habitat and bed load mobility. These features are important but cannot be addressed under TMDLs. DEQ will urge development of a TMDL implementation plan that takes a broader view of these habitat issues than the narrow focus of the TMDL pollutants of concern.

The SBA was strengthened to point out the many habitat problems the TMDL itself does not address.

Comment 7: Background and current levels of sedimentation may not have been accurately calculated, based on comment 3.

Response 7: All models of sediment yield provide relative as opposed to exact numbers. The science concerning sediment is not exact. The model numbers are not however based on WARBAL or WATSED as related in the response to comment 3. The model results are thought to be reasonably accurate and independent assessment from measured values indicates they are in the correct range.

Comment 8: The commentator believes extrapolation of Washington State Forest Practices Board guidelines to Idaho watersheds is not warranted.

Response 8: The Washington State Forest Practices Board guidelines is the published reference that both EPA and DEQ use to compare model results to the probability of water quality violation. It constitutes the best available information on which TMDLs must be based.

Comment 9: How will the "finite ability to process sediment" be determined?

Response 9: As stated in the TMDL it will be determined by bio-monitoring of the cold water biota. When the cold water biota meets the criteria stated in the TMDL, that finite ability to process sediment will be defined. This is explained in the sediment TMDL.

Comment 10: Why was the goal not set at 43% and what were the criteria for the reference streams? The choice of reference streams is not documented enough to confirm that they were scientifically based.

Response 10: The goal was set at 50% above background by the North Fork WAG after being advised that below 50% above background sedimentation rate the Washington State Forest Practices Board guidelines find a potential for chronic water quality problems. Below 50% these guidelines do not. Since these are all modeled numbers, there is likely not a large difference between 50% and 43% above background. The control streams are all located in the lightly roaded and lightly harvested Upper North Fork sub-basin. These watersheds range from no to little development owing to large fires that swept the area early in the twentieth century. It has been clarified in the SBA that the control streams and control areas are all in the Upper North Fork sub-basin. The level of development in the upper North Fork has been further clarified in the SBA.

Comment 11: The criterion, three age classes one young of the year, is totally inadequate as a criterion for salmonid spawning.

Response 11: We respectfully disagree. This is criterion indicates population structure and that reproduction is occurring. It is one of the metrics used in WBAG 2 to develop the fish index. DEQ believes it is a sound indicator of salmonid spawning.

Comment 12: Explain why tailed frogs and sculpin are indicators of cold water biota.

Response 12: Tailed frogs and scuplins are the two other cold water vertebrate species common waters no impaired by chemical pollutants. The SBA better explains the status of tailed frogs and sculpin in these watersheds.

Comment 13: Macroinvertebrate biotic index of 3.5 is questioned as a measure of cold water biota.

Response 13: The MBI of 3.5 or greater is used by WBAG to indicate a stream with healthy macroinvertebrate diversity. The WBAG2 uses a stream macrobiotic index based on percentile of reference streams with 3 as the highest rating. Comparison of the two methods indicates that a stream with a MBI of 3.5 would have a SMI of 3 indicating healthy macroinvertebrate diversity.

Comment 14: The criterion that needs to be added to judge success is habitat improvement.

Response 14: The TMDL can only address the pollutant of concern; in this case sediment. As explained in earlier comments the TMDL process is not designed to address all the ills in streams. It is designed to address pollutants of concern that can be quantified in mass or energy per unit time. Habitat, which we agree is important to the biota, does not meet this criterion. DEQ and EPA have decided that habitat is not a characteristic for which TMDLs can be developed. The SBA clarifies that sediment not habitat is the pollutant the TMDL must address.

Comment 15: Given the lack of a TMDL implementation plan there does not appear to be "reasonable assurance" that the TMDL will be implemented.

Response 15: The reasonable assurance language is that requested by EPA. In the case of the North Fork, implementation planning would be lead by the prime manager of the watershed the Forest Service. The federal land management agencies have agreed by MOA to lead the development of implementation plans in watersheds where they manage the majority of the land. The implementation plan is expected 18 months following approval of the TMDL. The metals TMDL implementation plan is the State of Idaho's cleanup plan. This plan currently exists.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

IDAHO FISH & GAME
PANHANDLE REGION
2750 Kathleen Avenue
Coeur d'Alene, Idaho 83815

Dirk Kempthorne / Governor
Rod Sando / Director

January 26, 2001

RECEIVED
JAN 29 2001
IDHW-DEQ
Coeur d'Alene Field Office

Mr. Geoff Harvey
Idaho Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814

Dear Geoff:

REFERENCE: COMMENTS ON NFCDA TMDL

We have reviewed the draft TMDL for the North Fork of the Coeur d'Alene River (NFCDA). In general, we believe the TMDL accurately puts the primary focus for sediment delivery to tributaries and mainstem reaches of the watershed on roads and road crossings.

Based on the observations of my staff, over many years of experience in the watershed, sediment issues in the watershed are acute in a number of the tributaries, and significant in some mainstem reaches. We also believe the problems are primarily associated with "legacy" conditions, i.e. those areas where roads were either poorly constructed, poorly located, and/or have been poorly maintained. However, other practices, we believe, have also contributed to the sediment related problems in the NFCDA and should be addressed in the TMDL. Further, we offer some suggestions for clarifying the information in the document.

Some important points to consider regarding fishery resources in the NFCDA watershed that are not clear from the document are that:

- Mountain whitefish (MWF) are a native, fall spawning salmonid. They are broadcast spawners (don't dig redds) with spawning areas primarily being riffles in mainstem channels. MWF are common in the NFCDA, but population trends are unknown. Densities (fish per unit area) are lower than those found for MWF in other river systems in Idaho.
- Westslope cutthroat trout spawning has only been documented in tributary streams, usually (but not exclusively) second and third order "B" and "C" channels in the NFCDA watershed.
- Available data suggest bull trout spawning occurred in tributaries also used by westslope cutthroat trout, although bull trout did not likely use all of the tributaries used by cutthroat trout.
- Prior to 2000, cutthroat trout populations in tributaries downstream from Yellow Dog Creek in the NFCDA, and downstream from Laverne Creek in the Little NFCDA were managed with a six fish bag limit, although fishing was closed through July 1 to protect spawners. If consumptive fishing pressure is significant, fish densities will decline under a six fish regulation. The regulations were changed in 2000 to allow a harvest of only two fish, and no fish between 8" and 16" can be harvested, thus we anticipate angler harvest to decline in the lower tributaries.

Some specific comments, by page, are as follows:

P3 – In the discussion on hydrology, we believe adding a sentence or two clarifying that flood events may occur more frequently in individual tributary streams, while not significantly affecting the hydrograph of the river. This is important, because some heavily managed tributaries do show an apparently elevated response to rain-on-snow events, and USFS data indicate that bedload sediment delivery may be greater in these streams. Bedload may also be more frequently moved in these streams.

P4 – It is probably worth noting under the vegetation section that prior to intensive logging along river and stream corridors, western red cedar was a significant component of the riparian vegetation community. Western red cedar, because it grows to large diameters and can last for many decades after it falls into streams, provides an important source of large woody debris, which in turn serves to sort and store gravels and other bedload sediments. Loss of red cedar has not only resulted in the loss of this function, but has contributed to reduced streambank stability.

Also on P4, MWF should be mentioned.

P12 – The discussion on flood magnitude and frequency should expand to include the issue of individual tributary flooding (see comments for P3). Because more frequent or more intense flooding in individual tributaries is most likely to negatively impact the key salmonid species being measured as a basis for determining attainment of beneficial uses, this point is important. Impacts due to disturbance in the NFCDA watershed are most likely to manifest themselves in the tributary streams, at least from a fisheries perspective. One culvert failure in an important spawning and rearing tributary may significantly reduce habitat quality and complexity for years in a tributary stream, without being noticed in the river system.

P14 – Under the discussion of sedimentation data, it would be useful to note that some reaches of the LNFCDA are now intermittent as a result of excess bedload sediment deposition into lower gradient reaches. This is a relatively recent occurrence (1990's), and represents an extreme case of sediment delivery impacting a mainstem reach.

P18-20 – The discussion of fisheries data ignores the (albeit limited) available information on MWF. Some discussion of MWF and their life history strategy is needed. Also, the statement that data collected by DEQ are "likely quite low" because they were collected near campgrounds implies that fishing pressure is the culprit, despite the discussion in the next paragraph. We suggest changing "likely quite" to "may be" if you still believe that proximity to campgrounds is the reason for low densities. Finally, we have significant concerns with reporting data in a catch per unit effort format. We recognize this represents an attempt to standardize the data from multiple sources, but it can be extremely misleading if effort is not standardized (i.e. crew size or experience is different, timing of collection is different, electrofishing gear is not the same or not used at the same settings, etc.). We recommend using only the data from the joint effort conducted in 1996 by the USFS Rocky Mountain Research Station in conjunction with the University of Idaho, IDFG, and IPNF personnel. These data covered a large number of streams over a short time period, and effort was generally standardized. If you elect to stay with the data in the TMDL document, we believe it is important to point out the weaknesses in using these

data. IDFG has data from the mainstems which include actual population estimates, eliminating the problems with using catch per unit effort data.

P40 – The discussion on vegetation alteration should, in our view, be expanded to include the issues of riparian logging, and the effects of high levels of canopy removal on the tributary watershed scale. As noted earlier, riparian logging has resulted in the loss of large woody debris recruitment to streams, and loss of bank stability. These factors contribute to the amount of bedload transported to depositional reaches or features in a stream, contributing to habitat loss. Also, USFS data indicate that storm run-off intensity and duration can be affected by significant canopy removal in lower order streams (this could also be discussed on the next page under rain-on-snow).

P42 – We believe some discussion of the effects of vegetation alteration on tributary watersheds (as opposed to just in the general sense) should be included in the summary, with reference to loss of riparian vegetation, and with reference to canopy loss.

In general, we believe the TMDL does a good job of identifying the principle sources of sediment in the watershed, and identifies an approach which, if conducted carefully, can be used to reduce the threat of additional sediment delivery. However, we also believe that there is a need to distinguish between the impacts to the tributary streams which are the primary spawning and rearing habitat for westslope cutthroat trout, and the mainstem reaches. Again, we believe most problems (the LNFCDA notwithstanding) will manifest themselves in smaller tributary streams important for early life stages of trout, but the problems will carry over into the river as recruitment declines. It is also important to note that more modern logging and road building practices pose significantly reduced risks, but by themselves will not remove legacy risks, experienced by fish populations. And, without proper road maintenance, even properly designed road systems can contribute significant amounts of sediment. We also suggest displaying the data of Cross and Everest, or at least providing more discussion of it, to help clarify sediment issues as they relate to fish.

Thanks for the opportunity to comment.

