UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: OW-134

AUG 18 2000

David Mabe, Administrator
State Water Quality Programs
Idaho Division of Environmental Quality
1410 N. Hilton
Boise, Idaho 83706-1255

Dear Mr. Mabe:

The U.S. Environmental Protection Agency (EPA) is pleased to approve the "Total Maximum Daily Load for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene Basin," established on August 14, 2000, as it pertains to waters of the State of Idaho (excluding waters or portions of waters within Indian Country). We have attached a list of the 28 waterbodies/segments on the Idaho 303(d) list that are included in the TMDL.

As you know, EPA and DEQ jointly prepared this TMDL, and EPA is separately establishing the same TMDL for waterbodies within the Coeur d'Alene Reservation boundaries. Because of this close coordination on a single set of documents (including the comment response document, the technical support document, and the underlying data), EPA is in a position to approve the state portion of the TMDL soon after its submission.

This TMDL is significant step forward in the effort to reduce metals contamination in the Coeur d'Alene basin. We appreciate your assistance during the development and issuance process for this TMDL, and we look forward to working with you to implement its provisions. By EPA's approval, the Coeur d'Alene Basin TMDL is now incorporated into the State's Water Quality Management Plan under Section 303(e) of the Clean Water Act. If you have any comments or questions, please feel free to call me at (206) 553-1261, or you may call Ben Cope of my staff at (206) 553-1442.

Sincerely,

Randy Smith

Randall F. Smith
Director
Office of Water

Enclosure

Attachment

Coeur d'Alene Basin Waterbodies on the Idaho 303(d) list

HUC	SEG #	WATERBODY NAME	SEGMENT BOUNDARIES
17010302	3513	South Fork Coeur d'Alene R.	Big Creek to Pine Creek
17010302	3514	South Fork Coeur d'Alene R.	Pine Creek to Bear Creek
17010302	3515	South Fork Coeur d'Alene R.	Bear Creek to Coeur d'Alene River
17010302	3516	South Fork Coeur d'Alene R.	Canyon Creek to Ninemile Creek
17010302	3517	South Fork Coeur d'Alene R.	Ninemile Creek to Placer Creek
17010302	3518	South Fork Coeur d'Alene R.	Placer Creek to Big Creek
17010302	3519	Pine Creek	E Fk Pine Creek to S Fk CdA River
17010302	3520	East Fork Pine Creek	Headwaters to Hunter Creek
17010302	3521	East Fork Pine Creek	Hunter Creek to Pine Creek
17010302	3524	Ninemile Creek	Headwaters to S Fk Coeur d'Alene R
17010302	3525	Canyon Creek	Gorge Gulch to South Fk CdA River
17010302	5084	Government Gulch	Headwaters to S.Fk of CdA River
17010302	5127	Moon Creek	Headwaters to S Fk CdA River
17010302	5661	Milo Creek	Headwaters to mouth
17010303	2001	Coeur d'Alene Lake	NA
17010303	3529	Coeur d'Alene River	Black Lake to Thompson Lake
17010303	4015	Coeur d'Alene River	Cave Lake to Black Lake
17010303	4016	Coeur d'Alene River	Fortier Creek to Robinson Creek
17010303	4017	Coeur d'Alene River	Fourth of July Creek to Fortier Cr
17010303	4018	Coeur d'Alene River	French Gulch to Skeel Gulch
17010303	4019	Coeur d'Alene River	Latour Creek to Fourth of July Cr
17010303	4020	Coeur d'Alene River	Robinson Creek to Cave Lake
17010303	4021	Coeur d'Alene River	S Fk CdA River to French Gulch
17010303	4022	Coeur d'Alene River	Skeel Gulch to Latour Creek
17010303	4023	Coeur d'Alene River	Thompson Lake to CdA Lake
17010305	3552	Spokane River	CdA Lake to Huetter
17010305	3553	Spokane River	Huetter to Post Falls Bridge
17010305	3554	Spokane River	Post Falls Bridge to WA border

Total Maximum Daily Load for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene River Basin

Under authority of the Clean Water Act, 33 U.S.C. § 1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the U.S. Environmental Protection Agency (EPA) and Idaho Department of Environmental Quality (DEQ) are establishing a Total Maximum Daily Load (TMDL) for dissolved cadmium, dissolved lead, and dissolved zinc in the surface waters in the following sub-basins of Idaho:

South Fork Coeur d'Alene	(HUC 17010302)
Coeur d'Alene Lake	(HUC 17010303)
Upper Spokane	(HUC 17010305)

The State of Idaho is establishing the TMDL for waters of the State. EPA is establishing the TMDL for waters within the reservation boundaries of the Coeur d'Alene Tribe.

The legal and technical basis for this TMDL is described in the final Technical Support Document: Total Maximum Daily Load for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene Basin (and Appendices), the Response to Comments document, and the Administrative Record for this TMDL.

This TMDL shall become effective immediately, and is incorporated into the water quality management plans for the State of Idaho under Clean Water Act § 303(e).

Randall F. Smith

8/18/2000
Date

Randall F. Smith,
Director,
Office of Water
EPA

David Mabe

8/14/2000
Date

David Mabe,
Administrator,
Water Quality Program
DEQ

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Tables and Figures

I. Scope of this TMDL

A. Pollutant Parameters

The TMDL is established for lead, cadmium, and zinc in the dissolved form in the water column.

B. Idaho 303(d) List

As required under Section 303(d) of the Clean Water Act, the State of Idaho has promulgated a listing of waters not currently meeting applicable water quality standards. Table 1 lists the waters in the Coeur d'Alene basin that are included on the 1998 Idaho 303(d) list as impaired by metals.

Table 1. Coeur d'Alene Basin Waterbodies on the 1998 Idaho 303(d) List for Metals

HUC	SEG #	WATERBODY NAME	SEGMENT BOUNDARIES	LENGTH (Mi.)
17010302	3513	South Fork Coeur d'Alene R.	Big Creek to Pine Creek	8.99
17010302	3514	South Fork Coeur d'Alene R.	Pine Creek to Bear Creek	1.79
17010302	3515	South Fork Coeur d'Alene R.	Bear Creek to Coeur d'Alene River	0.44
17010302	3516	South Fork Coeur d'Alene R.	Canyon Creek to Ninemile Creek	0.55
17010302	3517	South Fork Coeur d'Alene R.	Ninemile Creek to Placer Creek	0.33
17010302	3518	South Fork Coeur d'Alene R.	Placer Creek to Big Creek	7.56
17010302	3519	Pine Creek	E Fk Pine Creek to S Fk CdA River	5.28
17010302	3520	East Fork Pine Creek	Headwaters to Hunter Creek	5.19
17010302	3521	East Fork Pine Creek	Hunter Creek to Pine Creek	1.57
17010302	3524	Ninemile Creek	Headwaters to S Fk Coeur d'Alene R	4.91
17010302	3525	Canyon Creek	Gorge Gulch to South Fk CdA River	6.90
17010302	5084	Government Gulch	Headwaters to S.Fk of CdA River	3.53
17010302	5127	Moon Creek	Headwaters to S Fk CdA River	4.07
17010302	5661	Milo Creek	Headwaters to mouth	2.56
17010303	2001	Coeur d'Alene Lake	NA	NA
17010303	3529	Coeur d'Alene River	Black Lake to Thompson Lake	4.21
17010303	4015	Coeur d'Alene River	Cave Lake to Black Lake	4.00
17010303	4016	Coeur d'Alene River	Fortier Creek to Robinson Creek	0.80
17010303	4017	Coeur d'Alene River	Fourth of July Creek to Fortier Cr	10.50
17010303	4018	Coeur d'Alene River	French Gulch to Skeel Gulch	4.21
17010303	4019	Coeur d'Alene River	Latour Creek to Fourth of July Cr	4.09
17010303	4020	Coeur d'Alene River	Robinson Creek to Cave Lake	1.57
17010303	4021	Coeur d'Alene River	S Fk CdA River to French Gulch	2.13
17010303	4022	Coeur d'Alene River	Skeel Gulch to Latour Creek	1.16
17010303	4023	Coeur d'Alene River	Thompson Lake to CdA Lake	4.19
17010305	3552	Spokane River	CdA Lake to Huetter	3.45
17010305	3553	Spokane River	Huetter to Post Falls Bridge	4.89
17010305	3554	Spokane River	Post Falls Bridge to WA border	6.18

C. Target sites

The following table lists nine target sites in the Coeur d'Alene basin. The required elements of a TMDL under Section 303(d) of the Clean Water Act are established at the seven target sites below that are located on 303(d) listed waterbodies. A map of the basin is included in Appendix A.

Table 2. TMDL Target Sites

Target Site Name	Description
Spokane River @ State Line	Idaho-Washington Border
St. Joe River @ Calder[1]	USGS Station No. 12414500
Coeur d'Alene River @ Harrison	Near Mouth of Coeur d'Alene River
North Fork Coeur d'Alene River @ Enaville[1]	USGS Station No. 12413000
South Fork Coeur d'Alene River @ Pinehurst	USGS Station No. 12413470; URS Greiner Station No. 271
Pine Creek	Mouth of Pine Creek; URS Greiner Station No. 315
South Fork Coeur d'Alene River @ Wallace	South Fork downstream from Ninemile Creek confluence; URS Greiner Station No. 233
Ninemile Creek	Mouth of Ninemile Creek south of Depot RV park; URS Greiner Station No. 305
Canyon Creek	Mouth of Canyon Creek at Frontage Road Bridge north of I-90; URS Greiner Station No. 288

[1] Target sites on the North Fork of the Coeur d'Alene River and St. Joe River are established for tracking purposes and allocation of loading capacity through the river network. These two rivers currently meet water quality standards based on available information.

D. Source Identification

The TMDL allocations apply to all sources contributing dissolved metals to surface waters upgradient of a given target site. The TMDL assigns individual wasteload allocations to discrete sources and gross allocations to non-discrete sources in the basin.

II. Water Quality Standards

The TMDL elements are calculated to achieve the following metals concentrations in the surface waters of the basin.

Table 3: Water Quality Criteria for Dissolved Cadmium, Lead, and Zinc

Target Site	Flow Tier (cfs)	River Hardness (mg/l)	Dissolved Cd (ug/l)	Dissolved Pb (ug/l)	Dissolved Zn (ug/l)
288 Canyon	7.1	56	0.67	1.33	64
	11	56	0.67	1.33	64
	25	45	0.57	1.05	53
	149	25	0.37	0.54	32
305 Nine Mile	2.0	73	0.82	1.78	80
	3.0	73	0.82	1.78	80
	6.9	63	0.73	1.52	71
	41	36	0.48	0.81	44
233 South Fork Wallace	22	57	0.68	1.36	65
	35	56	0.67	1.33	64
	79	47	0.59	1.10	55
	469	25	0.37	0.54	32
315 Pine	20	25	0.37	0.54	32
	29	25	0.37	0.54	32
	80	25	0.37	0.54	32
	387	25	0.37	0.54	32
271 South Fork Pinehurst	68	101	1.00	2.54	105
	97	96	1.00	2.40	101
	268	71	0.80	1.73	78
	1,290	28	0.40	0.62	36
CDA River Harrison	239	47	0.59	1.10	55
	348	45	0.57	1.05	53
	1,100	36	0.48	0.81	44
	6,870	25	0.37	0.54	32
Spokane River	NA	20	0.31	0.42	27

III. TMDL Elements

A. TMDL Elements for Coeur d'Alene River and Tributaries

Tables 4 through 6 list the following TMDL elements for the target sites in the Coeur d'Alene River and tributaries: total loading capacity, natural background loading, loading allocated upstream, loading available for allocation, margin of safety, gross allocation to waste piles and nonpoint sources, and gross wasteload allocations for discrete sources.

The gross wasteload allocation for each target site is allocated to individual discrete sources in Part III. B.1 below.

Table 4 : TMDL Elements for Dissolved Cadmium								
Target Site	**Flow Tier** (cfs)	**Loading Capacity** (lbs/day)	**Background** (lbs/day)	**Capacity Used Upstream** (lbs/day)	**Loading Avail. for Allocation** (lbs/day)	**Margin of Safety (10%)** (lbs/day)	**Gross Allocation (65%)** (lbs/day)	**Wasteload Allocation (25%)** (lbs/day)
Canyon Creek CC288	7	2.57E-02	2.30E-03	NA	2.34E-02	2.34E-03	1.52E-02	5.85E-03
	11	3.98E-02	3.56E-03	NA	3.63E-02	3.63E-03	2.36E-02	9.07E-03
	25	7.70E-02	8.09E-03	NA	6.89E-02	6.89E-03	4.48E-02	1.72E-02
	149	2.97E-01	4.82E-02	NA	2.49E-01	2.49E-02	1.62E-01	6.21E-02
Ninemile Creek NM305	2	8.81E-03	6.47E-04	NA	8.17E-03	8.17E-04	5.31E-03	2.04E-03
	3	1.32E-02	9.71E-04	NA	1.22E-02	1.22E-03	7.96E-03	3.06E-03
	6.9	2.73E-02	2.23E-03	NA	2.50E-02	2.50E-03	1.63E-02	6.26E-03
	41	1.07E-01	1.33E-02	NA	9.38E-02	9.38E-03	6.09E-02	2.34E-02
South Fork at Wallace SF233	22	8.11E-02	7.15E-03	3.16E-02	4.24E-02	4.24E-03	2.75E-02	1.06E-02
	35	1.27E-01	1.13E-02	4.85E-02	6.69E-02	6.69E-03	4.35E-02	1.67E-02
	79	2.51E-01	2.55E-02	9.39E-02	1.31E-01	1.31E-02	8.55E-02	3.29E-02
	469	9.34E-01	1.52E-01	3.42E-01	4.40E-01	4.40E-02	2.86E-01	1.10E-01
Pine Creek PC315	20	3.98E-02	1.08E-02	NA	2.91E-02	2.91E-03	1.89E-02	7.26E-03
	29	5.78E-02	1.56E-02	NA	4.21E-02	4.21E-03	2.74E-02	1.05E-02
	80	1.59E-01	4.31E-02	NA	1.16E-01	1.16E-02	7.55E-02	2.91E-02
	387	7.71E-01	2.09E-01	NA	5.62E-01	5.62E-02	3.65E-01	1.41E-01
South Fork at Pinehurst SF271	68	3.81E-01	2.93E-02	7.14E-02	2.80E-01	2.80E-02	1.82E-01	7.00E-02
	97	5.23E-01	4.19E-02	1.09E-01	3.73E-01	3.73E-02	2.42E-01	9.31E-02
	268	1.16E+00	1.16E-01	2.48E-01	7.94E-01	7.94E-02	5.16E-01	1.98E-01
	1290	2.80E+00	5.57E-01	1.00E+00	1.24E+00	1.24E-01	8.03E-01	3.09E-01
North Fork at Enaville NF400	165	3.28E-01	7.12E-02	NA	NA	NA	NA	NA
	253	5.04E-01	1.09E-01	NA	NA	NA	NA	NA
	845	1.68E+00	3.65E-01	NA	NA	NA	NA	NA
	1100	1.01E+01	2.20E+00	NA	NA	NA	NA	NA
CdA River at Harrison	239	7.60E-01	1.03E-01	3.51E-01	3.05E-01	3.05E-02	2.75E-01	NA
	348	1.07E+00	1.50E-01	4.82E-01	4.40E-01	4.40E-02	3.96E-01	NA
	1100	2.87E+00	4.75E-01	1.16E+00	1.24E+00	1.24E-01	1.11E+00	NA
	6870	1.37E+01	2.96E+00	3.43E+00	7.29E+00	7.29E-01	6.56E+00	NA

Table 5 : TMDL Elements for Dissolved Lead								
Target Site	**Flow Tier** (cfs)	**Loading Capacity** (lbs/day)	**Background** (lbs/day)	**Capacity Used Upstream** (lbs/day)	**Loading Avail. for Allocation** (lbs/day)	**Margin of Safety (10%)** (lbs/day)	**Gross Allocation (65%)** (lbs/day)	**Wasteload Allocation (25%)** (lbs/day)
Canyon Creek CC288	7	5.10E-02	6.51E-03	NA	4.45E-02	4.45E-03	2.89E-02	1.11E-02
	11	7.90E-02	1.01E-02	NA	6.89E-02	6.89E-03	4.48E-02	1.72E-02
	25	1.41E-01	2.29E-02	NA	1.18E-01	1.18E-02	7.67E-02	2.95E-02
	149	4.35E-01	1.37E-01	NA	2.98E-01	2.98E-02	1.94E-01	7.45E-02
Ninemile Creek NM305	2	1.92E-02	1.83E-03	NA	1.74E-02	1.74E-03	1.13E-02	4.35E-03
	3	2.89E-02	2.75E-03	NA	2.61E-02	2.61E-03	1.70E-02	6.53E-03
	6.9	5.64E-02	6.33E-03	NA	5.01E-02	5.01E-03	3.26E-02	1.25E-02
	41	1.80E-01	3.76E-02	NA	1.43E-01	1.43E-02	9.26E-02	3.56E-02
South Fork at Wallace SF233	22	1.62E-01	2.03E-02	6.19E-02	7.97E-02	7.97E-03	5.18E-02	1.99E-02
	35	2.51E-01	3.21E-02	9.50E-02	1.24E-01	1.24E-02	8.08E-02	3.11E-02
	79	4.67E-01	7.23E-02	1.68E-01	2.26E-01	2.26E-02	1.47E-01	5.65E-02
	469	1.37E+00	4.30E-01	4.41E-01	4.98E-01	4.98E-02	3.24E-01	1.24E-01
Pine Creek PC315	20	5.84E-02	2.27E-02	NA	3.57E-02	3.57E-03	2.32E-02	8.93E-03
	29	8.46E-02	3.28E-02	NA	5.18E-02	5.18E-03	3.36E-02	1.29E-02
	80	2.33E-01	9.06E-02	NA	1.43E-01	1.43E-02	9.28E-02	3.57E-02
	387	1.13E+00	4.38E-01	NA	6.91E-01	6.91E-02	4.49E-01	1.73E-01
South Fork at Pinehurst SF271	68	9.33E-01	7.70E-02	1.15E-01	7.41E-01	7.41E-02	4.81E-01	1.85E-01
	97	1.26E+00	1.10E-01	1.76E-01	9.74E-01	9.74E-02	6.33E-01	2.43E-01
	268	2.50E+00	3.04E-01	3.69E-01	1.83E+00	1.83E-01	1.19E+00	4.57E-01
	1290	4.28E+00	1.46E+00	1.19E+00	1.63E+00	1.63E-01	1.06E+00	4.07E-01
North Fork at Enaville NF400	165	4.81E-01	1.87E-01	NA	NA	NA	NA	NA
	253	7.38E-01	2.87E-01	NA	NA	NA	NA	NA
	845	2.47E+00	9.57E-01	NA	NA	NA	NA	NA
	1100	1.49E+01	5.77E+00	NA	NA	NA	NA	NA
CdA River at Harrison	239	1.41E+00	2.70E-01	9.27E-01	2.14E-01	2.14E-02	1.93E-01	NA
	348	1.96E+00	3.94E-01	1.26E+00	3.07E-01	3.07E-02	2.76E-01	NA
	1100	4.83E+00	1.25E+00	2.79E+00	8.01E-01	8.01E-02	7.21E-01	NA
	6870	2.00E+01	7.78E+00	7.39E+00	4.87E+00	4.87E-01	4.39E+00	NA

Table 6 : TMDL Elements for Dissolved Zinc								
Target Site	**Flow Tier** (cfs)	**Loading Capacity** (lbs/day)	**Background** (lbs/day)	**Capacity Used Upstream** (lbs/day)	**Loading Avail. for Allocation** (lbs/day)	**Margin of Safety (10%)** (lbs/day)	**Gross Allocation (65%)** (lbs/day)	**Wasteload Allocation (25%)** (lbs/day)
Canyon Creek CC288	7	2.45E+00	2.34E-01	NA	2.22E+00	2.22E-01	1.44E+00	5.54E-01
	11	3.79E+00	3.62E-01	NA	3.43E+00	3.43E-01	2.23E+00	8.58E-01
	25	7.16E+00	8.23E-01	NA	6.34E+00	6.34E-01	4.12E+00	1.59E+00
	149	2.59E+01	4.90E+00	NA	2.10E+01	2.10E+00	1.37E+01	5.26E+00
Ninemile Creek NM305	2	8.63E-01	6.58E-02	NA	7.98E-01	7.98E-02	5.18E-01	1.99E-01
	3	1.30E+00	9.87E-02	NA	1.20E+00	1.20E-01	7.78E-01	2.99E-01
	6.9	2.63E+00	2.27E-01	NA	2.40E+00	2.40E-01	1.56E+00	6.01E-01
	41	9.72E+00	1.35E+00	NA	8.38E+00	8.38E-01	5.44E+00	2.09E+00
South Fork at Wallace SF233	22	9.04E-03	9.03E-03	3.01E+00	9.03E-03	0.00E+00	1.42E-02	1.00E+00
	35	3.39E-03	3.39E-03	4.63E+00	3.39E-03	0.00E+00	5.33E-03	1.00E+00
	79	4.67E-02	4.66E-02	8.74E+00	4.66E-02	0.00E+00	7.34E-02	1.00E+00
	469	2.26E-01	2.26E-01	2.94E+01	2.26E-01	0.00E+00	3.55E-01	1.00E+00
Pine Creek PC315	20	3.48E+00	3.34E-01	NA	3.15E+00	3.15E-01	2.05E+00	7.87E-01
	29	5.05E+00	4.85E-01	NA	4.57E+00	4.57E-01	2.97E+00	1.14E+00
	80	1.39E+01	1.34E+00	NA	1.26E+01	1.26E+00	8.19E+00	3.15E+00
	387	6.74E+01	6.47E+00	NA	6.09E+01	6.09E+00	3.96E+01	1.52E+01
South Fork at Pinehurst SF271	68	3.87E+01	2.24E+00	7.15E+00	2.93E+01	2.93E+00	1.90E+01	7.32E+00
	97	5.28E+01	3.19E+00	1.09E+01	3.88E+01	3.88E+00	2.52E+01	9.69E+00
	268	1.13E+02	8.82E+00	2.47E+01	7.95E+01	7.95E+00	5.17E+01	1.99E+01
	1290	2.47E+02	4.24E+01	9.77E+01	1.07E+02	1.07E+01	6.96E+01	2.68E+01
North Fork at Enaville NF400	165	2.87E+01	4.45E+00	NA	NA	NA	NA	NA
	253	4.41E+01	6.82E+00	NA	NA	NA	NA	NA
	845	1.47E+02	**2.28E+01**	NA	NA	NA	NA	NA
	1100	8.86E+02	1.37E+02	NA	NA	NA	NA	NA
CdA River at Harrison	239	7.10E+01	6.85E+00	3.37E+01	3.04E+01	3.04E+00	2.74E+01	NA
	348	9.97E+01	9.99E+00	4.56E+01	4.41E+01	4.41E+00	3.97E+01	NA
	1100	2.61E+02	3.16E+01	1.02E+02	1.27E+02	1.27E+01	1.14E+02	NA
	6870	1.20E+03	1.97E+02	2.44E+02	7.55E+02	7.55E+01	6.79E+02	NA

B. Allocations for Individual Sources

1. Wasteload Allocations for Coeur d'Alene River and Tributaries

a. For a given metal and target site flow, the wasteload allocation for an individual source in the Coeur d'Alene River and tributaries is:

(1) The calculated value listed in Tables 7 through 11; or,

(2) A reasonable estimate of the current monthly average performance at the facility (established in the NPDES permit),

whichever is more stringent.

b. After issuance of a permit with cadmium, lead, and/or zinc limits based on current performance (see Part a(2) above), the loading equal to the difference between the calculated value (in Tables 7 through 11) and the performance-based limit will be reserved for future growth. Reserve allocations created by a permitting action may be allocated to new or expanding facilities within the same target site or at a target site downstream of permitted source. Allocation of the future growth reserve will require formal modification of this TMDL.

c. In its discretion, the NPDES permitting authority may develop additional flow tiers (and associated permit limits) to those listed below.

d. The listed wasteload allocation applies to the monthly average discharge to the receiving water.

Maps showing the locations of discrete sources are included in Appendix B to the TMDL.

Table 7 : Calculated Wasteload Allocations for Individual Sources - Canyon Creek (URSG Site CC288)

All values in lbs/day

Station ID	Flow (cfs)	Total Recoverable Cadmium 7Q10L	Total Recoverable Cadmium 10th Percentile	Total Recoverable Cadmium 50th Percentile	Total Recoverable Cadmium 90th Percentile	Total Recoverable Lead 7Q10L	Total Recoverable Lead 10th Percentile	Total Recoverable Lead 50th Percentile	Total Recoverable Lead 90th Percentile	Total Recoverable Zinc 7Q10L	Total Recoverable Zinc 10th Percentile	Total Recoverable Zinc 50th Percentile	Total Recoverable Zinc 90th Percentile
CC817 Hecla #3	0.0684	4.85E-05	7.51E-05	1.43E-04	5.14E-04	1.01E-04	1.57E-04	2.68E-04	6.79E-04	4.58E-03	7.10E-03	1.31E-02	4.36E-02
CC355 Gem	0.26	1.84E-04	2.85E-04	5.42E-04	1.96E-03	3.85E-04	5.96E-04	1.02E-03	2.58E-03	1.74E-02	2.70E-02	4.99E-02	1.66E-01
CC816 Star/Phoenix Tailings (001)	2.34	1.66E-03	2.57E-03	4.88E-03	1.76E-02	3.46E-03	5.37E-03	9.19E-03	2.32E-02	1.57E-01	2.43E-01	4.49E-01	1.49E+00
CC357 Woodland Park Seep	0.0038	2.69E-06	4.17E-06	7.92E-06	2.86E-05	5.63E-06	8.72E-06	1.49E-05	3.77E-05	2.55E-04	3.95E-04	7.29E-04	2.42E-03
CC372 Tamarack #7	1.59	1.13E-03	1.75E-03	3.32E-03	1.20E-02	2.35E-03	3.65E-03	6.24E-03	1.58E-02	1.07E-01	1.65E-01	3.05E-01	1.01E+00
CC353 Hercules #5	1.707	1.21E-03	1.87E-03	3.56E-03	1.28E-02	2.53E-03	3.92E-03	6.70E-03	1.69E-02	1.14E-01	1.77E-01	3.28E-01	1.09E+00
CC371 Blackbear Fraction	1.165	8.25E-04	1.28E-03	2.43E-03	8.76E-03	1.72E-03	2.67E-03	4.57E-03	1.16E-02	7.81E-02	1.21E-01	2.24E-01	7.42E-01
CC373 Anchor	0.008	5.67E-06	8.78E-06	1.67E-05	6.02E-05	1.18E-05	1.83E-05	3.14E-05	7.94E-05	5.36E-04	8.31E-04	1.53E-03	5.09E-03
CC354 Hidden Treasure	0.72	5.10E-04	7.90E-04	1.50E-03	5.42E-03	1.07E-03	1.65E-03	2.83E-03	7.14E-03	4.83E-02	7.48E-02	1.38E-01	4.58E-01
Tiger/Poorman	0.4	2.83E-04	4.39E-04	8.34E-04	3.01E-03	5.92E-04	9.17E-04	1.57E-03	3.97E-03	2.68E-02	4.15E-02	7.67E-02	2.55E-01

Table 8 : Calculated Wasteload Allocations for Individual Sources - Ninemile Creek (URSG Site NM305)

All values in lbs/day

		Total Recoverable Cadmium				Total Recoverable Lead				Total Recoverable Zinc			
Station ID	**Flow (cfs)**	**7Q10L**	**10^{th} Percentile**	**50^{th} Percentile**	**90^{th} Percentile**	**7Q10L**	**10^{th} Percentile**	**50^{th} Percentile**	**90^{th} Percentile**	**7Q10L**	**10^{th} Percentile**	**50^{th} Percentile**	**90^{th} Percentile**
NM360 Interstate-Callahan (IC) #4	0.040	4.11E-05	6.17E-05	1.26E-04	4.72E-04	9.65E-05	1.45E-04	2.78E-04	7.90E-04	4.02E-03	6.03E-03	1.21E-02	4.22E-02
NM362 IC Waste Rock	1.790	1.84E-03	2.76E-03	5.64E-03	2.11E-02	4.32E-03	6.48E-03	1.24E-02	3.53E-02	1.80E-01	2.70E-01	5.42E-01	1.89E+00
NM363 IC Tailings Seep	0.004	4.11E-06	6.17E-06	1.26E-05	4.72E-05	9.65E-06	1.45E-05	2.78E-05	7.90E-05	4.02E-04	6.03E-04	1.21E-03	4.22E-03
NM361 Rex #2	0.020	2.06E-05	3.09E-05	6.31E-05	2.36E-04	4.82E-05	7.24E-05	1.39E-04	3.95E-04	2.01E-03	3.01E-03	6.05E-03	2.11E-02
NM364 Tamarack 400 Level	0.040	4.11E-05	6.17E-05	1.26E-04	4.72E-04	9.65E-05	1.45E-04	2.78E-04	7.90E-04	4.02E-03	6.03E-03	1.21E-02	4.22E-02
NM366 Tamarack #5	0.030	3.09E-05	4.63E-05	9.46E-05	3.54E-04	7.24E-05	1.09E-04	2.08E-04	5.92E-04	3.01E-03	4.52E-03	9.08E-03	3.16E-02
NM368 Rex Tailings Seep	0.020	2.06E-05	3.09E-05	6.31E-05	2.36E-04	4.82E-05	7.24E-05	1.39E-04	3.95E-04	2.01E-03	3.01E-03	6.05E-03	2.11E-02
NM359 Success #3	0.010	1.03E-05	1.54E-05	3.15E-05	1.18E-04	2.41E-05	3.62E-05	6.94E-05	1.97E-04	1.00E-03	1.51E-03	3.03E-03	1.05E-02
NM367 Dayrock 100	0.007	6.99E-06	1.05E-05	2.14E-05	8.03E-05	1.64E-05	2.46E-05	4.72E-05	1.34E-04	6.83E-04	1.02E-03	2.06E-03	7.17E-03
NM369 Silver Star	0.0096	9.87E-06	1.48E-05	3.03E-05	1.13E-04	2.32E-05	3.47E-05	6.67E-05	1.90E-04	9.65E-04	1.45E-03	2.90E-03	1.01E-02
NM370 Duluth	0.011	1.13E-05	1.70E-05	3.47E-05	1.30E-04	2.65E-05	3.98E-05	7.64E-05	2.17E-04	1.11E-03	1.66E-03	3.33E-03	1.16E-02
NM374 Success Tailings	0.003	3.50E-06	5.25E-06	1.07E-05	4.02E-05	8.20E-06	1.23E-05	2.36E-05	6.71E-05	3.42E-04	5.12E-04	1.03E-03	3.59E-03

Table 9 : Calculated Wasteload Allocations for Individual Sources - South Fork at Wallace (URSG Site SF223)

All values in lbs/day

		Total Recoverable Cadmium				Total Recoverable Lead				Total Recoverable Zinc			
Station ID	Flow (cfs)	7Q10L	10th Percentile	50th Percentile	90th Percentile	7Q10L	10th Percentile	50th Percentile	90th Percentile	7Q10L	10th Percentile	50th Percentile	90th Percentile
SF607 Lucky Friday Outfall 001	1.27	1.52E-03	2.40E-03	4.72E-03	1.58E-02	3.43E-03	5.35E-03	9.73E-03	2.14E-02	1.43E-01	2.26E-01	4.35E-01	1.32E+00
SF609 Lucky Friday Outfall 003	0.85	1.02E-03	1.61E-03	3.16E-03	1.06E-02	2.30E-03	3.58E-03	6.51E-03	1.43E-02	9.59E-02	1.51E-01	2.91E-01	8.84E-01
SF328 Star/Morning Waste Rock	1.59	1.90E-03	3.00E-03	5.90E-03	1.98E-02	4.29E-03	6.69E-03	1.22E-02	2.68E-02	1.79E-01	2.82E-01	5.44E-01	1.65E+00
SF 396 Square Deal	0.08	9.57E-05	1.51E-04	2.97E-04	9.94E-04	2.16E-04	3.37E-04	6.13E-04	1.35E-03	9.03E-03	1.42E-02	2.74E-02	8.32E-02
SF395 Golconda	0.03	3.59E-05	5.67E-05	1.11E-04	3.73E-04	8.10E-05	1.26E-04	2.30E-04	5.06E-04	3.39E-03	5.33E-03	1.03E-02	3.12E-02
SF627 Mullan STP	0.413	4.94E-04	7.80E-04	1.53E-03	5.13E-03	1.12E-03	1.74E-03	3.17E-03	6.97E-03	4.66E-02	7.34E-02	1.41E-01	4.29E-01
SF338 Snowstorm #3	2	2.39E-03	3.78E-03	7.43E-03	2.49E-02	5.40E-03	8.42E-03	1.53E-02	3.37E-02	2.26E-01	3.55E-01	6.84E-01	2.08E+00
SF339 Copper King	0.0564	6.75E-05	1.07E-04	2.09E-04	7.01E-04	1.52E-04	2.37E-04	4.32E-04	9.51E-04	6.37E-03	1.00E-02	1.93E-02	5.86E-02
SF345 Morning #4	0.0152	1.82E-05	2.87E-05	5.64E-05	1.89E-04	4.11E-05	6.40E-05	1.16E-04	2.56E-04	1.72E-03	2.70E-03	5.20E-03	1.58E-02
SF346 Morning #5	0.0111	1.33E-05	2.10E-05	4.12E-05	1.38E-04	3.00E-05	4.67E-05	8.51E-05	1.87E-04	1.25E-03	1.97E-03	3.80E-03	1.15E-02
SF347 Star 1200 Level	0.695	8.31E-04	1.31E-03	2.58E-03	8.64E-03	1.88E-03	2.93E-03	5.33E-03	1.17E-02	7.84E-02	1.23E-01	2.38E-01	7.23E-01
SF349 Grouse	1.82	2.18E-03	3.44E-03	6.76E-03	2.26E-02	4.92E-03	7.66E-03	1.39E-02	3.07E-02	2.05E-01	3.23E-01	6.23E-01	1.89E+00
SF386 Adit in Beacon Light Area	0.0003	3.59E-07	5.67E-07	1.11E-06	3.73E-06	8.10E-07	1.26E-06	2.30E-06	5.06E-06	3.39E-05	5.33E-05	1.03E-04	3.12E-04
SF389 Unnamed Adit Deadman Gulch	0.011	1.32E-05	2.08E-05	4.08E-05	1.37E-04	2.97E-05	4.63E-05	8.43E-05	1.86E-04	1.24E-03	1.95E-03	3.76E-03	1.14E-02
SF390 Reindeer Queen	0.011	1.32E-05	2.08E-05	4.08E-05	1.37E-04	2.97E-05	4.63E-05	8.43E-05	1.86E-04	1.24E-03	1.95E-03	3.76E-03	1.14E-02

Table 10 : Calculated Wasteload Allocations for Individual Sources - Pine Creek (URSG Site PC315)