Sincerely,

Greg Tourtlotte
Regional Supervisor

GIT:CEC:kh

C: Tracey Trent, IDFG, Boise
IDL, Coeur d'Alene
USFS, IPNF Supervisor's Office
BLM, Coeur d'Alene
USFWS, Spokane

May 23, 2001

Greg Tourtlotte
Regional Supervisor
Panhandle Region
2750 Kathleen Ave.
Coeur d'Alene ID 83815

Dear Greg:

Thank you for the comment provided by the Idaho Department of Fish & Game on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs). A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made the Idaho Department of Fish & Game as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: Mountain whitefish (MWF) are present in the North Fork, but are broadcast fall spawners. MWF are common in the North Fork, but their population trends are unknown. MWF are present in lower densities in the North Fork than in other rivers of Idaho. Mention MWF on page 4. Mention life cycle on pages 18-20.

Response 1: Mountain whitefish, their life cycle and Fish & Game's assessment of their populations in the North Fork were included on page 4 and 18-29 of the SBA.

Comment 2: Westslope cutthroat trout spawning has only been documented in tributary streams to the North Fork.

Response 2: It has been clarified in the SBA that westslope cutthroat spawning has only been documented in the North Fork tributaries.

Comment 3: Available data suggests bull trout also spawn in tributary streams used by cutthroats but not as many tributaries.

Response 3: It has been clarified in the SBA that Bull Trout spawning has only been documented in the tributaries to the North Fork but not in as many tributaries.

Comment 4: Below Yellow Dog Creek in the North Fork and Laverne Creek in the Little North Fork the harvest was changed from six west slope cutthroat trout per day to two west slope cutthroat trout per day in 2000. No west slope cutthroat trout between 6 and 16" can be harvested.

Response 4: It was noted in the SBA that the fishing harvest rules changed in 2000 and the nature of those changes.

Comment 5: A sentence or two should be added (p3) that flood events may occur occasionally on individual low order tributary streams and these may add additional bed load.

Response 5: Language indicating that fist and second order watersheds may experience peak flows due to vegetation modification has been added to the flood frequency section of the SBA.

Comment 6: It should be noted in the vegetation section (p4) that red cedar was a significant component of the riparian plant communities and not its importance as long lasting LOD.

Response 6: The importance of western red cedar is acknowledged and this point was made in the vegetation section. In addition the loss of red cedar and its impact on LOD recruitment is discussed in a SBA section covering impacts which are not pollutants of concern.

Comment 7: The discussion of flood frequency (p.12) should be expanded to address floods in tributary streams. These streams are important from the fisheries point of view and where failures can have their largest impact on the fishery.

Response 7: See IDFG comment 5 response. This change was made in the flood frequency section.

Comment 8: Under the discussion of sediment data it would be useful to note that some reaches of The Little North Fork are intermittent as a result of excess bed load. This is recent since 1990.

Response 8: It was noted in the sediment data section or elsewhere as appropriate that the Little North Fork is intermittent over some reaches as a result of bed load.

Comment 9: Fishing pressure (may be) rather than (quite likely) is responsible for low fish density data from Independence Creek near the mouth.(p18-20).

Response 9: The language is changed from "quite likely" to "may be" in the discussion of low fish density in Independence Creek.

Comment 10: Data should be reported as fish per unit area without effort. IDFG has actual population estimates from the main stems eliminating the problems of catch per unit effort.(p18-20).

Response 10: DEQ feels this change is not advisable in the SBA where several different data sets were used for fish population data. It was changed in the sediment TMDL where electrofishing methods will be controlled by a strict protocol.

Comment 11: Discussion on vegetation alteration (p.40) should be expanded to cover the impacts of riparian logging and canopy removal as these have effected LOD in the streams.

Response 11: The discussion on vegetation was expanded to address riparian logging and the loss of LOD recruitment and canopy shade in the SBA.

Comment 12: Vegetation alteration of the tributary watersheds should be included with reference to loss of riparian vegetation and canopy loss.

Response 12: See response to IDFG comment 11. This discussion was extend to the tributaries in the SBA.

Comment 13: More demonstration or discussion of the Cross and Everest data was requested.

Response 13: The Cross and Everest data is referenced and the key points covered in the SBA. The reader can read the referenced paper to further understand the details.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

February 1, 2001

Reply To
Attn Of: OW-134

Geoff Harvey
Idaho Department of Environmental Quality
Coeur d' Alene Regional Office
2110 Ironwood Pkwy., Suite 100
Coeur d' Alene, Idaho 83814

Dear Mr. Harvey:

Enclosed are Environmental Protection Agency's (EPA) comments on the Draft North Fork Coeur D Alene Subbasin Assessment/Total Maximum Daily Load (TMDL). If you have any questions regarding our comments on the draft subbasin assessment, please feel free to contact me at (206)553-6912.

Sincerely,

Curry Jones
TMDL Project Manager

Enclosure: USEPA Region 10 Comments on the North Fork Coeur d' Alene Subbasin Assessment/Total Maximum Daily Load

cc: Don Essig, IDEQ

USEPA Region 10
Comments on the
North Fork Coeur d' Alene Subbasin Assessment/
Total Maximum Daily Load

General Comments

1. Sediment impacts in the North Fork Coeur d' Alene are primarily bedload sediment impacting salmonid spawning through both filling in spawning habitat as well as physical injury to the redds. If the pollutant is bedload sediment, are the load allocations specified in section 3.0 of the TMDL reductions in bedload sediment or reduction in fine sediment or is this total sediment yield. ?

2. **Section 2.0** - North Fork Coeur d' Alene River Subbasin Water Quality At a Glance, This section indicates that temperature is a pollutant of concern in the Upper North Fork Coeur d' Alene subbasin. If temperature is a pollutant of concern in this subbasin, it should be addressed in the subbasin assessment.

3. **Page 12, Second Paragraph**, This section outlines all high and low flow event monitoring that occurred for bacteria, nutrients, oil and grease and dissolved oxygen on Pritchard Creek. This section should include a concluding recommendation from IDEQ as to whether delist the stream or to keep the stream listed. If no recommendation is not provided, then a TMDL must be developed for the above listed parameters.

4. **Page 12, Second Sentence**, The reference should be changed to Appendix D.

5. **Page 18-19**, In using the St. Joe River as a reference watershed to establish reference conditions, you should also include in the text what has been the fisheries response

6. **Page 19 - 21**, The subbasin assessment indicates that diminished pool volumes has resulted in streambed instability which has resulted in the loss of critical spawning habitat for trout. The current TMDL (Section 3), as it stands, primarily deal with decreasing total sediment yield from the landscape. The TMDL should consider incorporating these coarse sediment targets. The TMDL should consider using the following targets:

- Pool Frequency Targets (PACFISH/INFISH Target or Targets Adopted by the Panhandle National Forest)
- Residual Pool Volume Targets (m^3)
- Depth Fines Target (5-year mean not to exceed 27% with no individual year to exceed 29%, and subsurface fines <0.85 mm not exceeding 10%

(IDEQ 1999).

By incorporating these targets into the TMDL, the TMDL then makes inferential link between instream sediment targets and bedload mobility by assuming that by reducing the bedload transport rates with the Upper North Fork Coeur d' Alene River drainage, the stability of channels will increase, and by improving the channel stability , the bankfull width-to-depth ratio will decrease, pool frequency and pool volume will increase, and the volume of depth fine will decrease. This will help to create sufficient spawning habitat for fisheries in the drainage. Although hydrologic modification (flow alteration) is one of the cause of the channel instablity in the Upper North Fork Coeur d' Alene River drainage, it has been determined that flow is "pollution" and not a "pollutant" thus not requiring a TMDL. Other actions should also be considered, in the implementation phase of the TMDL, to decrease peak flow in the drainage.

Sediment Comments

1. **Page 23, Section 2.3.2.5**, The sediment section should include a "front-end" introductory piece which provides some background information and information on modeling assumptions used in developing the sediment TMDL. You may consider pulling information from Appendix B to include in this section.

2. **Page 31, Section 2.3.2.5.1.1.1**, Based on Table 14a-14g, agricultural land use was not incorporated into the analysis. Earlier in the subbasin assessment (page 5, paragraph 2) it was indicated that grazing was centered in the lower river valley. How was this factored into the sediment erosion model for the Upper North Fork Coeur d' Alene. This section of the TMDL should identify what sub-watersheds where the agricultural land use applies.

3. **Page 31, Section 2.3.2.5.1.1.1**, The TMDL indicates that sediment yield from agricultural lands was estimated by applying the sediment yield coefficients of 0.03 and 0.06 tons/acre/year to agricultural land. The TMDL should explain where and why the sediment yield coefficient of 0.03 and 0.06 tons/acre/year they were applied.

4. **Page 31, Section 2.3.2.5.1.1.3**, The TMDL indicates that paved roads was assigned a sediment yield on the low end of the range expected from a Belt geologic type. This section should include brief language indicating why the "low end" sediment yield is sufficient for highways in the Belt geologic type. The TMDL should also reference Table 15 which indicates that sediment yield coefficient used.

5. **Page 42, First Paragraph and Section 3.1.4** How was background/baseline sediment yield for each sub-watershed calculated ? The language in this section was confusing. Is natural background levels of sediment the same as the estimated background ? The TMDL fails to identify how these background sedimentation rates were derived.

6. **Page 42. First Paragraph and Section 3.1.4**, The TMDL cites Washington Forest Practices Board as indicating that sedimentation rates in excess of 100% of natural sedimentation are likely sufficiently high to exceed water quality standards. The Washington Forest Practices Board also indicates that if sediment is increased by 50 - 100%, the effect of sediment may be small, but chronically detectable. Thus, the TMDL sets a 50% over background targets. The TMDL should provide an explanation as to why 50% over background was selected. The TMDL should state if the 50% over background targets (50% "*chronically detectable*" WFPB, 1995(B-44)) will be protective of the designated beneficial use.

7. **Page 43, Section 2.3.2.5.3**, Because the major issue in the Upper North Fork Coeur d' Alene subbasin is stream-bed instability, which has reduced the amount of available spawning habitat for both cutthroat and bull trout, incorporation of a residual pool volume target and riffle armor stability target may be necessary.

8. **Page 45, Section 2.3.2.5.3** Summary, In the summary, you indicate that the key sources of sediment in the Upper North Fork Clearwater River watershed are roads located in the floodplain, stream crossings and active and abandoned roads in the subbasin. The summary fails to identify timber extraction activities as a source of sedimentation in the watershed.

9.**Section 3**, Sediment and Metals TMDL, This section should be incorporated into the main body of the document.

10.**Section 3.1.5, Loading Capacity, 3rd Sentence** - The TMDL indicates that adequate quantitative measurements of the effects of excess sediment have not been developed. This statement is not entirely true. Several current studies have been completed which have linked excess sediment back to impairment of the designated use. The European Inland Fisheries Advisory Commission (EIFAC), through their research, suggested the following standards for protection of salmonids and others fish: < 25mg/l - no effect, 25 - 80 mg/l - Slight effect on fisheries production, 80 - 400 mg/l Significant reduction in fisheries, > 400 mg/l - Poor fisheries. Included within these comments is a copy of paper which summarizes some of these studies which have quantitatively linked excess sediment to impacts on the designated use.

11. **Section 3.1.5 Loading Capacity, 1st/2nd Bullet** - The assumption used in this TMDL is that natural background levels of sedimentation are assumed to be fully supportive of the beneficial use. The second assumption is that sedimentation levels below 80% of background is likely supporting water quality standards. These assumptions conflicts with an earlier assumption where you (Washington Forest Practices Board, 1995) mention that *if sediment is increased by 50 - 100%, the effect of sediment may be small, but chronically detectable.....sedimentation rates in excess of 100% of natural sedimentation are likely..... to exceed water quality standards.* To resolve this problem, the TMDL should consider crafting the TMDL to meet estimated background sediment yield as shown in Table 17.

12.**Section 3.1.5, Loading Capacity**, The TMDL indicates as a premise that sedimentation rate below 80% of background are likely to support water quality standards. The TMDL then uses a 50% over background (Section 3.1.5, Page 5) as the target. The TMDL should consider referencing one number as a percent over background target (50% over background).

13. **Section 3.1.5, Loading Capacity, Page 4-5, Table 3** The TMDL indicates that an *interim* sediment TMDL goal of 50% above background is set for the entire watershed. The word interim should be struck out. TMDL actions are final actions. You may consider including language which indicates the sediment TMDL goals of 50% above background may be changed as additional data is collected. As mentioned earlier, what is the basis for the 50% above background ? How was it calculated and will it meet water quality standards and be protective the designated use ?

14.**Section 3.1.5, Loading Capacity, Table 3** - Table 17 in Section 2, Table 3 in Section 3 and Table 13 in Section 3 are all different. Because these table are the critical pieces used to both define the loading capacity and derive the percent reductions needed to meet the loading capacities, it is critical that these tables be consistent.

15.**Section 3.1.8, Table 13 Subbasin Sediment Allocation**, Table 13 does not clearly identify how the existing sediment load was calculated or how the sediment reduction required were calculated. Table 17 in Section 2 identified the existing sediment loads within each subwatershed. The required reductions to meet the loading capacity would be the load reduction necessary to meet the loading capacity as described in Table 3, Section 3. The TMDL should clearly state how the percentage reduction in sediment loading was calculated. In making revisions to the sediment load reductions, the TMDL should consider the earlier comments regarding using background as a starting point for the sediment reductions.

May 23, 2001

Curry Jones
USEPA Region 10
1200 Sixth Avenue
OW-134
Seattle WA 98101

Dear Curry:

Thank you for the comment provided by the Environmental Protection Agency (EPA) on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs) in your letter of February 1, 2001. A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made the Environmental Protection Agency (EPA) as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: Sediment impacts in the North Fork Coeur d'Alene are primarily bed load impacts to salmonid spawning through filling of habitat as well as physical injury to redds. Are sediment reductions, fines, bed load or total sediment yield?

Response 1: Sediment reductions in the TMDL are total sediment yield reductions. It should be clarified that the sediment impact is suspected to be pool filling. Fine sedimentation of redds does not appear to be a problem, because young of the year are detected in most tributaries, where the spawning does occur.

Comment 2: North Fork at a glance indicates temperature is a pollutant of concern. It should be addressed in the SBA. Section 2.0.

Response 2: This section was in error. Temperature is not listed as a pollutant of concern for any segment of the North Fork or its tributaries. Temperature was removed from the listing of pollutants of concern in section 2.0.

Comment 3: On page 12, 2nd paragraph, the section outlines all high and low event monitoring for bacteria, nutrients, oil and grease and dissolved oxygen on Prichard Creek. The section should end with a recommendation on these pollutants be delisted.

Response 3: We agree with this conclusion that is stated elsewhere in the document. It will be stated at the end of the paragraph on page 12.

Comment 4: On page 12, 2nd sentence, reference should be changed to Appendix D.

Response 4: We agree the reference is mislabeled.

Comment 5: On page 18-19, in using the St. Joe River as a reference watershed, the fisheries response in the St. Joe should be stated in the text.

Response 5: The fishery response, we believe is stated in the text. However, this will be clarified and we now show by reference that the St Joe has health fish density numbers.

Comment 6: The TMDL should consider using course sediment targets ie. pool frequency targets; residual pool volume targets, depth fines target.

Response 6: We do not believe the allocation should use surrogates of sediment mass per unit time. We do agree that residual pool volume targets would be of value in the implementation plan. The SBA and load allocation documents will indicate that the implementation plan should contain residual pool volume targets.

Comment 7: On page 23, section 2.3.2.5, the sediment section should include "front end" introductory piece that provides some background information and information on modeling assumptions.

Response 7: We believe the model assumptions are laid out in section 2.3.2.5.1 between pages 31 and 34. Since the model assumptions and its documentation are so important, we have expanded this discussion greatly in Appendix B. More discussion would burden the basic thrust of the SBA.

Comment 8: On page 31, section 2.3.2.5.1.1.1, agricultural land was not incorporated into the analysis. Yet grazing in the lower basin.

Response 8: In the case of the North Fork Coeur d'Alene River, the agricultural land is all grrazing land. The RUSLE coefficients are applied to this land in the Little North Fork and the lower North Fork sub-watersheds. Grazing is not practiced elsewhere to any great extent.

Comment 9: On page 31, section 2.3.2.5.1.1.1, the TMDL should say where/why the agricultural sediment yield coefficients were applied.

Response 9: We believe the SBA says that the agricultural coefficients are applied to the grazing land. This has been clarified in the SBA.

Comment 10: On page 31, section 2.3.2.5.1.1.3, the TMDL indicates paved roads were assigned a sediment yield coefficient at the low end for the Belt geologic type. The assessment should rationalize this coefficient and refer to table 15.

Response 10: This assumption is rationalized in Appendix B. Its use is clarified in the SBA.

Comment 11: On page 42, first paragraph and section 3.1.4, the TMDL fails to adequately define how background sedimentation was calculated. Natural and background sedimentation rates are confused.

Response 11: Natural and background sedimentation rates were used interchangeably as the amount of sediment yield expected from the fully forested watershed. We believe this was explained in the text, however this point has been clarified in the SBA and TMDL.

Comment 12: On page 42, first paragraph & section 3.1.4, the TMDL should provide an explanation of why 50% above background was selected as the goal when 50% is still in the chronically detectable range. The TMDL should show how 50% does not affect the beneficial uses.

Response 12: The TMDL cites the Washington Board of Forestry Guidelines. These guidelines indicated clear water quality problems above the benchmark of 100% above background and the possibility of chronic effects between 100% and 50% above background. Below 50% they speak only to "detectable" sediment. To our knowledge sediment is always detectable in streams, since it is a natural component of streams. IDEQ reads the Washington Board of Forestry guidelines to clearly indicate that water quality problems below 50% above background do not occur. These points are made clear in section 3.1.4.

Comment 13: On page 43, section 2.3.2.5.3, a residual pool volume target may be necessary.

Response 13: See response to EPA comment 6. We expect to recommend this for the implementation plan, but in the allocation (TMDL) will address mass per unit time as is required as the initial guideline in federal regulation.

Comment 14: The summary fails to identify timber extraction activities as a source of sedimentation in the watershed.

Response 14: Timber extraction is a fuzzy term. The assessment deals with all aspects of timber extraction. It provides higher yield coefficients for non-stocked forest acres, those not replanted and established, it addresses roads on which timber is exported. Timber extraction, removal of the log has no quantifiable impacts we have identified other than these. The summary was assessed to make clear the removal of vegetation from landmasses and the impacts of roads are addressed. It is unlikely the term timber extraction itself will be used.

Comment 15: Section 3, Sediment and metals TMDLs, this section should be incorporated into the main body of the document.

Response 15: The format used in the package, Section 1.0 Executive Summary, Section 2.0 SBA, Section 3.0 TMDL allocations, Section 4.0 Responsiveness Summary and Section 5.0 Implementation plans is set by the State Office and is the format required by IDEQ.

Comment 16: In section 3.1.5, Loading capacity, 3rd sentence, the TMDL indicates that adequate quantitative measurements of the effects of excess sediment have not been develop. This is not entirely true. The comment cites work of the European Inland Fisheries Advisory Commission on suspended sediment concentrations.

Response 16: The European Fish Commission quantitative measurements are obviously measurements of suspended sediment. Bed load sediment is clearly identified in the SBA as the pollutant of concern. The section was clarified by inserting the work "bed load" sediment.

Comment 17: In section 3.1.5, Loading Capacity, 1st and 2nd bullets, the assumption used in this TMDL is that natural background is assumed to support beneficial uses, that 80% above background is likely to support beneficial uses. The assumptions conflict with earlier assessment where Washington Forest Practices Board is cited; 50-100% above background chronically detectable sediment; 100% above background water quality violation. To resolve the problem the TMDL goal should be placed at background as shown in Table 17.

Response 17: The 80% is a typographical error it should be 50%. The 80% was corrected to 50%.

Comment 18: In section 3.1.5, Loading capacity, essentially same comment as comment 17.

Response 18: See the response to EPA comment 17.

Comment 19: The word interim should be struck from the TMDL. TMDL actions are final actions.

Response 19: We disagree. Any TMDL is subject to revision as standards change or new information is developed. In the usage of "interim" in the text, it is clear that the proper level of sediment yield will have been established. This new information will be used to develop a refined TMDL. In this sense any TMDL is interim. EPA does not govern usage of the English language, especially since the term interim still exists in its own guidance.

Comment 20: In section 3.1.5, Loading capacity, Table 3, Table 17 in Section 2, table 3 in Section 3 and table 13 in section 3 are all different. These tables should all be consistent.

Response 20: These tables are different for a reason. Table 17 in section 2 (SBA) is the model results for the major sub-basins of the watershed. Table 3 is the loading capacity, the load allowable at the point of compliance in tons per year. Table 13 is the estimated reduction necessary upstream of the point of compliance in tons per year. The simple subtraction demonstrated the modeled sediment at the point of compliance minus the loading capacity. The table and their distinctions are further clarified in the SBA and sediment TMDL.

Comment 21: In section 3.1.8, Table 13, sub-basin sediment allocation Table 13 does not indicate how the existing sediment load was calculated. The TMDL should clearly state how the percentage load reduction was calculated.

Response 21: The table takes the modeled sediment yield from the watershed above the point of compliance and subtracts the loading capacity at the point of compliance. This point has been clarified in the TMDL.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

Kootenai Environmental Alliance
P.O. Box 1598 Coeur d'Alene, ID 83816-1598

Geoff Harvey
Division of Environmental Quality
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May 2, 2000

Dear Mr. Harvey:

The following comments are in response to the Draft NF CDA River Sub-Basin Assessment. The subject title and page number of the Draft is given for each of the pages where we have comments and/or concerns.