All values in lbs/day

Station ID	Flow (cfs)	Total Recoverable Cadmium 7Q10L	Cadmium 10th Percentile	Cadmium 50th Percentile	Cadmium 90th Percentile	Total Recoverable Lead 7Q10L	Lead 10th Percentile	Lead 50th Percentile	Lead 90th Percentile	Total Recoverable Zinc 7Q10L	Zinc 10th Percentile	Zinc 50th Percentile	Zinc 90th Percentile
PC329 North Amy	0.322	3.48E-03	5.04E-03	1.39E-02	6.73E-02	4.27E-03	6.20E-03	1.71E-02	8.27E-02	3.77E-01	5.47E-01	1.51E+00	7.29E+00
PC330 Amy	0.005	5.40E-05	7.83E-05	2.16E-04	1.05E-03	6.64E-05	9.62E-05	2.65E-04	1.28E-03	5.85E-03	8.49E-03	2.34E-02	1.13E-01
PC331 Liberal King	0.005	5.40E-05	7.83E-05	2.16E-04	1.05E-03	6.64E-05	9.62E-05	2.65E-04	1.28E-03	5.85E-03	8.49E-03	2.34E-02	1.13E-01
PC332 Lookout	0.027	2.92E-04	4.23E-04	1.17E-03	5.64E-03	3.58E-04	5.20E-04	1.43E-03	6.94E-03	3.16E-02	4.58E-02	1.26E-01	6.12E-01
PC333 Upper Lynch	0.001	1.08E-05	1.57E-05	4.32E-05	2.09E-04	1.33E-05	1.92E-05	5.31E-05	2.57E-04	1.17E-03	1.70E-03	4.68E-03	2.27E-02
PC334 Lynch/Nabob	0.0006	6.48E-06	9.40E-06	2.59E-05	1.25E-04	7.96E-06	1.15E-05	3.19E-05	1.54E-04	7.02E-04	1.02E-03	2.81E-03	1.36E-02
PC335 Nevada-Stewart	0.091	9.83E-04	1.43E-03	3.93E-03	1.90E-02	1.21E-03	1.75E-03	4.83E-03	2.34E-02	1.07E-01	1.54E-01	4.26E-01	2.06E+00
PC336 Highland Surprise	0.038	4.10E-04	5.95E-04	1.64E-03	7.94E-03	5.04E-04	7.31E-04	2.02E-03	9.76E-03	4.45E-02	6.45E-02	1.78E-01	8.61E-01
PC375 Highland Surprise Waste Rock	0.0106	1.15E-04	1.66E-04	4.58E-04	2.22E-03	1.41E-04	2.04E-04	5.63E-04	2.72E-03	1.24E-02	1.80E-02	4.96E-02	2.40E-01
PC337 Sidney (Red Cloud Creek Adit)	0.006	6.48E-05	9.40E-05	2.59E-04	1.25E-03	7.96E-05	1.15E-04	3.19E-04	1.54E-03	7.02E-03	1.02E-02	2.81E-02	1.36E-01
PC340 Upper Little Pittsburg	0.002	2.16E-05	3.13E-05	8.64E-05	4.18E-04	2.65E-05	3.85E-05	1.06E-04	5.14E-04	2.34E-03	3.39E-03	9.37E-03	4.53E-02
PC341 Lower Little Pittsburg	0.006	6.48E-05	9.40E-05	2.59E-04	1.25E-03	7.96E-05	1.15E-04	3.19E-04	1.54E-03	7.02E-03	1.02E-02	2.81E-02	1.36E-01
PC343 Nabob 1300 Level	0.066	7.13E-04	1.03E-03	2.85E-03	1.38E-02	8.76E-04	1.27E-03	3.50E-03	1.70E-02	7.73E-02	1.12E-01	3.09E-01	1.50E+00
PC344 Big It	0.00106	1.15E-05	1.66E-05	4.58E-05	2.22E-04	1.41E-05	2.04E-05	5.63E-05	2.72E-04	1.24E-03	1.80E-03	4.96E-03	2.40E-02
PC348 Upper Constitution	0.079	8.53E-04	1.24E-03	3.41E-03	1.65E-02	1.05E-03	1.52E-03	4.19E-03	2.03E-02	9.25E-02	1.34E-01	3.70E-01	1.79E+00
PC351 Marmion Tunnel	0.0089	9.61E-05	1.39E-04	3.85E-04	1.86E-03	1.18E-04	1.71E-04	4.73E-04	2.29E-03	1.04E-02	1.51E-02	4.17E-02	2.02E-01
PC352 Seep Below Nevada Stewart	0.0028	3.02E-05	4.39E-05	1.21E-04	5.85E-04	3.72E-05	5.39E-05	1.49E-04	7.19E-04	3.28E-03	4.75E-03	1.31E-02	6.34E-02
PC 400 Adit Upstream of Little Pittsburg	0.000422	4.56E-06	6.61E-06	1.82E-05	8.82E-05	5.60E-06	8.12E-06	2.24E-05	1.08E-04	4.94E-04	7.16E-04	1.98E-03	9.56E-03

Table 11 : Calculated Wasteload Allocations for Individual Sources - South Fork above Pinehurst (URSG Site SF271)

All values in lbs/day

Station ID	Flow (cfs)	Total Recoverable Cadmium 7Q10L	Cadmium 10th Percentile	Cadmium 50th Percentile	Cadmium 90th Percentile	Total Recoverable Lead 7Q10L	Lead 10th Percentile	Lead 50th Percentile	Lead 90th Percentile	Total Recoverable Zinc 7Q10L	Zinc 10th Percentile	Zinc 50th Percentile	Zinc 90th Percentile
SF382 Silver Dollar	0.015	7.00E-05	9.30E-05	1.98E-04	3.09E-04	4.07E-04	5.35E-04	1.00E-03	8.93E-04	7.31E-03	9.68E-03	1.99E-02	2.67E-02
SF393 Western Union (Lower Adit)	0.001	4.67E-06	6.20E-06	1.32E-05	2.06E-05	2.71E-05	3.57E-05	6.70E-05	5.96E-05	4.87E-04	6.46E-04	1.32E-03	1.78E-03
SF3 Central Tmt Plant	4.990	2.33E-02	3.10E-02	6.59E-02	1.03E-01	1.35E-01	1.78E-01	3.34E-01	2.97E-01	2.43E+00	3.22E+00	6.60E+00	8.90E+00
SF620 Page STP	3.870	1.81E-02	2.40E-02	5.11E-02	7.97E-02	1.05E-01	1.38E-01	2.59E-01	2.31E-01	1.89E+00	2.50E+00	5.12E+00	6.90E+00
SF383 St. Joe	0.007	3.27E-05	4.34E-05	9.25E-05	1.44E-04	1.90E-04	2.50E-04	4.69E-04	4.17E-04	3.41E-03	4.52E-03	9.26E-03	1.25E-02
SF384 Coeur d'Alene (Mineral Point)	0.005	2.33E-05	3.10E-05	6.61E-05	1.03E-04	1.36E-04	1.78E-04	3.35E-04	2.98E-04	2.44E-03	3.23E-03	6.62E-03	8.92E-03
SF385 Unnamed Adit	0.001	3.27E-06	4.34E-06	9.25E-06	1.44E-05	1.90E-05	2.50E-05	4.69E-05	4.17E-05	3.41E-04	4.52E-04	9.26E-04	1.25E-03
SF600 Caladay	0.210	9.80E-04	1.30E-03	2.77E-03	4.32E-03	5.70E-03	7.49E-03	1.41E-02	1.25E-02	1.02E-01	1.36E-01	2.78E-01	3.74E-01
SF602 Galena	1.300	6.06E-03	8.06E-03	1.72E-02	2.68E-02	3.53E-02	4.64E-02	8.71E-02	7.74E-02	6.34E-01	8.39E-01	1.72E+00	2.32E+00
SF623 Smelterville STP	0.421	1.96E-03	2.61E-03	5.56E-03	8.66E-03	1.14E-02	1.50E-02	2.82E-02	2.51E-02	2.05E-01	2.72E-01	5.57E-01	7.51E-01
SF624 Sunshine 001	3.120	1.46E-02	1.94E-02	4.12E-02	6.42E-02	8.46E-02	1.11E-01	2.09E-01	1.86E-01	1.52E+00	2.01E+00	4.13E+00	5.56E+00
Coeur/Galena 002	0.775	3.62E-03	4.81E-03	1.02E-02	1.60E-02	2.10E-02	2.76E-02	5.19E-02	4.62E-02	3.78E-01	5.00E-01	1.03E+00	1.38E+00
Consolidated Silver	0.300	1.40E-03	1.86E-03	3.97E-03	6.18E-03	8.14E-03	1.07E-02	2.01E-02	1.79E-02	1.46E-01	1.94E-01	3.97E-01	5.35E-01

2. Load Allocations for Coeur d'Alene Lake Sediments

The following allocations apply to net loadings of dissolved metals occurring within Coeur d'Alene Lake. Net loadings in this case are defined as the loadings in the Spokane River at the lake outlet minus the loadings at the mouth of the Coeur d'Alene River.

Table 12 : Load Allocations for Coeur d'Alene Lake Sediments

Flow in St. Joe River at Calder (cfs)	Load Allocation for Net Loading from Lake Sediments (lbs/day)		
	Dissolved Cadmium (lbs/day)	Dissolved Lead (lbs/day)	Dissolved Zinc (lbs/day)
241	0.46	0.38	36
374	0.71	0.59	56
1,000	1.9	1.6	150
6,470	12	10	970

3. Wasteload Allocations for the Spokane River

a. For a given metal, the wasteload allocation for an individual source in the Spokane River is:

(1) The value listed in Table 13; or,

(2) A reasonable estimate of the current monthly average performance at the facility (established in the NPDES permit fact sheet),

whichever is more stringent.

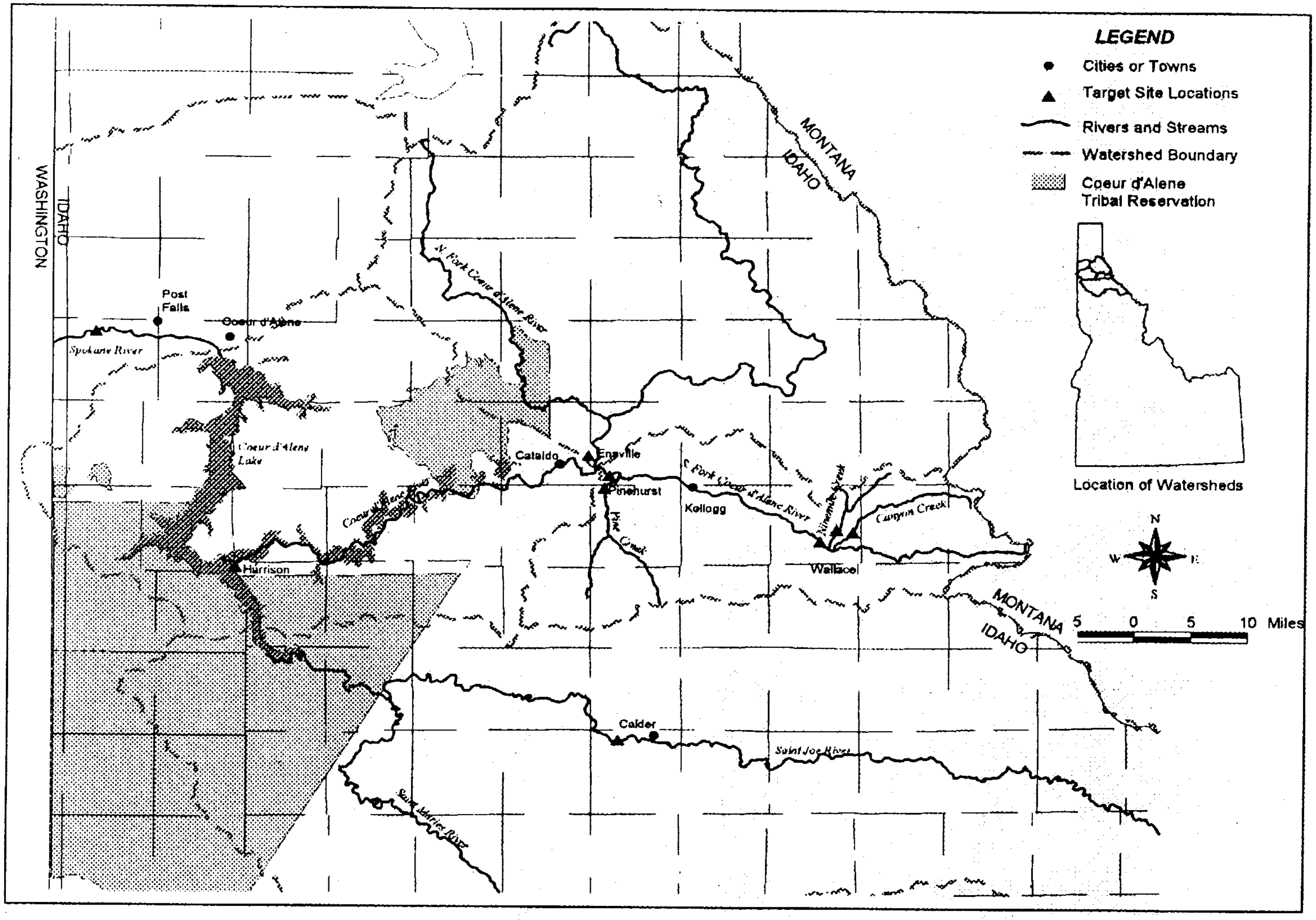
b. After a permit is issued with any cadmium, lead, and/or zinc limits based on current performance, the loading equal to the difference between the value in Table 13 and the performance-based limit will be reserved for municipal stormwater sources. Allocation of the future stormwater reserve will require formal modification of this TMDL.

c. The listed wasteload allocation applies to the monthly average discharge to the receiving water.

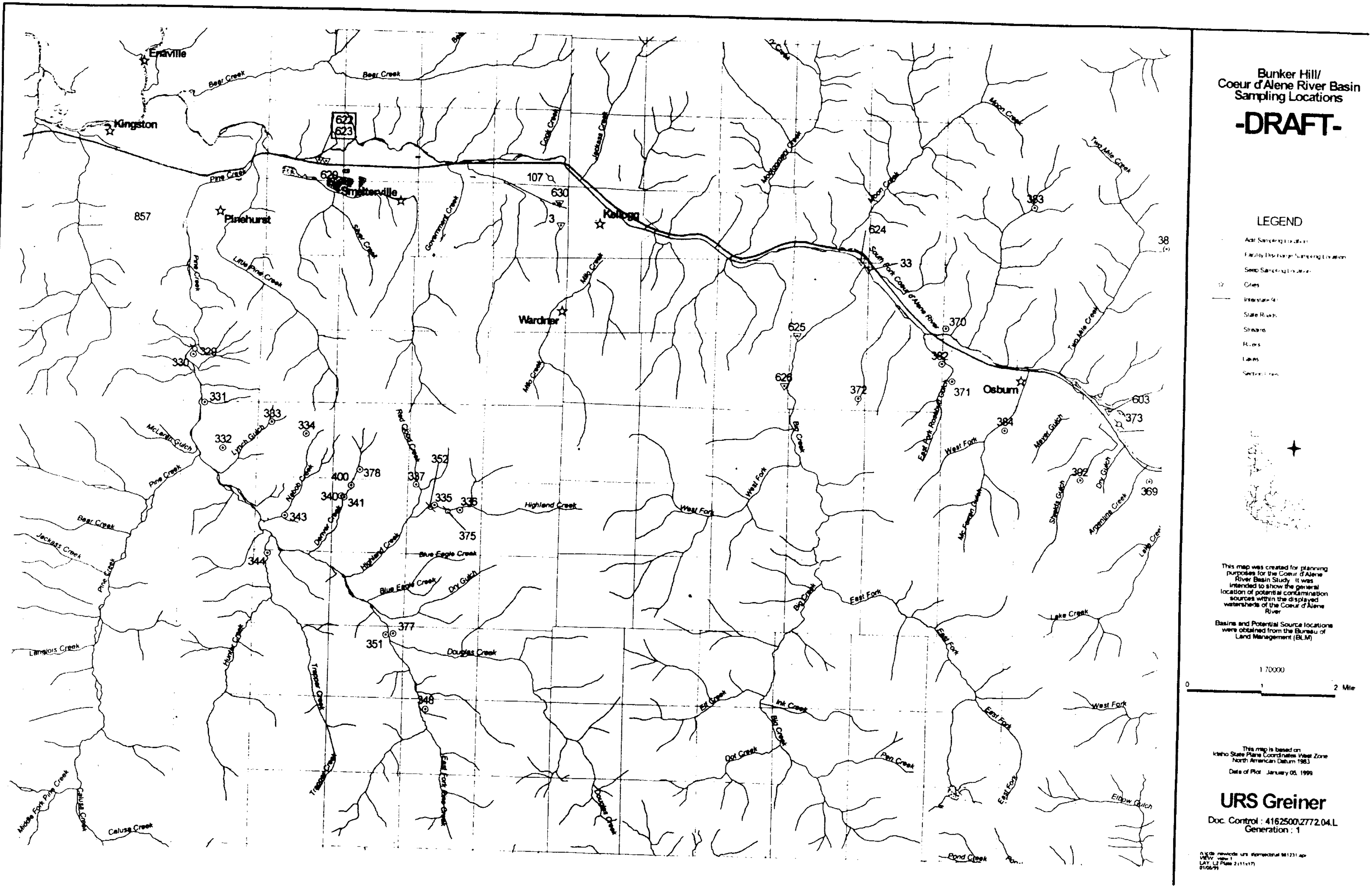
Table 13 : Spokane River Wasteload Allocations

Facility	Total Recoverable Cadmium (ug/l)	Total Recoverable Lead (ug/l)	Total Recoverable Zinc (ug/l)
City of Coeur d'Alene	1.3	3.3	132
City of Post Falls	1.0	2.4	101
City of Hayden Lake	1.0	2.3	97

Appendix A : Map of Coeur d'Alene Basin


LEGEND
Cities or Towns
Target Site Locations
Rivers and Streams
Watershed Boundary
Coeur d'Alene Tribal Reservation
Location of Watersheds
N
W
E
S
5 0 5 10 Miles
MONTANA
IDAHO
WASHINGTON
IDAHO
MONTANA
IDAHO
Post Falls
Coeur d'Alene
Spokane River
Coeur d'Alene Lake
Harrison
Coeur d'Alene River
N. Fork Coeur d'Alene River
Cataldo
Enaville
Pinehurst
Pine Creek
Kellogg
S. Fork Coeur d'Alene River
Ninemile Creek
Canyon Creek
Wallace
Calder
Saint Joe River
Saint Maries River

Appendix B : Source Location Maps for Coeur d'Alene River and Tributaries



Bunker Hill/
Coeur d'Alene River Basin
Sampling Locations
-DRAFT-
LEGEND
Seep Sampling Location
Cities
State Roads
Streams
Lakes
This map was created for planning purposes for the Coeur d'Alene River Basin Study. It was intended to show the general location of potential contamination sources within the displayed watersheds of the Coeur d'Alene River
Basins and Potential Source locations were obtained from the Bureau of Land Management (BLM)
1:70000
0 1 2 Mile
This map is based on Idaho State Plane Coordinates West Zone North American Datum 1983
Date of Plot: January 06, 1999
URS Greiner
Doc. Control : 4162500\2772.04.L
Generation : 1
Enaville
Kingston
Pinehurst
Smelterville
Kellogg
Wardner
Osburn
Bear Creek
Pine Creek
Little Pine Creek
Government Creek
Silver Creek
Cook Creek
Jackass Creek
Milo Creek
Montgomery Creek
Moon Creek
Two Mile Creek
South Fork Coeur d'Alene River
Big Creek
West Fork
East Fork
McLaren Gulch
Lynch Gulch
Nabob Creek
Denver Creek
Highland Creek
Red Cloud Creek
Blue Eagle Creek
Dry Gulch
Douglas Creek
Trapper Creek
Hunter Creek
Langlois Creek
Jackass Creek
Middle Fork Pine Creek
Calusa Creek
East Fork Pine Creek
Elk Creek
Ink Creek
Dot Creek
Pen Creek
Lake Creek
Elbow Gulch
Pond Creek
Mayer Gulch
Shields Gulch
Argentine Creek
Mc Fadden Gulch
East Fork Rosebud Creek
857
622
623
629
107
630
3
624
33
38
383
625
626
370
382
371
372
603
373
384
392
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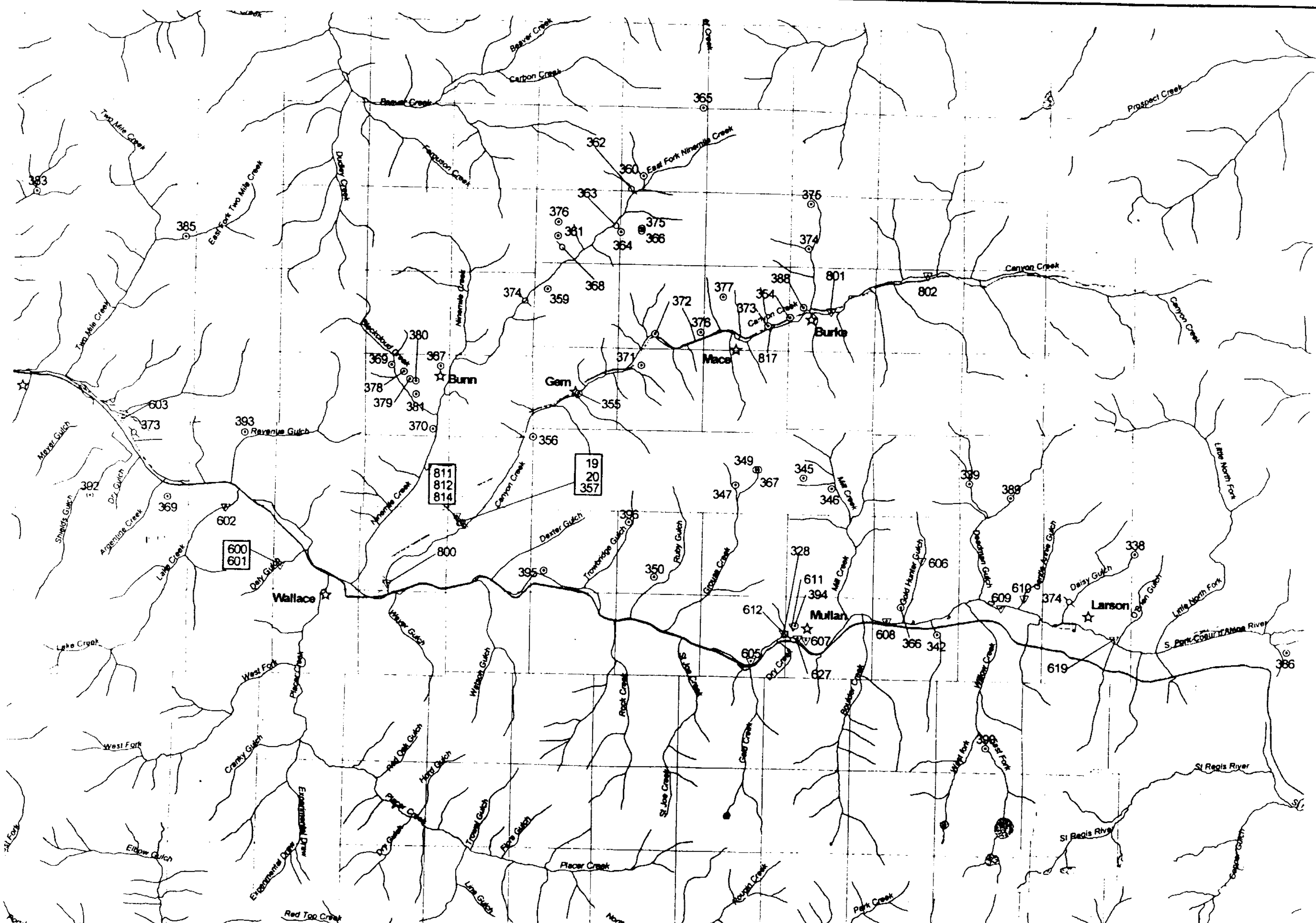

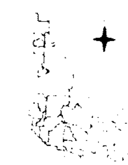

Bunker Hill/ Coeur d'Alene River Basin Sampling Locations

-DRAFT-

LEGEND

- Adit Sampling Location
- Facility Discharge Sampling Location
- Seep Sampling Location
- ☆ Cities
- Interstate 90
- State Roads
- Streams
- Rivers
- Lakes
- Section Lines

This map was created for planning purposes for the Coeur d'Alene River Basin Study. It was intended to show the general location of potential contamination sources within the displayed watersheds of the Coeur d'Alene River.

Basins and Potential Source locations were obtained from the Bureau of Land Management (BLM)

1:70000

0 — 1 — 2 Miles

This map is based on Idaho State Plane Coordinates West Zone North American Datum 1983

Date of Plot : January 06, 1999

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VIEW : view 1
LAY: L2 Plate 1 (11x17)
01/06/99

TECHNICAL SUPPORT DOCUMENT

Total Maximum Daily Load for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene Basin

FINAL

August 2000

U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Idaho Department of Environmental Quality
1410 North Hilton
Boise, Idaho 83706

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1.0 INTRODUCTION

Lead and silver mining began in the South Fork Coeur d'Alene River (South Fork) in 1885, when lead-bearing rock was discovered in the drainage. In the early mining operation, ore was sorted from waste rock by hand and shipped out to smelters. In later years, concentrators were established within the mining district and tailings were produced. In most cases, tailings were disposed directly in the stream channels. Originally, the zinc in the ore was not commercially valuable and was discarded with the tailings. As zinc became commercially marketable, it joined silver and lead as the primary metals being mined in the valley. Initially, all mining operations in the area disposed of tailings by deposition in the streams. The Mine Owner's Association, which had been formed to control the threat of organized labor, constructed plank dams in Osburn and the Pinehurst Narrows in 1901 and 1902. These dams were constructed to control the tailings in the river which were causing flooding and resulting in law suits and damage claims.

In the 1920's, the first tailings impoundments were constructed. In the 1950's, mines started to use tailings to fill open mine areas. By the 1960's, tailings deposition directly into the waterways had ceased. In the mid-1960's, action was taken to stop mines and mills from discharging into the river as well as to stop towns from pumping raw sewage into the waterways. In addition to concentrators, metals recovery facilities were constructed in the Silver Valley. These included a smelter, an electrolytic zinc plant built in 1928, and a phosphoric acid/fertilizer plant in 1960. All of these operations had ceased by 1981.

Beginning in the 1970's, EPA issued wastewater discharge permits to mines and sewage treatment plants operating along the South Fork. In 1983, the Bunker Hill Mining and Metallurgical Complex was placed on the National Priorities List (NPL). EPA and the State of Idaho continue to fund and implement clean-up activities in the 21-square mile study area. In late 1997, EPA decided to conduct a basin-wide Remedial Investigation and Feasibility Study (RI/FS) to identify other sources of contamination, risks, and clean-up alternatives.

In September 1996, the United States District Court for the Western District of Washington ordered EPA, in concurrence with the State of Idaho, to develop a schedule for completion of total maximum daily loads (TMDLs) for all streams identified by the State of Idaho in its 1994 Section 303(d) list. In response to concerns over delays in submittal of TMDLs for the Coeur d'Alene (CDA) basin, and concerns about intergovernmental coordination between the States of Idaho and Washington and the Coeur d'Alene Tribe, EPA initiated development of a basin-wide TMDL in 1998. In a letter dated February 26, 1999, the State of Idaho proposed that EPA and the State jointly issue a TMDL for the basin. EPA and the State of Idaho released a proposed TMDL for public comment on April 15, 1999. The agencies held public hearings on the proposed TMDL in Wallace, Coeur d'Alene, and Osburn during a 120-day comment period.

EPA and the State of Idaho are jointly issuing the final TMDL. The State of Idaho is issuing (and EPA is simultaneously approving), the final TMDL for those waters within the jurisdiction of the State of Idaho. EPA is issuing the final TMDL for waterbodies within the Coeur d'Alene Reservation boundaries (see below for discussion of legal authority).

This document, which has been revised in response to public comments and new information, describes the information assembled and analyzed to develop the TMDL, including: applicable water quality standards, available water quality and flow data, calculation methods, legal and policy considerations, and implementation mechanisms. The proposed TMDL establishes loading capacities, wasteload allocations, load allocations, background conditions, and a margin of safety in accordance with federal regulations (40 CFR 130).

2.0 LEGAL AUTHORITY AND BACKGROUND

2.1 Legal Authority

EPA has the authority under section 303(d) of the Clean Water Act to approve the final TMDLs submitted by the State. EPA also has the legal authority to develop these TMDLs for the CDA basin in Idaho if the State is unable or unwilling to submit a TMDL. When Congress directed EPA to approve or disapprove State § 303(d) lists and TMDL submissions and to establish its own lists or TMDLs in the event EPA disapproves the State submission, Congress imposed very specific duties on EPA under section 303(d). However, EPA does not believe that its role under section 303(d) is limited to those narrow, although important, duties. It would be anomalous and contrary to Congress' intent in enacting this section if States could obstruct the implementation of section 303(d) simply by refusing to submit TMDLs in a timely fashion. Rather, EPA believes that the most reasonable interpretation of section 303(d) vests in EPA more general authority to ensure timely and meaningful implementation of section 303(d). This includes the discretionary authority to develop TMDLs in the absence of a State submission.

This interpretation of section 303(d) is also the basis for EPA's issuance of TMDLs for waters within reservation boundaries for tribes which have not been authorized under section 518(e). Under the authority of CWA section 518(e), EPA may approve eligible tribes to carry out the responsibilities of CWA section 303. While, at this time, the Coeur d'Alene Tribe has not yet been approved to exercise this authority, the Tribe has submitted its application for EPA approval of its water quality standards program. To the extent that waterbodies lie within reservation boundaries, it is EPA's position that EPA, rather than the State of Idaho, has the authority to develop TMDLs for those waters. It is acknowledged that ownership and jurisdiction over portions of the submerged lands underlying waters covered by this basin-wide TMDL are contested between the State of Idaho, United States and/or Coeur d'Alene Tribe. This TMDL is not intended as a waiver or admission of ownership or jurisdiction regarding the contested submerged lands by any of those parties.

In developing this basin-wide TMDL, EPA has utilized federally recommended "Gold Book" water quality criteria for those waters within Indian Country. EPA also considered the water quality standards of the downstream jurisdiction (Idaho) at the border. Those water quality standards are identical to EPA's Gold Book water quality criteria guidance. This approach ensures consistency within the basin and assures that the standards of the downstream state waters of Idaho and Washington will be met.

2.2 Background

The Idaho Department of Environmental Quality (DEQ) is authorized to issue and submit to EPA for approval this TMDL pursuant to section 303(d) of the Clean Water Act, Idaho Code §§ 39-101 through 39-130 and 39-3601 through 39-3624. Within the time frames established in the Idaho TMDL Schedule developed as a result of Idaho Sportsmen's Coalition v. Browner, W.D. Wash., C93-943-WD, the State originally developed draft TMDLs for the Coeur d'Alene River system based upon site-specific criteria. Idaho did not finalize and submit the TMDLs to EPA for approval, however, for a number of reasons, including the fact that the State could not use site-specific criteria while Idaho was still subject to the federally promulgated National Toxics Rule. In October 1998, the State changed the TMDL Schedule so that it could submit TMDLs after EPA removal of the State from the National Toxics Rule. The Plaintiffs in the Idaho Sportsmen's Coalition v Browner case raised concerns about the legality of this delay in TMDL development, while EPA raised concerns about its appropriateness.

The State has determined to proceed at this time with a final TMDL. EPA removed Idaho from the National Toxics Rule on April 12, 2000 (FR19659). Since Idaho had previously adopted EPA "Gold Book" criteria into its water quality standards, which are now the applicable standards for the Coeur d'Alene River basin, the NTR removal has no effect on the dissolved metals goals of the final TMDL. However, the removal from the National Toxics Rule does give the State the flexibility to employ water quality standards mechanisms such as site-specific criteria (SSC) and variances.

In the Coeur d'Alene basin, SSC have been under development for some time for the South Fork Coeur d'Alene River segment above Wallace (upstream of the Canyon Creek confluence). This effort has included extensive toxicity testing with a representative suite of resident species to determine the metals levels that will fully support aquatic biota in this segment. This work has been funded by the state of Idaho and Hecla Mining Company.

EPA and DEQ have evaluated the impact of a potential SSC on the TMDL. The draft SSC for the Wallace segment would not have any effect on the TMDL allocations, because Idaho water quality criteria would still be applied in the impaired segments downstream of the Wallace segment. Meeting these downstream criteria would require the same calculations and wasteload allocations in the TMDL. On the other hand, an SSC for the entire South Fork mainstem (from Pinehurst to the Montana border) could affect the TMDL allocations. This is because statewide criteria could be achieved in the mainstem Coeur d'Alene River after dilution of metals (in excess of the statewide criteria) in the South Fork by the relatively clean North Fork.

The State continues to be committed to the development of appropriate site-specific criteria and intends to complete its work with respect to such criteria. If site-specific criteria that impact the TMDL are developed and adopted by the State and approved by EPA, the State intends to modify the TMDL applicable to waters within its jurisdiction to reflect the site-specific criteria. Any substantive modification to the State's TMDL would be submitted to EPA for approval.

3.0 SCOPE OF THE TMDL

3.1 Pollutant Parameters

The TMDL is established for lead, cadmium, and zinc in the dissolved form in the water column. These metals parameters are considered the highest priority for TMDL development, because large portions of the CDA basin exceed the water quality standards for these metals. As a result of these exceedances, these metals are also important parameters in the NPDES permits and RI/FS analysis in the basin.

3.2 Geographic Scope

The geographic scope of the TMDL includes the entire CDA basin, from the headwaters to the Idaho-Washington border. Figure 3-1 presents a map of the drainages in the CDA basin. These drainages include the Idaho portion of the Spokane River, Coeur d'Alene Lake, St. Joe River, main stem Coeur d'Alene River, and the North and South Forks of the Coeur d'Alene River. Each of these streams has many named and unnamed tributaries.

Because the majority of sources are located in the South Fork portion of the basin, the TMDL components are established at a finer scale in this area. More detailed maps of the drainages and sources in the South Fork are included in Appendix A. A location key is provided in Appendix B.

3.3 Idaho 303(d) List

As required under Section 303(d) of the Clean Water Act, the State of Idaho has promulgated a listing of waters not currently meeting applicable water quality standards. A number of waterbodies in the CDA basin are included on the 303(d) list as impaired by metals.