1. Vegetation, page 4.
We do not believe the sentence that White pine, PP, and WL have been selectively logged is accurate. No data is supplied that would show the locations where the so called selective logging occurred, and during what years the selective logging occurred. Also numerous Forest Service(FS) documents released during the 1990's indicated that there were logging root rot trees in order to halt the spread of root rot. The final report needs to supply data that would show the year when the FS first realized that there logging was causing the root rot problems to get worse instead of better.

site specific

2. Cultural Impacts, page 5.
There is the following sentence on page 5 "The watershed has sustained appreciable timber harvest with the development since the turn of the century."
This sentence and other sentences on page 5 do not give a true and accurate picture of the extent of the FS logging that has taken place in the watersheds of the NF Assessment Area after 1970 and which continues up to the present time.

I have enclosed Attachment #1 which indicates that there has been very significant logging in the Coeur d'Alene National Forest(CDA NF). The data indicates that intensive clearcut logging has taken place on the CDA NF after 1970.

Between the years 1970-1979, 13,049 acres were clearcut on the Forest.
Between the years 1980-1989, 17,287 acres were clearcut on the Forest.
Between the years 1990-1996, 11,214 acres were clearcut on the

Forest.
This amounts to 41,550 acres of clearcuts, or 64.9 square miles of clearcuts. An examination of this logging will show that it was not uniformly distributed across the entire Forest. Intensive clearcut logging occurred in a number of watersheds within the 536,605 acres of National Forests that are mentioned at the top of page 5.

I have also enclosed for the record Attachment #2, FS letter to KEA, dated Nov 7, 1997. This letter has FS data for selected Compartments that include watersheds that are within the NF Assessment Area. Compartment 138 is in the Flat Creek drainage; Compartment 139 is in the Yellowdog drainage; Compartment 140 is in the Uranus drainage; Compartment 141 is in the Grizzly drainage; Compartment 142 is in the Comfy drainage; Compartment 143 is in the Clay drainage; Compartment 144 is in the Can creek drainage; Compartment 145 is in the Upper Cougar drainage; Compartment 146 is in the Lower Cougar drainage and Compartment 181 is in the Lower Steamboat drainage.
For these Compartments alone there has been over 16,000 acres clearcut. Also, it is not mentioned on page 5 that over 1,000 acres in the Steamboat Creek drainage that were clearcut in the late 1980's and early 1990's and then replanted. These acres were not in fact planted properly. These acres have had to be replanted or are in the process of being replanted.

The Final Assessment should provide to the public and the EPA data from the FS that will indicate the number of acres of clearcut logging that has taken place since 1970 for the other Compartments that are within the NF Assessment Area. This data is needed in order to show that intensive clearcut logging in the NF Assessment Area did not stop in mid century as is stated at the bottom of page 5. KEA does not have access to the Oracle database software that is used by the FS to access the TSMRS database. We would have supplied the data for the other Compartments if we had the Oracle software.

3. Delisting of waterbodies. Page 7.
KEA submitted written comments in 1999 to DEQ in Boise regarding segments that were proposed for delisting. We did not agree with the proposed delisting and the Final Assessment should indicate whether the EPA has approved delisting of any of the streams that were proposed for delisting by DEQ.

4. Flow alteration. Page 11.
We wish to add the following quotations to the record regarding the two sentences that mention flow alteration at the top of page 11.
These sentences are found in Section 1, page 2 of the USDA Forest Service, Northern Region, publication "Forest Hydrology, Hydrologic Effects of Vegetation Manipulation, part II, Haupt, H.F., et al, 1976."

"The fact that removal of forest vegetation increases streamflow has been known since the early 1900's. Research conducted across the Nation has verified this fact. Nearly every study in forested zones has shown a pronounced increase in streamflow following forest cutting or a gradual decrease in streamflow if an area is reforested (Hibbert, 1967). The magnitude of the increase or decrease is a function of climate, topography, vegetation, and other environmental factors."
From page 7 of Section 1 "Forest removal increases water yield because of one or more of the following:
1. A reduction of transpiration.
2. An increase in wind turbulence which results in redistribution of snow and greater local snow accumulation.
3. A reduction of interception.
4. More efficient conversion of the snowpack to streamflow."

From page 15 of Section 1 "Increased water yields from clearcutting have been found to be proportional to the percent of the drainage cleared (Rothacher, 1970). Greater water yields are also obtained from deep rather than shallow soils, and from high precipitation areas (Hewlett and Hibbert, 1961; Lull and Reinhart, 1967)."

5. RASI Indices, pages 14 and 15.
Our interpretation of the RASI procedure as developed by the former Forest Hydrologist for the IPNF is that increased stream flow is intimately related to the degree of bedload movement. It is the stream flow that is moving nearly 100% of the stream particles in streams within a number of the watersheds in the NF Assessment Area.
Regarding the terms managed vs. unmanaged watersheds, the unmanaged watersheds in the upper St. Joe River have not been logged. The Final Assessment should indicate that the "managed watersheds" in the NF Assessment Area have in fact been intensively logged, which includes numerous large 40 acre clearcuts. The FS TSMRS database can be queried using Oracle to indicate the number of large clearcuts that have been produced since 1970 within the NF Assessment Area.

We do not believe there is accurate, credible scientific studies that has been produced that will prove the high RASI values, along with the very RASI values are a result of road construction only in the NF Assessment Area. If there are such reports, the Final Report needs to supply the specific data from each of these studies that indicates road construction is solely responsible for high RASI values.

6. Residual pool volume. Page 16.
We wish to include for the record the following quote from the 1993 IPNF Forest Plan and Evaluation Report. On page 45 it was stated "Our data suggest that past methods of roading and harvesting have altered rain on snow peak flows effecting changes

in channel stability detrimental to physical fish habitat as a result of headwater scour. Changes in physical fish habitat, loss of residual pool depth and volume, have resulted in a downward trend in fish populations in general and the restriction of the geographic range of bull trout, a Forest Plan management indicator species."

On page 16 of the draft it is indicated that the NF segment below Yellowdog Creek has diminished pool volume, and Steamboat Creek has significant reductions in mean residual pool volume. We believe that there is a direct correlation between the negatively impacted pool quality and pool quantity in the streams in each area, and the 4,348 acres that have been clearcut in the Yellowdog Compartment, and the 5,599 acres that have been clearcut in the Comfy, Clay, and Can Compartments in the Steamboat Creek drainage. It also should be pointed out that additional logging has taken place in the Yellowdog drainage since 1997 and more logging is proposed by the FS for both the Yellowdog Downey and Steamboat drainages.

7. Fish Population Data. Page 18.
We wish to enter into the record the following sentences that concern the discussion of Westslope Cutthroat Trout on page 18. On page 216 of the Small Sales Draft EIS, Coeur d'Alene River Ranger District, March 2000, it is stated "A population status review of the westslope cutthroat trout in Idaho has determined that populations in northern Idaho have declined over their historic distribution with viable populations existing in only 36% of the original Idaho range. The primary cause of the decline was found to be habitat degradation (Rieman and Apperson 1989)." We believe that stream bed instability, including bedload movement, is in fact habitat degradation. The habitat degradation resulting from the streambed instability, including bedload movement, appears to be causing as much damage to fisheries as does sediment production.

8. Land use data. pages 21 thru 27.
Tables 9a thru 9g left out data for the number of acres that have been logged from FS timber sales in each of the watersheds listed. There is not explanation for the complete lack of logging data on these tables and the issues relating to increased flows canopy openings, and bedload movement.

9. Forest land sediment yield and export. Page 28.
Page 28 discusses sediment yield and the WATBAL model. The 1989 WATBAL Technical User Guide on page 15 has a section devoted to Sediment Routing. On page 15 it is stated "WATBAL uses a primitive equation based on a function of the area of the watershed to perform this function. It is recognized that this lack of accurate stream routing and insufficient recognition of stream dynamics is the weakest and as a critical element must be given top priority in future developments."

A recent document from the Clearwater National Forest, North Lochsa Face ROD, April 2000, indicates that there have been some updates to the Model, including landtypes and precipitation data, but no update that would produce more accurate stream routing. We question how useful the values are that are given in the draft document. The sediment routing section of the Model still lacks scientific accuracy.

10. Sedimentation Mechanisms. Page 38.
There is the following sentence near the bottom of the page "Stream bed instability is typically caused by increases in the sedimentation or stream power." This sentence is not clear. It would seem that stream bed instability is the amount of bed material that is moving annually. The degree or percent of the streambed that is moving annually should also be a part of streambed instability.
The final Assessment document should have an extended discussion of the hydrology involved when talking about stream bed instability.

It is also mentioned on page 38 "The root parameter of concern for the North Fork is hydrologic modification." The next sentence indicates that logging is the chief land use and that the cause of the hydrologic modification should be sought in this nonpoint source activity. Why would the extensive regeneration logging in the watersheds not be considered as a cause of hydrologic modification? The FS Forest Hydrology publication mentioned above in #4 considered logging as a hydrologic modification.

The first 4 sentences at the top of page 39 do not make sense in relation to the sentences at the bottom of page 38. It appears some sentences are missing.

11. Vegetation Alteration,etc. pages 39 thru 43.
The following Federal Laws have specific requirements that were to be followed by the Forest Service regarding planning timber sales and logging on the National Forests.

The National Environmental Policy Act of 1969, P.L. 91-190, effective January 1, 1970.
NEPA at 40 CFR 1500.1(b) states "The information must be of high quality. Accurate scientific analysis expert agency comments and public scrunity are essential to implementing NEPA."
NEPA at 1500.3 states "Parts 1500 through of this title provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of the National Environmental Policy Act of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321 et seq.)"
NEPA at 1502.16(a) & (b) have requirements that concern direct and indirect effects.
NEPA at 1502.24 has requirements regarding methodology and scientific accuracy.

NEPA at 1508.7 has requirements regarding cumulative impacts.
NEPA at 1508.27(a)& (b) has requirements regarding significant impacts.

The National Forest Management Act of 1976, P.L. 94-588, October 22, 1976.
The NFMA has the following requirements at Sec. 6(g)(3)(E)... "insure that timber will be harvested from National Forest System lands only where--
(i) soil, slope, or other watershed conditions will not be irreversibly damaged;
(iii) protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat;".
NFMA at 6(g)(3)(F)(v) also required that... "such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource."

The Clean Water Act of 1972. P.L. 92-500. also had as a goal to restore and maintain the chemical, physical and biological integrity of the Nation's waters. An interim goal was the protection and propagation of fish, shellfish, and wildlife.

The Idaho Forest Practices Act also has been in existence for over 25 years. The Act and the state BMP's were suppose to prevent damage to fisheries and water quality when logging took place on forest lands.

The Forest Service consistently over the last 25 years released timber sale documents with a Finding of No Significant Impact (FONSI). The FONSI's stated there would be no negative impacts to fisheries, fisheries habitat, water quality and water quantity. Every single timber sale document released for logging in the 27,000 acre Steamboat Creek drainage had a Finding of No Significant Impact. This drainage has had over 100 timber sales of various sizes with over 215 MMBF of timber removed from the drainage. Every timber sale proposed in Yellowdog Downey drainage also had a Finding of No Significant Impact, as has nearly every other timber sale proposed for the drainages within the NF Assessment Area. Large timber sales that took place in; Shoshone Creek, Lost Creek, Cabin Creek, Rampike Creek, Clinton Creek, Prichard Creek, Falls Creek, East and West Fork of Eagle Creek also had FONSI's issued by the Forest Service.
The facts show however that the FS FONSI's have been consistently wrong, but this is not mentioned anywhere in the draft.

The draft assessment on pages 39 through 43 does not discuss, nor explain, nor address the issue of watersheds now being classified

by the FS as Non Functional(NF), or Functioning at Risk(FAR). Enclosed as Attachment #3 are pages 60 and 61 of the IPNF's 1998 report "An Assessment of the Coeur d'Alene River Basin." Page 60 is a map that indicates the areas on the entire CDA National Forest, which includes the NF Assessment Areas, that are either NPF or FAR. Page 61 describes NF and FAR.

How is it is that nearly every single major watershed in the NF Assessment Area is now either classified as NF or FAR when the experts consistently stated year after year after year that there would be no negative impacts to these watersheds from logging? How is it that the State BMP's did not protect the fisheries in each of the watersheds from degradation?

The classifications of the watersheds by the FS are now classified as Properly Functioning(PF), FAR, and Not Properly Functioning(NPF), IPNF Douglas Fir Beetle FEIS, chapter III, page 117, June 1999.
For the record, the DBF FEIS, pages 122 thru 144 of Chapter III, describe the following watersheds as either NFP or FAR; the Hayden Lake watershed. Also, the Fernan Creek tributary, Wolf Lodge Creek tributary, Marie Creek tributary, Stella Creek tributary, Beauty Creek tributary, Carlin Creek tributary, Cedar Creek tributary, Forth of July Creek tributary, all of which are in the CDA Lake watershed. Also listed as either NPF or FAR; Chain Lakes Analysis area; Steamboat Creek watershed; Bumblebee Creek watershed; part of the Hart Creek watershed; and the Beaver Creek watershed.

Since the emphasis is on the damage caused by roads in the NF Assessment Area on pages 39 thru 43, there is no explanation or discussion as to why the damage happened. The professional expertise and judgement by the experts would have been expected to prevent this damage.
The Forest Hydrology publication, in Section 4 has a discussion that concerns protecting fish habitat and road construction. The References that are cited include "Criteria for designing and locating logging roads to control sediment, Packer, Paul E., Forest Science, 13(1) 2-18-(1957)."
Another Reference is "Guides for controlling sediment from secondary logging roads, Christenson, G.F., Intermountain Forest and Range Experimental Station, Northern Region Handbook, U.S. Forest Service, Region 4 (1964)."
There are also 3 References that have a date of 1970 that all address the issue of Forest roads, roadbuilding and sediment production.

Would not a literature search for FS documents relating to road building and sediment production produce a large number of documents that have been published over the past 40+ years? How is it that the damage to the watersheds by road building occurred when the FS experts had the research to prevent the

damage?
The draft on pages 39 thru 43 does not mention or discuss the amount of FS road construction and reconstrucion that took place in the watersheds throughout the 1980's and into the 1990's. The number of miles of new road that were built and the number of miles that were reconstructed should be included in the Final Asessment.
It is clear that research regarding road building and sediment production was performed by the FS and available to the FS since at least 1957. Now 40+ years later, it is stated by the experts, who are absolutely sure, that building new roads, reconstructing old roads, along with pulling some culverts and closing some roads will fix all the water related problems in the watersheds of NF Assessment Area.

Proposed TMDL's that are strictly concerned with sediment reductions alone and that do not address stream bed movement and instability will not meet the reqirements of the CWA. The intent of the Clean Water Action Plan will also not be meet with the continued refusal to address the issues relating to peak flows from canopy removal and bedload movement.

12. Pollution Control Strategy, page 44.
More FS timber sales will not cure the water related problems within the NF Assessemet Area. This approach has not worked and will not work due to continued failure of FS timber sales to meet the requirements of Federal laws including NEPA, NFMA, and the CWA. More timber sales are a business as usual approach that has as the highest priority cutting trees in order to meet timber targets.
The proposed pollution control strategy would simply allow more logging in degraded watersheds and any so called improvements to fisheries would take 40 or more years to achieve at the earliest. FS documents for proposed timber sales, such as the Boston Brook sale proposed during 1998 in Steamboat Creek have already stated that the improvements to the fisheries from restoration work would be slight and would only occur over the "long term". At the same time there would be a negligible improvement to the fisheries in the drainage, 667 acres were planned to be clearcut and 8.4 MMBF of timber removed.

The March 30, 2000 ruling by U.S. District Judge William Alsup in San Francisco which upheld the EPA's authority regarding nonpoint sources directly concerns the proposed strategy of continued logging in damaged watersheds in the Assessment Area. The cumulative effects to the fisheries in the watersheds from both logging and road building are being ignored on page 44 of the draft and will not comply with the requirements of the CWA.

It has not be shown anywhere in the draft that the proposed strategy of more logging and road building in the damaged watersheds will significantly improve the fisheries and fish

habitat in the Assessment Area. No analysis is supplied in the draft that indicates independent professional fisheries biologists, or Idaho Fish & Game fisheries biologists support the proposed logging strategy called for on page 44. The final assessment document needs to include an indepth analysis of the fisheries conditions from independent professional fisheries biologists.

The 573,695 acre watershed includes 536,605 acres that are managed by the FS and another 3,378 acres managed by the BLM, page 5 of the draft. Any proposed timber sales in the NF Assessment Area by the FS must fully and completely comply with the Federal Laws mentioned earlier.

13. Appendix B. pages 1 thru 4.
Regarding the use of the WATSED model, the final assessment document should have information that will indicate to the public the minimum number of acres in a watershed that can be analyzed by the Model. The final assessment document should also include information that will inform the public of the size in acres of the smallest watershed that was analyzed using the Model.

We wish to be put on the mailing list to receive a copy of the final assessment when it is released.

Sincerely,

Mike Mihelich

Mike Mihelich Forestry Committee

Attachments: 1, 2, 3

cc: US EPA

United States Department of Agriculture

Forest Service

Idaho Panhandle National Forests

Coeur d'Alene River Ranger District

Silverton Office
P. O. Box 14
Silverton, ID 83867

Fernan Office
2502 East Sherman Avenue
Coeur d' Alene, ID 83814

File Code: 1950

Date: October 23, 1997

Mike Mihelich
Kootenai Environmental Alliance
P.O. Box 1598
Coeur d'Alene, ID 83816-1598

Dear Mr. Mihelich:

The following information is provided from the Timber Stand Activities database in response to your request dated September 6, 1997.

1. Approximately 701,166 acres of the Coeur d'Alene River Ranger District are classified as forested.

2. Approximately 74,911 acres have had regeneration harvests from 1965-1996 on the Coeur d'Alene River Ranger District. This includes clearcut, seedtree, selection, shelterwood, and liberation harvests.

3. Approximately 56,439 acres were clearcut harvested from 1965-1996 on the Coeur d'Alene River Ranger District. During the same period, salvage logging occurred on approximately 57,960 acres, and shelterwood harvests occurred on approximately 11,070 acres.

4. Approximately 14,889 acres were clearcut harvested from 1965-1969 on the Coeur d'Alene River Ranger District.

5. Approximately 13,049 acres were clearcut harvested from 1970-1979 on the Coeur d'Alene River Ranger District.

6. Approximately 17,287 acres were clearcut harvested from 1980-1989 on the Coeur d'Alene River Ranger District. with approximately 11,214 acres clearcut harvested from 1990-1996.

7. Between 1980 and 1989, clearcut harvest occurred on 969 acres in Compartment 138: on 1,276 acres in Compartment 139; on 356 acres in Compartment 140; on 131 acres in Compartment 141; on 820 acres in Compartment 142. on 469 acres in Compartment 143; on 180 acres in Compartment 144; on 1,580 acres in Compartment 145; and on 14 acres in Compartment 146. Between 1990 and 1996, clearcut harvest occurred on 128 acres in Compartment 138; on 72 acres in Compartment 139; on 127 acres in Compartment 140; on 0 acres in Compartment 141; on 435 acres in Compartment 142, on 0 acres in Compartment 143; on 479 acres in Compartment 144; on 10 acres in Compartment 145; and on 96 acres in Compartment 146.

8. Between 1980 and 1989, clearcut harvest occurred on 0 acres in Compartments 314, 319, 335 and 346; on 57 acres in Compartment 320; and on 285 acres in Compartment 357. Between 1990 and 1996, clearcut harvest occurred on 0 acres in Compartments 314, 319, 320, and 335; on 11 acres in Compartment 346; and on 192 acres in Compartment 357.

You also requested information regarding the amount of timber volume removed from the Coeur d'Alene Ranger District since 1965, and since 1980 in specific compartments. Our database records do not contain this information.

Susan Jeheber-Matthews

SUSAN JEHEBER-MATTHEWS
District Ranger

United States Department of Agriculture

Forest Service

Idaho Panhandle National Forests

Coeur d'Alene River Ranger District

Silverton Office
P. O. Box 14
Silverton, ID 83867

Fernan Office
2502 East Sherman Avenue
Coeur d' Alene, ID 83814

File Code: 1950

Date: November 7, 1997

Mike Mihelich
Kootenai Environmental Alliance
P.O. Box 1598
Coeur d'Alene, ID 83816-1598

Dear Mr. Mihelich:

The following information is provided from the Timber Stand Activities database in response to your request dated November 1, 1997.

Compartment #	Acres	Acres of Regeneration	Acres of Clearcut Harvests
138	9,992	3,119	2,672
139	11,471	4,871	4,348
140	4,757	815	815
141	4,635	131	131
142	8,637	2,968	2,514
143	7,640	4,115	2,187
144	5,867	933	898
145	8,662	3,439	2,146
146	4,062	242	137
181	5,921	585	378

Please note that under some regeneration methods, a second treatment may occur on the same acres. For example, a shelterwood is a regeneration harvest method in which some of the trees remain following initial harvest to supply seed and shelter for the remaining stand. Final removal of the shelterwood trees may or may not occur following regeneration establishment (5 to 15 years).

If you have additional questions, please feel free to contact either Steve Bateman or me at 769-3000.