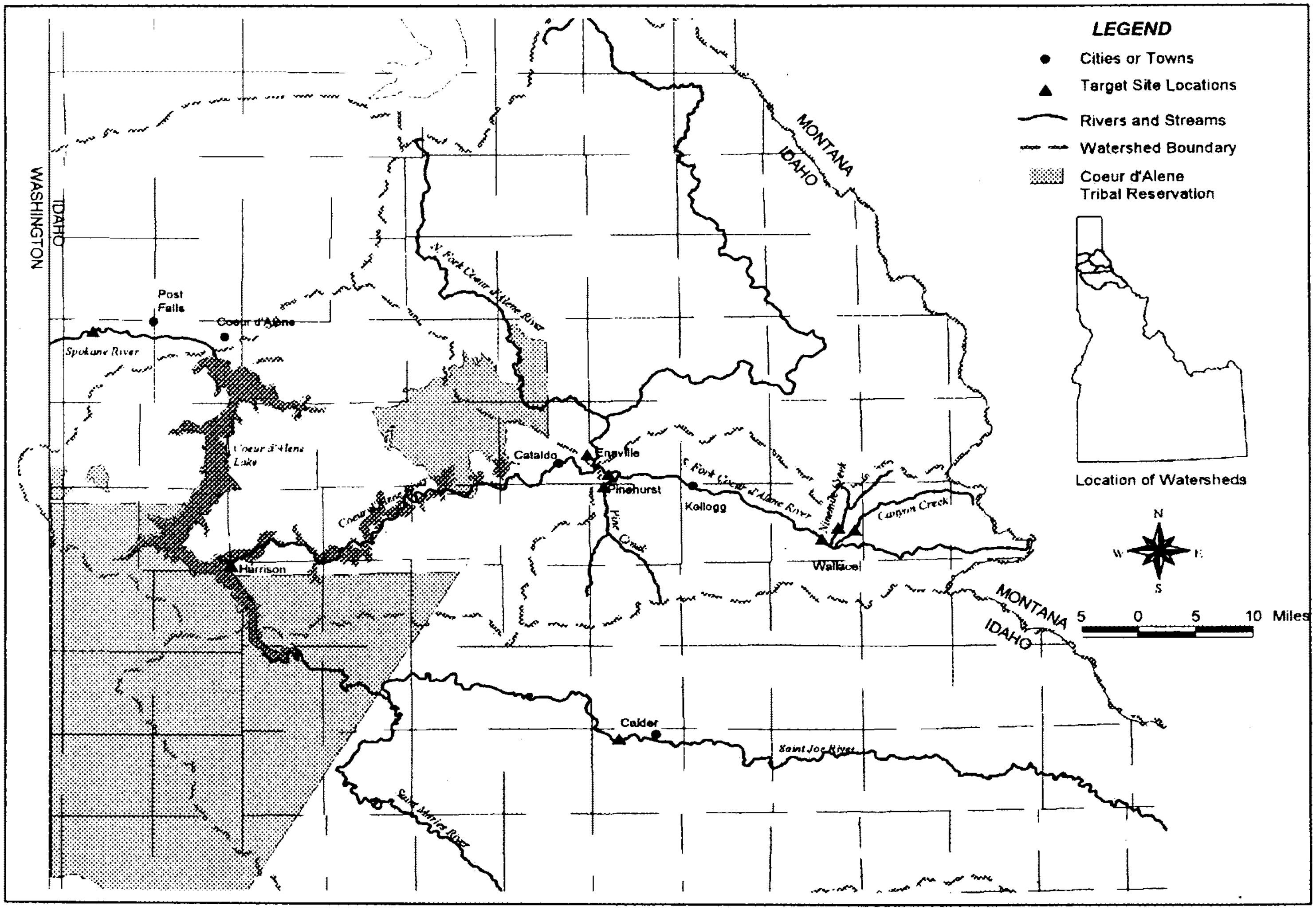

Figure 3-1 Map of Coeur d'Alene Basin

Table 3-1. Coeur d'Alene Basin Waterbodies on the 1998 Idaho 303(d) List for Metals

HUC	SEG #	WATERBODY NAME	SEGMENT BOUNDARIES	LENGTH (Mi.)
17010302	3513	South Fork Coeur d'Alene R.	Big Creek to Pine Creek	8.99
17010302	3514	South Fork Coeur d'Alene R.	Pine Creek to Bear Creek	1.79
17010302	3515	South Fork Coeur d'Alene R.	Bear Creek to Coeur d'Alene River	0.44
17010302	3516	South Fork Coeur d'Alene R.	Canyon Creek to Ninemile Creek	0.55
17010302	3517	South Fork Coeur d'Alene R.	Ninemile Creek to Placer Creek	0.33
17010302	3518	South Fork Coeur d'Alene R.	Placer Creek to Big Creek	7.56
17010302	3519	Pine Creek	E Fk Pine Creek to S Fk CDA River	5.28
17010302	3520	East Fork Pine Creek	Headwaters to Hunter Creek	5.19
17010302	3521	East Fork Pine Creek	Hunter Creek to Pine Creek	1.57
17010302	3524	Ninemile Creek	Headwaters to S Fk Coeur d'Alene R	4.91
17010302	3525	Canyon Creek	Gorge Gulch to South Fk CDA River	6.90
17010302	5084	Government Gulch	Headwaters to S.Fk of CDA River	3.53
17010302	5127	Moon Creek	Headwaters to S Fk CDA River	4.07
17010302	5661	Milo Creek	Headwaters to mouth	2.56
17010303	2001	Coeur d'Alene Lake	NA	NA
17010303	3529	Coeur d'Alene River	Black Lake to Thompson Lake	4.21
17010303	4015	Coeur d'Alene River	Cave Lake to Black Lake	4.00
17010303	4016	Coeur d'Alene River	Fortier Creek to Robinson Creek	0.80
17010303	4017	Coeur d'Alene River	Fourth of July Creek to Fortier Cr	10.50
17010303	4018	Coeur d'Alene River	French Gulch to Skeel Gulch	4.21
17010303	4019	Coeur d'Alene River	Latour Creek to Fourth of July Cr	4.09
17010303	4020	Coeur d'Alene River	Robinson Creek to Cave Lake	1.57
17010303	4021	Coeur d'Alene River	S Fk CDA River to French Gulch	2.13
17010303	4022	Coeur d'Alene River	Skeel Gulch to Latour Creek	1.16
17010303	4023	Coeur d'Alene River	Thompson Lake to CDA Lake	4.19
17010305	3552	Spokane River	CDA Lake to Huetter	3.45
17010305	3553	Spokane River	Huetter to Post Falls Bridge	4.89
17010305	3554	Spokane River	Post Falls Bridge to WA border	6.18

In the process of developing this TMDL, additional data and analysis indicate that metals criteria are exceeded in a number of additional tributaries to the South Fork Coeur d'Alene River. EPA has evaluated the available metals data and screened for stations that exceed water quality criteria at an assumed hardness of 100 mg/l (see "WQC" values in table below). Based on this analysis, the following tributaries exceed one or more of the metals criteria.

Table 3-2. Metals Concentrations in Non-Listed South Fork Tributaries

Waterbody	Station	Maximum Reported Concentrations in ug/L		
		Dissolved Cd (WQC=1.0)	Dissolved Pb (WQC=2.5)	Dissolved Zn (WQC=105)
SF CDA River above Canyon Cr.	SF228	3.1	8.0	475
Gorge Gulch	CC392	1.9	27	172
East Fork Ninemile	NM291	2.9	4.0	397
Wilson Creek	NM292	1.4	2.5	354
Highland Creek	PC307	3.5	5.0	1370
Denver Creek	PC308	18	14	7410
Nabob Creek	PC310	4.8	16	3430
Bunker Creek	SF100	152	20	9910
Portal Creek	SF104	6.0	26	1300
Grouse Creek along Govt Gulch	SF110	306	21	10500
Slaughterhouse Gulch	SF218	1.0	3.4	190
Grouse Gulch near Wallace	SF223	17	19	2400
McFarren Gulch	SF250	2.5	< 2.5	272
Prospect Gulch	SF261	13	11	1720

Source: URS Greiner RI/FS Database, April 2000

This list is provided for informational purposes and does not account for site-specific differences in hardness levels.

3.4 Identification of Target sites

Due to resource constraints, it is not feasible to specifically develop loading capacities and allocations for each individual 303(d)-listed waterbody in the basin (including South Fork tributaries likely to be added in future listings) in this TMDL. The extent of this pollution problem and the attempt to address it at the basin scale necessitates the selection of a limited number of points-of-compliance or "target sites" that span the basin. Target sites are locations in the river network where the loading capacities for dissolved metals are calculated and allocated to upgradient sources contributing metals to the target site.

EPA selected nine target sites that would result a TMDL that is fair, equitable, and appropriate to the scale of the pollution problem. Target sites are located at the mouths of major tributaries or on mainstem junctions. EPA considered the location and number of contributing point and nonpoint sources in establishing the target sites. Also, each target site is located at a sampling station that has been used for synoptic sampling for water quality and discharge in the South Fork or has been historically monitored for discharge by the United States Geological Survey (USGS). Of the nine target sites, five sites are located in the South Fork, because of the large number of point source and nonpoint source discharges in this drainage. A list of the target sites is provided in the table below, and locations are depicted in Figure 3-1.

Table 3-3. TMDL Target Sites

Target Site Name	Description
Spokane River @ State Line	Idaho-Washington Border
St. Joe River @ Calder	USGS Station No. 12414500
Coeur d'Alene River @ Harrison	Near Mouth of Coeur d'Alene River
North Fork Coeur d'Alene River @ Enaville	USGS Station No. 12413000
South Fork Coeur d'Alene River @ Pinehurst	USGS Station No. 12413470; URS Greiner Station No. 271
Pine Creek	Mouth of Pine Creek; URS Greiner Station No. 315
South Fork Coeur d'Alene River @ Wallace	South Fork downstream from Ninemile Creek confluence; URS Greiner Station No. 233
Ninemile Creek	Mouth of Ninemile Creek south of Depot RV park; URS Greiner Station No. 305
Canyon Creek	Mouth of Canyon Creek at Frontage Road Bridge north of I-90; URS Greiner Station No. 288

With the exception of two target sites, each target site is located on a segment listed on the current Idaho 303(d) list. Target sites on the North Fork of the Coeur d'Alene River and St. Joe River are established for tracking purposes and allocation of loading capacity through the river network. These two rivers currently meet metals criteria based on available information.

3.5 Identification of Sources

To achieve water quality standards at the target sites, the TMDL must address all sources of dissolved metals to waters at a given target site. In the Coeur d'Alene River and tributaries, the loading capacity at each target site is allocated to all identified sources of dissolved metals that are upgradient from the target site. Thus, while the TMDL addresses impairment on 303(d)-listed waters, the allocations may include sources located along upstream watersheds that are tributary to the listed waterbody. Some of these smaller, upstream watersheds are not on the 303(d) list. Nevertheless, sources in these watersheds discharge metals to the upstream watershed, and the stream network then transports the metals downstream to the waters at the target site location. Therefore, inclusion of these sources in the TMDL is essential to ensure that water quality standards will be achieved, because metals discharged from these upstream watershed sources are contributing to water quality standards exceedances in both listed and unlisted waters. For example, the Star 1200 adit discharges dissolved metals to Grouse Creek, a tributary to the South Fork above Wallace, which is not included on the 1998 Idaho 303(d) list. Grouse Creek flows into the South Fork upstream from the Wallace target site. Since the metals from the Star adit ultimately reach the Wallace target site, this adit is included in the wasteload allocations for that target site, even though the creek immediately adjacent to the adit portal is not included on the current 303(d) list.

4.0 APPLICABLE WATER QUALITY STANDARDS

4.1 General

Water quality standards are adopted by states and tribes to maintain and restore the nation's waters for "beneficial uses" such as drinking, swimming, and fishing. The standards for a particular waterbody consist of a set of protected uses ("designated" uses), the water quality criteria necessary to protect these uses, and an "anti-degradation" requirement (see below). The water quality criteria can be expressed as numeric criteria (e.g., contaminant concentrations) or narrative criteria (e.g., "No toxics in toxic amounts"). The following discussions describe the water quality standards applicable to CDA basin waters.

4.2 Designated Uses

Title 1, Chapter 2 of the State of Idaho Department of Environmental Quality rules presents the State's water quality standards. Sections 100 and 110 present the Use Designations for Surface Waters in the Panhandle Basin of Idaho, including the South Fork Coeur d'Alene Subbasin, Coeur d'Alene Lake Subbasin, and Upper Spokane Subbasin (IDAPA 58.01.02.110[1]). The uses designated for the Spokane River, Coeur d'Alene Lake, mainstem Coeur d'Alene River, and the North Fork of the Coeur d'Alene River include the following:

- Domestic water supply
- Industrial and agricultural water supply
- Cold water biota
- Salmonid spawning

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[1]Effective July 1, 2000, the citation to Idaho standards changed from IDAPA 16.01.02 to 58.01.02.

- Primary contact recreation
- Secondary contact recreation.

In addition, Coeur d'Alene Lake and the North Fork of the Coeur d'Alene River are designated as Special Resource Waters. Sections 56 and 400.01(b) describe specific requirements related to Special Resource Waters in Idaho.

The South Fork below Daisy Gulch and Canyon Creek below Gorge Gulch have been heavily impacted by historic and ongoing mining activities. Above these segment boundaries (Daisy Gulch and Gorge Gulch, respectively), the South Fork and Canyon Creek are designated for cold water biota, salmonid spawning, primary contact recreation, agricultural water supply, industrial water supply and domestic water supply. Below these boundaries, the South Fork and Canyon Creek are classified for:

- Industrial and agricultural water supply
- Secondary contact recreation
- Cold water biota

The cold water biota use designations for the South Fork below Daisy Creek, Canyon Creek and Shields Gulch, were promulgated by EPA on July 31, 1997 in accordance with section 303(c) of the Clean Water Act, 33 U.S.C. Sec. 313(c) (see 62 Fed. Reg. 41162, July 31, 1997). EPA's promulgation of water quality standards for Idaho was subsequently challenged in federal court. On March 15, 2000, the United States District Court for District of Idaho issued a decision largely upholding EPA's promulgation but vacating the cold water biota designation for Shields Gulch. The District Court ruling results in two sets of use designations applicable to Shields Gulch. Above the mining impacted area (P-8a), Shields Gulch is protected for cold water biota, salmonid spawning, primary contact recreation, agricultural water supply, industrial water supply and drinking water supply. Below the mining impact (P-8b), it is protected for secondary contact recreation, agricultural water supply and industrial water supply.

The CDA basin includes hundreds of tributaries not specifically addressed in the Idaho water quality standards. The standards include a default provision that designates these unspecified waters for cold water biota, primary or secondary contact recreation, agricultural water supply, and industrial water supply (IDAPA 58.01.02.101).

In summary, with the exception of Shields Gulch below the mining impact, the cold water biota use applies to all streams in the CDA basin.

4.3 Applicable Water Quality Criteria

For cadmium, lead, and zinc in the dissolved form in the water column, the water quality criteria designed to protect aquatic life from chronic exposure effects are the most stringent criteria that apply to waters in the CDA basin. The applicable criteria for the TMDL are established in the approved State of Idaho water quality standards (IDAPA 58, Title 01, Chapter 02). The criteria for dissolved cadmium, lead, and zinc in the Washington and Idaho standards are identical except for assumptions about hardness.

The toxicity of dissolved metals to aquatic life is dependent on the hardness of the river or lake waters. For this reason, the chronic criteria for dissolved cadmium, lead, and zinc are calculated from hardness-based equations. The following equations are established in both Idaho and Washington water quality standards:

Dissolved Cadmium Criteria = **(1.101672-[ln(hardness)(0.041838)])*(exp[0.7852(ln(hardness)) - 3.490])**

Dissolved Lead Criteria = **(1.46203-[ln(hardness)(0.145712)])*(exp[1.273(ln(hardness)) - 4.705])**

Dissolved Zinc Criteria = **0.986exp[.8473(ln(hardness)) + 0.7614]**

CDA basin waters exhibit a range of hardness levels, and river hardness in the basin is strongly related to the flowrate of the rivers. This relationship between river flow and hardness at various locations in the river network is evaluated in more detail under "Derivation of TMDL Elements" below. Hardness levels in the basin generally fall between 10 and 100 mg/l. However, the Idaho water quality standards set a minimum hardness to be used in calculating the criteria at 25 mg/l. Washington has applied the criteria equations at a hardness value of 20 mg/l in its approved TMDL for the cadmium, lead, and zinc in the Spokane River. Based on these considerations, the range of applicable dissolved metals criteria is depicted in Table 4-1.

Table 4-1. Range of Applicable Criteria in the Coeur d'Alene Basin

Metal	Criterion @hardness of 20 mg/l	Criterion @hardness of 25 mg/l	Criterion @hardness of 100 mg/l
Dissolved Cadmium	0.31 ug/l	0.37 ug/l	1.03 ug/l
Dissolved Lead	0.42 ug/l	0.54 ug/l	2.52 ug/l
Dissolved Zinc	27 ug/l	32 ug/l	105 ug/l

4.4 Anti-degradation

The Idaho anti-degradation requirements (IDAPA 58.01.02.051) are pertinent to the CDA basin TMDL. If a waterbody has better water quality than that necessary to support designated uses, the anti-degradation requirements dictate that the existing quality shall be maintained and protected, unless the state finds that a lowering of water quality (i.e., degradation) is necessary to accommodate important economic or social development.

While large portions of the CDA basin surface water network contain metals concentrations well above the applicable water quality criteria, a cursory review of the available data indicates that there are also a number of waters within the CDA basin with metals concentrations well below the water quality criteria. Anti-degradation requirements apply to any proposed activities that would lower water quality in these areas.

5.0 AVAILABLE DATA

5.1 Data Sources

A significant amount of monitoring information is available for the waterbodies in the CDA basin. The data can be classified as one-time studies and longer term, programmatic monitoring. Table 5-1 lists data sources and features of each data set that are pertinent to this TMDL. EPA evaluated these data as part of the development of the TMDL elements described in Chapter 6.

Table 5-1. Analytical Water Quality Data Available for CDA basin

Data set	Period of Record	Geographic Scope	Measured Features	Measured Parameters	Number of Samples
EPA	9/22/87- 5/19/88	S. Fork (& major Tributaries)	Surface Water	Hardness Cadmium (dis) Lead (dis) Zinc (dis)	29 sites 101 samples
USGS	Nov. 20, 1989- Nov. 14, 1990	S. Fork	Surface Water	Cadmium (dis) Lead (dis) Zinc (dis)	1 site 5 samples
USGS	1991-1992	Coeur d'Alene Lake	Surface Water	Cadmium (tot rec) Lead (tot rec.) Zinc (tot rec.)	6 sites 146 samples
Idaho Dept. Env. Quality	Dec. 4, 1989- Jan. 23, 1990	S. Fork	Surface Water Effluent	Hardness Cadmium (dis) Lead (dis) Zinc (dis)	7 sites 36 samples

Table 5-1. Analytical Water Quality Data Available for CDA basin (Continued)

Data set	Period of Record	Geographic Scope	Measured Features	Measured Parameters	Number of Samples
Idaho Dept. Env. Quality	Jan.-Aug 1993	Pine Creek	Surface Water	Hardness Cadmium (tot) Lead (tot) Zinc (tot)	18 sites 90 samples
Idaho Dept. Env. Quality	Apr. 23-Sept. 28, 1993	Canyon Creek Ninemile Creek	Surface Water	Hardness Cadmium (dis) Lead (dis) Zinc (dis)	10 sites 36 samples
Idaho Dept. Env. Quality	Oct 26, 1993 - Sept. 14, 1995	S. Fork and tributaries	Surface Water	Hardness Cadmium (dis+tot) Lead (dis+tot) Zinc (dis+tot)	14 sites 451 samples
CH2MHill (for EPA)	Oct. 16-28, 1996 (once each site)	Bunker Hill site	Ground Water	Cadmium (dis) Lead (dis) Zinc (dis)	72 sites 72 samples
CH2MHill (for EPA)	Feb. 6-12, 1997 (once each site)	Bunker Hill site	Ground Water Surface Water	Cadmium (dis) Lead (dis) Zinc (dis) Flow (7 sites)	89 sites 89 samples
CH2MHill (for EPA)	Apr. 21-29, 1997 (once each site	Bunker Hill site	Ground Water Surface Water	Cadmium (dis) Lead (dis) Zinc (dis) Flow (12 sites)	92 sites 92 samples
CH2MHill (for EPA)	Sept.1997-Jan. 1998	Bunker Hill site	Ground Water	Cadmium (dis) Lead (dis) Zinc (dis)	11 sites 41 samples
CH2MHill (for EPA)	Oct. 1997 Feb. 1998	Bunker Hill site	Ground Water	Cadmium (dis) Lead (dis) Zinc (dis)	68 sites 136 samples
CH2MHill (for EPA)	Oct. 9, 1997 Feb. 9, 1998	Bunker Hill site S. Fork (few)	Surface Water	Cadmium (dis+tot) Lead (dis+tot) Zinc (dis+tot) Flow (4 sites)	17 sites 34 samples
McCulley, Frick, and Gilman (MFG)	May 14-18, 1991	S. Fork (& major Tributaries)	Surface Water	Cadmium (dis+tot) Lead (dis+tot) Zinc (dis+tot) Flow	57 sites 57 samples
MFG	Oct. 1-5, 1991	S. Fork (& major Tributaries)	Surface Water	Cadmium (dis+tot) Lead (dis+tot) Zinc (dis+tot) Flow	70 sites 70 samples

Table 5-1. Analytical Water Quality Data Available for CDA basin (Continued)

Data set	Period of Record	Geographic Scope	Measured Features	Measured Parameters	Number of Samples
EPA PCS and Facility/ Discharge Monitoring Reports	1996-1998	Discharges in the S. Fork (& major Tributaries) and Spokane River	Effluent	Cadmium (tot+tot rec) Lead (tot+tot rec) Zinc (tot+tot rec) (Also dissolved metals for Lucky Friday Mine) Flow	15 sites (monthly summaries) on South Fork, 3 sites on Spokane River
EPA Inspection Reports	Apr. 96 and Mar. 98	S. Fork (& major Tributaries)	Surface Water Effluent	Cadmium (tot) Lead (tot) Zinc (tot) (Also dissolved metals for Lucky Friday Mine) Hardness Flow	24 sites 42 samples
URS Greiner (for EPA)	Nov. 1997 and May 1998	S. Fork (& all Tributaries) N. Fork Mainstem St. Joe River Spokane River	Surface Water Effluent	Cadmium (dis+tot) Lead (dis+tot) Zinc (dis+tot) Hardness Flow	184 sites 380 samples
USGS	Oct. 1998 to Sept. 1999	S. Fork (& select Tributaries) N. Fork Mainstem St. Joe River Spokane River CDA Lake	Surface Water	Cadmium (dis+tot) Lead (dis+tot) Zinc (dis+tot) Hardness Flow	42 sites

Note: (dis) = dissolved
(tot) = total
(tot rec) = total recoverable

The State of Idaho sampling has produced the largest data sets over time at several key locations in the Coeur d'Alene river network, while USGS has collected the most recent data across the river network. The November 1997 and May 1998 URSG sampling, which was performed under EPA's Superfund program, was conducted at the finest geographic scale of all the sampling to date, with stations established at all tributary mouths to the South Fork outside of the Bunker Hill Superfund site. Also, the URSG efforts are the only synoptic field studies (i.e., studies that present data over a large area in a single period of time) that include parallel sampling of abandoned adit discharges. Appendix C provides a more detailed description of the studies completed by URSG in 1997 and 1998, MFG in 1991, IDEQ in 1993-1995, and CH2MHill in 1996-1998, and USGS in 1999. The URSG sampling locations are described in Appendix B.

5.2 Data Limitations

While a significant amount of data is available for the TMDL analysis, a number of inconsistencies in the data require EPA to make interpretative judgments and assumptions. The limitations or inconsistencies in the data include:

- Lack of data for certain sources that presented access difficulties (e.g., snowpack) for field crews during a given sampling episode
- Limited hardness data at some sites
- Limited flow data at some sites
- Non-uniform sampling locations from one sampling period to the next
- Some data sets are summary information only (e.g., monthly averages, maxima)
- Varied NPDES permit monitoring requirements
- NPDES discharges are better characterized than unpermitted discharges
- Metals analyses vary between dissolved, total recoverable, and total form
- Some data sets have detection levels above the water quality criteria

These issues are not unusual in water quality analysis and regulation, because water quality and flow data are often collected using a variety of methods and for different purposes. Collectively, the above sources provide for the development of a sound and reasonable TMDL. In the descriptions below of the methods used to develop the TMDL, EPA explains its approach integrating and interpreting the varied data sources, including simplifying assumptions.

5.3 Current Metals Concentrations in the Basin

Table 5-2 summarizes current water quality in the basin based on available information in April 1999.

Table 5-2. Current Conditions at TMDL Target Sites (in ug/l)

Dissolved Cadmium

Target Site (URSG Station ID)	n	Min	Max	Avg	Std Dev
SF at Wallace (SF233)	21	2.4	16	9.7	3.7
Canyon Creek (CC287)	49	5.2	200	22	27
Ninemile Creek (NM305)	51	7.4	48	23	7.5
Pine Creek (PC305)	49	0.2	5.0	0.8	1.1
SF at Pinehurst (S271)	46	1.6	18	7.8	3.7
NF at Enaville (NF400)	9	< 1.0	< 1.0	< 1.0	NA
CDA River at Cataldo (USGS)	12	0.9	3.0	1.9	0.6
St. Joe R (SJ004)[1]	2	<0.04	<0.10	NA	NA
Coeur d'Alene Lake[2]	146	<1.0	2	<1.0[3]	NA
Spokane R (state line)	15	0.04	0.41	0.25	0.11

Table 5-2. Current Conditions at TMDL Target Sites (continued)

Dissolved Lead

Target Site (URSG Station ID)	n	Min	Max	Avg	Std Dev
SF at Wallace (SF233)	20	8.8	31	19	5.4
Canyon Creek (CC287)	49	20	223	43	31
Ninemile Creek (NM305)	51	4.0	91	48	19
Pine Creek (PC305)	49	1.0	11	2.4	1.8
SF at Pinehurst (S271)	46	0.8	12	4.7	3.4
NF at Enaville (NF400)	9	< 1.0	< 1.0	< 1.0	NA
CDA River at Cataldo (USGS)	12	1.5	8.0	4.0	2.0
St. Joe R (SJ004)[1]	2	<0.5	1.0	NA	NA
Coeur d'Alene Lake[2]	146	<1.0	41	3.3[3]	NA
Spokane R (state line)	15	0.06	3.9	0.7	1.0

Dissolved Zinc

Target Site (URSG Station ID)	n	Min	Max	Avg	Std Dev
SF at Wallace (SF233)	21	319	2280	1250	540
Canyon Creek (CC287)	49	688	6730	2770	1510
Ninemile Creek (NM305)	52	1787	9710	3730	1500
Pine Creek (PC305)	49	20	402	122	63
SF at Pinehurst (S271)	46	345	2920	1420	767
NF at Enaville (NF400)	9	3.0	20	7.4	5.7
CDA River at Cataldo (USGS)	12	169	797	403	206
St. Joe R (SJ004)[1]	2	4.2	<5.0	NA	NA
Coeur d'Alene Lake[2]	146	<10	390	99[3]	NA
Spokane R (state line)	15	22	105	73	25

[1]Only 2 sample results available for St. Joe River (URSG 1997-98), no averages or standard deviations calculated.
[2]Data are total recoverable concentrations from lake-wide samples obtained from the euphotic and lower hypolimnion zones. No dissolved data available for lake.
[3]Median concentration.
[4]All values in ug/l

Data Sources: South Fork (and tributaries) data collected by IDEQ, stored in URS Greiner RI/FS database (Dec. 1998)

North Fork data collected by USGS, stored in URS Greiner RI/FS database (Dec. 1998)

Cataldo data collected by IDEQ WY1996 monitoring in "Coeur d'Alene River Water Quality Assessment and Total Maximum Daily Load to Address Trace (Heavy) Metals Criteria Exceedences" (January 1998)

St. Joe River data collected by URS Greiner, stored in RI/FS database (Dec. 1998)

Coeur d'Alene Lake data collected by USGS, reported in "Nutrient and Trace-element Enrichment of Coeur d'Alene Lake, Idaho" (U.S. Geological Water-Supply Paper 2485. 1997)

Spokane R. data collected by Washington Department of Ecology in "Cadmium, Lead, and Zinc in the Spokane River" (Pub. 98-329, September 1998)

6.0 DERIVATION OF TMDL ELEMENTS

This chapter describes the derivation of the required "TMDL Elements", which include the water quality standards, loading capacity, natural background loads, gross allocations, wasteload allocations, load allocations, and margin of safety. These elements are consistent with the requirements of the TMDL regulations (40 CFR 130.7).

6.1 Approach to Calculating Loading Capacities at Target Sites

6.1.a. Seasonal Variation

Two approaches were considered to account for variability in river flows and hardness levels, which directly affect the loading capacity of CDA waters for dissolved metals. The first approach is to develop calendar-based, seasonal loading capacities. Critical flows and hardness levels over each particular season are derived, and one loading capacity and set of allocations for each metal would apply during that season.

The second approach, and the approach chosen for development of this TMDL, is to develop flow-based loading capacities. In this approach, the continuous range of river flow that occurs at each target site is broken down into ranges or tiers. The loading capacity for each breakpoint in the flow tiers is established. The applicable allocation for a given source does not depend on the time of year, but rather on the actual river flow at the time of discharge and a conservative estimate of the river hardness at that river flow. This approach was chosen because, unlike the calendar-based approach, this flow-based approach allows for allocations based on actual river discharge conditions and provides more flexibility in establishing and implementing allocations.

The technical information and analyses used to establish the appropriate flow tiers and hardness levels is provided below.

6.1.b. Flow Estimation

USGS has collected long-term flow records from several stations across the CDA basin, with some monitoring records dating back to the early 1900's. In addition, numerous field studies have been conducted in the CDA basin, focusing on a wide variety of assessment questions. Because studies were conducted for a variety of purposes, flow monitoring has not been conducted in a standardized fashion. A handful of one-time studies have included flow monitoring at numerous sites within the same time frame. These studies have been conducted by MFG (1991), MFG (1992), IDEQ (1994), and URSG (1998). Measurement locations, sampling techniques, analytical methods, and sample time frames have varied from one study to the next. In 1999, USGS conducted a major monitoring program of the river network, which included daily flow monitoring at key locations in the basin. Prior to 1999, flow data was very limited for tributaries to the South Fork CDA River, including TMDL target site tributaries (Canyon Creek, Ninemile Creek, and Pine Creek). The USGS monitoring program significantly increased the body of flow data for these target sites. EPA has used this new information to develop flow tiers for the previously ungauged tributaries. For the purpose of establishing consistent and reasonably accurate flow tiers, EPA has calculated linear regressions between tributary flows and flows at USGS stations with long term records. Using these relationships, EPA can estimate design flows at the less-monitored tributaries from the extensive record at the long term stations.

Flows Tiers

In order to represent the full range of river flows in a consistent manner, EPA calculates the TMDL elements for four flow conditions at each target site: 7Q10 low flow (see below) and the 10^{th}, 50^{th}, and 90^{th} percentile average daily flow. These design flows are used as breakpoints for four flow tiers in the TMDL: 7Q10 to 10^{th} percentile, 10^{th} percentile to 50^{th} percentile, 50^{th} percentile to 90^{th} percentile, and greater than 90^{th} percentile.

The characteristic flow used for water quality compliance programs in concert with chronic aquatic life criteria is the lowest 7-day average daily river flow that occurs with a 10-year return period (7Q10) (i.e., there is a 10 percent chance that this 7-day average river flow could occur in any given year). The 7Q10 is used in development of this TMDL because it is the threshold defined for use in the Idaho water quality standards.

For target sites with statistically sufficient long-term gauging of average daily river flow, the 7Q10 is calculated directly from the flow record. Table 6-1 shows 7Q10 and percentile river flows calculated for these stations using the Log Pearson Type III distribution.

Table 6-1. Flow Tiers for USGS Stations in the CDA basin

Station Name	USGS Station Number	Available Period of Record[1]	Discharge Percentiles			
			7Q10 (cfs)	10th	50th	90th
Spokane River @ Post Falls	12419000	1913-1997	211	906	2,980	17,400
St. Joe River @ Calder	12414500	1912-1997	241	374	1,000	6,470
CDA River @ Cataldo	12413500	1912-1997	239	348	1,100	6,870
North Fork CDA River @ Enaville	12413000	1911-1997	165	253	845	5,090
South Fork CDA River @ Pinehurst	12413470	1988-1997	68	97	268	1,290
South Fork CDA River @ Silverton	12413150	1967-1986	31	48	109	649
Placer Creek	12413140	1967-1997	1.0	3.6	15	97

[1]Source: USGS WATSTORE database

For target sites without a long-term flow record, EPA used the 1999 USGS data to examine the relationship between flows at a particular target site and two USGS stations with long term records. First, regressions were calculated for each site and the long-term Placer Creek station, because Placer Creek is closest in size to the target site creeks. Second, regressions were calculated between each target site and the nearest long-term station on the South Fork. The target site and selected long term stations are shown in Table 6-2. The flow data used for the estimations and graphs of the regressions are included in Appendix L.

The gauging station for Placer Creek is situated below a water intake structure operated by the East Shoshone Water District. Since past water withdrawals may have effected measured low flows at this gauge, EPA selected the South Fork gauges for use in estimating flows. As indicated in Table 6-3, the R^2 values for the South Fork regressions were either similar or higher than those for the Placer Creek regressions.

Table 6-2. Flow Relationships between Short-Term and Long-Term Sites

Target Site	Long-Term USGS Station	R-Squared Value	Regression Equation[1]
Canyon Creek	Placer Creek South Fork at Silverton	0.81 0.96	NA y = 0.23(x)
Ninemile Creek	Placer Creek South Fork at Silverton	0.84 0.79	NA y = .063(x)
Pine Creek	Placer Creek South Fork at Pinehurst	0.82 0.90	NA y =0.30(x)

[1] y = flow at target site
x = flow at long term gauge
y-intercept for each regression is fixed at zero.

South Fork at Wallace

The target site on the South Fork at Wallace is not included in the table, because USGS did not monitor this location in 1999. The flow at this site is estimated as the combined flows from Canyon Creek, Ninemile Creek, and the South Fork above the confluence with Canyon Creek. Flows at Canyon Creek and Ninemile Creek are calculated above. The remaining contribution requires an estimate of flows in the South Fork above Canyon Creek.

Two methods were considered to estimate 7Q10 river flows in the South Fork above Canyon Creek. The first method considered would be to determine runoff coefficients. Runoff coefficients are the unit runoff per unit drainage area for the watershed of interest. Runoff coefficients can be developed and applied to an ungauged target site using downstream gauged data. River flow and 7Q10 characteristic flows from the ungauged tributary can be estimated by multiplying the calculated runoff coefficient by the drainage area associated with the ungauged target site.

The other method considered was to utilize measured river flow data from synoptic sampling studies. Since several of the long-term gauged stations were also sampled during these studies, or automatically recorded, a ratio of river flow measured at a gauged station to river flow measured at an ungauged station can be calculated for that sampling event. The calculated ratio is then used to estimate design flows at ungauged locations using the design flows for gauged stations. The assumption used in this method is that the ratio calculated between one-time measured river flows and the ratio between the design flows are similar. EPA chose this method for the Wallace site, because it provides estimates using actual measured tributary flows rather than watershed area ratios.

Measured river flows reported by MFG (1992) for the fall 1991 and URSG (1998) for the fall 1997 at Wallace were used to the calculate river flow ratio. Three USGS gauges within the CDA basin with sufficient long term records to determine the 7Q10 were evaluated using the synoptic data. The stations compared were the Coeur d'Alene River@Cataldo, the South Fork@Silverton (USGS No. 12413150), and Placer Creek (USGS No. 12413140).

EPA's examination of the available flow information led to the selection of the MFG fall 1991 data and the South Fork@Silverton gauge. The gauged flows recorded at Silverton showed low variability during the period of the MFG synoptic sampling in 1991. Also, the sum of flows measured by MFG in 1991 at the upstream ungauged tributaries is in greater agreement with the recorded river flow at Silverton than the sum of similar flows in the URSG 1997 river flow data.

EPA has performed a check on the ratio calculated for the South Fork using the 1999 monitoring data. EPA calculated the difference between the mean flow at the Silverton station and the sum of mean flows at Canyon, Ninemile, and Placer Creeks in 1999. This difference represents a rough estimate of the combined contributions of surface flow in the South Fork above Wallace, groundwater recharge flows between Wallace and Silverton, and unmonitored flows in Lake Creek and Daly Gulch. The ratio of this difference to the mean flow at Silverton (0.54) is somewhat higher than the ratio of directly-measured Wallace/Silverton flows (0.43) calculated using the MFG 1991 data. This difference in ratios is to be expected given the additional inputs to flow at Silverton not captured in the 1999 monitoring, and the results of this check suggest that the estimates for the South Fork above Wallace are reasonably accurate and conservative.