Susan Jeheber-Matthews

SUSAN JEHEBER-MATTHEWS
District Ranger

Coeur d'Alene Geographic Area
Watershed & Aquatic Condition and Priority

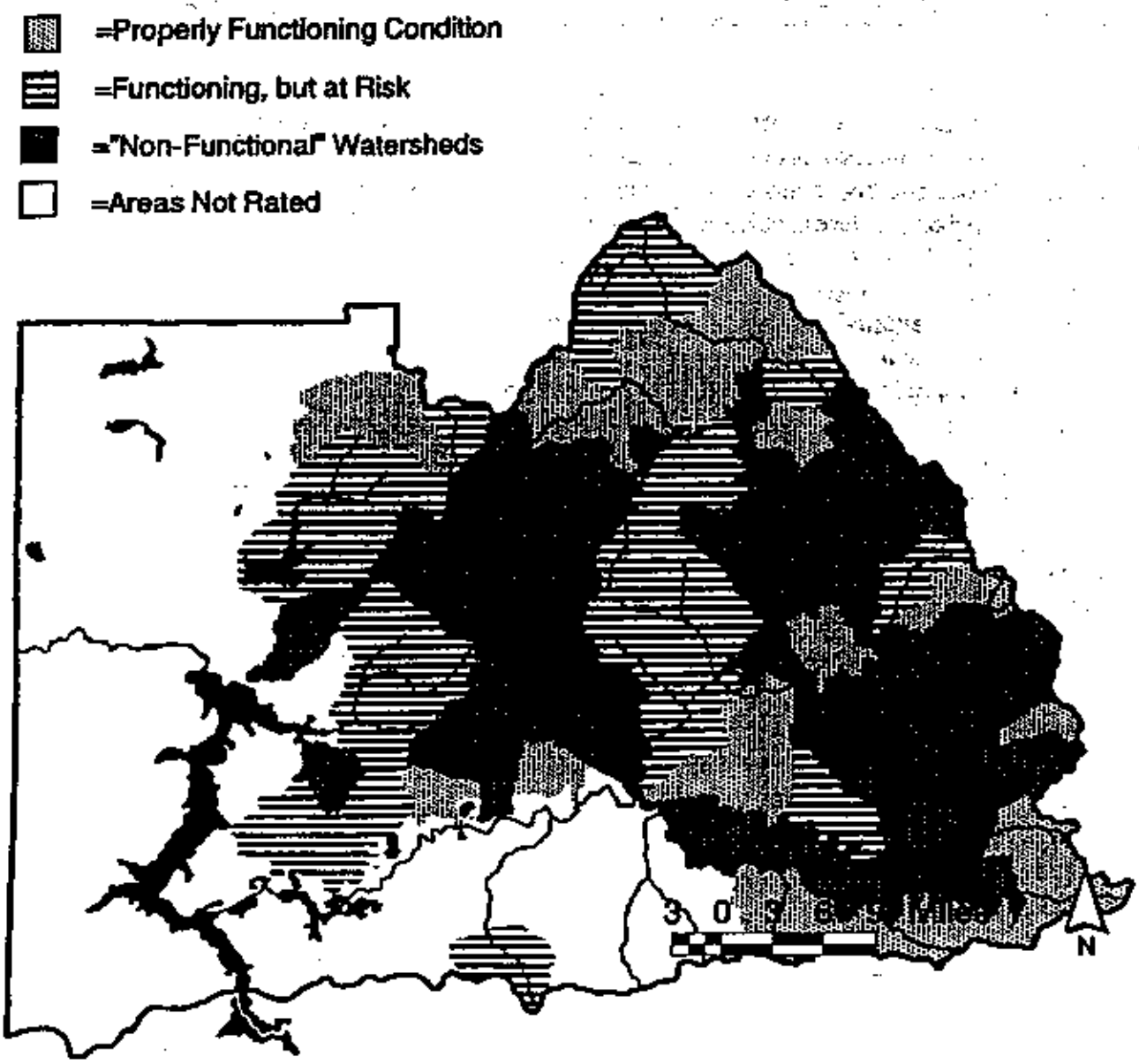

FIGURE 21. COEUR D'ALENE GEOGRAPHIC AREA:
WATERSHED / AQUATIC CONDITION AND PRIORITY.

Expectations for these watersheds include:

* Conserve and protect functioning processes
* Little or no risk to aquatic systems
* No priorities for watershed-wide restoration
* Few new roads.

"Functioning-at-risk" watersheds have high watershed and aquatic integrity with present or ongoing adverse disturbances likely to compromise that integrity if the disturbances are not modified or corrected; or, at a minimum, the watersheds have moderate hydrologic and aquatic integrity which has been compromised by adverse disturbances.

Expectations for these watersheds include:

* Highest priority for watershed and aquatic restoration
* Net reduction in roads
* Focus for watershed restoration funding.

"Non-functional" watersheds are either not in dynamic equilibrium or the physical and/or aquatic integrit has been so compromised that restoration efforts may be futile without extraordinary funding sources an very long recovery time periods. Non-functional watershed systems contain aquatic resources that are degraded; essentially, these systems are not capable of fully supporting beneficial uses without management intervention and/or extremely long time periods.

Expectations for these watershed include:

* Aquatic recovery is a very long prospect
* Large-scale restoration occurs in conjunction with vegetative restoration
* Some short-term aquatic risks may be tolerated to foster long-term recovery.

Further detailed information on the watershed restoration priorities can be found in the watershed recommendation component report listed in Appendix A.

Terrestrial landscapes were classified into one of three condition classes (Figure 22):

– Condition 1 – Moderate problems, but some desirable attributes;
– Condition 2 – Serious problems;
– Condition 3 – Relatively good condition.

"Condition 1" landscapes have vegetative patterns and composition that are out of sync with natural forces, fragmentation and loss of large blocks of mature/old forests, and loss of wildlife security due to heavy roading. However, these same landscapes also have significant areas with desirable attributes that should be sustained. "Condition 1" landscapes are primarily a heavily roaded matrix of mature/old forest mixed with numerous patches of young stands that were regenerated in the past 40 years.

Expectations for these landscapes include:

* Designating well connected, large blocks of mature/old forest to meet the needs of species dependent upon this habitat type.
* Tending young stands to favor potentially long-lived early seral tree species and to promote development of large trees.
* Reducing road density to increase wildlife security, while maintaining a basic transportation system necessary for stand tending.

May 23, 2001

Mike Milhelich
Kootenai Environmental Alliance
P.O. Box 1598
Coeur d'Alene ID 83816-1598

Dear Mike:

Thank you for the comment provided by Kootenai Environmental Alliance (KEA) on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs) in your letter of May 2, 2000. A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made by KEA as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: The commentor does not believe that White Pine, Ponderosa and Western Larch were selectively logged, Page 4, SBA .

Response 1: Selectively logged was used here in the sense that these species were taken while most others were left ("highgraded") or the rest of the stand was slashed and burned. This was typical in the early logging days according to Russell (Russell, B. 1985. North Fork of the Coeur d'Alene. Lacon Press Harrison, Idaho. This point has been clarified in the text of the SBA.

Comment 2: The description of the magnitude of logging does not give the true picture of the logging. This is followed by a list of intensive clearcutting since 1970.

Response 2: The magnitude of logging is described in the document and certainly the road density data indicates the level of watershed entry. This part of the sub-basin assessment (SBA) has been beefed up to explain the logging has been extensive in the basin.

Comment 3: KEA did not agree with the waterbodies delisted from the 1996 list to create the 1998 list.

Response 3: EPA approved he 1998 list 303(d) list with some adjustments. Those EPA adjustments addressed temperature delistings and do not affect the North Fork Coeur d'Alene watershed.

Comment 4: Sentences on flow alteration provided for the record. From Section 1 page 2 of U.S. Forest Service Hydrologic Effects of Vegetation Manipulation Part II Haupt, H. F. et. al. 1976.

Response 4: This material is noted. The SBA has been altered to indicate that discharge alteration is possible but unproven in the first and possibly second order tributaries. However, the flood frequency analysis clearly indicates that this effect is soon diminished in the larger order streams and is not detectable at the USGS gauge sites.

Comment 5: RASI Indices located on pages 14 & 15. The interpretation of RASI is that bed particles move in high percentages is related to high flows and not road construction.

Response 5: RASI measurements indicate the percentage of the particle size distribution moving in-stream during the two-year flow event. The reason for that movement may be varied. It may be a function of stream power, but it may also be a function of increased sediment yield to the stream.

Comment 6: Residual pool volume located on page 16. Statements from Forest Service documents added to the record on indicating that roading and timber harvest increased peak flows.

Response 6: See response to comment 4.

Comment 7: Fish population data located on page 18. Statements from Forest Service documents provided indicate that cutthroat trout populations have declined.

Response 7: The data in the Table 13 on page 22 support and document this view. The SBA chooses to develop its own conclusions from the data and not rely on those of the agencies.

Comment 8: Land use data located on pages 21-27. Tables leave out the number of acres that have been logged by Forest Service timber sales.

Response 8: DEQ was strongly advised by its sediment technical advisory group that forest acres that had been harvested, but that were now fully stocked with young trees, seedlings and saplings, do not yield sediment at any greater level than areas in coniferous forest. The model was run assigning land types in seedlings and saplings a higher sediment yield to resolve the magnitude of the difference. It was found to be a small component of the sediment source. For these reasons DEQ modeled land use contribution of sediment by assigning non-stocked areas the maximum value of the sediment yield range for coniferous forest on Belt geology, while all other forest land was assigned the mid-range value. These details of the modeling are described in Appendix B.

Comment 9: Forest Land sediment yield and export located on page 28. Comment on the correctness of the WATBAL model.

Response 9: The sediment yield coefficients were incorrectly referred to as the WATSED coefficients. The coefficients are the mean coefficients for Belt geology developed from in-stream sediment measurements in northern and north central Idaho. The mis-identification lead to the mistaken idea that WATSED and WATBAL were used to estimate sediment yield. This is not true.

Comment 10: Sedimentation mechanisms located on page 38. Sentence near bottom of page is not clear in that it ascribes channel instability to stream power and sedimentation. Regenerative logging is adding to stream power and is important in stream instability. It appears some sentences are missing.

Response 10: The missing sentences have been restored.

Comment 11: Vegetation alteration located on pages 39-48. The federal and state laws that the Forest Service must comply with are listed. The assessment does not address watersheds the Forest Service classifies as nonfunctional or functioning at risk. Issues are stated with Forest Service NEPA documents. There is no discussion in the assessment of why the damage happened. Would not a literature search and review of Forest Service document be appropriate? TMDLs that deal with sediment alone and do not address bed load sediment will not meet the requirements of the CWA.

Response 11: The SBA is addressing the listed pollutant of concern. It is not delving into the many federal or even Clean Water Act requirements the Forest Service is required by federal law to adhere to. The SBA must remain focused on the pollutant of concern and it must make the case that the pollutant in impairing the beneficial use(s).

Comment 12: Pollution control strategy located on page 44. Additional timber sales will not solve the water quality problems of the North Fork Coeur d'Alene watershed.

Response 12: The Pollution Control Strategy Section suggests two methods by which the sediment yield might be controlled. One of these would require timber harvest. The SBA has been modified to not take a position on timber harvest. It clearly states this position on page 49. It simply states that if timber harvest is pursued (a decision of the Forest Service, BLM, IDL, Louisiana Pacific and numerous private landowners) the pollution credit scheme suggested might be instituted to make road remediation a part of doing business.

Comment 13: Appendix B pages 1-4. Regarding use of the WATSED model, the final document should have information that indicates the minimum number of acres in a watershed that can be analyzed by the model.