Using the estimated ratio of Wallace/Silverton flows and the design flows at the Silverton gauge, the 7Q10, 10th, 50th, and 90th percentile flows for the South Fork above Canyon Creek are 13, 21, 47, and 279 cfs. These values are added to the Ninemile Creek and Canyon Creek flows to estimate the flows in the South Fork target site.

Harrison

River flow in the mainstem of the Coeur d'Alene River below Cataldo and above Harrison is characterized by unsteady flows for the majority of the year. Flow through this reach is affected by backwater conditions caused by the stage (height) of Coeur d'Alene Lake. The 1999 USGS flow data collected at Harrison and Cataldo indicate that the flows at the two locations are nearly identical, with a regression coefficient (i.e., the predicted ratio between the sites) of approximately 0.99. Based on these data, the 7Q10 and the 10^{th}, 50^{th}, and 90^{th} percentile flows for the Cataldo gauge are directly applied in the TMDL as the estimated Harrison target site flows.

TMDL Flow Tiers

Based on the above analysis, the flow values used to calculate the TMDL elements are shown in Table 6-3.

Table 6-3. TMDL Flow Tiers

Target Site	URSG Station ID No.	Discharge Percentiles			
		7Q10 (cfs)	10% (cfs)	50% (cfs)	90% (cfs)
Spokane River @ state line[1]	NA	211	906	2,980	17,400
St. Joe River @ Calder [1]	NA	241	374	1,000	6,470
Coeur d'Alene River @ Harrison [1]	NA	239	348	1,100	6,870
North Fork CDA River @ Enaville [1]	NA	165	253	845	5,090
South Fork CDA River @ Pinehurst [1]	NA	68	97	268	1290
Pine Creek [2,3]	315	20	29	80	387
South Fork @ Wallace [6]	233	22	35	79	469
Ninemile Creek [2,4]	305	2.0	3.0	6.9	41
Canyon Creek [2,5]	288	7.1	11	25	149

[1] Average daily discharge data for nearest USGS gauge (long term data)
[2] Average daily discharge data for nearest USGS gauge (1999 monitoring)
[3] Regression of flows in Pine Creek and South Fork (Pinehurst)
[4] Regression of flows in Ninemile Creek and South Fork (Silverton)
[5] Regression of flows in Canyon Creek and South Fork (Silverton)
[6] Stream discharge data from MFG database, October 3, 1991 (MFG, 1992) for South Fork above Canyon Creek & Silverton. Flow is estimated as sum of Ninemile Creek, Canyon Creek, and South Fork above Canyon Creek.

6.1.c. Hardness and Water Quality Criteria

The chronic cold water biota criteria for dissolved cadmium, lead, and zinc are hardness-dependent. Toxicity of metals to aquatic life increases as hardness decreases. For this reason, hardness-based water quality criteria are most stringent at low hardness levels. The available data indicate that hardness levels vary from approximately 20 mg/l to 100 mg/l in waters of the Couer d'Alene River basin. Based on this variability in hardness levels, a range of water quality criteria apply to basin waters.

In some rivers, hardness levels vary depending on river flowrate. The available data indicate a strong flow/hardness relationship at most of the Coeur d'Alene River and tributary target sites. At these sites, hardness increases as flow decreases. This means that a higher water quality criterion is applicable to these waters under low flow conditions.

Since the TMDL elements are flow-based for the Coeur d'Alene River and tributaries, EPA has incorporated the flow/hardness relationship into the TMDL. At each target site showing a flow/hardness relationship, a linear regression between ln(flow) and hardness was performed using the available data for the target site. The resulting regression equation is used to predict hardness values at the flow tiers. The lower bound of a 90^{th} percentile confidence interval for the regression equation is used in the prediction. Hardness values were not estimated outside the range of available data, which did not include flows at or below the 7Q10 flows. Table 6-4 lists the flows, hardness values, and resulting criteria applied in the TMDL. The data and regression calculations for those sites that show a flow/hardness relationship is included in Appendix I.

6.2 Total Loading Capacity

The total loading capacity is calculated by multiplying the river flow rate by the water quality criterion concentration and a conversion factor (for "pounds per day" units) for each of the target sites. The values calculated for Coeur d'Alene River target sites are shown in Tables 6-5 through 6-7. The total loading capacity is not calculated in Coeur d'Alene Lake and Spokane River, because it is not needed for allocation of pollutant loads (see discussion in Section 6.7).

6.3 Loading Available for Allocation

Once the loading capacity is established, a series of calculations are performed, culminating in an allocation of a portion of the loading capacity to sources upstream of each target site. This series of calculations is depicted in Figure 6-1.

The portion of the loading capacity in the Coeur d'Alene River and tributaries that is available for allocation is equal to the total loading capacity minus the natural background load, upstream allocated load, and margin of safety. Each of these factors is described in detail in this section.

Table 6-4. Water Quality Criteria for Metals in the Coeur d'Alene Basin TMDL

Target Site	Flow Tier[1] (cfs)	River Hardness[2] (mg/l)	Dissolved Cd (ug/l)	Dissolved Pb (ug/l)	Dissolved Zn (ug/l)
288 Canyon	7.1	56	0.67	1.33	64
	11	56	0.67	1.33	64
	25	45	0.57	1.05	53
	149	25	0.37	0.54	32
305 Nine Mile	2.0	73	0.82	1.78	80
	3.0	73	0.82	1.78	80
	6.9	63	0.73	1.52	71
	41	36	0.48	0.81	44
233 South Fork Wallace	22	57	0.68	1.36	65
	35	56	0.67	1.33	64
	79	47	0.59	1.10	55
	469	25	0.37	0.54	32
315 Pine	20	25	0.37	0.54	32
	29	25	0.37	0.54	32
	80	25	0.37	0.54	32
	387	25	0.37	0.54	32
271 South Fork Pinehurst	68	101	1.00	2.54	105
	97	96	1.00	2.40	101
	268	71	0.80	1.73	78
	1,290	28	0.40	0.62	36
CDA River Harrison	239	47	0.59	1.10	55
	348	45	0.57	1.05	53
	1,100	36	0.48	0.81	44
	6,870	25	0.37	0.54	32
Spokane River	NA	20[3]	0.31	0.42	27

Notes
(1) These flows are estimates of the 7Q10, 10th, 50th, and 90th percentiles for each target site.
(2) Idaho water quality standards establish a 25 mg/l minimum for criteria calculation, while the Washington water quality standards contain no minimum.
(3) The applicable hardness value for the Spokane River at the Idaho-Washington border is 20 mg/l based on the approved Spokane River TMDL.

6.3.a. Natural Background Conditions

The TMDL takes into account estimates of the natural background loadings of metals in the Coeur d'Alene River. These loadings are subtracted from the loading capacity to determine the loading capacity available for allocation to point and nonpoint sources in the basin.

South Fork and Tributaries

Evaluation of natural background conditions in historic mining areas such as the Silver Valley is very difficult, because naturally mineralized areas are also disturbed throughout by mining activities. In these areas, actual natural background conditions may only occur in non-mineralized watersheds or high in the headwaters of mineralized watersheds. Under these constraints, EPA reviewed data from locations above mining influences in the South Fork and tributaries. Overall, the concentrations at the few available stations are very low, with cadmium and lead generally not detected and zinc detected at levels below 10 ug/l (which is below the Idaho water quality criterion). For example, EPA evaluated URSG Station 205 in the South Fork above Larson. Table 6-5 presents metals data collected by URSG for Station 205 and MFG for corresponding location SF-1.

Table 6-5. Background Dissolved Metal Concentrations at Station 205 (in ug/l)

Source	Date	Lead	Cadmium	Zinc
MFG	5/16/91	<3	<0.2	<20
MFG	10/4/91	<1	<0.2	<12
URS Greiner	11/10/97	<0.1	<0.04	6.78
URS Greiner	5/8/98	<0.2	<0.2	<10

There is a concern with the assumption that the water quality at this station reflects natural conditions throughout the basin. This site does not reflect the geology of the many mineralized areas of the basin, which could have historically delivered higher metals concentrations to the river network.

A group of experts involved in the ongoing Natural Resource Damage Assessment for this basin has recently produced a more comprehensive analysis of the river network in a report entitled "Release, Transport, and Environmental Fate of Hazardous Substances in the Coeur d'Alene River Basin, Idaho" (Maest et al., 1999). This assessment is a comprehensive evaluation of background conditions in over 40 watersheds of the South Fork, including conditions in mineralized areas of historic mining activity. Additional discussion is found in a rebuttal to the report (Runnels, 1999) and a response to the rebuttal (Maest et al, 2000). CH2M Hill has further evaluated and updated the estimates from the Maest report based on additional sampling data (CH2M Hill, 2000).

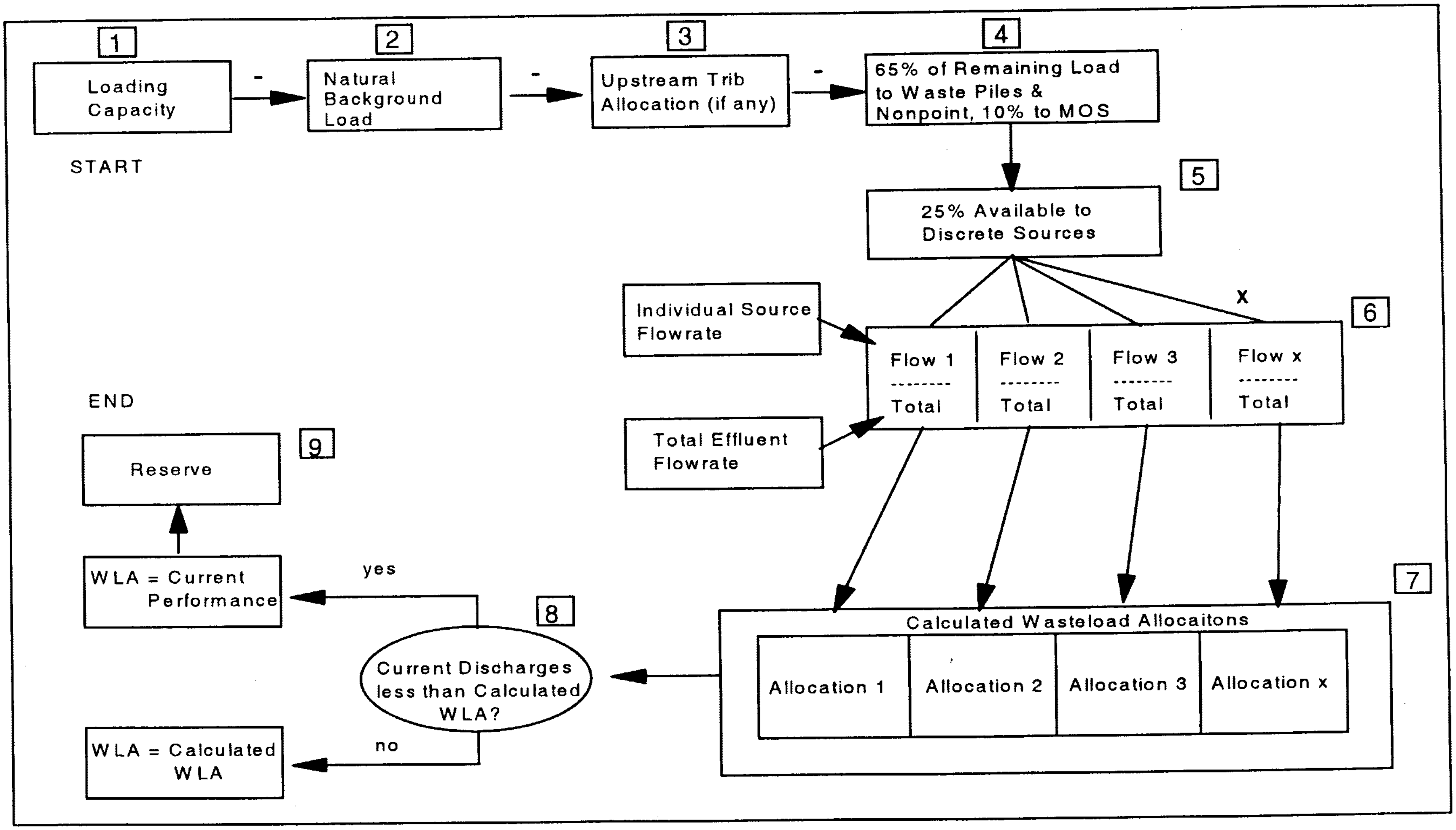

Figure 6-1 Flow Diagram for CDA River and Tributary Allocations

Table 6-6. Median Background Metals Concentrations in the South Fork Subbasin

Area	Dissolved Cadmium (ug/l)	Dissolved Lead (ug/l)	Dissolved Zinc (ug/l)
Upper South Fork	.06	.17	6.1
Page-Galena Mineral Belt	.16	.40	7.5
Pine Creek Drainage	.10	.21	3.1
Entire South Fork CDA Basin	.08	.21	6.1

Source: CH2M Hill, July 2000

While drainages with large producing mines and/or mill sites were excluded from the dataset underlying these estimates, the authors report that limited mining disturbances (e.g., small adits, waste rock piles) are observed in some of the watersheds included in the analysis. The inclusion of these watersheds by the authors provides better representativeness of the dataset with respect to mineralized watersheds. EPA has incorporated the baseline estimates from CH2M Hill (July 2000) into the TMDL, recognizing that they are conservative estimates with respect to natural background conditions. This conservative approach provides one element of the margin of safety for the TMDL (See Margin of Safety). Recognizing that the baseline estimates include some mining-influenced areas, EPA has used the median estimates in the final TMDL calculations rather than upper-percentile estimates.

The "Upper South Fork" estimates above are used at the Canyon Creek, Ninemile Creek, and South Fork at Wallace target sites. The "Entire South Fork CDA Basin" estimates are used at the Pinehurst target site. "Pine Creek Drainage" estimates are used at the Pine Creek target site.

North Fork and Mainstem Coeur d'Alene River

Metals concentrations in the North Fork are needed in order to calculate the TMDL elements in the mainstem Coeur d'Alene River at Harrison. Since the TMDL does not call for any reductions in metals in the North Fork, the current metals concentrations are used in the TMDL calculations rather than an estimate of natural background. EPA has made estimates for the North Fork at Enaville using the most recent monitoring information from the USGS (October 1998 to September 1999). The North Fork was below the detection limits for dissolved cadmium (1 ug/l) and dissolved lead (1 ug/l). Using an assumption that the North and South Fork have similar natural background characteristics, EPA has set the North Fork background values equal to the South Fork natural background estimates for cadmium (.08 ug/l) and lead (.21 ug/l). For zinc, the background value was set at the maximum detected value in the North Fork (5 ug/l).

The background concentrations for the Harrison target site are estimated by combining the natural background conditions in the South Fork and the background conditions in the North Fork. As described above, cadmium and lead estimates are identical for the South and North Forks, and are therefore the same for Harrison. For zinc, background concentrations and average river flows for the two forks are used in a mass balance to estimate the background zinc concentration in the mainstem at Harrison (5.3 ug/l).

6.3.b. Upstream Allocations

Some Coeur d'Alene River target sites are located downstream from other target sites. Because loading capacity builds with increased river flow, the allocation calculations (described below) begin at the target sites at the headwaters of the basin and step through each target site in the downstream direction. Before allocating loads at a target site, EPA subtracts the loading capacity allocated (i.e., already used) at any upstream target sites. For example, the loads allocated at the two headwater target sites (Canyon Creek and Ninemile Creek) are subtracted from the loading capacity downstream at Wallace; the remainder is allocated to sources contributing metals loads to the South Fork above the Canyon Creek confluence. Similarly, loads allocated at the Wallace site are subtracted from the loading capacity downstream at Pinehurst before allocating the remainder to sources contributing metals between Wallace and Pinehurst. For the mainstem Coeur d'Alene River site (at Harrison), the loading capacity allocated upstream at Pinehurst and background loading in the North Fork are subtracted from the loading capacity at Harrison prior to allocation.

The subtraction of all upstream loadings from the loading capacity at downstream target sites is based on an assumption that there is no in-stream attenuation of dissolved metals releases to the river network. This is one of the conservative assumptions that comprise the margin of safety for the TMDL. EPA provides additional information about fate and transport of metals in the Coeur d'Alene basin in Appendix G.

6.3.c. Margin of Safety

Section 303(d) of the Clean Water Act requires that TMDLs be established with a margin of safety to account for these uncertainties and insure the TMDL will achieve water quality standards. Each element of the TMDL is developed with some degree of uncertainty. While some uncertainties can be addressed using conservative analyses and assumptions, others cannot be addressed in that fashion. For this reason, the margin of safety for this TMDL consists of a combination of conservative assumptions used in building the TMDL elements and an explicit margin of safety equal to 10% of the loading capacity. The following is a discussion of the uncertainties considered in establishing this dual margin of safety.

Conservative Assumptions

The following conservative assumptions were employed in the development of the TMDL:

- Conservative estimates of natural background concentrations
- Lower bound of 90^{th} percentile confidence interval for hardness estimates
- Restriction of hardness predictions to the range of available flow data
- Exclusion of flow contributions from St. Maries River in load allocations for lake
- 5^{th} percentile translators for total recoverable wasteload allocations
- Conservative lead translator during peak runoff

Explicit Margin of Safety

There are other uncertainties in the TMDL not addressed by the above assumptions. In particular, there are uncertainties related to the flow and hardness predictions used to calculate the loading capacities and uncertainties in the identification and characterization of discrete sources.

With regard to flow and hardness values, there are uncertainties in the flow regression estimates for ungauged tributaries. This is particularly an issue for critical low flow conditions, which were extrapolated outside the range of the data (i.e., critical low flow conditions are not represented in the dataset). There are also uncertainties in the hardness predictions, because the datasets used to perform the regressions are modest in size and the strength of the correlations varies. To minimize the potential for over-predicting hardness levels, EPA has not extrapolated hardness values outside the range of available flow data and has used the lower bound of a confidence interval. Nevertheless, because the loading capacities are sensitive to flow and hardness predictions, EPA believes that an explicit margin of safety to address uncertainties in the predictions is prudent.

EPA has also identified two areas of uncertainty in the assignment of wasteload allocations for individual discrete sources (see discussion of the allocation process below). First is the potential that some discrete sources are omitted from the wasteload allocations. A margin of safety is appropriate to ensure that the sum of wasteload allocations, load allocations, and omitted source contributions does not exceed the loading capacity available for allocation. EPA has attempted to identify and sample all discrete sources in the South Fork and tributaries, and the TMDL establishes wasteload allocations for all sources with measurable discharges from the URSG database. EPA believes that any omissions from the discrete source inventory will be minor loadings.

A second source of uncertainty is associated with effluent variability. Available data is not sufficient to support an evaluation of individual versus aggregate variability in discrete loadings. The TMDL establishes wasteload allocations on a monthly average basis (see description of allocation process below). While EPA believes that individual source variability will not result in criteria exceedances at the target sites under most conditions, it is appropriate to apply a margin of safety for this uncertainty.

To account for the above uncertainties, EPA has established an explicit 10% margin of safety in the TMDL. EPA believes 10% is a reasonable value that will account for the specific uncertainties identified. After subtraction of the natural background load from the total loading capacity, 10% of the remaining loading capacity is subtracted for the margin of safety. The remainder is the loading available for allocation.

Table 6-7: Available Loading Capacity for Dissolved Cadmium								
Target Site	**Flow Tier** (cfs)	**Loading Capacity** (lbs/day)	**Background** (lbs/day)	**Capacity Used Upstream** (lbs/day)	**Loading Avail. for Allocation** (lbs/day)	**Margin of Safety (10%)** (lbs/day)	**Gross Allocation (65%)** (lbs/day)	**Wasteload Allocation (25%)** (lbs/day)
Canyon Creek CC288	7	2.57E-02	2.30E-03	NA	2.34E-02	2.34E-03	1.52E-02	5.85E-03
	11	3.98E-02	3.56E-03	NA	3.63E-02	3.63E-03	2.36E-02	9.07E-03
	25	7.70E-02	8.09E-03	NA	6.89E-02	6.89E-03	4.48E-02	1.72E-02
	149	2.97E-01	4.82E-02	NA	2.49E-01	2.49E-02	1.62E-01	6.21E-02
Ninemile Creek NM305	2	8.81E-03	6.47E-04	NA	8.17E-03	8.17E-04	5.31E-03	2.04E-03
	3	1.32E-02	9.71E-04	NA	1.22E-02	1.22E-03	7.96E-03	3.06E-03
	6.9	2.73E-02	2.23E-03	NA	2.50E-02	2.50E-03	1.63E-02	6.26E-03
	41	1.07E-01	1.33E-02	NA	9.38E-02	9.38E-03	6.09E-02	2.34E-02
South Fork at Wallace SF233	22	8.11E-02	7.15E-03	3.16E-02	4.24E-02	4.24E-03	2.75E-02	1.06E-02
	35	1.27E-01	1.13E-02	4.85E-02	6.69E-02	6.69E-03	4.35E-02	1.67E-02
	79	2.51E-01	2.55E-02	9.39E-02	1.31E-01	1.31E-02	8.55E-02	3.29E-02
	469	9.34E-01	1.52E-01	3.42E-01	4.40E-01	4.40E-02	2.86E-01	1.10E-01
Pine Creek PC315	20	3.98E-02	1.08E-02	NA	2.91E-02	2.91E-03	1.89E-02	7.26E-03
	29	5.78E-02	1.56E-02	NA	4.21E-02	4.21E-03	2.74E-02	1.05E-02
	80	1.59E-01	4.31E-02	NA	1.16E-01	1.16E-02	7.55E-02	2.91E-02
	387	7.71E-01	2.09E-01	NA	5.62E-01	5.62E-02	3.65E-01	1.41E-01
South Fork at Pinehurst SF271	68	3.81E-01	2.93E-02	7.14E-02	2.80E-01	2.80E-02	1.82E-01	7.00E-02
	97	5.23E-01	4.19E-02	1.09E-01	3.73E-01	3.73E-02	2.42E-01	9.31E-02
	268	1.16E+00	1.16E-01	2.48E-01	7.94E-01	7.94E-02	5.16E-01	1.98E-01
	1290	2.80E+00	5.57E-01	1.00E+00	1.24E+00	1.24E-01	8.03E-01	3.09E-01
North Fork at Enaville NF400	165	3.28E-01	7.12E-02	NA	NA	NA	NA	NA
	253	5.04E-01	1.09E-01	NA	NA	NA	NA	NA
	845	1.68E+00	3.65E-01	NA	NA	NA	NA	NA
	5090	1.01E+01	2.20E+00	NA	NA	NA	NA	NA
CdA River at Harrison	239	7.60E-01	1.03E-01	3.51E-01	3.05E-01	3.05E-02	2.75E-01	NA
	348	1.07E+00	1.50E-01	4.82E-01	4.40E-01	4.40E-02	3.96E-01	NA
	1100	2.87E+00	4.75E-01	1.16E+00	1.24E+00	1.24E-01	1.11E+00	NA
	6870	1.37E+01	2.96E+00	3.43E+00	7.29E+00	7.29E-01	6.56E+00	NA

Table 6-8: Available Loading Capacity for Dissolved Lead								
Target Site	**Flow Tier** (cfs)	**Loading Capacity** (lbs/day)	**Background** (lbs/day)	**Capacity Used Upstream** (lbs/day)	**Loading Avail. for Allocation** (lbs/day)	**Margin of Safety (10%)** (lbs/day)	**Gross Allocation (65%)** (lbs/day)	**Wasteload Allocation (25%)** (lbs/day)
Canyon Creek CC288	7	5.10E-02	6.51E-03	NA	4.45E-02	4.45E-03	2.89E-02	1.11E-02
	11	7.90E-02	1.01E-02	NA	6.89E-02	6.89E-03	4.48E-02	1.72E-02
	25	1.41E-01	2.29E-02	NA	1.18E-01	1.18E-02	7.67E-02	2.95E-02
	149	4.35E-01	1.37E-01	NA	2.98E-01	2.98E-02	1.94E-01	7.45E-02
Ninemile Creek NM305	2	1.92E-02	1.83E-03	NA	1.74E-02	1.74E-03	1.13E-02	4.35E-03
	3	2.89E-02	2.75E-03	NA	2.61E-02	2.61E-03	1.70E-02	6.53E-03
	6.9	5.64E-02	6.33E-03	NA	5.01E-02	5.01E-03	3.26E-02	1.25E-02
	41	1.80E-01	3.76E-02	NA	1.43E-01	1.43E-02	9.26E-02	3.56E-02
South Fork at Wallace SF233	22	1.62E-01	2.03E-02	6.19E-02	7.97E-02	7.97E-03	5.18E-02	1.99E-02
	35	2.51E-01	3.21E-02	9.50E-02	1.24E-01	1.24E-02	8.08E-02	3.11E-02
	79	4.67E-01	7.23E-02	1.68E-01	2.26E-01	2.26E-02	1.47E-01	5.65E-02
	469	1.37E+00	4.30E-01	4.41E-01	4.98E-01	4.98E-02	3.24E-01	1.24E-01
Pine Creek PC315	20	5.84E-02	2.27E-02	NA	3.57E-02	3.57E-03	2.32E-02	8.93E-03
	29	8.46E-02	3.28E-02	NA	5.18E-02	5.18E-03	3.36E-02	1.29E-02
	80	2.33E-01	9.06E-02	NA	1.43E-01	1.43E-02	9.28E-02	3.57E-02
	387	1.13E+00	4.38E-01	NA	6.91E-01	6.91E-02	4.49E-01	1.73E-01
South Fork at Pinehurst SF271	68	9.33E-01	7.70E-02	1.15E-01	7.41E-01	7.41E-02	4.81E-01	1.85E-01
	97	1.26E+00	1.10E-01	1.76E-01	9.74E-01	9.74E-02	6.33E-01	2.43E-01
	268	2.50E+00	3.04E-01	3.69E-01	1.83E+00	1.83E-01	1.19E+00	4.57E-01
	1290	4.28E+00	1.46E+00	1.19E+00	1.63E+00	1.63E-01	1.06E+00	4.07E-01
North Fork at Enaville NF400	165	4.81E-01	1.87E-01	NA	NA	NA	NA	NA
	253	7.38E-01	2.87E-01	NA	NA	NA	NA	NA
	845	2.47E+00	9.57E-01	NA	NA	NA	NA	NA
	5090	1.49E+01	5.77E+00	NA	NA	NA	NA	NA
CdA River at Harrison	239	1.41E+00	2.70E-01	9.27E-01	2.14E-01	2.14E-02	1.93E-01	NA
	348	1.96E+00	3.94E-01	1.26E+00	3.07E-01	3.07E-02	2.76E-01	NA
	1100	4.83E+00	1.25E+00	2.79E+00	8.01E-01	8.01E-02	7.21E-01	NA
	6870	2.00E+01	7.78E+00	7.39E+00	4.87E+00	4.87E-01	4.39E+00	NA

Table 6-9: Available Loading Capacity for Dissolved Zinc								
Target Site	**Flow Tier** (cfs)	**Loading Capacity** (lbs/day)	**Background** (lbs/day)	**Capacity Used Upstream** (lbs/day)	**Loading Avail. for Allocation** (lbs/day)	**Margin of Safety (10%)** (lbs/day)	**Gross Allocation (65%)** (lbs/day)	**Wasteload Allocation (25%)** (lbs/day)
Canyon Creek CC288	7	2.45E+00	2.34E-01	NA	2.22E+00	2.22E-01	1.44E+00	5.54E-01
	11	3.79E+00	3.62E-01	NA	3.43E+00	3.43E-01	2.23E+00	8.58E-01
	25	7.16E+00	8.23E-01	NA	6.34E+00	6.34E-01	4.12E+00	1.59E+00
	149	2.59E+01	4.90E+00	NA	2.10E+01	2.10E+00	1.37E+01	5.26E+00
Ninemile Creek NM305	2	8.63E-01	6.58E-02	NA	7.98E-01	7.98E-02	5.18E-01	1.99E-01
	3	1.30E+00	9.87E-02	NA	1.20E+00	1.20E-01	7.78E-01	2.99E-01
	6.9	2.63E+00	2.27E-01	NA	2.40E+00	2.40E-01	1.56E+00	6.01E-01
	41	9.72E+00	1.35E+00	NA	8.38E+00	8.38E-01	5.44E+00	2.09E+00
South Fork at Wallace SF233	22	7.74E+00	7.27E-01	3.01E+00	4.00E+00	4.00E-01	2.60E+00	9.99E-01
	35	1.21E+01	1.15E+00	4.63E+00	6.29E+00	6.29E-01	4.09E+00	1.57E+00
	79	2.35E+01	2.60E+00	8.74E+00	1.21E+01	1.21E+00	7.88E+00	3.03E+00
	469	8.17E+01	1.54E+01	2.94E+01	3.68E+01	3.68E+00	2.39E+01	9.21E+00
Pine Creek PC315	20	3.48E+00	3.34E-01	NA	3.15E+00	3.15E-01	2.05E+00	7.87E-01
	29	5.05E+00	4.85E-01	NA	4.57E+00	4.57E-01	2.97E+00	1.14E+00
	80	1.39E+01	1.34E+00	NA	1.26E+01	1.26E+00	8.19E+00	3.15E+00
	387	6.74E+01	6.47E+00	NA	6.09E+01	6.09E+00	3.96E+01	1.52E+01
South Fork at Pinehurst SF271	68	3.87E+01	2.24E+00	7.15E+00	2.93E+01	2.93E+00	1.90E+01	7.32E+00
	97	5.28E+01	3.19E+00	1.09E+01	3.88E+01	3.88E+00	2.52E+01	9.69E+00
	268	1.13E+02	8.82E+00	2.47E+01	7.95E+01	7.95E+00	5.17E+01	1.99E+01
	1290	2.47E+02	4.24E+01	9.77E+01	1.07E+02	1.07E+01	6.96E+01	2.68E+01
North Fork at Enaville NF400	165	2.87E+01	4.45E+00	NA	NA	NA	NA	NA
	253	4.41E+01	6.82E+00	NA	NA	NA	NA	NA
	845	1.47E+02	2.28E+01	NA	NA	NA	NA	NA
	5090	8.86E+02	1.37E+02	NA	NA	NA	NA	NA
CdA River at Harrison	239	7.10E+01	6.85E+00	3.37E+01	3.04E+01	3.04E+00	2.74E+01	NA
	348	9.97E+01	9.99E+00	4.56E+01	4.41E+01	4.41E+00	3.97E+01	NA
	1100	2.61E+02	3.16E+01	1.02E+02	1.27E+02	1.27E+01	1.14E+02	NA
	6870	1.20E+03	1.97E+02	2.44E+02	7.55E+02	7.55E+01	6.79E+02	NA

6.4 Proposed Allocation Method - CDA River and Tributaries

A range of options are available to allocate the loading capacity to sources of dissolved metals. A full list of options considered by EPA is summarized in Appendix D. The method adopted by EPA for the Coeur d'Alene River and tributaries is outlined in Figure 6-1, with explanations for each step provided below.

6.4.a. Source Categorization in Mining Areas

Mining sources in the Coeur d'Alene River and tributaries have been classified into three general categories: adits and impoundments, waste piles, and nonpoint sources. Adits and impoundments that discharge are point sources subject to technology-based and water quality-based requirements in NPDES permitting regulations. The term "point source" also includes waste piles. These "waste pile" point sources may discharge to receiving waters via surface water runoff and/or seepage, reaching the receiving water via overland flow, through a pipe, or through a groundwater hydraulic connection. Waste pile discharges are also subject to NPDES permitting regulations.

Based on the above, the only nonpoint sources of metals in the CDA basin are those mining wastes that were disposed directly into the receiving water in the past. These wastes are no longer confined to waste piles; rather, they are eroded and deposited in the bed and banks of the river or lakes downstream from the original disposal site.

While most of the pollutant loads from waste pile and nonpoint source areas have not been characterized in detail, EPA has identified and characterized over 70 individual "discrete" point source discharges to CDA basin waters. These "discrete" sources are those individually identified point sources with discharges that are readily observed and sampled. The TMDL establishes individual wasteload allocations for each of the discrete sources observed to date in the basin. These sources include adits, impoundments, visible waste pile seeps, and municipal wastewater treatment plants. The TMDL establishes gross allocations to the remainder of uncharacterized point sources (waste piles, urban stormwater) and nonpoint sources above each target site. Allocation between the large number of non-discrete source areas will require significantly more data and technical analyses than are currently available for this TMDL. Analysis of these non-discrete sources is a component of the ongoing RI/FS for the basin.

Some of the sampled adits are located high in the watersheds of the upper portion of the basin, and some are located some distance from the nearest gulch or creek. Investigation and monitoring efforts to date identified adit locations, adit discharge flow rates, and the chemical make-up of adit discharges. The discharge pathways to receiving waters have not been documented for some adits. For the purposes of this TMDL, EPA has made a conservative assumption that some fraction of dissolved metals from adit discharges enter the nearest gulch or creek down-gradient from the adit location. Based on this assumption, all adits are assigned a wasteload allocation. EPA also assumes that all significant adit discharges are identified and assigned wasteload allocations, and that any unidentified adits are accounted for in the margin of safety (see section 6.4.c.).

The allocation applies to the loading of the source to the receiving water. EPA and DEQ anticipate that an adit with a subsurface or otherwise difficult-to-access discharge to a receiving water will be regulated (based on the TMDL wasteload allocations) and monitored at the adit portal. If it is demonstrated during permitting that an adit portal discharge is attenuated prior to reaching the receiving water, the limits that apply to the adit portal can be adjusted upward while remaining consistent with the TMDL wasteload allocations. For NPDES permits, the permittee will bear the burden of demonstrating any attenuation of the source between the monitoring location and the receiving water.

6.4.b. Gross Allocation at Each Target Site

In this TMDL, a gross allocation is made as the first division of available loading capacity among the general categories of sources. The TMDL allocates 25% of the loading available to individually identified discrete sources above each target site. The 25% allocation to discrete point sources is consistent with the mixing zone guidelines in the Idaho state water quality standards (IDAPA 58.02.01.060.01.e.iv.). A mixing zone is a portion of a river that is allowed to exceed chronic water quality criteria. Mixing zones for rivers are commonly expressed as a portion of the river flow that can be used for dilution of a point source discharge (assuming the discharge is above water quality criteria to some degree) to levels below the water quality criteria. The state of Idaho guidelines state that a mixing zone should not exceed more than 25% of the stream flow. The TMDL allocates the same proportion of the loading capacity (25%) to the group of individually identified discrete sources in the CDA basin. The remaining 75% of the loading capacity is allocated to a margin of safety (10%, see discussion below) and waste piles and nonpoint sources (65%).

EPA and DEQ are not directly applying the mixing zone regulation in this TMDL, and the agencies do not take the position that the state's 25% mixing zone guideline dictates the percentage of the loading capacity to be allocated to point sources. Rather, this guideline reflects state policy on the use of river flow for assimilation of point source discharges, allowing up to 25% of the flow for this purpose. Because loading capacity is directly proportional to the river flow, there is a nexus between mixing zones and TMDL allocations. Therefore, it is reasonable to analogize to this guideline and allow the use of the guideline maximum of 25% of the loading capacity for point source discharges. This analogy provides a reasonable, objective policy basis for distributing the river's loading capacity between discrete point sources and non-discrete sources.