Response 13: See response to comment 9. The WATSED model was not used in the SBA.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

JUN 1 9 [redacted]

Reply To
Attn Of: OW-134

Geoff Harvey
State of Idaho Department of Health and Welfare
Division of Environmental Quality
2110 Ironwood Pkwy
Coeur d'Alene, ID 83814

Dear Mr. Harvey:

Thank you for giving me the opportunity to provide comments on the North Fork Coeur D' Alene River Subbasin Assessment. Enclosed are detailed comments. The review was based on "Subbasin Assessment: Critical Questions" from the State of Idaho Guidance for Development of Total Maximum Daily Loads. The major concerns with the assessment are listed below.

Although the pollutants of concern in this subbasin include sediment and metals (and dissolved oxygen, oil and gas, nutrients and bacteria for "delisted" waterbodies), the assessment almost entirely focused on sediments. For example, the assessment did not address metals with respect to loads, potential sources, pollution control efforts done to date, planned activities to achieve water quality standards for metals, etc.

The draft assessment focuses on sediment reductions and does not address stream bed movement and instability, peak flows from canopy removal and bedload movement. The final assessment will need to incorporate the results of the field work scheduled for this summer on channel/stream bed instability and stream bank erosion.

When describing the damage to the watershed caused by excess sediments from vegetation alteration, etc., the assessment failed to provide an explanation or discussion as to why the damage occurred. This makes it difficult to evaluate the likelihood of success for the proposed plan of providing credits for rehabilitating abandoned stream crossings and encroaching roads to the timber industry which could be used toward building new roads. Since road construction and maintenance (or lack of) had been a primary cause of the damage to the watershed, the assessment will need to include an explanation as to how new road construction will not result in negative impacts to the watershed such as further channel instability, hydrologic modification, and habitat degradation, etc. Furthermore, it was not clear whether this proposal has been reviewed and endorsed by IDEQ, the Forest Service, timber companies, and environmental groups. Finally, you failed to provide the timeframe in which the rehabilitation is expected to be completed.

The North Fork Coeur D'Alene Subbasin assessment concludes that 16 waterbodies listed in Table 2 (page 7) are now meeting Idaho water quality standards, and should be removed from the §303(d) list, based on procedures outlined in the 1996 Waterbody Assessment Guidance. EPA reviewed the 1996 WBAG during the 1998 303(d) list cycle and agreed it was an acceptable method for making listing decisions for the 1998 list. However, EPA raised several concerns with the WBAG process, and reached agreement with IDEQ on a time frame to resolve these issues (Letter from: Randall F. Smith, Director, Office of Water, USEPA Region 10; To: Stephen Allred, Administrator, Idaho Division of Environmental Quality; Re: WBAG process and revisions. May 6, 1999). Specifically, revisions to address these concerns were to be completed by the 2002 list cycle. Our agreement for the 2002 list is that all BURP data collected since 1993 would be reconsidered using the revised WBAG process in making listing decisions. While the North Fork Coeur D'Alene Subbasin Assessment concludes that 16 waterbodies listed in Table 2 are now meeting water quality standards and should be removed from the list, the expectation is that these conclusions will be revisited using the revised WBAG before these waters are removed from the Idaho 303(d) list.

If you have any questions about the comments, please feel free to contact me at (206) 553-6912.

Sincerely,

Curry Jones
Watershed Restoration Unit

Enclosure

SUBBASIN ASSESSMENT (SBA)

SCOPE REVIEW

Subbasin:	**(Draft) North Fork Coeur D' Alene River Subbasin Assessment**
Reviewer:	Curry Jones and Jayne Carlin
Date of Review:	May 10, 2000
Pollutant:	sediment, metals (temperature, dissolved oxygen, oil and gas, nutrients and bacteria)
Type of Proposed TMDL:	Non-Point Source

	Reviewers Comments
Characterization of Watershed	**Issues/Comments:** ***None***
	Suggestions: ***None***

Regulatory Requirements	**Issues/Comments:** • **The North Fork Coeur D'Alene Subbasin assessment concludes that 16 waterbodies listed in Table 2 (page 7) are now meeting Idaho water quality standards, and should be removed from the §303(d) list, based on procedures outlined in the 1996 Waterbody Assessment Guidance. EPA reviewed the 1996 WBAG during the 1998 303(d) list cycle and agreed it was an acceptable method for making listing decisions for the 1998 list. However, EPA raised several concerns with the WBAG process, and reached agreement with IDEQ on a time frame to resolve these issues (Letter from: Randall F. Smith, Director, Office of Water, USEPA Region 10; To: Stephen Allred, Administrator, Idaho Division of Environmental Quality; Re: WBAG process and revisions. May 6, 1999). Specifically, revisions to address these concerns were to be completed by the 2002 list cycle. Our agreement for the 2002 list is that all BURP data collected since 1993 would be reconsidered using the revised WBAG process in making listing decisions. While the North Fork Coeur D'Alene Subbasin Assessment concludes that 16 waterbodies listed in Table 2 are now meeting water quality standards and should be removed from the list, the expectation is that these conclusions will be revisited using the revised WBAG before these waters are removed from the Idaho 303(d) list.** • **The TMDL identifies Shoshone Creek as water quality limited for unknown pollutants. What is the pollutant ?** • **Include any data information on current and historic water quality and beneficial use status.** • **Assessment states that TMDLs are not needed for dissolved oxygen, bacteria, nutrients, or oil and grease (gas?) for Prichard Creek and for pH for EF Eagle Creek, as found no evidence of these impairments. Need to include a reference to the testing and analysis on which these conclusions are based.** • **Table 1 identifies Beaver Creek as impaired for sediments and Table 13 identifies this same waterbody as impaired by metals. Which is correct? Is Beaver Creek listed for both sediment and metals ?**

	• The Subbasin assessment notes that a sediment TMDL is not needed for Beaver Creek since fish density data and residual pool volume are the same as reference streams. Provide a to the reference stream studies, testing or analysis on which the conclusion that Beaver Creek did not need a sediment TMDL was based. • Identify gaps in data or if there are no gaps, then state that fact. • Section 2.3.1 fails to specifically identity active clearcut logging that continues to occur in the North Fork Coeur D' Alene subbasin. A Forest Service memo (October 1997) shows the number of acres that have been logged. This information should be incorporated into the subbasin assessment. The TMDL loading analysis should consider the amount of sediment delivery from recent clearcuts as well as sediment delivery from roads. • Section 2.3.2.3.2 indicates that poor residual pool volume is due to channel instability. In these watersheds where channel instability is the problem, what are the causes of channel instability ? • Section 2.3.2.4 indicates that trout densities have declined due to increased pressure by anglers. A Small Sale Draft EIS, Coeur D' Alene Ranger District, March 2000 report indicates that the primary cause of the decline in trout densities is habitat degradation. Information from the EIS should be considered in completing the subbasin assessment.
	Suggestions: • The Table 3: Water Quality Criteria Supportive of Beneficial Uses is confusing and lacks information on the criteria for the following beneficial uses: domestic water supply, agricultural water supply, special resource water (which should be defined), wildlife habitat, and aesthetics. Also this table fails to provide criteria for the following "pollutants" identified in the subbasin: metals, bacteria, oil and gas. The table includes pollutants which are not identified for any of the water bodies such as ammonia and chlorine and combines elements for no known reason such as coliforms and pH and coliforms and dissolved gas. Revise the table to include all the criteria and uses which pertain to this subbasin.

Water Quality Concerns and Status	**Issues/Comments:** • Addressed only sediments with respect to loads. Needs to address metals (and other pollutants) in terms of loads, except to provide data on concentrations/values and information on likely sources. • Need to provide information on the relationship between metals and sediments (and other pollutants) and impact of land use or source type on quantity and behavior. • Needs to discuss potential and variability of these sources with respect to metals and other pollutants. • The assessment (page 10) identifies bacterial loading comes from predominately from human sources. Is this a point source or non-point source? If this is a point source, then replace human with point source. If this is a non-point source, then the sentence should reflect that the source is non-point source. • Need additional information about how pH and metals listing on the East Fork Eagle Creek are related to metals discharge from the Jack Waite Mining Complex and/or other mines in the areas. Which mines are still in operation? Does the Jack Waite mine (or any of the other mines) have a permit to discharge?
	Suggestions: • A more detailed explanation on what is meant by vegetation manipulation and its impact on flow would be helpful.
Summary of Past and Present Pollution Control Efforts	**Issues/Comments:** • Missing discussion on whether any pollution control efforts have been done to address metals. • Need to address present or planned activities to achieve water quality standards for metals. • Need to provide timeframe for planned activities to achieve water quality standards for metals and sediments.
	Suggestions: • Noted that intensive road remediation has been completed in Steamboat Creek. Would be helpful to include additional details on the specific types of control efforts took place in Steamboat Creek. • To understand the costs involved in the remediation actions such as road removal, would be helpful to provide amount feet of impaired roads and estimated costs of road removal and/or road remediation. • Although the draft proposed implementation strategy for the North Fordk Coeur D' Alene subbasin encourages decommissioning of old timber roads (not built to FPA guidelines) in sensitive areas, the plan continues to promote active logging practices (including construction of new roads) in area where extensive logging and logging roads have degraded instream water quality. Other pollution control alternatives should be considered because this pollution control effort would not lead to the attainment of water quality standard thereby failing to protect the designated beneficial use.

May 23, 2001

Curry Jones
USEPA Region 10
1200 Sixth Avenue
OW-134
Seattle WA 98101

Dear Curry:

Thank you for the comment provided by the Environmental Protection Agency (EPA) on the North Fork Coeur d'Alene River Sub-basin Assessment and Total Maximum Daily Loads (TMDLs) in your letter of June 19, 2000. A considerable amount of comment was received on these documents. Comments raising legal issues comprised some of this comment. Response to the comment and revision of the Sub-basin Assessment (SBA) and the TMDLs has taken some time since the close of comment on January 22, 2001.

The comments made the Environmental Protection Agency (EPA) as we understood them and our responses follow. If a revision was made to the documents this is noted. A responsiveness summary of all the comment will be submitted with the assessment and TMDLs. If you wish to review the comments of others and our response and actions taken, this document should be consulted.

Comment 1: Draft assessment does not adequately address metals.

Response 1: The comment was made to an earlier sub-basin assessment (SBA) draft. Metals issues are covered in section 2.3.2.2.1 of the sub-basin assessment.

Comment 2: The assessment focuses on sediment and does not address streambed movement and instability, peak flows from canopy removal and bed load movement.

Response 2: The SBA focuses on sediment because sediment is the pollutant of concern. Bed load movement and instability are habitat issues that may be exacerbated by excess sedimentation. Peak discharge alteration was not demonstrated by the flood frequency analysis, but is a matter of flow alteration. Canopy removal, like riparian logging impact on large organic debris recruitment, are issues of habitat alteration. The issues raised are matters of either habitat or flow alteration both of which have been deemed by DEQ and EPA beyond the scope of TMDLs because these effects cannot be allocated in mass or energy per unit time.