In selecting the above gross allocation breakdown, EPA considered several alternatives. EPA considered the simplistic approach of citing that "background" (as opposed to "natural background") metals exceed the Idaho water quality criteria and allocating zero to the individual discrete sources, with the remainder of the load capacity allocated to waste piles and nonpoint sources. EPA does not believe this is a reasonable option, because it does not allow continued operations at municipal treatment plants and operating mines. Another option would be to establish end-of-pipe water quality criteria concentrations as the wasteload allocations for individual discrete sources (based on a conservative hardness estimate). However, to quantify non-discrete allocations by subtracting from the loading capacity, EPA would need to assign not only a concentration but also a flow to each discrete source at each flow tier. The available information for the majority of discrete sources is not sufficient to assign source flowrates that correspond to each target site flow tier.

EPA also considered different percentage breakdowns in the gross allocation. One option was to allocate according to estimates of the current contribution of point sources to the instream metals loadings. Because calculations indicate that the percentage contribution varies substantially between target sites and between metals, EPA chose not to employ this allocation scheme. For all metals and sites, EPA's gross estimates of the contribution of discrete sources ranged from 7% (cadmium in Pine Creek) to 100% (zinc above Wallace) of the total current loadings. At the Pinehurst target site, the discrete source contributions were estimated at 28% for cadmium and 12% for zinc (lead estimates were highly variable).

Given the above examination, EPA concludes that a 25% gross allocation to individual discrete sources at each target site is both straightforward and reasonable. EPA believes it is reasonable to set aside a majority of the loading capacity for waste piles and nonpoint sources, given the magnitude of metals contributions from these sources in this basin. EPA also believes that the 25% allocation to point sources will enable active facilities to continue operations while also resulting in improvements to current wastewater management in the basin.

Consistent with the requirements of the TMDL regulations at 40 CFR 130.2(i), the sum of wasteload allocations (including individual allocations to discrete sources and gross allocations for waste piles), load allocations (including allocations to nonpoint sources and natural background loadings), and the margin of safety is equal to the loading capacity at each target site.

Over the long term, EPA plans to refine the gross allocations for waste piles and nonpoint sources into individual allocations, as data collection and analysis proceeds for the RI/FS in the basin. The RI/FS analysis may also lead to adjustments in some of the individual allocations to discrete sources, particularly those for abandoned mine adits.

6.4.c. Wasteload Allocations to Discrete Sources

The 25% gross allocation to discrete sources is further allocated to individual sources based on the average flowrates of the discrete sources within the target site watershed. Discharge flow data were obtained from EPA's Permit Compliance System and Discharge Monitoring Reports, EPA Inspection Reports, the URSG 1997-1998 and MFG 1991 sampling events, and other sources. Appendix E describes EPA's specific sources for and methodologies used in calculating average flows from each discrete source.

EPA recognizes that the use of the average flowrates to calculate allocations for all flow tiers does not take into seasonal variation in flows between individual sources. In an attempt to correlate individual source types to stream flow, EPA compared data from NPDES-permitted sources with long-term flow measurements to the corresponding stream flow data for the USGS Station at Elizabeth Park. While EPA observed some increased source flow under high stream flow conditions, these relationships were not consistent and varied significantly by source. Similarly, EPA found that flows in the Bunker Hill Kellogg Tunnel and the South Fork Coeur d'Alene River are poorly correlated (CH2M Hill, 2000). Since source flows do not necessarily correlate to river flows, EPA has allocated loadings among discrete sources using a single flow ratio (based on average flow rates) for all river flow tiers.

Steps 1 through 5 on Figure 6-1 are explained in earlier sections. The remaining steps in the development of wasteload allocations for individually identified discrete sources are as follows:

Step 6 — For each flow scenario (7Q10, 10th, 50th, and 90th percentile), the gross allocation for discrete point sources (25%) is divided by the total average flowrate of all the discrete discharges (i.e., the sum of the individual average flowrates). The resulting ratio, in pounds of metal per unit flow, is used in Step 7 to derive flow-proportioned wasteload allocations. An illustration of the practical effect of flow-proportioning is as follows: if Source A discharges at twice the flowrate of Source B on average, its calculated wasteload allocation is twice that of Source B.

Step 7 — The ratio derived in Step 6 is multiplied by each individual average discharge flow to establish the calculated wasteload allocation to that source. This is repeated for each design flow. The calculated allocations by target site, parameter, and source are shown in Appendix H.

Step 8 — The last step in the allocation involves a comparison between current discharge levels and the calculated wasteload allocation for a given source. If the current discharge concentrations are below the concentration associated with the wasteload allocation, the assigned allocation is set at the current discharge level. This adjustment ensures that sources already meeting their allocation do not increase loadings above current levels. EPA believes this allocation step is consistent with anti-degradation requirements and appropriate in the context of basin-wide cleanup activities. The evaluation of current discharge levels necessary to complete this step will be performed as part of the development of individual NPDES permits.

Step 9 When a permit containing performance-based limits (Step 8) is issued, the loading equal to the difference between the calculated wasteload allocations in the TMDL and the performance-based limits for that facility will be reserved to allow for future growth (new or expanding facility). The reserve allocation created by a permitting action can only be used by new or expanding facilities within the same target site or at a target site downstream of permitted source. This limitation on the use of the reserve is necessary to insure that use of the future growth reserve does not result in exceedances of the gross allocation for discrete sources at upstream target sites. EPA also notes that allocation of the future growth reserve to individual sources will require formal modification of the TMDL.

6.5 Refinement of Wasteload Allocations for CDA River and Tributaries

6.5.a. Translators

In order to express wasteload allocations in a manner consistent with NPDES permitting regulations (40 CFR 122.45), the dissolved wasteload allocations are translated into total recoverable wasteload allocations in the TMDL. "Total recoverable metal" is a measure of the amount of metal in both the dissolved and particulate phase in a water sample. Its use in permitting reduces the potential impacts on downstream biota from effluent metals shifting from the particulate phase to the (more bioavailable) dissolved phase upon discharge.

EPA has evaluated the ratio of total recoverable metal to dissolved metal in the Coeur d'Alene River and tributaries (this ratio is also called a "translator"). Cadmium and zinc in the river are almost entirely in the dissolved form at all of the target sites (i.e., the translator is approximately 1). For lead, the particulate fraction is a significant portion of the total lead concentration at a number of target sites. Appendix G includes more discussion of physical/chemical processes that affect the total-to-dissolved ratios for metals in the water column.

EPA also reviewed the available data for the South Fork Pinehurst station to determine whether the total-to-dissolved ratio varies with respect to river flow. Over the range of flow tiers established in the TMDL (68 cfs to 1290 cfs), there was no discernible relationship between river flow and the total-to-dissolved ratios for cadmium, lead, and zinc.

Recent data collected by the USGS indicates that during peak runoff events, the total-to-dissolved ratio for lead increases significantly in basin waters. The flows at which this phenomenon occurs are higher than the top flow tier in the TMDL (greater than 1290 cfs). Since the total-to-dissolved ratio at the top flow tier is more stringent than the actual ratio during peak runoff events, the lead translators in the TMDL provide a margin of safety during peak runoff events.

Table 6-10. Translators from Dissolved to Total Recoverable Metal

Target Site	Metal	No. of Samples[3]	Translator (Total/Dissolved)
Canyon Creek	Cadmium	49	1.0
Ninemile Creek	Cadmium	39	1.0
South Fork @ Wallace	Cadmium	17	1.0
Pine Creek	Cadmium	38	1.1[2]
South Fork @ Pinehurst	Cadmium	50	1.0
Spokane River @ state line[1]	Cadmium	29	1.0
Canyon Creek	Lead	66	1.1
Ninemile Creek	Lead	61	1.1
South Fork @ Wallace	Lead	20	1.2
Pine Creek	Lead	47	1.0
South Fork @ Pinehurst	Lead	59	2.3
Spokane River @ state line[1]	Lead	26	3.2
Canyon Creek	Zinc	28	1.0
Ninemile Creek	Zinc	24	1.0
South Fork @ Wallace	Zinc	9	1.0
Pine Creek	Zinc	30	1.0
South Fork @ Pinehurst	Zinc	36	1.0
Spokane River @ state line[1]	Zinc	30	1.0

[1] Some Spokane River data (8 samples) used in this calculation (Oct 1997 to Aug 1998) are provisional data from the Department of Ecology (lab QC only).

[2] This is a case where the upstream translator is higher than a downstream translator. In this case, metal discharged in particulate form could change to the dissolved form downstream. Therefore, the translator applied to Pine Creek for cadmium is adjusted to 1.0, the translator calculated downstream at Pinehurst.

[3] Sample results reporting a higher dissolved than total value were eliminated from the data set for this analysis. This artifact is primarily found in the cadmium and zinc data.

EPA has calculated the translator for each sample taken at or near a target site. From this group of values, EPA has calculated a 5th percentile value in order to assure compliance with water quality standards. This translator is then multiplied by the dissolved wasteload allocation to derive the total recoverable wasteload allocation. Table 6-10 lists the calculated translators and Appendix J includes the data used in the calculations.

6.5.b. Implementation of Flow-based Allocations in Permits

Flow-based allocations in a TMDL can be incorporated into NPDES permits as monthly average effluent limitations (note that additional limitations may also be included as required by the NPDES regulations). Rather than a single monthly average limit, a set of limits with associated river discharge rates can be included in the permit. The applicable permit limit is dependent on the discharge measured at the gauging station on the day (or over the month) of sampling. Using this approach, however, the Permittee will be required to report the corresponding river flow at the target site along with effluent monitoring information. The NPDES permit will set forth the specific reporting requirements necessary to insure compliance with the flow-based allocations.

The TMDL establishes wasteload allocations at four flow tiers. The TMDL includes language allowing for flexibility to interpolate between these flow tiers to establish additional flow tiers and associated permit limits in an NPDES permit. EPA's permits program will balance the need for flexibility with the additional compliance-tracking burden when considering any requests from permittees for additional flow tiers in their individual NPDES permits.

The calculated wasteload allocations for sources in the CDA River and tributaries are listed in Tables 6-11 through 6-15 below.

Table 6-11 : Calculated Wasteload Allocations for Individual Sources - Canyon Creek (URSG Site CC288)

All values in lbs/day

		Total Recoverable Cadmium				Total Recoverable Lead				Total Recoverable Zinc			
Station ID	**Flow (cfs)**	**7Q10L**	**10th Percentile**	**50th Percentile**	**90th Percentile**	**7Q10L**	**10th Percentile**	**50th Percentile**	**90th Percentile**	**7Q10L**	**10th Percentile**	**50th Percentile**	**90th Percentile**
CC817 Hecla #3	0.0684	4.85E-05	7.51E-05	1.43E-04	5.14E-04	1.01E-04	1.57E-04	2.68E-04	6.79E-04	4.58E-03	7.10E-03	1.31E-02	4.36E-02
CC355 Gem	0.26	1.84E-04	2.85E-04	5.42E-04	1.96E-03	3.85E-04	5.96E-04	1.02E-03	2.58E-03	1.74E-02	2.70E-02	4.99E-02	1.66E-01
CC816 Star/Phoenix Tailings (001)	2.34	1.66E-03	2.57E-03	4.88E-03	1.76E-02	3.46E-03	5.37E-03	9.19E-03	2.32E-02	1.57E-01	2.43E-01	4.49E-01	1.49E+00
CC357 Woodland Park Seep	0.0038	2.69E-06	4.17E-06	7.92E-06	2.86E-05	5.63E-06	8.72E-06	1.49E-05	3.77E-05	2.55E-04	3.95E-04	7.29E-04	2.42E-03
CC372 Tamarack #7	1.59	1.13E-03	1.75E-03	3.32E-03	1.20E-02	2.35E-03	3.65E-03	6.24E-03	1.58E-02	1.07E-01	1.65E-01	3.05E-01	1.01E+00
CC353 Hercules #5	1.707	1.21E-03	1.87E-03	3.56E-03	1.28E-02	2.53E-03	3.92E-03	6.70E-03	1.69E-02	1.14E-01	1.77E-01	3.28E-01	1.09E+00
CC371 Blackbear Fraction	1.165	8.25E-04	1.28E-03	2.43E-03	8.76E-03	1.72E-03	2.67E-03	4.57E-03	1.16E-02	7.81E-02	1.21E-01	2.24E-01	7.42E-01
CC373 Anchor	0.008	5.67E-06	8.78E-06	1.67E-05	6.02E-05	1.18E-05	1.83E-05	3.14E-05	7.94E-05	5.36E-04	8.31E-04	1.53E-03	5.09E-03
CC354 Hidden Treasure	0.72	5.10E-04	7.90E-04	1.50E-03	5.42E-03	1.07E-03	1.65E-03	2.83E-03	7.14E-03	4.83E-02	7.48E-02	1.38E-01	4.58E-01
Tiger/Poorman	0.4	2.83E-04	4.39E-04	8.34E-04	3.01E-03	5.92E-04	9.17E-04	1.57E-03	3.97E-03	2.68E-02	4.15E-02	7.67E-02	2.55E-01

Table 6-12 : Calculated Wasteload Allocations for Individual Sources - Ninemile Creek (URSG Site NM305)

All values in lbs/day

		Total Recoverable Cadmium				Total Recoverable Lead				Total Recoverable Zinc			
Station ID	Flow (cfs)	7Q10L	10th Percentile	50th Percentile	90th Percentile	7Q10L	10th Percentile	50th Percentile	90th Percentile	7Q10L	10th Percentile	50th Percentile	90th Percentile
NM360 Interstate-Callahan (IC) #4	0.040	4.11E-05	6.17E-05	1.26E-04	4.72E-04	9.65E-05	1.45E-04	2.78E-04	7.90E-04	4.02E-03	6.03E-03	1.21E-02	4.22E-02
NM362 IC Waste Rock	1.790	1.84E-03	2.76E-03	5.64E-03	2.11E-02	4.32E-03	6.48E-03	1.24E-02	3.53E-02	1.80E-01	2.70E-01	5.42E-01	1.89E+00
NM363 IC Tailings Seep	0.004	4.11E-06	6.17E-06	1.26E-05	4.72E-05	9.65E-06	1.45E-05	2.78E-05	7.90E-05	4.02E-04	6.03E-04	1.21E-03	4.22E-03
NM361 Rex #2	0.020	2.06E-05	3.09E-05	6.31E-05	2.36E-04	4.82E-05	7.24E-05	1.39E-04	3.95E-04	2.01E-03	3.01E-03	6.05E-03	2.11E-02
NM364 Tamarack 400 Level	0.040	4.11E-05	6.17E-05	1.26E-04	4.72E-04	9.65E-05	1.45E-04	2.78E-04	7.90E-04	4.02E-03	6.03E-03	1.21E-02	4.22E-02
NM366 Tamarack #5	0.030	3.09E-05	4.63E-05	9.46E-05	3.54E-04	7.24E-05	1.09E-04	2.08E-04	5.92E-04	3.01E-03	4.52E-03	9.08E-03	3.16E-02
NM368 Rex Tailings Seep	0.020	2.06E-05	3.09E-05	6.31E-05	2.36E-04	4.82E-05	7.24E-05	1.39E-04	3.95E-04	2.01E-03	3.01E-03	6.05E-03	2.11E-02
NM359 Success #3	0.010	1.03E-05	1.54E-05	3.15E-05	1.18E-04	2.41E-05	3.62E-05	6.94E-05	1.97E-04	1.00E-03	1.51E-03	3.03E-03	1.05E-02
NM367 Dayrock 100	0.007	6.99E-06	1.05E-05	2.14E-05	8.03E-05	1.64E-05	2.46E-05	4.72E-05	1.34E-04	6.83E-04	1.02E-03	2.06E-03	7.17E-03
NM369 Silver Star	0.0096	9.87E-06	1.48E-05	3.03E-05	1.13E-04	2.32E-05	3.47E-05	6.67E-05	1.90E-04	9.65E-04	1.45E-03	2.90E-03	1.01E-02
NM370 Duluth	0.011	1.13E-05	1.70E-05	3.47E-05	1.30E-04	2.65E-05	3.98E-05	7.64E-05	2.17E-04	1.11E-03	1.66E-03	3.33E-03	1.16E-02
NM374 Success Tailings	0.003	3.50E-06	5.25E-06	1.07E-05	4.02E-05	8.20E-06	1.23E-05	2.36E-05	6.71E-05	3.42E-04	5.12E-04	1.03E-03	3.59E-03

Table 6-13 : Calculated Wasteload Allocations for Individual Sources - South Fork at Wallace (URSG Site SF223)

All values in lbs/day

Station ID	Flow (cfs)	Total Recoverable Cadmium 7Q10L	Total Recoverable Cadmium 10th Percentile	Total Recoverable Cadmium 50th Percentile	Total Recoverable Cadmium 90th Percentile	Total Recoverable Lead 7Q10L	Total Recoverable Lead 10th Percentile	Total Recoverable Lead 50th Percentile	Total Recoverable Lead 90th Percentile	Total Recoverable Zinc 7Q10L	Total Recoverable Zinc 10th Percentile	Total Recoverable Zinc 50th Percentile	Total Recoverable Zinc 90th Percentile
SF607 Lucky Friday Outfall 001	1.27	1.52E-03	2.40E-03	4.72E-03	1.58E-02	3.43E-03	5.35E-03	9.73E-03	2.14E-02	1.43E-01	2.26E-01	4.35E-01	1.32E+00
SF609 Lucky Friday Outfall 003	0.85	1.02E-03	1.61E-03	3.16E-03	1.06E-02	2.30E-03	3.58E-03	6.51E-03	1.43E-02	9.59E-02	1.51E-01	2.91E-01	8.84E-01
SF328 Star/Morning Waste Rock	1.59	1.90E-03	3.00E-03	5.90E-03	1.98E-02	4.29E-03	6.69E-03	1.22E-02	2.68E-02	1.79E-01	2.82E-01	5.44E-01	1.65E+00
SF 396 Square Deal	0.08	9.57E-05	1.51E-04	2.97E-04	9.94E-04	2.16E-04	3.37E-04	6.13E-04	1.35E-03	9.03E-03	1.42E-02	2.74E-02	8.32E-02
SF395 Golconda	0.03	3.59E-05	5.67E-05	1.11E-04	3.73E-04	8.10E-05	1.26E-04	2.30E-04	5.06E-04	3.39E-03	5.33E-03	1.03E-02	3.12E-02
SF627 Mullan STP	0.413	4.94E-04	7.80E-04	1.53E-03	5.13E-03	1.12E-03	1.74E-03	3.17E-03	6.97E-03	4.66E-02	7.34E-02	1.41E-01	4.29E-01
SF338 Snowstorm #3	2	2.39E-03	3.78E-03	7.43E-03	2.49E-02	5.40E-03	8.42E-03	1.53E-02	3.37E-02	2.26E-01	3.55E-01	6.84E-01	2.08E+00
SF339 Copper King	0.0564	6.75E-05	1.07E-04	2.09E-04	7.01E-04	1.52E-04	2.37E-04	4.32E-04	9.51E-04	6.37E-03	1.00E-02	1.93E-02	5.86E-02
SF345 Morning #4	0.0152	1.82E-05	2.87E-05	5.64E-05	1.89E-04	4.11E-05	6.40E-05	1.16E-04	2.56E-04	1.72E-03	2.70E-03	5.20E-03	1.58E-02
SF346 Morning #5	0.0111	1.33E-05	2.10E-05	4.12E-05	1.38E-04	3.00E-05	4.67E-05	8.51E-05	1.87E-04	1.25E-03	1.97E-03	3.80E-03	1.15E-02
SF347 Star 1200 Level	0.695	8.31E-04	1.31E-03	2.58E-03	8.64E-03	1.88E-03	2.93E-03	5.33E-03	1.17E-02	7.84E-02	1.23E-01	2.38E-01	7.23E-01
SF349 Grouse	1.82	2.18E-03	3.44E-03	6.76E-03	2.26E-02	4.92E-03	7.66E-03	1.39E-02	3.07E-02	2.05E-01	3.23E-01	6.23E-01	1.89E+00
SF386 Adit in Beacon Light Area	0.0003	3.59E-07	5.67E-07	1.11E-06	3.73E-06	8.10E-07	1.26E-06	2.30E-06	5.06E-06	3.39E-05	5.33E-05	1.03E-04	3.12E-04
SF389 Unnamed Adit Deadman Gulch	0.011	1.32E-05	2.08E-05	4.08E-05	1.37E-04	2.97E-05	4.63E-05	8.43E-05	1.86E-04	1.24E-03	1.95E-03	3.76E-03	1.14E-02
SF390 Reindeer Queen	0.011	1.32E-05	2.08E-05	4.08E-05	1.37E-04	2.97E-05	4.63E-05	8.43E-05	1.86E-04	1.24E-03	1.95E-03	3.76E-03	1.14E-02

Table 6-14 : Calculated Wasteload Allocations for Individual Sources - Pine Creek (URSG Site PC315)

All values in lbs/day

		Total Recoverable Cadmium				Total Recoverable Lead				Total Recoverable Zinc			
Station ID	Flow (cfs)	7Q10L	10th Percentile	50th Percentile	90th Percentile	7Q10L	10th Percentile	50th Percentile	90th Percentile	7Q10L	10th Percentile	50th Percentile	90th Percentile
PC329 North Amy	0.322	3.48E-03	5.04E-03	1.39E-02	6.73E-02	4.27E-03	6.20E-03	1.71E-02	8.27E-02	3.77E-01	5.47E-01	1.51E+00	7.29E+00
PC330 Amy	0.005	5.40E-05	7.83E-05	2.16E-04	1.05E-03	6.64E-05	9.62E-05	2.65E-04	1.28E-03	5.85E-03	8.49E-03	2.34E-02	1.13E-01
PC331 Liberal King	0.005	5.40E-05	7.83E-05	2.16E-04	1.05E-03	6.64E-05	9.62E-05	2.65E-04	1.28E-03	5.85E-03	8.49E-03	2.34E-02	1.13E-01
PC332 Lookout	0.027	2.92E-04	4.23E-04	1.17E-03	5.64E-03	3.58E-04	5.20E-04	1.43E-03	6.94E-03	3.16E-02	4.58E-02	1.26E-01	6.12E-01
PC333 Upper Lynch	0.001	1.08E-05	1.57E-05	4.32E-05	2.09E-04	1.33E-05	1.92E-05	5.31E-05	2.57E-04	1.17E-03	1.70E-03	4.68E-03	2.27E-02
PC334 Lynch/Nabob	0.0006	6.48E-06	9.40E-06	2.59E-05	1.25E-04	7.96E-06	1.15E-05	3.19E-05	1.54E-04	7.02E-04	1.02E-03	2.81E-03	1.36E-02
PC335 Nevada-Stewart	0.091	9.83E-04	1.43E-03	3.93E-03	1.90E-02	1.21E-03	1.75E-03	4.83E-03	2.34E-02	1.07E-01	1.54E-01	4.26E-01	2.06E+00
PC336 Highland Surprise	0.038	4.10E-04	5.95E-04	1.64E-03	7.94E-03	5.04E-04	7.31E-04	2.02E-03	9.76E-03	4.45E-02	6.45E-02	1.78E-01	8.61E-01
PC375 Highland Surprise Waste Rock	0.0106	1.15E-04	1.66E-04	4.58E-04	2.22E-03	1.41E-04	2.04E-04	5.63E-04	2.72E-03	1.24E-02	1.80E-02	4.96E-02	2.40E-01
PC337 Sidney (Red Cloud Creek Adit)	0.006	6.48E-05	9.40E-05	2.59E-04	1.25E-03	7.96E-05	1.15E-04	3.19E-04	1.54E-03	7.02E-03	1.02E-02	2.81E-02	1.36E-01
PC340 Upper Little Pittsburg	0.002	2.16E-05	3.13E-05	8.64E-05	4.18E-04	2.65E-05	3.85E-05	1.06E-04	5.14E-04	2.34E-03	3.39E-03	9.37E-03	4.53E-02
PC341 Lower Little Pittsburg	0.006	6.48E-05	9.40E-05	2.59E-04	1.25E-03	7.96E-05	1.15E-04	3.19E-04	1.54E-03	7.02E-03	1.02E-02	2.81E-02	1.36E-01
PC343 Nabob 1300 Level	0.066	7.13E-04	1.03E-03	2.85E-03	1.38E-02	8.76E-04	1.27E-03	3.50E-03	1.70E-02	7.73E-02	1.12E-01	3.09E-01	1.50E+00
PC344 Big It	0.00106	1.15E-05	1.66E-05	4.58E-05	2.22E-04	1.41E-05	2.04E-05	5.63E-05	2.72E-04	1.24E-03	1.80E-03	4.96E-03	2.40E-02
PC348 Upper Constitution	0.079	8.53E-04	1.24E-03	3.41E-03	1.65E-02	1.05E-03	1.52E-03	4.19E-03	2.03E-02	9.25E-02	1.34E-01	3.70E-01	1.79E+00
PC351 Marmion Tunnel	0.0089	9.61E-05	1.39E-04	3.85E-04	1.86E-03	1.18E-04	1.71E-04	4.73E-04	2.29E-03	1.04E-02	1.51E-02	4.17E-02	2.02E-01
PC352 Seep Below Nevada Stewart	0.0028	3.02E-05	4.39E-05	1.21E-04	5.85E-04	3.72E-05	5.39E-05	1.49E-04	7.19E-04	3.28E-03	4.75E-03	1.31E-02	6.34E-02
PC 400 Adit Upstream of Little Pittsburg	0.000422	4.56E-06	6.61E-06	1.82E-05	8.82E-05	5.60E-06	8.12E-06	2.24E-05	1.08E-04	4.94E-04	7.16E-04	1.98E-03	9.56E-03

Table 6-15 : Calculated Wasteload Allocations for Individual Sources - South Fork above Pinehurst (URSG Site SF271)

All values in lbs/day

Station ID	Flow (cfs)	Total Recoverable Cadmium 7Q10L	Total Recoverable Cadmium 10th Percentile	Total Recoverable Cadmium 50th Percentile	Total Recoverable Cadmium 90th Percentile	Total Recoverable Lead 7Q10L	Total Recoverable Lead 10th Percentile	Total Recoverable Lead 50th Percentile	Total Recoverable Lead 90th Percentile	Total Recoverable Zinc 7Q10L	Total Recoverable Zinc 10th Percentile	Total Recoverable Zinc 50th Percentile	Total Recoverable Zinc 90th Percentile
SF382 Silver Dollar	0.015	7.00E-05	9.30E-05	1.98E-04	3.09E-04	4.07E-04	5.35E-04	1.00E-03	8.93E-04	7.31E-03	9.68E-03	1.99E-02	2.67E-02
SF393 Western Union (Lower Adit)	0.001	4.67E-06	6.20E-06	1.32E-05	2.06E-05	2.71E-05	3.57E-05	6.70E-05	5.96E-05	4.87E-04	6.46E-04	1.32E-03	1.78E-03
SF3 Central Tmt Plant	4.990	2.33E-02	3.10E-02	6.59E-02	1.03E-01	1.35E-01	1.78E-01	3.34E-01	2.97E-01	2.43E+00	3.22E+00	6.60E+00	8.90E+00
SF620 Page STP	3.870	1.81E-02	2.40E-02	5.11E-02	7.97E-02	1.05E-01	1.38E-01	2.59E-01	2.31E-01	1.89E+00	2.50E+00	5.12E+00	6.90E+00
SF383 St. Joe	0.007	3.27E-05	4.34E-05	9.25E-05	1.44E-04	1.90E-04	2.50E-04	4.69E-04	4.17E-04	3.41E-03	4.52E-03	9.26E-03	1.25E-02
SF384 Coeur d'Alene (Mineral Point)	0.005	2.33E-05	3.10E-05	6.61E-05	1.03E-04	1.36E-04	1.78E-04	3.35E-04	2.98E-04	2.44E-03	3.23E-03	6.62E-03	8.92E-03
SF385 Unnamed Adit	0.001	3.27E-06	4.34E-06	9.25E-06	1.44E-05	1.90E-05	2.50E-05	4.69E-05	4.17E-05	3.41E-04	4.52E-04	9.26E-04	1.25E-03
SF600 Caladay	0.210	9.80E-04	1.30E-03	2.77E-03	4.32E-03	5.70E-03	7.49E-03	1.41E-02	1.25E-02	1.02E-01	1.36E-01	2.78E-01	3.74E-01
SF602 Galena	1.300	6.06E-03	8.06E-03	1.72E-02	2.68E-02	3.53E-02	4.64E-02	8.71E-02	7.74E-02	6.34E-01	8.39E-01	1.72E+00	2.32E+00
SF623 Smelterville STP	0.421	1.96E-03	2.61E-03	5.56E-03	8.66E-03	1.14E-02	1.50E-02	2.82E-02	2.51E-02	2.05E-01	2.72E-01	5.57E-01	7.51E-01
SF624 Sunshine 001	3.120	1.46E-02	1.94E-02	4.12E-02	6.42E-02	8.46E-02	1.11E-01	2.09E-01	1.86E-01	1.52E+00	2.01E+00	4.13E+00	5.56E+00
Coeur/Galena 002	0.775	3.62E-03	4.81E-03	1.02E-02	1.60E-02	2.10E-02	2.76E-02	5.19E-02	4.62E-02	3.78E-01	5.00E-01	1.03E+00	1.38E+00
Consolidated Silver	0.300	1.40E-03	1.86E-03	3.97E-03	6.18E-03	8.14E-03	1.07E-02	2.01E-02	1.79E-02	1.46E-01	1.94E-01	3.97E-01	5.35E-01

6.6 Proposed Allocation Method - Coeur d'Alene Lake and Spokane River

The allocation approach for Coeur d'Alene Lake and the Spokane River is significantly different than the approach used for the Coeur d'Alene River and tributaries. The differences stem from the significant differences in the number, types, and proximity of metals sources in the Coeur d'Alene Lake/Spokane River area. If the Coeur d'Alene River allocations were achieved and the lake continues to act as a sink for dissolved metals (see discussion below), the Spokane River would likely meet water quality standards if current metals concentrations were maintained by discrete sources along the Spokane River. This contrasts with the need for significant reductions from both discrete and non-discrete sources upstream in the Coeur d'Alene River to meet water quality standards.

6.6.a. Sources in Coeur d'Alene Lake and the Spokane River

Aside from the dissolved metals in the Coeur d'Alene River, the only other potentially significant source of metals to the lake is the release (or "flux") of dissolved metals from the contaminated sediments on the lake bottom to the overlying water column. Results of studies to ascertain the magnitude and direction of metals fluxes from the lake sediments are summarized in Appedix F. The most direct measurements of metals fluxes at the lake bottom indicate that the sediments deliver a dissolved metals loading to the water column. Furthermore, the magnitude of measured fluxes were significant in relation to Coeur d'Alene River loadings.

At the same time, the available flow/concentration data at the lake boundaries indicate that dissolved metals loadings in the Spokane River (at the Post Falls dam) are lower than loadings delivered by the Coeur d'Alene River. This suggests that other physical, chemical, and/or biological processes are occurring in Coeur d'Alene Lake that result in a net loss of dissolved metals from the water column. These processes are not fully understood, and study of the lake is ongoing. It is also recognized that cleanup actions over the long term could affect both the sediment fluxes and other lake processes. Based on the magnitude of the measured fluxes from the sediments and the uncertainty about long term changes in lake dynamics, EPA believes it is prudent to establish a load allocation for net loadings from lake sediments to the water column. Net loadings in this case are defined as the difference between loadings at the mouth of the Couer d'Alene River and in the Spokane River at the lake outlet. The development of this allocation is described below.

Along the Spokane River, between the lake and the state line, the only identified sources of metals are three municipal treatment plants (Hayden Lake, Coeur d'Alene, and Post Falls) and urban stormwater.

6.6.b. Load Allocations for Net Loadings from Lake Sediments

The load allocation for lake sediments is calculated in a straightforward manner based on an idealized view of the lake as the confluence of two large rivers. The predominant inflows to

Coeur d'Alene Lake are from the St. Joe River and Coeur d'Alene River. That portion of the lake's loading capacity derived from the Coeur d'Alene River is already allocated to upstream sources in the TMDL. However, the St. Joe River's loading capacity is not allocated. The loading capacity delivered to the lake by the St. Joe River (i.e., the total loading capacity minus the current background loading for a particular metal) can be allocated to the lake sediment source.

The load allocation is calculated for the same flow tier percentiles as those used for the Coeur d'Alene River and tributaries (7Q10, 10th, 50th, and 90th percentiles). The available water quality data for the St. Joe River (9 samples) indicates that hardness is generally below the 25 mg/l lower bound in the Idaho water quality standards (the highest sample value was 27 mg/l). EPA has applied the water quality criteria for a hardness of 25 mg/l in calculating the loading capacity at the four flow tiers. Background levels are below detection for dissolved cadmium and lead, though detection levels vary within the dataset. EPA has estimated background in the St. Joe by applying one-half the lowest detection level for cadmium (.02 ug/l) and lead (.25 ug/l), and using the highest detected value for zinc (4.2 ug/l).

Table 6-16. St. Joe River Loading Capacity and Background

Flow (cfs)	St. Joe Loading Capacity (lbs/day)			Background Loading (lbs/day)		
	Dissolved Cadmium	Dissolved Lead	Dissolved Zinc	Dissolved Cadmium	Dissolved Lead	Dissolved Zinc
241	0.48	0.70	41.6	0.02	0.33	5.5
374	0.74	1.09	64.6	0.04	0.50	8.5
1,000	2.00	2.92	173	0.11	1.4	23
6,470	12.9	18.9	1,120	0.70	8.7	147

Table 6-17. Load Allocations for Net Loadings from Coeur d'Alene Lake Sediments

Flow at Calder (cfs)	Dissolved Cadmium (lbs/day)	Dissolved Lead (lbs/day)	Dissolved Zinc (lbs/day)
241	0.46	0.38	36
374	0.71	0.59	56
1,000	1.9	1.6	150
6,470	12	10	970

The above load allocation is established conservatively by using the flow measured at the USGS station at Calder. The actual flow into the lake includes contributions from the St. Maries River, downstream from the Calder station.

6.6.c. Wasteload Allocations for Spokane River Treatment Plants

The State of Washington has issued an EPA-approved TMDL for metals in the Spokane River downstream of the state line (Washington Department of Ecology, 1999). Because the river and source conditions are similar in the Spokane River segment upstream of the state line, EPA allocates loading in a two-step method consistent with that used by the State of Washington in its Spokane River TMDL. In the first step, an upper bound concentration is calculated for each point source by applying the Idaho water quality criteria at the end-of-pipe using the effluent hardness (in other words, applying an "effluent-based criterion"). The effluent-based criterion accounts for differences between effluent and ambient hardness levels. The hardness levels of the three municipal discharges to the Spokane River in Idaho are higher than that of the river, because these cities pump groundwater for their water supplies, and this source water has a significantly higher hardness than the Spokane River.

In simple terms, applying the effluent-based criterion is analogous to treating the effluent discharge as if it were a tributary that has higher hardness levels than the mainstem river. As discussed earlier, metals toxicity decreases with increased hardness. The tributary would be allowed to achieve less stringent (i.e., higher) metals criteria by virtue of its elevated hardness levels. It can be shown that the mixture of the tributary and mainstem waters would not result in any local criteria exceedances. A detailed analysis of the relationship between the water quality criteria equations and the mixing of two waters with different hardness levels is included in the State of Washington TMDL.

In order to develop monthly average wasteload allocations for use in NPDES permits, it is appropriate to translate dissolved metal allocations into total recoverable metal allocations. EPA has calculated translators for the Spokane River (see Table 6-10). Since the translators from total recoverable to dissolved metal are 1.0 for cadmium and zinc, the equations for these metals provide both dissolved and total recoverable values. For lead, the characteristics of the criterion curve necessitate a different approach to achieve a total recoverable allocation. Consistent with the State of Washington TMDL, the dissolved criterion equation is converted to a total recoverable equation using a default conversion factor. The tangent line is then used, at the river hardness value, to calculate a total recoverable lead allocation. The effluent-based criteria for the Spokane River dischargers are calculated using the equations in Table 6-18.

Table 6-18. Effluent-based Criteria Equations

Pollutant	Equation
Total Recoverable Cadmium	$y = \exp^{(.7852[(\ln(x)]-3.49)})$
Total Recoverable Lead	$y = .0261(x) - .1119$
Total Recoverable Zinc	$y = \exp^{(.8473[(\ln(x)]+.7614)}$

Notes:

y = criterion (ug/l)
x = effluent hardness (mg/l)

Provided facilities maintain effluent metals concentrations below the effluent-based criteria, effluent flow (and loading) can be increased without exceeding the loading capacity in the Spokane River. In addition, the wasteload allocation concentration is not dependent on the river flow. For this reason, the wasteload allocation is expressed as a concentration (ug/l) rather than a load (lbs/day). A wasteload allocation expressed in this manner allows for future growth without the need to revise wasteload allocations.

In the second step of the allocation process, the current discharge level (or current "performance") is compared to the calculated effluent-based criterion during permit development, and the more restrictive value is assigned as the wasteload allocation for the facility. This step is similar to the final step (Step 8) of the allocation approach for the Coeur d'Alene River and tributaries.

Based on the information in Table 6-19, all three municipalities on the Spokane River are expected to have final allocations based on current performance. The intent of this step in the allocation process is to prevent significant increases in metals discharges from sources in this basin, and this approach is consistent with anti-degradation requirements in the Idaho water quality standards. In the Spokane River, this approach also allows for allocation of remaining capacity to urban stormwater sources.

Table 6-19. Effluent-Based Criteria for Spokane River Facilities

Facility	Minimum Hardness (mg/l as $CaCO_3$)	Total Recoverable Cadmium (ug/l)		Total Recoverable Lead (ug/l)		Total Recoverable Zinc (ug/l)	
		Effluent Criterion	Current Perform.	Effluent Criterion	Current Perform.	Effluent Criterion	Current Perform.
Hayden	92	1.0	0.2	2.3	1.9	97	80
Coeur d'Alene	132	1.3	0.2	3.3	2.3	132	72
Post Falls	96	1.0	0.2	2.4	2.0	101	80

Notes:

1. The wasteload allocation for a facility will be the lower value of the current performance and effluent-based criterion. The above comparison is provided for informational purposes only. Final performance-based permit limits will be developed in the individual NPDES permits.
2. Minimum hardness is used because the criteria increase with increased hardness.
3. Current performance is the 90th percentile of the available discharge data.
4. Effluent criteria are Idaho water quality criteria values associated with the minimum hardness of the effluent.

6.6.d. Wasteload Allocations for Urban Stormwater

EPA has no information on the metals loadings entering Coeur d'Alene Lake and the Spokane River from urban stormwater. Nevertheless, metals are commonly present in urban stormwater, and therefore the TMDL must address these sources in the allocation process. The TMDL stipulates that, upon issuance of a permit with performance-based limits in the Coeur d'Alene Lake/Spokane River area, the reserve loadings associated with the differences between the effluent criterion values and the performance-based values are reserved for municipal stormwater sources in the area.

7.0 TMDL IMPLEMENTATION ISSUES

7.1 General

Under current regulations, an implementation plan is not a required element of a TMDL. Nevertheless, EPA has considered implementation issues in the development of this TMDL. This section of the document provides a preliminary discussion of several of these issues.

7.2 FACA Report

EPA believes the metals contamination in the CDA basin meets the description of "Impairments Due to Extremely Difficult Problems" in the Report of the Federal Advisory Committee on the TMDL Program (FACA Report, EPA, July 1998). The clean-up of abandoned mine wastes in the Coeur d'Alene is certainly "technically and/or practically very difficult and extremely costly." The report makes several recommendations for design and implementation of TMDLs for "special challenge sources", notably the following:

> "The Committee recommends that, where necessary, a TMDL implementation plan involving special challenge sources allow a relatively longer timeframe for water quality standards attainment. Different timeframes for implementation of (waste)load allocations may be needed for special challenge vs. existing sources. For example, existing sources may be required to achieve necessary load reductions quickly (i.e., within a compliance

schedule in a 5-year NPDES permit), even if achieving prescribed load reductions for these historic sources is anticipated to take longer. In such a situation, the state may consider relying more on a phased (or iterative) TMDL approach, in which expected loading reductions from special challenge sources over the long-term are factored in when establishing short-term allocations for permit limits for point sources." (FACA Report, page 42).

In the CDA basin TMDL, EPA believes that most of the waste piles and eroded tailings in the bed and banks of the basin rivers can be viewed as "special challenge sources." EPA has begun to address the contamination by establishing specific allocations for discrete point sources in the basin. EPA does not currently possess the necessary information to establish specific allocations for the waste piles and nonpoint (bed and banks) sources. However, these sources are currently the subject of the Superfund RI/FS for the basin.

7.3 Coordination of Clean Water Act and Superfund Authorities

EPA has explored a conceptual framework to effectively use its authorities under the CWA and CERCLA in the CDA basin. EPA proposes to issue NPDES permits that incorporate the TMDL wasteload allocations to operating NPDES facilities in the basin, including mining facilities and municipal sewage treatment plants. In the meantime, further study and identification of other sources can proceed in the RI/FS, culminating in a Record of Decision (ROD) that will identify the plan for clean-up of waste piles, inactive adits, and tailings in the river bed and banks.

Figure 7-1 displays conceptually how EPA plans to coordinate CWA and CERCLA authorities such that they essentially support one another as both processes unfold. The narrative below corresponds to the 13 points in the chart and provides a brief explanation of important steps in both processes.

1. Water Quality Standards

As described in this document, water quality standards form the basis of the TMDL and are goals for CERCLA actions (see also discussion of "ARARs" under "Feasibility Study" below).

2. Remedial Investigation (RI)

Under CERCLA, an RI may be performed to determine the nature and extent of contamination in a particular area. This normally entails a review of existing data and collection of additional information to fill in data gaps. The RI will examine all environmental media (e.g., surface water, soils, groundwater), evaluate risks to human health and ecosystems, and identify specific sources of pollution. The TMDL Technical Support Document is analagous to the RI, albeit with a narrowed focus on surface water quality and no risk analysis. Some of the information gathered to support the RI was used in the development of the TMDL.

The RI will also generate 'risk-based' cleanup levels, and these cleanup levels may apply to dissolved metals in the water column. The development of risk-based cleanup levels may employ laboratory and field methods that are similar to those used to develop site-specific criteria under the CWA.

3. Total Maximum Daily Load (TMDL)

Described in this document.

4. Feasibility Study (FS)

The FS will develop remedial goals based on the risk assessments and will also identify Applicable or Relevant and Appropriate Requirements (ARARs). ARARs are cleanup standards or other requirements specified in state and federal laws. Actions taken under CERCLA must comply with ARARs unless they are explicitly waived. As shown in the flowchart, the TMDL provides information for consideration in the ARAR identification process. The FS will develop a range of remedial action alternatives and then, for each alternative, evaluate the feasibility of meeting remedial goals according to 7 criteria, including compliance with ARARs, protection of human health and the environment, implementability and cost. Two additional criteria, state and local acceptance, will be evaluated in the ROD, after comments on the RI/FS and proposed plan have been received. Treatability studies may be conducted to support evaluation of remedial alternatives.

5. NPDES Permits

A number of sources of pollution in the CDA basin are sources with existing NPDES permits, issued pursuant to the CWA. These sources include three operating mines (Lucky Friday, Coeur/Galena and Sunshine), three inactive mines (Caladay, Consolidated Silver, and Star/Morning) and several municipal wastewater treatment plants (Mullan, Page, Smelterville, Hayden, Post Falls, and Coeur d'Alene). Once a TMDL has been established, EPA will begin developing NPDES permits for the operating mines and municipalities along the South Fork. The schedule for issuing the South Fork municipal permits will be coordinated with any variance actions. The appropriate approach to address all inactive mine adits will be evaluated in the RI/FS process. Decisions on next steps to implement the TMDL for these adits will be made in the Superfund Record of Decision.

It is possible that final NPDES permits will include compliance schedules to allow operators a specified time to install the necessary treatment or water management measures to meet the new permit limits. Variances may be considered on a case-by-case basis.

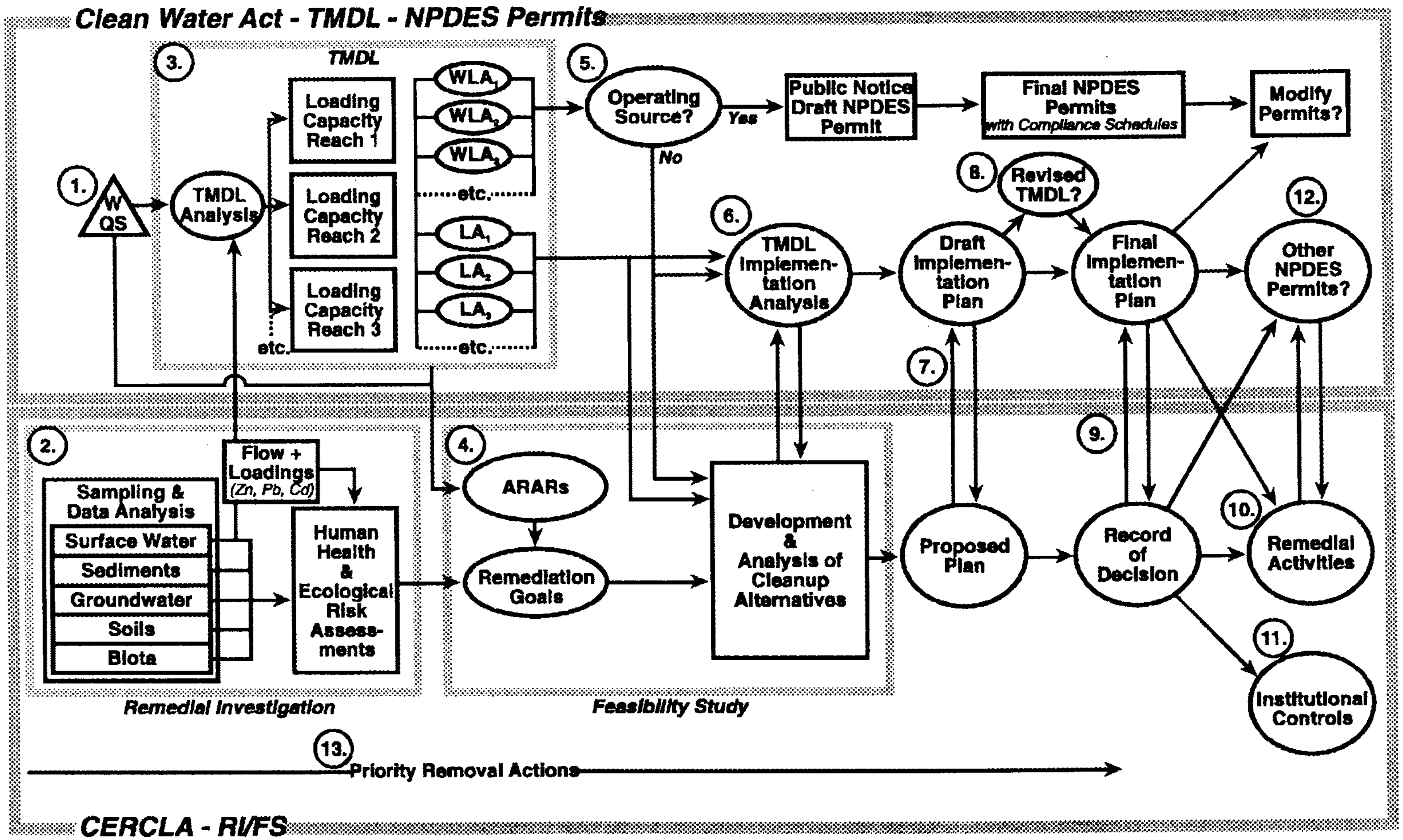

Figure 7-1 Coordinating Clean Water Act and CERCLA Activities

6 & 7. CERCLA Feasibility Study and TMDL Implementation Analysis

The FS and TMDL Implementation Analysis are focused on the same question: how, and on what schedule, will source reductions and other control measures be achieved to meet environmental goals? The TMDL plan is focused on surface water quality, while the FS is broader in scope, addressing other media in addition to surface water (and potentially other surface water pollutants, such as other metals, nutrients, etc.). Thus, the TMDL implementation analysis draws upon the data and analysis in the RI/FS.

A consistent, informed understanding of the feasibility and scheduling of pollution controls will require strong interagency coordination to ensure sharing of information between state/federal/local agencies.

8. Possible TMDL Revisions

The TMDL can be revised in the future to reflect new information (such as information from the RI/FS process) and/or changes to water quality standards. Any revisions to the TMDL would be subject to public comment.

9. Record of Decision (ROD)/Final TMDL Implementation Plan

The outcome of coordinated CERCLA and CWA activities is a coordinated ROD and TMDL Implementation Plan that are fully consistent and complementary. The TMDL Implementation Plan may be one component of the broader ROD document. Both the TMDL Implementation Plan and ROD are public documents that explain which cleanup alternative(s) will be used to meet specific remediation goals. Both documents are based on a common information base and technical analysis generated during the RI/FS study, taking into consideration public comments and community concerns.

10. Remedial Actions

Following a Remedial Design stage (not shown), implementation of the remedial actions specified in the ROD and TMDL Implementation Plan should begin.

11. Institutional Controls

In some cases, 'institutional controls' are necessary to help meet the remediation goals. An example of an institutional control would be a local zoning ordinance prohibiting excavation in potentially contaminated areas. Institutional controls must be evaluated as other remedial alternatives prior to inclusion in a ROD and implementation following Remedial Design.

12. Other NPDES Permit Actions

Throughout the RI/FS and CWA processes, other previously unpermitted point sources of pollution that need NPDES permits (e.g., unpermitted adit discharges, waste pile seeps) may be identified. Also, if the TMDL wasteload allocations are revised, the corresponding NPDES permit limitations may be modified during the five year permit term.

13. Priority Removal Actions

Throughout the RI/FS and CWA processes, it is envisioned that priority removal actions may be conducted in the CDA basin, as deemed necessary to protect the public health or welfare or the environment. To the extent practicable, such removal actions would contribute to the efficient performance of any anticipated long-term remedial actions in the CDA basin.

7.4 Preliminary Assessment of Feasibility

EPA has explored the feasibility of whether individual sources that currently exceed the wasteload allocations can achieve compliance with assigned loadings. EPA's Superfund program has evaluated the feasibility of the TMDL allocations for the Bunker Hill Central Treatment Plant (CTP) in Kellogg. On behalf of EPA, CH2M Hill has analyzed the hydraulic characteristics of the Bunker Hill mine and a number of alternatives to reduce metals loadings to the levels required in the draft TMDL, including: source control to reduce water entering the mine workings, in-mine storage of untreated and/or treated wastewater when necessary to meet TMDL allocations, and wastewater treatment using a variety of technologies. Based on the analyses completed to date, EPA is optimistic that the CTP can achieve the TMDL allocations using conventional pollution control technologies. While EPA requested comments on feasibility from other sources in the basin, no information comparable to the Bunker Hill CTP study has been received to date.

Many mining projects have historically used hydroxide precipitation to treat wastewaters for metals removal prior to discharge. For example, hydroxide precipitation is currently employed at the Bunker Hill CTP. Work to date at the CTP indicates that this technology, combined with filtration and used in conjunction with mine water storage measures, may be sufficient to meet the TMDL. Figure 7-2 shows theoretical lowest residual metal concentrations that can be achieved by hydroxide precipitation.

Sulfide precipitation, which can be used in concert with hydroxide precipitation, offers advantages due to the high reactivity of sulfides with heavy metal ions and the very low solubilities of metal sulfides over a broad pH range. As shown in Figure 7-2, metal sulfides have much lower solubilities than metal hydroxides. For example, at the Red Dog Mine in Alaska, a sulfide precipitation and filtration system has been installed to treat effluent with high metals levels to concentration ranges similar to levels specified in this TMDL. Laboratory treatability work to date at the CTP indicates that sulfide precipitation is an effective add-on to the existing hydroxide precipitation system. By bringing effluent metals concentrations lower than can be achieved by hydroxide precipitation alone, sulfide precipitation reduces the reliance on mine water storage measures to meet the effluent limits based on the TMDL.

For municipalities along the South Fork, information collected as part of the TMDL and NPDES permit development process indicates that the primary source of metals to these systems is infiltration of groundwater contaminated by tailings material to the collection systems. EPA expects that, at a minimum, a long term effort to maintain or replace portions of the sewage collection systems at these facilities will be needed to achieve the TMDL allocations. These collection system improvements will also put the facilities in a better position to operate nutrient-control technology in the future if needed. Because of the potential costs to local communities of remedies to reduce metals in the municipal discharges, variances from state water quality standards may be appropriate and necessary for these facilities (variances are discussed in further detail in the Response to Comments document for the TMDL).

EPA recognizes that abandoned mine projects present significant challenges in designing and implementing remedial/treatment measures. For many of these projects it may not be feasible or practical to design and construct an active wastewater treatment facility, especially in remote locations. In other cases, other source control measures (e.g., capping a waste pile or plugging an adit) may be feasible.

7.5 Other TMDL Issues

Reasonable Assurance

When wasteload allocations are established under the assumption that nonpoint source contributions will be reduced, a TMDL must provide "reasonable assurance" that nonpoint source reductions will be implemented.

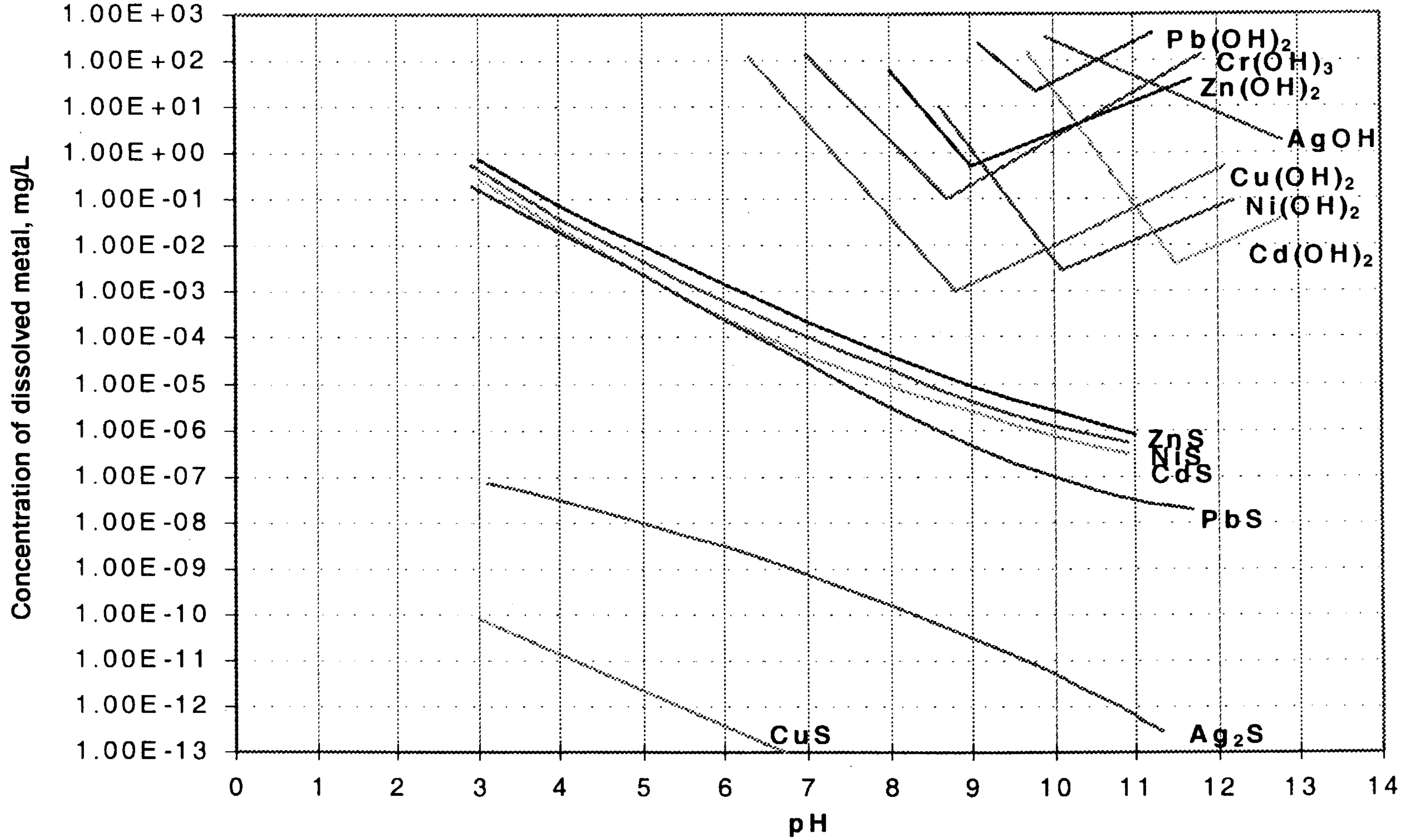

Figure 7-2 Solubility of Metal Hydroxides and Sulfides

EPA is currently conducting a Remedial Investigation/Feasibility Study (RI/FS) for the Coeur d'Alene River Basin pursuant to authorities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et. seq. EPA has authority under CERCLA to conduct an RI/FS for an area regardless of whether releases of hazardous substances in the area are included on the National Priorities List (NPL). If releases in an area are not included on the NPL, EPA ordinarily has authority to spend up to $2 million from the Superfund trust fund to conduct discrete removal actions in that area. If releases are included on the NPL, EPA has broader authority to draw from the Superfund trust fund for financing remedial actions in that area following completion of an RI/FS. However, EPA ordinarily seeks funds from the Superfund trust fund only if potentially responsible parties are unable or unwilling to perform or finance the response actions themselves. Through litigation filed in March 1996, the U.S. Department of Justice, on behalf of EPA and other federal agencies, is seeking a declaration that several mining company defendants are liable for past and future response costs caused by releases of hazardous substances in the Coeur d'Alene Basin. EPA also retains administrative authority under CERCLA to issue orders compelling parties to undertake response actions to address releases that may present an imminent and substantial endangerment to public health, welfare, or the environment. Through removal and remedial actions funded by potentially responsible parties and the Superfund trust fund, EPA's Superfund program has been actively addressing releases of hazardous substances in the Coeur d'Alene Basin. These continuing and anticipated activities may reasonably be expected to continue in the future, resulting in substantial reduction of discharges from non-point sources into the Coeur d'Alene River and tributaries, Coeur d'Alene Lake, and Spokane River.

Anti-degradation

Idaho's water quality regulation contains anti-degradation requirements pertinent to certain waters in this basin. This regulation provides that where a waterbody exceeds the quality necessary to support designated uses, the existing quality shall be maintained and protected unless the State makes a formal finding that lowering of water quality is needed to accommodate important economic or social development.

While large portions of the CDA basin surface water network contain metals concentrations well in excess of the water quality criteria, there are also a number of waters within the CDA basin with metals concentrations well below the water quality criteria. In particular, metals levels are low within the North Fork sub-basin and numerous small tributaries to the South Fork and mainstem CDA that are not influenced by mining activity. A State of Idaho anti-degradation analysis and decision is required before activities that lower water quality (i.e., elevate metals levels in the receiving water) can proceed in these areas.

7.6 Development of Site-Specific Criteria

This TMDL is established to achieve the currently applicable water quality criteria for CDA basin waters in the Idaho water quality standards. EPA and the state of Idaho recognize that site-specific criteria (SSC) for lead, zinc and cadmium may be appropriate for the South Fork to reflect the specific characteristics of the river and the sensitivity of the resident cold water biota. In 1993, DEQ began efforts to develop SSC for the South Fork between Daisy Gulch and Canyon Creek (8 mile study section upstream of Wallace). DEQ intends to complete this work and adopt SSC for this section of the river. The SSC will be submitted to EPA for approval.

The spatial extent of an SSC is critical to its application in regulatory actions. For example, the SSC for the Wallace segment would have no practical effect on the TMDL allocations, because statewide water quality criteria would still apply in the impaired segments immediately downstream of the Wallace segment. Meeting these downstream criteria would require the same calculations and wasteload allocations in the TMDL. On the other hand, establishing an SSC for the entire South Fork mainstem from Pinehurst to the headwaters (i.e., moving the point of application of the statewide criteria to the mainstem Coeur d'Alene River) could have an effect on the TMDL allocations. This is because statewide criteria could be achieved in the mainstem Coeur d'Alene River after dilution of metals (in excess of the statewide criteria) in the South Fork by the relatively clean North Fork.

Development of SSC for the entire South Fork would require an analysis based on differences in biological community structure and water chemistry (hardness, etc) downstream of Wallace. This work has not been funded by the state or mining companies to date. Even if the testing and analyses indicate a substantially higher tolerance in resident species for dissolved metals, the regulatory relief provided by such an SSC would be limited by the available dilution from the North Fork.

The mining companies and State currently have no plans to establish SSC for cadmium. This is because the SSC work to date indicates that resident species are sensitive to cadmium concentrations in the range of the statewide criteria.

In the future, DEQ intends to adopt SSC based on biological end points that reflect the existence of a healthy, balanced biological community (full support of uses) in the South Fork. Water quality, including levels of metals, that exists when the biological endpoints are met will be used by DEQ to develop alternative SSC for lead and zinc.

8.0 DATA MANAGEMENT AND SOFTWARE APPLICATIONS

EPA directed its contractor, URSG, to incorporate the water quality and point source datasets described in Table 5-1 into a relational database (Oracle®) for use in both TMDL and RI/FS analyses. For certain large data sets (e.g., PCS, USGS flows), a subset of the data was loaded into the database. For example, three years of data for the three metals of concern was downloaded from PCS and incorporated into the database.

A number of Geographic Information System (GIS) coverages were used to generate the detailed maps of the upper basin in this report. The relational database contains the necessary location information to generate maps of station and source locations. The routines employ ARCVIEW® coding.

TMDL allocations and other measures were calculated using EXCEL® spreadsheet applications designed for the Coeur d'Alene TMDL. Copies of the spreadsheets used for the TMDL are included on diskette in the Administrative Record for the TMDL.

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TECHNICAL SUPPORT DOCUMENT

APPENDICES

Total Maximum Daily Load for Dissolved Cadmium, Dissolved Lead, and Dissolved Zinc in Surface Waters of the Coeur d'Alene Basin

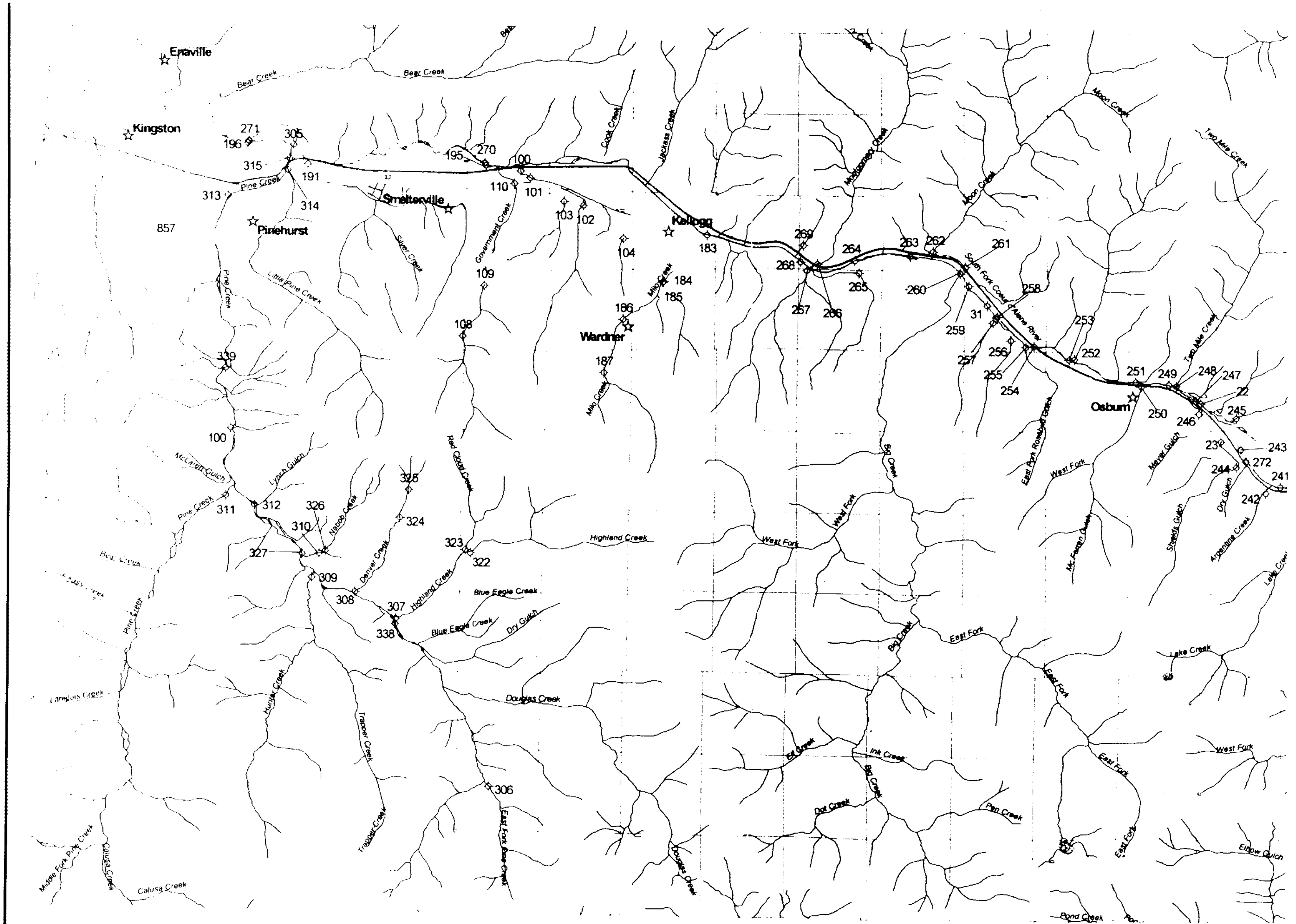
FINAL
August 2000

U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Idaho Department of Environmental Quality
1410 North Hilton
Boise, Idaho 83706

Table of Contents

APPENDIX A: SOUTH FORK COEUR D'ALENE RIVER MAPS



Bunker Hill/
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Sampling Locations

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River/Stream Sampling Locat
Cities
Interstate 90
State Roads
Streams
Rivers
Lakes
Section Lines

This map was created for planning purposes for the Coeur d'Alene River Basin Study. It was intended to show the general location of potential contamination sources within the displayed watersheds of the Coeur d'Alene River.