Comment 3: The assessment does not provide an explanation of how the damage occurred. The assessment needs to explain how new road construction will not cause additional damage. It is not clear that the proposal is endorsed by the stakeholders.

Response 3: The SBA contains this information, but it is within the model interpretation. It is clear that roads that encroach on streams and to a lesser extent stream crossings are the major sediment contributors. This is not to say that non-stocked forest acres, mass failures and other sources are not site specifically problems, but these are minor sediment sources. The construction of any new roads will be with methods and in locations that will solve these problems. The old road in many cases must be removed. These issues are covered in the pollution control strategy. The stakeholder agreement was on the sediment model

development. That model was then applied and the sources identified. The SBA will be modified to further clarify the sources and the remedial requirements.

Comment 4: Segments de-listed from the 1996 list in the 1998 list must be re-assessed with an improved WBAG process when this has been developed.

Response 4: When WBAG2 is approved streams could be reevaluated. It is the decision of the State DEQ office what data sets are used to reevaluate streams and which streams are reevaluated. It will not likely affect the metals impaired streams since the exceedence of metals standards is clear-cut. It will also not affect the sediment TMDL since by necessity it must be written for the entire watershed to address the lowest segment of the watershed that is impaired, The North Fork Coeur d'Alene River from Yellow Dog Creek to its mouth.

Comment 5: The 16 segments dropped from the 1998 303(d) list need to have the BURP data since 1993 reassessed with the improved WBAG system.

Response 5: See response to EPA comment 4. When WBAG2 is approved streams could be re-evaluated. It is the decision of the State DEQ office what data sets are used to reevaluate streams. In the case of the segments de-listed in the North Fork Coeur d'Alene River HUC this is a moot point. They are all listed for sediment. A sediment TMDL addresses all of these segments.

Comment 6: The TMDL should identify Shoshone Creek as water quality limited for unknown pollutants. What is the pollutant?

Response 6: The SBA could not find any evidence of an unknown pollutant in Shoshone Creek. Pollution is most likely from sediment. The stream is included in the sediment TMDL

Comment 7: Include any data information on current or historic and beneficial use status.

Response 7: The available data is included on the historic and current beneficial use status. This is specifically the fisheries data in table 13 of the SBA.

Comment 8. Need to include data for Prichard and EF Eagle Creek on dissolved oxygen, bacteria, nutrients and oil and grease and pH.

Response 8: The SBA has been revised with this data now included.

Comment 9: Table 1 identifies Beaver Creek as impaired for sediment while Table 13 identifies it as listed for metals. Which or are both correct?

Response 9: Table 13 is now Table 18. Beaver Creek was listed for sediment. Data in the SBA and noted in Table 18 does not support the sediment listing. Nevertheless Beaver Creek is included in the basin wide sediment TMDL making the point moot. The SBA further found clear exceedences of trace metals standards. Beaver Creek is clearly impaired by metals as clarified in Table 18 that summarizes the results of the assessment.

Comment 10: The SBA concludes that a sediment TMDL is not needed for Beaver Creek because fish density and residual pool volumes are similar reference streams. Provide the reference stream studies.

Response 10: The reference stream data is provided in Tables 12 (residual pool volume) and 13 (fish density). These data for reference and listed streams is drawn from the BURP database and various fishery studies referenced in Tables 12 and 13 respectively. Buckskin is the control stream of the most analogous

size. Beaver Creek appears to have adequate residual pool volume, while its fish density and composition are similar with control stream.

Comment 11: Identify data gaps if none so state.

Response 11: Data gaps were identified. These were stated in the SBA in section 2.3.2.5.3.

Comment 12: Section 2.3.1 fail to specifically identify active clear-cut logging that continues in the North Fork. A Forest Service memo shows the clear-cut acres that have been logged. This information should be incorporated in the SBA.

Response 12: We disagree. Clear-cut logging over 40 acres is rare in the forest. The contention is made that clear-cuts add remarkably to sedimentation, however modeling with all non-stocked, seedling and sapling cover types assigned the highest sediment yield coefficient for coniferous forest on a Belt geology demonstrated only marginally higher sediment discharge to the streams. The strongly held conviction that clear-cuts themselves markedly increase sedimentation does not hold up to analysis. These points were expanded on in the SBA. The level of land treatment over the history of the forest is estimated in section 2.1.2.

Comment 13: Section 2.3.2.3.2 Indicates that poor residual pool volume is due to channel instability. What are the causes of the channel instability.

Response 13: The causes of channel instability can be stream power or excess sedimentation as explained in section 2.3.2.5.3. The flood frequency analysis does not support higher than normal discharges based on existing data from the gauges and the flood history. The assessment has been revised to suggest that first and second order tributaries might have higher discharges after harvest but no data fully supports this. Such effects are de-synchronized in the larger watershed. The model clearly indicates excess sedimentation. The SBA comes to the conclusion excess sedimentation is the most likely cause of bed instability and pool filling and the sediment TMDL addresses that sedimentation.

Comment 14: Section 2.3.2.4 Indicates that trout densities have declined due to angler pressure while USFS EIS ascribes it to habitat alteration. Information from the EIS should be included in the SBA.

Response 14: The SBA considers fishing pressure as a possible cause of low densities, however the SBA is clear in ascribing low trout density to sedimentation. DEQ would rather draw its own conclusions based on the data rather than to rely on the potentially biased opinions of any of the stakeholders. The SBA comes to the same conclusion as the Forest Service EIS selected to make a point.

Comment 15: Table 3: is confusing not including standards for DWS, AWS and SRW and including standards for pollutants not of concern to the SBA.

Response 15: Table 3 is a designed to be a general review of all the state water quality standards that affect the most sensitive and important beneficial uses of the North Fork or for that matter most forested watersheds. Domestic (DWS) and Agricultural Water Supply (AWS) do not have specific support standards in-stream in the Idaho water quality standards. Special Resource Water is a designation addressing the applicability of point discharges. The North Fork has no point discharges. For these reasons these beneficial uses were not included in a short synopsis table of the most germane standards. No table in a SBA can replace a full reading of the Idaho Water Quality Standards and Wastewater Treatment Requirements and this is not the intention of Table 3.

Comment 16: The SBA addresses only sediments with respect to loads. It needs to address metals and other pollutants.

Response 16: This comment is in response to an earlier draft of the SBA. The SBA addresses metals loads and metals TMDL allocations are provided for the streams impaired by metals.

Comment 17: Need to provide information on the relationship between metals and sediments.

Response 17: The SBA indicates the only relationship between metals and sediment. Lead is particulate bound. There is no other relationship between metals (zinc and cadmium in the dissolved fraction and lead on fine particulate) and the sediment (cobble) filling pools in the North Fork. Sediment from mining sources is a very small component even in the Prichard and Beaver Creek watersheds as compared to sediment from other sources. On a North Fork wide basis there is no comparison.

Comment 18: Need to discuss potential and variability of these sources with respect to metals and other pollutants.

Response 18: Variability of sediment discharge to the streams is discussed and its episodic nature noted. The variability of metals loads is addressed in the SBA and TMDLs by addressing flow tiers (seasonal discharge).

Comment 19: The SBA (p. 10) identifies bacterial loading from human sources. Is this point or nonpoint sources?

Response 19: The SBA is discussing potential bacterial sources on page 10. The lack of in-stream bacteria detection indicates this is not an issue.

Comment 20: Need additional information about pH and metals on East Fork Eagle Creek and metals data from the Jack Waite complex. Does Jack Waite or other mines have permitted discharges?

Response 20: The comment was made to an earlier draft of the TMDL. These data are provided in the current SBA draft. The fact that the Jack Waite Adit discharge and for that matter the discharge of all adits in Beaver, Prichard and East Fork Eagle Creek are not permitted is noted.

Comment 21: Suggest more information on vegetation manipulation and its impact on flows.

Response 21: The flood frequency analysis and historical flood data, which is the existing data does not support the contention that vegetation manipulation has altered discharge on a large basin basis. The flood frequency of the North Fork is analyzed on page 11 of the Sub-basin Assessment. The analysis examines the peak discharge events over the past sixty-two years. It finds that the 1974 and 1996 high discharge events are the largest of record. The 1933 event is thought to be the largest flood of historic times based on photographic evidence and the Cataldo and Post Falls gauges. The 1974 and 1996 events are listed in their order of size. The history of logging is clear that clear-cuts began in the forty's and fifty's and intensified through the 1960's and 1970's and decelerated into the 1980's. The flood history does not support the argument that clear-cutting has caused greater flood discharges basin wide.

The riverbed has filled with cobble materials. This phenomenon is related to erosion rates. The presence of this material has caused discharges of lower amounts to result in more over bank flooding, causing the impression that higher discharges have occurred with the proliferation of clear-cutting.

Higher discharge may occur in first and second order tributaries, but no data exists to support this contention. We have found the belief that clear-cutting increases discharges in the Coeur d'Alene basin to be firmly held, but with little evidence to support it.

The SBA was altered in many places to clarify this picture.

Comment 22: The SBA is missing discussion on pollution control efforts to control metals.

Response 22: This material is missing. Metals pollution control is taking shape in the Beaver and Prichard Creek watersheds. This information was added to the pollution control strategy section of the SBA.

Comment 23: The SBA needs to discuss present and planned activities to achieve water quality standards for metals.

Response 23: See response to EPA comment 22.

Comment 24: The SBA needs to provide the time frame for activities to achieve water quality standards for metals.

Response 24: A time line to address metals is provided in the pollution control strategy.

Comment 25: Would it be helpful to further describe the specific control efforts taken in the Steamboat Creek watershed?

Response 25: These controls were road removal actions. This fact was noted in the actions to date section. It was noted that the Autumn and Martin Creek actions were road removal actions.

Comment 26: To understand the cost of road removals it would be helpful to include additional details on the number of feet of roads to be removed and the costs.

Response 26: This assessment was not made directly for the SBA modeling but estimates are available in the GIS coverages. It would be premature to make such an assessment at this time since the estimates require ground truthing. Such an estimate is much more reasonable as a part of the implementation plan.

Comment 27: Other pollutant control alternatives should be considered because this pollution control effort would not lead to attainment of water quality standards.

Response 27: We respectfully disagree that with EPA's assertion that road removal pollution control strategy would not work. Model results based on the most current GIS databases clearly point to encroaching roads and road crossings as the major sediment source to the North Fork watershed. Road removal is a tested technology that must be paid for by some funding mechanism, but two are mentioned in the SBA. The record indicates and is supported by model results, that if roads are properly sited and constructed, sediment yield from them is a small fraction of that from improperly sited and constructed roads. The Forest Service has demonstrated road removal is effective. The only outstanding question is how to pay for it. The SBA makes an innovative suggestion. However it is not for DEQ or EPA to decide such funding issues directly.

Thank you for the comments that were developed on the North Fork Coeur d'Alene River Sub-basin Assessment and TMDLs. If you have questions concerning our responses or the actions taken, please contact me at 208-769-1422.

Sincerely,

Geoffrey W. Harvey
Watershed Coordinator