Basins and Potential Source locations were obtained from the Bureau of Land Management (BLM)

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This map is based on
Idaho State Plane Coordinates West Zone.
North American Datum 1983

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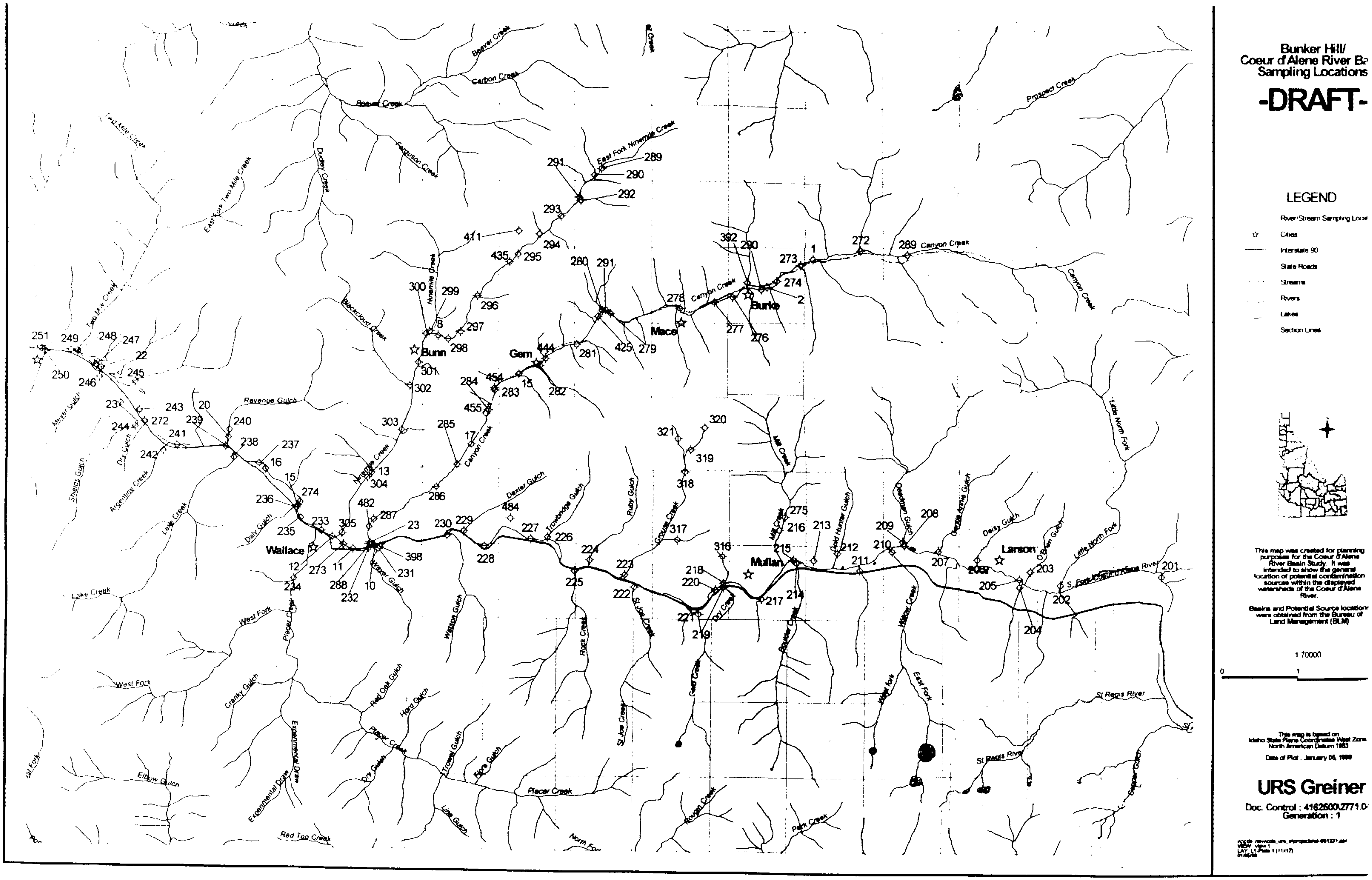
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Wallace
Bunn
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Canyon Creek
Ninemile Creek
East Fork Ninemile Creek
Beaver Creek
Carbon Creek
Ferguson Creek
Dudley Creek
Two Mile Creek
East Fork Two Mile Creek
Blackcloud Creek
Revenue Gulch
Argentine Creek
Lake Creek
Daly Gulch
Placer Creek
West Fork
Experimental Draw
Elbow Gulch
Red Top Creek
Cranky Gulch
Red Oak Gulch
Hord Gulch
Dry Gulch
Trowel Gulch
Flora Gulch
Line Gulch
Watson Gulch
Dexter Gulch
Trowbridge Gulch
Ruby Gulch
Grouse Creek
Rock Creek
St Joe Creek
Gold Creek
Dry Creek
Mill Creek
Gold Hunter Gulch
Boulder Creek
Willow Creek
East Fork
West fork
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St Regis River
Prospect Creek
Rouge Creek
Park Creek
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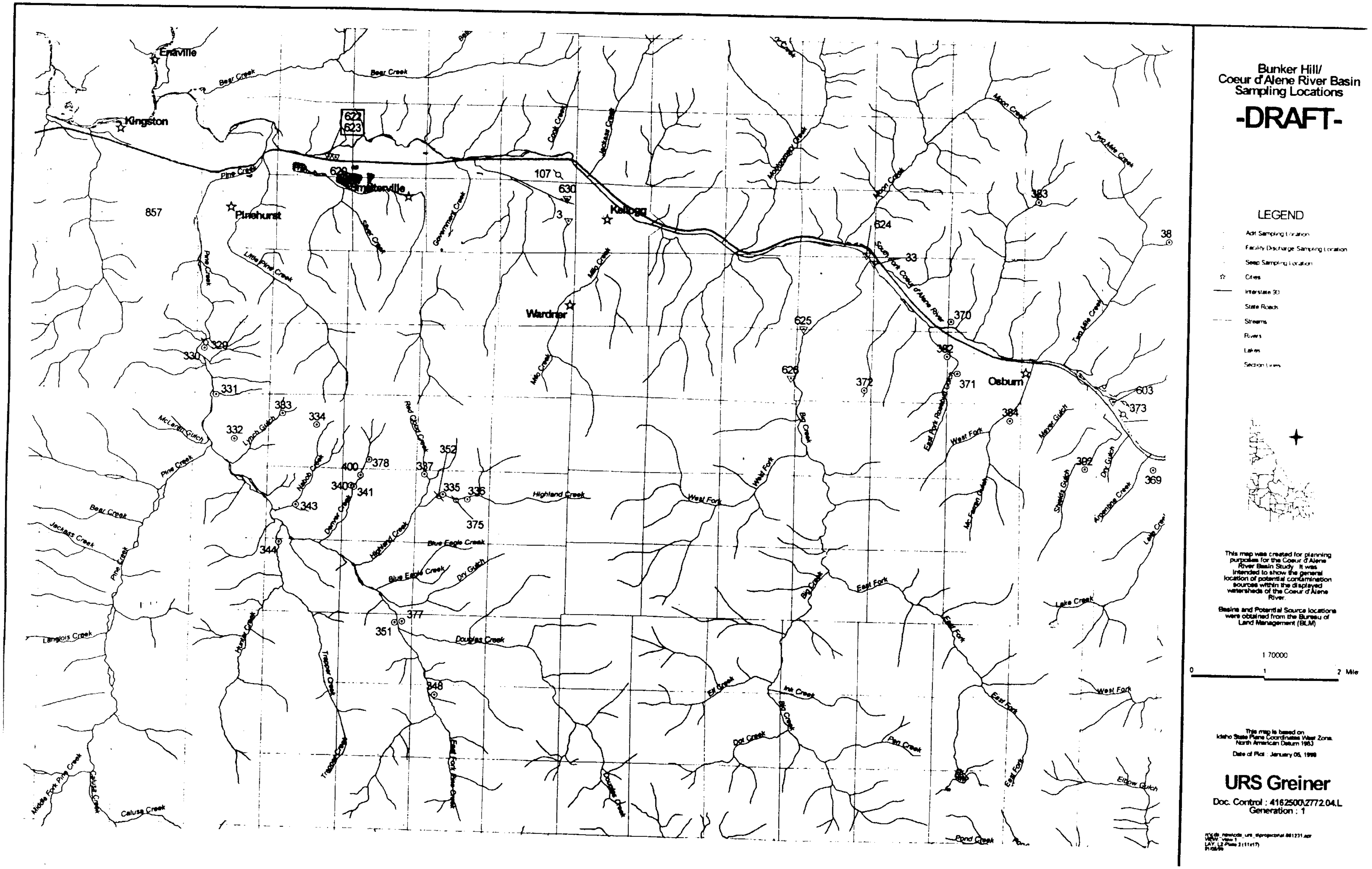
Bunker Hill/
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Facility Discharge Sampling Location
Seep Sampling Location
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Interstate 90
State Roads
Streams
Rivers
Lakes
Section Lines
This map was created for planning purposes for the Coeur d'Alene River Basin Study. It was intended to show the general location of potential contamination sources within the displayed watersheds of the Coeur d'Alene River.
Basins and Potential Source locations were obtained from the Bureau of Land Management (BLM)
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Wardner
Osburn
Bear Creek
Pine Creek
Little Pine Creek
Silver Creek
Government Creek
Cook Creek
Jackass Creek
Milo Creek
Montgomery Creek
Moon Creek
Two Mile Creek
South Fork Coeur d'Alene River
Big Creek
West Fork
East Fork
McLaren Gulch
Lynch Gulch
Nabob Creek
Denver Creek
Highland Creek
Blue Eagle Creek
Dry Gulch
Douglas Creek
Trapper Creek
Hunter Creek
Langlois Creek
Calusa Creek
Middle Fork Pine Creek
East Fork Pine Creek
Elk Creek
Ink Creek
Dot Creek
Pen Creek
Lake Creek
Elbow Gulch
Pond Creek
Meyer Gulch
Shield's Gulch
Argentine Creek
Two Mile Creek
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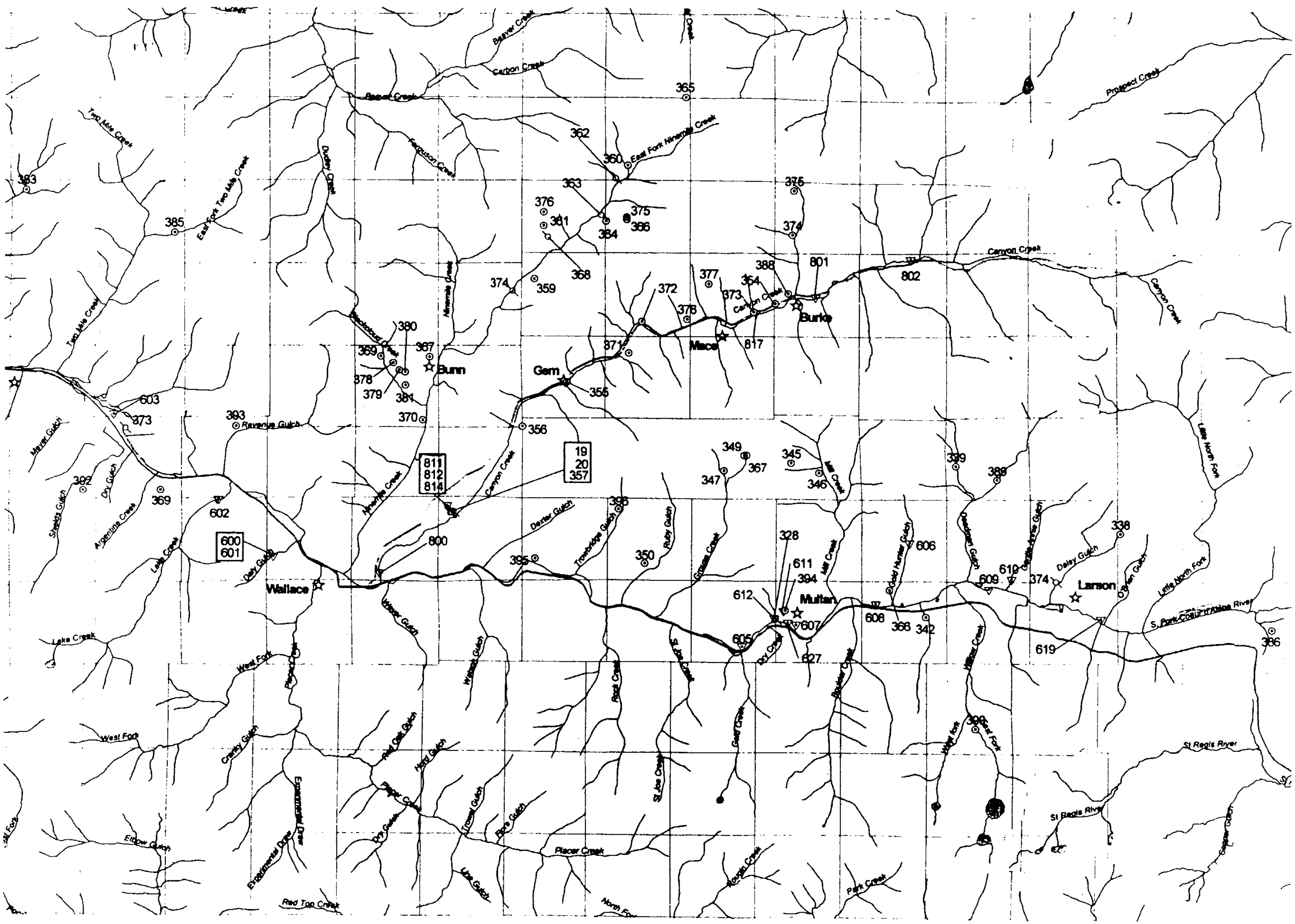

Bunker Hill/ Coeur d'Alene River Basin Sampling Locations

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LEGEND

- Adit Sampling Location
- Facility Discharge Sampling Location
- Seep Sampling Location
- Cities
- Interstate 90
- State Roads
- Streams
- Rivers
- Lakes
- Section Lines

This map was created for planning purposes for the Coeur d'Alene River Basin Study. It was intended to show the general location of potential contamination sources within the displayed watersheds of the Coeur d'Alene River

Basins and Potential Source locations were obtained from the Bureau of Land Management (BLM)

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This map is based on
Idaho State Plane Coordinates West Zone
North American Datum 1983

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APPENDIX B: LOCATION KEY FOR COEUR D'ALENE RIVER MAPS

Canyon Creek Station Locations

Location ID	Location Type	Location Description
1	RV	Canyon Creek, just below outlet from domestic water supply
2	RV	Canyon Creek above Gorge Gulch and downstream from Gertie Mine.
15	RV	Canyon Creek, downstream from GEM, at wooden bridge.
17	RV	Canyon Creek, near separation of Hecla upper tailings ponds.
19	SP	Star-Hecla tailings pile (seep at culvert).
20	SP	Star-Hecla tailings pile seep that drains into open field.
23	RV	Canyon Creek, near mouth, at Frontage Road bridge.
272	RV	Canyon Creek, upstream of source areas and Humboldt Gulch.
273	RV	Canyon Creek, bridge at 0.35 miles from dam
274	RV	Canyon Creek, 0.5 miles upstream of Gorge Gulch.
276	RV	Canyon Creek, above Hecla Portal, at walkway cross-over.
277	RV	Canyon Creek, at bridge below Hecla Star Mine and Mill site.
278	RV	Canyon Creek above Cornwall at Highway 4 bridge.
279	RV	Canyon Creek, upstream of Tamarack No. 7.
280	RV	Canyon Creek downstream of Tamarack No. 7.
281	RV	Canyon Creek at Frisco Mine bridge.
282	RV	Canyon Creek, at Whites Bridge
283	RV	Canyon Creek, above Hecla-Star tailings ponds and Canyon Silver Formosa Adit
284	RV	Canyon Creek, above Hecla-Star tailings ponds.
285	RV	Canyon Creek at Grays Bridge.
286	RV	Canyon Creek, below Hecla-Star tailings pond.
287	RV	Lower Canyon Creek, below Woodland Park.
288	RV	Canyon Creek, near mouth at Frontage Road bridge north of I 90.
289	RV	Canyon Creek upstream of sources and Military Gulch.
290	RV	Canyon Creek, 0.2 miles upstream of Gorge Gulch.
291	RV	Canyon Creek downstream of Tamarack No. 7.
353	AD	Hercules #5 Mine
354	AD	Hidden Treasure
355	RV	Gem No. 3/GEM-1
356	AD	Canyon Silver-Formosa
357	SP	Woodland Park Area
371	AD	Blackbear Fraction
372	AD	
373	AD	Anchor
392	RV	Gorge Gulch, near confluence with Canyon Creek.
695	RV	2.75 river miles upstream of Canyon Creek confluence with South Fork.
699	RV	1.25 river miles upstream of Canyon Creek confluence with South Fork.
702	RV	4 river miles upstream of Canyon Creek confluence with South Fork.
705	RV	1.75 river miles upstream of Canyon Creek conlfuence with South Fork.
800	OF	Canyon Creek 200 yd above SF Coeur d Alene river
801	OF	Canyon Creek above Gorge Gulch at Gertie Mine.
802	OF	Canyon Creek at Burke Water Supply Dam (east of Burke).
811	OF	Star Outfall 001A, 2 miles Northeast of Wallace.
812	OF	Unknown supplemental monitoring point at Star Morning Mine.
814	OF	Hecla-Star Morning 002B.
817	OF	Hecla #3 0.5 miles southwest of Burke

Ninemile Creek Station Locations

Location ID	Location Type	Location Description
8	RV	East Nine Mile Creek, 200 yds above confluence with Ninemile Fork.
13	RV	Ninemile Creek, approximately 1.1 miles upstream of mouth.
289	RV	East Fork Ninemile Creek, upstream of Interstate at Callahan Mine/Rock Dumps.
290	RV	Tamarack tributary"
291	RV	East Fork Ninemile Creek upstream of Wilson Creek.
292	RV	Wilson Creek, near confluence with East Fork Ninemile Creek.
293	RV	East Fork Ninemile Creek, 0.2 miles downstream of Insterstate Mill site.
294	RV	Rex tributary"
295	RV	East Fork Ninemile Creek, 1/4 mile upstream of Success #3 Adit.
296	RV	East Ninemile Creek, 1/4 mile downsteam of Success Mine Rock Dump.
297	RV	East Ninemile Creek, downstream of Succes Mine Rock Dump.
298	RV	East Fork Ninemile Creek 0.3 miles upstream of confluence with West Fork.
299	RV	West Fork Ninemile Creek, 90 yards upstream of confluence with the East Fork.
300	RV	West Fork Nine Mile, at confluence with East Nine Mile
301	RV	Ninemile Creek, north side of culvert under road at Zannetville.
302	RV	Black Cloud Creek, before confluence with Nine Mile
303	RV	Ninemile Creek,Sheperd's Bridge above McCarthy.
304	RV	Nine Mile Creek between cemetary and Sierra Silver tours
305	RV	Ninemile Creek, below RV Park, 0.1 mile upstream of confluence with SF.
359	AD	Success No. 3
360	AD	Interstate-Callahan No. 4
361	AD	Rex No. 2/Goldback Co. Adit Drainage
362	SP	
363	SP	Tamarack No. 5 Waste Rock Seep
364	AD	Tamarack 400 Level
365	AD	Sunset Tunnel
366	AD	Tamarack No. 5
367	AD	Day Rock 100
368	SP	Rex Tailings
369	AD	Duluth
370	AD	Silverstar
374	SP	Success Tailings
753	RV	1.25 river miles upstream of Ninemile Creek confluence with South Fork.
757	RV	2.25 river miles upstream of Ninemile Creek confluence with South Fork.
762	RV	3.25 river miles upstream of Ninemile Creek conlfuence with South Fork.
766	RV	4.25 river miles upstream of Ninemile Creek confluence with South Fork.

Pine Creek Station Locations

Location ID	Location Type	Location Description
305	RV	Pine Creek @ Mouth
306	RV	East Fork Pine Creek -head waters
307	RV	Highland Creek near mouth.
308	RV	Denver Creek, near mouth.
309	RV	Trapper Creek, near mouth.
310	RV	Nabob Creek, near mouth.
311	RV	West Fork Pine Creek near confluence with East Fork.
312	RV	East Fork Pine Creek upstream from West Fork
313	RV	Pine Creek at Main Street bridge, west of Pinehurst, South of I-90.
314	RV	Little Pine Creek
315	RV	Pine Creek approximately 1/2 mile upstream of mouth.
322	RV	Upstream Highland Creek 1; east tributary
323	RV	Upstream Highland Creek 2; Red Cloud Creek
324	RV	Upstream Denver Creek 1; above Little Pittsburg
325	RV	Upstream Denver Creek 2; above Sydney Mine
326	RV	Nabbob Creek, upstream of Nabob 1300 Level Adit
327	RV	East Fork Pine Creek Downstream of Nabob Creek
329	SP	North Amy
330	AD	Amy
331	AD	Liberal King
332	AD	Lookout
333	AD	Upper Lynch
334	AD	Lynch/Nabob
335	AD	Nevada-Stewart
336	AD	Highland Surprise
337	AD	Sidney (Red Cloud Ck. Adit)
338	RV	East Fork Pine Creek above Highland Creek
339	RV	PIne Creek between PC315 and PC312
340	AD	Upper Little Pittsburg
341	AD	Lower Little Pittsburg
343	AD	Nabob (1300 level)
344	AD	Big It
348	AD	Upper Constitution
351	AD	Marmion Tunnel
352	SP	Below Neveda-Steward
375	SP	Highland-Surprise Waste Rock Pile
400	AD	Upstream of Little Pittsburg
810	RV	1 river mile upstream of Main Street bridge.
812	RV	2 river miles downstream of Main Street bridge.
820	RV	3 river miles down stream of Main Street bridge.
823	RV	4 river miles downstream of Main Street bridge.
829	RV	5 river miles downstream of Main Street bridge.
834	RV	6 river miles downstream of Main Street bridge.
842	RV	7 river miles downstream of Main Street bridge.
845	RV	8 river miles downstream of Main Street bridge.
851	RV	8.75 river miles downstream of Main Street bridge.
857	RV	

South Fork Coeur d'Alene River Station Locations

Location ID	Location Type	Location Description
2	RV	At Smelterville bridge, east of airport
3	OF	(ID0000078 - Bunker Hill Mining Co.) Central Treatment Plant near Kellogg.
10	RV	South Fork CDR, east of Wallace, above confluence with Canyon Creek.
11	RV	South Fork CDR, above confluence with Ninemile Creek.
12	RV	South Fork CDR, at old railroad bridge in Wallace.
15	RV	South Fork CDR, above Daly Gulch.
16	RV	South Fork CDR, at private bridge, 3/4 of a mile upstream of Silverton.
20	RV	Revenue Gulch near mouth.
22	RV	South Fork CDR, near Osburn between Twomile Creek and Nuchols Gulch.
23	RV	Shield Gulch near mouth.
31	RV	South Fork CDR, at roadside stop I-90, 1 mile upstream of Big Creek.
33	AD	
100	RV	Bunker Creek between Deadwood and Government Gulch/GI
101	RV	Bunker Creek between Deadwood and Government Gulch/GI
102	RV	Bunker Creek near Deadwood Gulch
103	RV	Bunker Creek near Magnet Gulch
104	RV	Portal Creek between Deadwood and Government Gulch/GI
107	RV	Flats between Kellogg and Smelterville
108	RV	Grouse Creek along Government Gulch/GI
109	RV	Grouse Creek along Government Gulch/GI
110	RV	Grouse Creek along Government Gulch/GI
183	RV	Milo Creek near confluence to South Fork.
184	RV	Milo Creek upstream of MC-2.
185	RV	Milo Creek upstream of MC-2A and MC-2B.
186	RV	Milo Creek upstream of MC-3.
187	RV	Milo Creek
191	RV	South Fork North of Blue Star Ridge
195	RV	South Fork near Smelterville Flats.
196	RV	South Fork Coeur D'Alene
201	RV	Above Klondike Gulch on South Side of SFCDR
202	RV	Little North Fork
204	RV	Below OBrien Gulch on unnamed creek south side of SFCDR
205	RV	Above Mullan
206	RV	Daisy Gulch
207	RV	Gentle Annie Gulch
208	RV	South Fork CDR at bridge, upstream of Deadman Gulch.
209	RV	Deadman Gulch near mouth.
210	RV	Willow Creek near mouth.
211	RV	Above Boulder Creek on unnamed creek south side of SFCDR
212	RV	Gold Hunter Gulch near mouth.
213	RV	Unnamed creeks between Mill Creek and Gold Hunter Gulch
214	RV	Boulder Creek
215	RV	
216	RV	Mill Creek
218	RV	Slaughterhouse Gulch, below Morning No. 6
219	RV	Dry Creek
220	RV	South Fork CDR, below Mullan
221	RV	Gold Creek
222	RV	St. Joe Creek
223	RV	Grouse Gulch
224	RV	Ruddy Gulch

225	RV	Rock Creek
226	RV	Trowbridge Gulch
227	RV	South Fork CDR, upstream of Golconda Mine.
228	RV	South Fork CDR, above Wallace, fifty yards downstream of railroad bridge.
229	RV	Dexter Gulch
230	RV	Watson Gulch
231	RV	In Weyer Gulch
232	RV	South Fork CDR, downtown Wallace above Nine Mile Creek
233	RV	South Fork CDR, at old railroad bridge in Wallace
234	RV	Placer Creek
235	RV	SF CDR Bridge next to gas station at visitor center west end of Wallace.
236	RV	Placer Creek near mouth.
237	RV	South Fork CDR, Bridge next to old railroad bridge West of Wallace.
238	RV	Lake Creek near mouth.
239	RV	South Fork CDR, Silverton.
240	RV	Revenue Gulch 100 yards from I 90 at Silverton off ramp
241	RV	South Fork CDR, downstream of Silverton and trailer park.
242	RV	Argentine Gulch
243	RV	South Fork CDR, at Galena tailing pile bridge.
244	RV	Shield Gulch before crossing under I 90
245	RV	Nuchols Gulch.
246	RV	Meyer Gulch
247	RV	South Fork CDR, halfway between SF 170 and NG 1.
248	RV	Twomile Creek.
249	RV	South Fork CDR, Osburn.
250	RV	McFarren Gulch.
251	RV	Jewel Gulch
252	RV	Terror Gulch.
253	RV	South Fork CDR, below Terror Gulch near bridge.
254	RV	South Fork CDR, 100 feet upstream of Frontage Road, below Little Terror Gulch.
255	RV	Rosebud Gulch
256	RV	Spring Gulch
257	RV	Polaris Gulch
258	RV	South Fork CDR, at roadside stop on I 90 above Big Creek
259	RV	South Fork CDR, west side of I-90 bridge above Big Creek confluence.
260	RV	Big Creek south of Frintage Road bridge.
261	RV	Prospect Gulch
262	RV	Moon Creek at mouth.
263	RV	South Fork CDR, below Big Creek under golf course.
264	RV	South Fork CDR, above confluence with Gold Run Gulch.
265	RV	Gold Run Gulch
266	RV	Montgomery Creek.
267	RV	Elk Creek
268	RV	South Fork CDR, Elizabeth Park.
269	RV	Unnamed creek, downstream of Elk Creek on north side.
270	RV	South Fork CDR, Smelterville.
271	RV	South Fork CDR, USGS Station at Enaville.
272	RV	South Fork CDR, at Galena Mine Tailings Pond bridge.
273	RV	South Fork CDR, below confluence with Canyon Creek above confluence Ninemile.
274	RV	South Fork CDR, below Daly Gulch.
275	RV	Mill Creek, 0.6 miles upstream of confluence with South Fork CDR.
316	RV	Upstream Slaughterhouse Gulch 1; above Morning No. 6
317	RV	Upstream Grouse Gulch 1:east tributary in vicinity of houses
318	RV	Upstream Grouse Gulch 2; below Star Mine

319	RV	Upstream Grouse Gulch 3:below West Star,east tributary
320	RV	Upstream Grouse Gulch 4: above West Star, east tributary
321	RV	Upstream Grouse Gulch 5; above Star Mine, west tributary
328	SP	Morning No. 6 Waste Rock Pile
338	AD	Snowstorm No. 3
339	AD	Copper King
342	AD	Atlas
345	AD	Morning No. 4
346	AD	Morning No. 5
347	AD	Star 1200 level
349	AD	Grouse
350	AD	Alice
364	SP	
382	AD	Silver Dollar
383	AD	St. Joe
384	AD	Coeur D alène (Mineral Point)
385	AD	Unnamed Location
386	AD	Princeton-Magna
389	AD	Unnamed Adit
390	AD	Reindeer Queen
392	AD	Rainbow
393	AD	Western Union (Lower Adit)
394	AD	
395	AD	Golconda
396	AD	Square Deal
398	RV	Just Below Weyer Gulch Confluence
512	RV	14 river miles downstream of Deadman Gulch bridge.
518	RV	9.5 river miles downstream Deadman Gulch bridge.
536	RV	7.5 river miles downstream of Deadman Gulch bridge.
539	RV	1.75 river miles upstream of Deadman Gulch bridge.
543	RV	12 river miles downstream of Deadman Gulch bridge.
549	RV	17 river miles downstream of Deadman Gulch bridge.
600	OF	(ID0025429/Silver Valley Resources) Caladay Portal/001A, 1/2 mi. NW of Wallace.
601	OF	(ID0025429/Silver Valley Resoures) Along facility boundary on Daly Gulch.
602	OF	(ID0000027A) Galena 001/001A, 1 mi. NW of Wallace
603	OF	(ID0000027B) Stream monitoring location SE of Osburn at Osburn Tailings Pond.
605	OF	Adit 1/3 mile SW of Morning Star Mine Dump (ID0000167A/B)
606	OF	Creek in Gold Hunter Gulch various small mines north of Lucky Friday Mine.
607	OF	(ID0000175C) Lucky Friday outfall 001/001A - Tailings Pond #1 below Mullan.
608	OF	(ID0000175B) Lucky Friday Mine Tailings Pond, 1 mile east of Mullan.
609	OF	(ID0000175A) Lucky Friday 003A- Tailings Pond #3 below Gentle Annie Creek.
610	OF	North of Lucky Friday 003A on Gentle Annie Creek near small mining claims.
611	OF	(ID0000167A) Morning Portal Raw (002)/Hecla-Star Morning 002A.
612	OF	(ID0000167B) Morning Ditch Outfall 002/Hecla Star Morning Mine.
619	OF	SF Coeur d Alene River near Shoshone Park, east of Larson.
620	OF	(ID0021300) SFCDSD Page Plant Effluent/001A-1, Smelterville.
622	OF	(ID0021300) Unknown supplemental monitoring point at Page Plant.
623	OF	(ID0020117) City of Smelterville STP @ End of Pipe/Effluent 001A-1.
624	OF	(ID0000060/ID0000159) Sunshine Mine/Consolidated Silver, effluent outall 001A.
625	OF	(ID0000060/ID0000159) Sunshine Mine/Consolidated Silver effluent outfall 002A.
626	OF	(ID0000060/ID0000159) Sunshine Mine/Consolidated Silver effluent outfall 003A.
627	OF	(ID0021296) Mullan STP Effluent/001A
630	OF	Central Impoundment Treatment Plant #6 near Bunker Hill CTP.

APPENDIX C: DESCRIPTION OF WATER QUALITY DATA

WATER QUALITY STUDIES

URSG - Nov. 1997 to Jan. 1998 (Low Flow Sampling)

Low flow sampling was conducted throughout the CDA basin principally along Canyon Creek, Nine Mile Creek, Pine Creek, and the South Fork of the Coeur d'Alene River. Approximately 120 river channel samples and 45 source discharge samples were collected. Field measurements were recorded for stream flows, source discharges (adits and seeps), and water quality parameters (pH, dissolved oxygen, and temperature). Surface water samples at these locations were analyzed for total and dissolved inorganics, including cadmium, lead, and zinc. Hardness was determined from calcium and magnesium concentrations. Descriptions were recorded for most locations to provide information on location proximity to mapped features and landmarks. Average daily flow rates at several USGS gauging stations were obtained that correspond to the date range of the sampling events. With a few exceptions, chemical concentrations, flow measurements, and hardness calculations are available for each location. A total of 12 samples did not have corresponding flow rates measured due to field conditions.

URSG - May 1998 (High Flow Sampling)

High flow sampling was conducted at many of the same locations sampled during low flow data collection. The purpose of this sampling design was to have a set of flows and chemical concentrations for both low and high flow conditions. A total of 180 river channel samples and 45 source discharge samples were collected. Approximately 50 of the channel samples were collected in the North Fork of the Coeur d'Alene River. Only one of these 50 samples corresponded to a previous location sampled during the low flow sampling phase. Otherwise, the same sampling and measurement pattern was used for this phase of work as previously described for low flow sampling. A total of 17 samples did not have flow rates to correspond to the analytical results because of high flows and other field conditions. Appendix B identifies URSG sampling locations for both the November through January and May sampling events.

MFG - Spring 1991 (High Flow Sampling)

High flow sampling was conducted at many of the same locations sampled by URSG during 1997 and 1998. Approximately 60 river channel samples and 5 source discharge samples were collected. Field measurements were recorded for stream flow and water quality parameters. Samples at these locations were analyzed for both total and dissolved inorganics, total suspended solids, and total dissolved solids. However, hardness was not determined and cannot be calculated from the analytical results reported.

MFG - Fall 1991 (Low Flow Sampling)

Low flow sampling was predominantly conducted at the same sample locations as the high flow sampling of May 1991. The sample quantities and sampling design were the same as those used for the corresponding high flow sampling phase. Similarly, hardness was not determined for this phase of work.

CH2M Hill - Oct. 1996 to Feb. 1998 (Superfund Site Groundwater & Surface Water Data)

Groundwater and surface water sampling was conducted at the Bunker Hill Superfund site surrounding Smelterville. The site covers a portion of the drainage basin of the South Fork of the Coeur d'Alene River between Kellogg and Pinehurst Narrows. One river sampling location is on Pine Creek near its confluence to the South Fork. The majority of the data is attributable to groundwater sampling across 80 monitoring well locations and eight sampling events targeting potential source areas. The remainder of the data is attributable to surface water consisting of 52 river channel samples collected primarily in locations not sampled by URSG or MFG. The surface water locations are associated with tributary streams near Government Gulch, Smelterville Flats, and Kellogg. Corresponding field measurements of surface water flow rates were recorded at only a portion of these sampling locations. Hardness was not measured nor were calcium or magnesium concentrations for calculation of hardness. Chemical analyses consisted of dissolved and total inorganics, including cadmium, lead and zinc. Supplemental descriptions were developed for all new locations to provide information on location proximity to mapped features and landmarks. Average daily flow rates at several USGS gauging stations were obtained that correspond to the date range of the sampling events.

IDEQ - Oct. 1993 to Sept. 1996 (Surface Water Quality)

Surface water sampling was conducted in the CDA basin, specifically along Canyon Creek, Nine Mile Creek, Pine Creek, and the South Fork of the Coeur d'Alene River. The sampling intervals for many locations vary considerably from biweekly to several times a year, but in general span high and low flow conditions for all locations. Approximately 940 river channel samples were collected. Field measurements of stream flow rates were recorded for approximately 85% of the river channel samples. All samples were analyzed for total and dissolved cadmium, lead and zinc. Hardness was measured for most of the samples. Average daily flow rates at several USGS gauging stations were also obtained that correspond to the date range of the sampling events.

USGS - Oct. 1998 to Sept. 1999 (Surface Water Quality)

Surface water sampling in the CDA basin at 42 sites on a monthly basis. Field measurements include flow; hardness; dissolved and total cadmium, lead, and zinc; and nutrients. Spring sampling included high flow event sampling and sampling of a discharge event along climbing and falling limb of event hydrograph.

APPENDIX D: ALLOCATION ALTERNATIVES

Allocation Alternatives

EPA has evaluated a number of allocation methods for the Coeur d'Alene (CDA) basin. The final TMDL incorporates two allocation approaches. The following are some of the approaches considered by EPA during the development of the TMDL.

Set Wasteload Allocations to Zero

By setting wasteload allocations at zero, the remainder of the loading capacity is set aside in load allocations for nonpoint sources.

Set Wasteload Allocations to Water Quality Criteria at End-of-Pipe

One way to ensure that point sources do not cause exceedances of the water quality standard for a toxic pollutant is to establish uniform wasteload allocations at the water quality criterion level.

Effluent-based Criterion

This option is a refinement of the above water quality criteria approach, applicable to the regulation of metals. The metals criteria for protection of aquatic life are based on hardness, because the toxicity of metals to aquatic life decreases as hardness increases. Thus, as a river flows downstream, its loading capacity for metals may increase due to inflows of higher hardness water, such as effluent discharges with elevated hardness. In determining whether a discharge is above the criteria, one option is to consider the effect of the effluent hardness on the loading capacity. Rather than evaluating whether a discharge exceeds the criteria for the receiving water, the effluent-based criteria (defined as the water quality criteria associated with the effluent hardness) can be calculated for each discharge to determine whether, on balance, a discharge diminishes the loading capacity of the receiving water. This method was employed for point sources along the Spokane River.

Uniform Reductions or Concentration

Another method to allocate the load among sources is to set a uniform pollutant concentration target or a uniform percent reduction for all sources. The resulting allocations will be easily developed and understood, but they may not account for variation between sources and spatial variation in loading capacity.

Available Treatment Technologies

Discharges from many sources in the CDA basin receive no wastewater treatment beyond settling ponds. Cost-effective technologies to remove metals from mining wastewaters are in widespread use in the industry, and the TMDL can consider treatment performance in setting allocations. While not specifically used to calculate allocations, EPA considered information about treatment options to evaluate the wasteload allocations in this TMDL.

For waste pile sources, Best Management Practices (BMPs) can significantly reduce metals discharges. Examples include collection/routing of runoff around metals-laden wastes, removal/backfill of a waste pile into a nearby mine or into a confined storage area, and isolation of wastes with capping material. Site-specific information is critical for developing allocations to specific sources of this kind.

This TMDL does not have the benefit of a comprehensive feasibility study for the CDA basin. Proposals for treatment of adit and impoundment wastewater can be founded upon site-specific information and understandings from relevant literature. For the waste piles and nonpoint source discharges, however, judgments on the feasibility of achieving loading reductions carry a high uncertainty because of the difficulty in quantifying source characteristics and expected reductions.

Gross Allocation and Within-Category Refinement

Because of the number of sources in the upper part of the basin, a multi-step allocation method was considered appropriate for the CDA basin. For example, a "gross allocation" was established for a general class of sources (e.g., "waste piles and nonpoint sources"). This gross allocation can then be divided into individual allocations (e.g., 3 lbs/day lead allocated to "Blue Mountain Mine Wasterock Pile 2A") using an allocation scheme tailored to that source category.

Using a Characteristic Feature

Another option for allocation to a category of sources is to find a characteristic feature of the source that directly affects its loading. The allocations can then be developed using a "use ratio" based on this characteristic feature. For example, the loading capacity of a river for dioxin can be allocated to pulp mills based on the relative production rate (tons/day of pulp) of each mill. This achieves a reasonable and equitable allocation if sources are similar and there is a direct relationship between the pollutant discharge and production rate. Another characteristic feature that can be used to develop a use ratio is effluent flow. Dividing the available capacity by the total effluent flow, a ratio (lbs/day of pollutant per unit flow) can be multiplied by each discharge flow rate to establish individual allocations. This method was used for point sources along the Coeur d'Alene River and tributaries.

Effluent Trading for Refinement of Allocations

"Effluent Trading" is an umbrella term to describe a number of new, innovative approaches to allocate pollutant loads among sources. EPA has not issued final guidance or regulations on acceptable trading mechanisms. Nevertheless, public interest in trading is high and pilot projects (many supported by EPA) are underway throughout the country. An attractive aspect of most effluent trading approaches is the opportunity provided to dischargers and communities to participate directly in developing cost-effective solutions to a water pollution problem.

APPENDIX E: DERIVATION OF AVERAGE SOURCE FLOWS

The allocations for each discrete source were determined on the basis of actual, average flow data for the discharge. To the extent practicable, data was obtained over similar time frames. Flow data were compiled from the following sources:

1. Facilities with NPDES permitted discharges are required to submit Discharge Monitoring Reports (DMRs) which usually include monthly average and maximum flows. These data are then entered into EPA's Permit Compliance System (PCS). PCS data used for the TMDL were downloaded for the period from January 1994 to June 1998. For most locations, both average and maximum flows were reported, and an average of the average monthly flows was used for the TMDL allocations. For the sewage treatment plants at Mullan and Page and the Sunshine mine, only the maximum flows were reported. The averages of the maximum values were used to calculate the allocations for these facilities.

2. McCully, Frick and Gillman, Inc. (MFG) conducted two sampling events during 1991, intended to evaluate river contaminant levels during high flow and low flow periods.

3. URSG conducted similar, but more thorough, sampling events in November 1997 and May 1998. This study included adits and seeps which were known to discharge. Many sources were sampled during only one event. Some of the sources were not included in the initial sampling plan while others were sampled only once due to inaccessibility or inability to locate the source during one of the events.

4. EPA inspection data from March 1998 that provides flow information for some of the NPDES permitted sources.

The following sections describe source flow data compiled by target site.

Canyon Creek (Above Target Site CC288)

The discharge from the Star/Phoenix Tailings Ponds (CC816), also referred to as Star/Morning and Star-Hecla tailings, is permitted as Outfall 001 under the same NPDES permit as Star/Morning (Outfall 002 above). Flow data were taken from PCS and each of the two MFG sampling events. The Woodland Park Area Seep (CC357) is an unpermitted seep from these tailings which was sampled by MFG in 1991, but no flow was recorded. URSG reported a flow in May of 1998, which was used for the allocation.

The unpermitted discharge from the Gem #3 adit (CC355) was sampled in each of the MFG events and the May 1998 URSG sampling. Because URSG found the site dry in November 1997, a value of zero flow was averaged with the other three flows for this site. One URSG and two MFG flows were averaged for the Tamarack #7 Adit (CC372).

The Hercules Mine Portal #5 (CC353) allocation was based on the average of four flows, including one zero value because the adit was dry during the November 1997 URSG sampling event.

The Hidden Treasure adit (CC354) was sampled by URSG in November 1997 and found dry in 1998. A zero value was used for the 1998 event to determine an average for the two sampling events.

The Hecla #3 discharge at Burke (CC817) was not included in either URSG or MFG studies but was sampled during EPA inspections in 1996 and 1998. Flow was only recorded during the 1998 sampling (note also that this was a visual estimate rather than a direct measurement), so that value was used for the allocation. Other adits on Canyon Creek were each sampled once by URSG and those flows were used for the allocation.

The Tiger/Poorman adit was not included in either URSG or MFG studies but was sampled by DEQ in July 2000. The single flow estimate obtained during this sampling was used for the allocations.

Ninemile Creek (Target Site NM305)

Several unpermitted discharges occur at the Interstate Callahan mine and mill site. The waste rock discharge (NM362) was sampled during both events by URSG and MFG and the flow was averaged from the four values. The tailings seep (NM363) was sampled by URSG during both sampling events, but flow during the 1997 event was reported as insignificant so the 1998 value was used for the allocation. Two flows for the adit (NM360), obtained by URSG, were averaged to obtain the value used for the allocation.

The Tamarack 400 Level (NM364) flow was reported as "insignificant" in November 1997 and measured in May 1998, so a zero value was used for the 1997 sample to determine an average for the two sampling events. Both the Success #3 (NM359) and Success Tailings (NM374) were dry in 1997 so a zero value was averaged with the May 1998 values. The remainder of the flows on Ninemile Creek were determined from URSG measurements, and were either the average of two values, or a single sample value.

South Fork (At Wallace, Target Site SF233)

There are two NPDES permitted facilities upstream from the Wallace target site on the South Fork above the Canyon Creek confluence. The Lucky Friday Mine has three outfalls. No data are available for Outfall 002 which has not recently discharged. Data for Outfall 001 (SF607) was obtained from PCS. Flow data for Outfall 003 (SF609) was taken from DMRs for January 1996 to March 1998. Handwritten entries in a logbook, apparently belonging to the mine operator, Hecla, were used for data from December 1994 through January 1995. Additional Outfall 003 flow data were obtained from IDEQ for July, 1990 and November, 1991.

Hecla holds an NPDES permit for the Star/Morning mine. The permit authorizes discharges from Outfall 001 into Canyon Creek (discussed in next section) and from Outfall 002 into the South Fork (from a waste rock pile). The source of water from the waste rock pile includes flow from the Morning No. 6 Portal. Flow data for the waste rock pile discharge (Outfall 002) was taken from PCS monthly averages and both MFG and URSG sampling events.

The Golconda and Square Deal Adits (SF395, SF396) were sampled during both URSG sampling events and the average of the two flows was used. The remaining adits in this stretch were sampled once each during the URSG sampling events, and these flow values were used for the allocations.

PCS data was used to determine the average flow for the Mullan Wastewater Treatment Plant.

Pine Creek (Target Site PC315)

All locations on Pine Creek were sampled only by URSG and are either an average of two values where available, or the actual flowrate where only one measurement was obtained.

South Fork (at Pinehurst, Target Site SF271)

The following information applies to facilities contributing metals to the South Fork between Pinehurst and Wallace.

Sunshine Precious Metals holds NPDES permits for the Sunshine mine and Consolidated Silver mine. The Sunshine mine permit includes three NPDES permitted discharges on the South Fork or its tributary, Big Creek. Sunshine is conducting a Supplemental Environmental Project, pursuant to a consent order, that includes elimination of Outfalls 002 and 003. Therefore, only Outfall 001 is allocated a load. Flow data were obtained from PCS, with two additional values from MFG, for the tailings pond discharge, Outfall 001 (SF624). Average monthly flows were only reported for two months during the period from April 1997 to June 1998.

There has been no discharge from Sunshine's Consolidated Silver mine in the last five years. However, Sunshine has indicated that the company is currently conducting further exploration of the mine for potential re-opening in the future. In keeping with the use of actual flow data for establishment of allocations, the allocation for Consolidated Silver is established based on the most recently reported average flowrate of .194 mgd (0.3 cfs) in the March 1993 NPDES permit application for this facility.

Flows for the sewage treatment plant at Page (SF622) were taken from PCS; however, two numbers were reported for each date in a single column. EPA determined that the lower flow number for each date is an influent value so only the higher number for each date was included in calculating the average flow. The PCS data for the Smelterville treatment plant (SF623) was unusable, due to inconsistency of the units reported, so flows were compiled from available

DMRs. The Central Treatment Plant (SF3) flow average was determined from the average monthly flows reported by EPA for the period from June 1996 through June 1998.

Silver Valley Resources holds NPDES permits for the Coeur/Galena (SF602) and Caladay (SF600) mines. The flow data for these dischargers were averaged from PCS. The Caladay average flow data included only one entry for the period from January 1994 to October 1997. The Coeur/Galena permit includes two outfalls (Lake Creek tailings pond {001} and Osburn tailings pond {002}). Because Outfall 002 commenced discharging in August 1998, it was necessary to use more recent flow information (PCS data from August 1998 to March 2000) to calculate the average flowrate. The average of the average monthly flows reported over this period for Outfall 002 (0.775 cfs) was used in the allocation.

The remaining allocation flows for adits in this reach were taken from URSG sample events. Where the flow was successfully measured during both events, the average value was used. A "zero" value was used in calculating average flow for Coeur d'Alene Mineral Point (SF384) since it was reported dry during one sampling event. Where only one flow was recorded, that value was used for the allocation.

APPENDIX F : METALS FLUXES FROM COEUR D'ALENE LAKE SEDIMENTS

The long-term risk of metal release from lakebed sediments was a major reason that a detailed limnological study of Coeur d'Alene Lake was conducted in the early 1990's, the results of which are described in Woods and Beckwith (1996). The justification for the study was based on the following two key issues gleaned from previous studies of the lake: 1) the lake exhibited classic symptoms of eutrophication; and 2) the lakebed sediments contained highly enriched concentrations of metals such as arsenic, cadmium, lead, and zinc. The research question posed for the study was therefore, "Has Coeur d'Alene Lake advanced far enough in the eutrophication process to have a substantial risk to develop an anoxic hypolimnion, which would increase the potential for release of nutrients and metals from the lakebed sediments into the overlying water column?"

The limnological study addressed the eutrophication issue with water-quality data collected in the lake and its watershed, as well as empirical modeling. The trophic state of the majority of the lake was determined to be oligotrophic on the basis of concentrations of nitrogen, phosphorus, and chlorophyll-*a*. Despite its oligotrophy, the deeper areas of the lake had a substantial hypolimnetic dissolved-oxygen deficit, which is symptomatic of eutrophication. A nutrient load/lake response model was used to determine the response of the hypolimnetic dissolved-oxygen deficit to incremental increases or decreases in nutrient loads to the lake. Modeling results indicated the lake has a large assimilative capacity for nutrients before anoxic conditions were likely to develop in the hypolimnion. Limnological monitoring conducted between 1995 and 1999 indicate that oligotrophic conditions have continued and that the hypolimnetic dissolved-oxygen deficit has lessened somewhat (written communication, G. Harvey, Idaho Division of Environmental Quality, January 2000).

The limnological study also addressed the lakebed metals issue via collection and analysis of about 150 surficial samples of the lakebed sediments followed by collection of 12 cores of lakebed sediments (Horowitz and others, 1993, 1995). The goal of the analytical work was to determine concentration, partitioning, and potential environmental availability of selected metals. About 85 percent of the lakebed's surface area was found to be highly elevated in antimony, arsenic, cadmium, copper, lead, mercury, silver, and zinc. The depth of elevated sediments ranged from 17 to 119 centimeters. The chemical distribution of metals throughout the lake clearly indicated that their source was the Coeur d'Alene River. Most of the metals in surficial and core samples were associated with ferric oxides and thus would be subject to redissolution under the reducing conditions that can occur within an anoxic hypolimnion. Previously, the metals in the lakebed sediments were thought to be associated with sulfides and, under reducing conditions, would remain immobile.

There is little doubt that the lakebed sediments in Coeur d'Alene Lake have elevated levels of metals and that the source of those metals is the long-term mining and ore-processing activities within the Coeur d'Alene River Basin. The presence or absence of an oxidized microzone in the lakebed sediments and its effect on metal flux has been critically discussed in the expert reports from Falter (1999), Maest (1999), and Pederson/Carmack (1999). Observations by Horowitz and others (1993) during collection of surficial samples of lakebed sediments from Coeur d'Alene Lake noted that many of the samples had a thin (few millimeters) veneer of fine-grained reddish material overlying an oxidized layer between 1 and 5 centimeters thick. Maest (1999) reviewed core-derived, pore-fluid concentration data for iron, manganese, and sulfate, as reported by Balistrieri (1998), and concluded the profiles showed classic patterns for a transition from oxygenated conditions near the sediment-water interface through suboxic and anoxic conditions deeper in the sediment profile. The presence of an oxidized microzone highly enriched in metals, an oxic hypolimnion, and the metal-rich veneer at the lakebed surface all indicate remobilization of metals within the upper sediment column accompanied by some unquantified degree of sequestration at the sediment- water interface.

The first estimates of the flux of metals from the lakebed sediments of Coeur d'Alene Lake were made by Balistrieri (1998) using porewater data collected in 1992 as part of the limnological study. On the basis of porewater extracted from sectioned and centrifuged cores and diffusion-controlled samplers. Balistrieri concluded the lakebed sediments were a source of dissolved zinc, copper, manganese, and, possibly, lead. However, Balistrieri noted uncertainties in the original data and recommended additional research to verify the direction and magnitude of fluxes.

Ongoing litigation (U.S. v. ASARCO) over the link between mining industry practices and the presence of highly elevated levels of metals in Coeur d'Alene Lake have brought close scrutiny of the limnological study in expert reports from the plaintiffs (Falter, 1999; Maest, 1999) and defendents (Pederson and Carmack, 1999). A central issue is whether the metals in the lakebed sediments are associated with ferric oxides or sulfides because that association bears directly on the direction and magnitude of potential benthic fluxes of metals in the presence of an anoxic hypolimnion. A litigated resolution of the metal-association issue may be in the future; however, current information can be synthesized to answer the question about the long-term risk of metal release from lakebed sediments.

Water-quality data collected in the 1990's indicate that the lake may receive a flux of metals from its lakebed sediments. The early-1990's limnological study revealed a definite elevation of whole-water recoverable concentrations of lead and zinc in the lower hypolimnion in comparison to epilimnetic concentrations. Dissolved metals data collected in the summer of 1999 indicated that cadmium, lead, and zinc concentrations in the lower hypolimnion were from between 1.5 and 3 times higher than those measured in the epilimnion (written communication, P. Woods, U.S. Geological Survey, January 2000). Three processes, separately or in combination, could explain these concentration differences. In the first, the inflow plume of the Coeur d'Alene River and its associated metal load enters the lake as an interflow or underflow current into the lake's hypolimnion on a seasonal basis (e.g., underflow tends to occur from October through December because the river cools faster than the lake). Secondly, metals taken up by phytoplanktonic production in the epilimnion may settle into the hypolimnion upon the demise of those phytoplankton. The third process is remobilization of metals within the lakebed sediments and subsequent release into the overlying hypolimnion.

In the near future (Summer 2000), an improvement in the understanding of the role of remobilization and benthic flux will be available from a study conducted by the U.S. Geological Survey. This study employed two independent research methods to measure benthic flux in Coeur d'Alene Lake during August 1999. A benthic flux chamber (also called a "lander") was placed on the lakebed to measure numerous variables associated with the geochemical interaction of the lakebed sediments and overlying water column. Concurrently, a series of lakebed sediment cores and overlying hypolimnetic water samples were collected with specialized sampling equipment. The cores were incubated using dissolved-oxygen concentrations from saturated to anoxic in order to measure the metal flux between lakebed sediments and the overlying water column over a gradient of redox conditions.

Preliminary results from the August 1999 study indicate that the potential magnitude of metals fluxes into and out of lake sediments is significant in relation to the metals loadings from the Couer d'Alene River (Kuwabara, personal communication). The lander and core sample results both indicate that dissolved lead fluxes are occurring from the sediments to the overlying water column. The two methods, however, provided conflicting results with respect to the direction of dissolved cadmium and zinc fluxes (lander indicates a positive flux, cores indicate a negative flux). Analyses of water overlying the cores under anoxic conditions indicated smaller fluxes of lead and a negative flux of both cadmium and zinc. This suggests that large fluxes would not occur if the lake became anoxic at depth over the long term due to eutrophication. Questions remain about the representativeness of the core sampling techniques, seasonal variability of fluxes and potential changes to fluxes resulting from future cleanup actions along the Coeur d'Alene River.

A review of water quality data collected by USGS upstream and downstream of the lake indicates that, despite the positive fluxes from the sediments, the lake as a whole acts as a sink for dissolved metals inputs from the Coeur d'Alene River. Dissolved metals loads exiting the lake for lead at the Post Falls dam are significantly lower than the loadings entering the lake from the Coeur d'Alene River; cadmium and zinc loads appear lower at the Post Falls dam as well, but to a lesser degree (Woods, personal communication). This data suggests that fluxes from the sediments measured in the lander study may be smaller in magnitude than dissolved metals reductions due to planktonic uptake, chemical interactions, or other processes occurring in the lake.

In conclusion, available data indicate that the chemical, physical, and biological processes affecting dissolved metals concentrations in the lake currently result in a net reduction in the metals loads introduced by the Coeur d'Alene River. EPA also believes the long-term risk for a substantial release of metals from lakebed sediments is low because (1) Coeur d'Alene Lake's large assimilative capacity for nutrients makes it very unlikely that an anoxic hypolimnion will develop, and (2) core samples did not release larger metals loads under anoxic conditions (in fact, cadmium and zinc fluxes were negative in the tests). The lake's susceptibility to eutrophication, a prerequisite for an anoxic hypolimnion, can be managed if nutrient loads to the lake are not allowed to increase appreciably.

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APPENDIX G : FATE AND TRANSPORT OF SURFACE WATER METALS

One of the fundamental assessment questions for the Coeur d'Alene River Basin TMDL is the following: Are there chemical, physical, and/or biological mechanisms occuring in the river that consistently remove dissolved metals from the water column? EPA notes that the fate of particulate metals (metals attached to particles) is not the subject of this TMDL, which is focused on achieving Idaho water quality standards for dissolved metals in the water column.

While biological uptake processes may be important in the lake environment (see discussion of potential planktonic uptake in Appendix F), biological processes are not expected to significantly alter or remove dissolved metals in the upstream riverine environment.

Conversely, chemical/physical processes such as adsorption and precipitation can potentially remove dissolved metals from the water column. These processes involve complex and dynamic interactions between metal species in the presence of other waterbody consituents. Since the water quality criteria are not established for specific metal complexes (e.g., cadmium sulfate) but rather for the sum of metal ions (e.g., dissolved cadmium), which can be directly measured, it is not important to evaluate physical/chemical processes that may occur in the water column or sediments for the TMDL. However, it is important to determine the amount of total metal and dissolved metal to calculate translators. Fortunately, for the Coeur d'Alene River and tributaries, there is a sufficient body of paired river samples (dissolved vs. particulate metal) to directly calculate the translators.

EPA has evaluated the ratio of particulate (total recoverable) metal to dissolved metal in the Coeur d'Alene River and tributaries. This ratio is also called a "translator" in the NPDES program. Cadmium and zinc in the river are almost entirely in the dissolved form at all of the target sites (i.e., the translator is approximately 1). For lead, the particulate fraction is a significant portion of the total lead concentration at a number of target sites. This is consistent with preliminary analyses from the RI/FS indicating that lead can be expected to adsorb and/or co-precipitate with iron in basin waters. The particulate lead fraction increases in the downstream direction from the South Fork headwaters to the Spokane River.

EPA also reviewed the available data for the South Fork Pinehurst station to determine whether the total-to-dissolved ratio varies with respect to river flow. Over the range of flow tiers established in the TMDL (68 cfs to 1290 cfs), there was no discernible relationship between river flow and the total-to-dissolved ratios for cadmium, lead, and zinc.

Recent data collected by the USGS indicates that during peak runoff events, the total-to-dissolved ratio for lead increases significantly in basin waters. The flows at which this phenomenon occurs are higher than the top flow tier in the TMDL (greater than 1290 cfs). Since the total-to-dissolved ratio at the top flow tier is more stringent than the actual ratio during peak runoff events, the lead translators in the TMDL provide a margin of safety during peak runoff events.

In conclusion, the available paired samples indicate that dissolved cadmium and zinc are not appreciably removed from the water column in Coeur d'Alene Basin waters, while dissolved lead is removed to some extent to the particulate form between the headwaters and lower basin. This transformation of dissolved lead toward particulate lead is captured in the translator applied to the wasteload allocations in the TMDL.

APPENDIX H : TMDL CALCULATION SPREADSHEETS

South Fork Coeur d'Alene River Basin
TMDL Allocations
Cadmium (Cd)

North Fork Coeur d'Alene River @ Enaville
URS Greiner Station ID 400

	Discharge cfs	Loading Capacity (lbs/day)	Cadmium Background (lbs/day)
7Q10L	165	3.28E-01	7.115E-02
10th Percentile	253	5.04E-01	1.092E-01
50th Percentile	845	1.68E+00	3.646E-01
90th Percentile	5,090	1.01E+01	2.196E+00

South Fork Coeur d'Alene River Basin
TMDL Allocations
Cadmium (Cd)

South Fork Coeur d'Alene River @ Pinhurst
URS Greiner Station ID 271

	Discharge cfs	Loading Capacity (lbs/day)	Cadmium Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	68	3 81E-01	2 934E-02	7.14E-02	2.80E-01	2 80E-02	1.82E-01	7.00E-02	1.82E-01	7.00E-02
10th Percentile	97	5 23E-01	4.185E-02	1.09E-01	3 73E-01	3.73E-02	2.42E-01	9.31E-02	2.42E-01	9.31E-02
50th Percentile	268	1 16E+00	1.156E-01	2.48E-01	7.94E-01	7.94E-02	5.16E-01	1.98E-01	5.16E-01	1.98E-01
90th Percentile	1290	2.80E+00	5.566E-01	1 00E+00	1.24E+00	1 24E-01	8.03E-01	3.09E-01	8.03E-01	3.09E-01

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)
SF382 Silver Dollar	0.015	0.001	7.00E-05	1.00E+00	7.00E-05
SF393 Western Union (Lower Adit)	0.001	0.0001	4 67E-06	1.00E+00	4.67E-06
SF3 CTP	4.990	0.332	2 33E-02	1.00E+00	2 33E-02
SF620 Page STP	3.870	0 258	1.81E-02	1.00E+00	1.81E-02
SF383 St. Joe	0.007	0.0005	3.27E-05	1.00E+00	3.27E-05
SF384 Coeur d'alene (Mineral Point)	0.005	0.0003	2.33E-05	1.00E+00	2 33E-05
SF385 Unnamed Location (adit)	0.001	0 00005	3 27E-06	1.00E+00	3.27E-06
SF600 Caladay	0 210	0.014	9 80E-04	1.00E+00	9 80E-04
SF602 Silver Valley Galena	1 300	0.087	6 06E-03	1.00E+00	6.06E-03
SF623 Smelterville STP	0.421	0.028	1 96E-03	1.00E+00	1 96E-03
SF624 Sunshine 001,SUN-1	3 120	0.208	1 46E-02	1.00E+00	1.46E-02
Silver Valley (Coeur)	0.775	0.052	3 62E-03	1.00E+00	3.62E-03
Consolidated Silver	0 300	0.020	1.40E-03	1.00E+00	1.40E-03
Total Effluent Flow	**15.014818**			**Total Loading**	**7.00E-02**

Station ID	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)
SF382 Silver Dollar	9.30E-05	1.00E+00	9.30E-05
SF393 Western Union (Lower Adit)	6.20E-06	1.00E+00	6.20E-06
SF3 CTP	3.10E-02	1.00E+00	3.10E-02
SF620 Page STP	2.40E-02	1.00E+00	2.40E-02
SF383 St. Joe	4.34E-05	1.00E+00	4.34E-05
SF384 Coeur d'alene (Mineral Point)	3.10E-05	1.00E+00	3.10E-05
SF385 Unnamed Location (adit)	4.34E-06	1.00E+00	4.34E-06
SF600 Caladay	1.30E-03	1.00E+00	1.30E-03
SF602 Silver Valley Galena	8.06E-03	1.00E+00	8.06E-03
SF623 Smelterville STP	2.61E-03	1.00E+00	2 61E-03
SF624 Sunshine 001,SUN-1	1.94E-02	1.00E+00	1.94E-02
Silver Valley (Coeur)	4.81E-03	1.00E+00	4.81E-03
Consolidated Silver	1.86E-03	1.00E+00	1.86E-03
		Total Loading	**9.31E-02**

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)
SF382 Silver Dollar	1.98E-04	1.00E+00	1.98E-04
SF393 Western Union (Lower Adit)	1.32E-05	1.00E+00	1.32E-05
SF3 CTP	6.59E-02	1.00E+00	6.59E-02
SF620 Page STP	5.11E-02	1.00E+00	5.11E-02
SF383 St. Joe	9.25E-05	1.00E+00	9.25E-05
SF384 Coeur d'alene (Mineral Point)	6.61E-05	1.00E+00	6.61E-05
SF385 Unnamed Location (adit)	9.25E-06	1.00E+00	9.25E-06
SF600 Caladay	2 77E-03	1 00E+00	2.77E-03
SF602 Silver Valley Galena	1.72E-02	1.00E+00	1.72E-02
SF623 Smelterville STP	5.56E-03	1.00E+00	5.56E-03
SF624 Sunshine 001,SUN-1	4.12E-02	1.00E+00	4.12E-02
Silver Valley (Coeur)	1.02E-02	1.00E+00	1.02E-02
Consolidated Silver	3.97E-03	1.00E+00	3.97E-03
		Total Loading	**1.98E-01**

Station ID	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
SF382 Silver Dollar	3 09E-04	1.00E+00	3 09E-04
SF393 Western Union (Lower Adit)	2.06E-05	1.00E+00	2.06E-05
SF3 CTP	1.03E-01	1.00E+00	1 03E-01
SF620 Page STP	7.97E-02	1.00E+00	7 97E-02
SF383 St. Joe	1 44E-04	1.00E+00	1 44E-04
SF384 Coeur d'alene (Mineral Point)	1 03E-04	1 00E+00	1 03E-04
SF385 Unnamed Location (adit)	1.44E-05	1 00E+00	1 44E-05
SF600 Caladay	4.32E-03	1.00E+00	4 32E-03
SF602 Silver Valley Galena	2.68E-02	1 00E+00	2 68E-02
SF623 Smelterville STP	8.66E-03	1 00E+00	8 66E-03
SF624 Sunshine 001,SUN-1	6.42E-02	1 00E+00	6 42E-02
Silver Valley (Coeur)	1.60E-02	1 00E+00	1 60E-02
Consolidated Silver	6.18E-03	1.00E+00	6.18E-03
		Total Loading	**3.09E-01**

South Fork Coeur d'Alene River Basin
TMDL Allocations
Cadmium (CD)

South Fork Coeur d'Alene River at Wallace
URS Greiner Station ID 233

	Discharge cfs	Loading Capacity (lbs/day)	Cadmium Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	22	8.11E-02	7.15E-03	3.16E-02	4.24E-02	4.24E-03	2.75E-02	1.06E-02	2.75E-02	1.06E-02
10^{th} Percentile	35	1.27E-01	1.13E-02	4.85E-02	6.69E-02	6.69E-03	4.35E-02	1.67E-02	4.35E-02	1.67E-02
50^{th} Percentile	79	2.51E-01	2.55E-02	9.39E-02	1.31E-01	1.31E-02	8.55E-02	3.29E-02	8.55E-02	3.29E-02
90^{th} Percentile	469	9.34E-01	1.52E-01	3.42E-01	4.40E-01	4.40E-02	2.86E-01	1.10E-01	2.86E-01	1.10E-01

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)
SF 607 Lucky Friday 001	1.27	0.143	1.52E-03	1.00E+00	1.52E-03
SF609 Lucky Friday 003	0.85	0.096	1.02E-03	1.00E+00	1.02E-03
SF328, (Morn waste rock)	1.59	0.180	1.90E-03	1.00E+00	1.90E-03
SF 396 Square Deal	0.08	0.009	9.57E-05	1.00E+00	9.57E-05
SF395, Golconda	0.03	0.003	3.59E-05	1.00E+00	3.59E-05
SF627 STP Mullan	0.413	0.047	4.94E-04	1.00E+00	4.94E-04
SF338 Snowstorm #3	2.00	0.226	2.39E-03	1.00E+00	2.39E-03
SF339 Copper King	0.0564	0.006	6.75E-05	1.00E+00	6.75E-05
SF345 Morning #4	0.0152	0.002	1.82E-05	1.00E+00	1.82E-05
SF346 Morning No 5	0.0111	0.001	1.33E-05	1.00E+00	1.33E-05
SF347 Star 1200 Level	0.695	0.079	8.31E-04	1.00E+00	8.31E-04
SF349 Grouse	1.82	0.206	2.18E-03	1.00E+00	2.18E-03
SF386 Princeton-Magma	0.0003	0.00003	3.59E-07	1.00E+00	3.59E-07
SF389 Unnamed Adit	0.011	0.001	1.32E-05	1.00E+00	1.32E-05
SF390 Reindeer Queen	0.011	0.001	1.32E-05	1.00E+00	1.32E-05
Total Effluent Flow	8.853			Total Loading	1.06E-02

Station ID	10^{th} Percentile: Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)
SF 607 Lucky Friday 001	2.40E-03	1.00E+00	2.40E-03
SF609 Lucky Friday 003	1.61E-03	1.00E+00	1.61E-03
SF328, (Morn waste rock)	3.00E-03	1.00E+00	3.00E-03
SF 396 Square Deal	1.51E-04	1.00E+00	1.51E-04
SF395, Golconda	5.67E-05	1.00E+00	5.67E-05
SF627 STP Mullan	7.80E-04	1.00E+00	7.80E-04
SF338 Snowstorm #3	3.78E-03	1.00E+00	3.78E-03
SF339 Copper King	1.07E-04	1.00E+00	1.07E-04
SF345 Morning #4	2.87E-05	1.00E+00	2.87E-05
SF346 Morning No 5	2.10E-05	1.00E+00	2.10E-05
SF347 Star 1200 Level	1.31E-03	1.00E+00	1.31E-03
SF349 Grouse	3.44E-03	1.00E+00	3.44E-03
SF386 Princeton-Magma	5.67E-07	1.00E+00	5.67E-07
SF389 Unnamed Adit	2.08E-05	1.00E+00	2.08E-05
SF390 Reindeer Queen	2.08E-05	1.00E+00	2.08E-05
		Total Loading	1.67E-02

Station ID	50^{th} Percentile: Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)
SF 607 Lucky Friday 001	4.72E-03	1.00E+00	4.72E-03
SF609 Lucky Friday 003	3.16E-03	1.00E+00	3.16E-03
SF328, (Morn waste rock)	5.90E-03	1.00E+00	5.90E-03
SF 396 Square Deal	2.97E-04	1.00E+00	2.97E-04
SF395, Golconda	1.11E-04	1.00E+00	1.11E-04
SF627 STP Mullan	1.53E-03	1.00E+00	1.53E-03
SF338 Snowstorm #3	7.43E-03	1.00E+00	7.43E-03
SF339 Copper King	2.09E-04	1.00E+00	2.09E-04
SF345 Morning #4	5.64E-05	1.00E+00	5.64E-05
SF346 Morning No 5	4.12E-05	1.00E+00	4.12E-05
SF347 Star 1200 Level	2.58E-03	1.00E+00	2.58E-03
SF349 Grouse	6.76E-03	1.00E+00	6.76E-03
SF386 Princeton-Magma	1.11E-06	1.00E+00	1.11E-06
SF389 Unnamed Adit	4.08E-05	1.00E+00	4.08E-05
SF390 Reindeer Queen	4.08E-05	1.00E+00	4.08E-05
		Total Loading	3.29E-02

Station ID	90^{th} Percentile: Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)
SF 607 Lucky Friday 001	1.58E-02	1.00E+00	1.58E-02
SF609 Lucky Friday 003	1.06E-02	1.00E+00	1.06E-02
SF328, (Morn waste rock)	1.98E-02	1.00E+00	1.98E-02
SF 396 Square Deal	9.94E-04	1.00E+00	9.94E-04
SF395, Golconda	3.73E-04	1.00E+00	3.73E-04
SF627 STP Mullan	5.13E-03	1.00E+00	5.13E-03
SF338 Snowstorm #3	2.49E-02	1.00E+00	2.49E-02
SF339 Copper King	7.01E-04	1.00E+00	7.01E-04
SF345 Morning #4	1.89E-04	1.00E+00	1.89E-04
SF346 Morning No 5	1.38E-04	1.00E+00	1.38E-04
SF347 Star 1200 Level	8.64E-03	1.00E+00	8.64E-03
SF349 Grouse	2.26E-02	1.00E+00	2.26E-02
SF386 Princeton-Magma	3.73E-06	1.00E+00	3.73E-06
SF389 Unnamed Adit	1.37E-04	1.00E+00	1.37E-04
SF390 Reindeer Queen	1.37E-04	1.00E+00	1.37E-04
		Total Loading	1.10E-01

South Fork Coeur d'Alene River Basin
TMDL Allocations
Cadmium (Cd)

Pine Creek
URS Greiner Station ID 315

	Discharge cfs	Loading Capacity (lbs/day)	Cadmium Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	20	3.98E-02	1.079E-02	0.00E+00	2.91E-02	2.91E-03	1.89E-02	7.26E-03	1.89E-02	7.26E-03
10th Percentile	29	5.78E-02	1.564E-02	0.00E+00	4.21E-02	4.21E-03	2.74E-02	1.05E-02	2.74E-02	1.05E-02
50th Percentile	80	1.59E-01	4.315E-02	0.00E+00	1.16E-01	1.16E-02	7.55E-02	2.91E-02	7.55E-02	2.91E-02
90th Percentile	387	7.71E-01	2.087E-01	0.00E+00	5.62E-01	5.62E-02	3.65E-01	1.41E-01	3.65E-01	1.41E-01

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)
PC329 North Amy	0.322	0.479	3.48E-03	1.00E+00	3.48E-03
PC330 Amy	0.005	0.007	5.40E-05	1.00E+00	5.40E-05
PC331 Liberal King	0.005	0.007	5.40E-05	1.00E+00	5.40E-05
PC332 Lookout	0.027	0.040	2.92E-04	1.00E+00	2.92E-04
PC333 Upper Lynch	0.001	0.001	1.08E-05	1.00E+00	1.08E-05
PC334 Lynch/Nabob	0.0006	0.001	6.48E-06	1.00E+00	6.48E-06
PC335 Nevada-Stewart	0.091	0.135	9.83E-04	1.00E+00	9.83E-04
PC336 Highland Surprise	0.038	0.057	4.10E-04	1.00E+00	4.10E-04
PC375 Highland Surp. Waste Rock	0.011	0.016	1.15E-04	1.00E+00	1.15E-04
PC337 Sidney (Red Cloud)	0.006	0.009	6.48E-05	1.00E+00	6.48E-05
PC340 Upper Little Pittsburg	0.002	0.003	2.16E-05	1.00E+00	2.16E-05
PC341 Lower Little Pittsburg	0.006	0.009	6.48E-05	1.00E+00	6.48E-05
PC343 Nabob 1300 Level	0.066	0.098	7.13E-04	1.00E+00	7.13E-04
PC344 Big It	0.001	0.002	1.15E-05	1.00E+00	1.15E-05
PC348 Upper Constitution	0.079	0.117	8.53E-04	1.00E+00	8.53E-04
PC351 Marmion Tunnel	0.009	0.013	9.61E-05	1.00E+00	9.61E-05
PC352 Seep Below Nevada Stewart	0.003	0.004	3.02E-05	1.00E+00	3.02E-05
PC 400 Adit Upstream of Little Pittsburg	0.0004	0.001	4.56E-06	1.00E+00	4.56E-06
Total Effluent Flow	0.672382		**Total Loading**		7.26E-03

Station ID	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
PC329 North Amy	5.04E-03	1.00E+00	5.04E-03	1.39E-02	1.00E+00	1.39E-02	6.73E-02	1.00E+00	6.73E-02
PC330 Amy	7.83E-05	1.00E+00	7.83E-05	2.16E-04	1.00E+00	2.16E-04	1.05E-03	1.00E+00	1.05E-03
PC331 Liberal King	7.83E-05	1.00E+00	7.83E-05	2.16E-04	1.00E+00	2.16E-04	1.05E-03	1.00E+00	1.05E-03
PC332 Lookout	4.23E-04	1.00E+00	4.23E-04	1.17E-03	1.00E+00	1.17E-03	5.64E-03	1.00E+00	5.64E-03
PC333 Upper Lynch	1.57E-05	1.00E+00	1.57E-05	4.32E-05	1.00E+00	4.32E-05	2.09E-04	1.00E+00	2.09E-04
PC334 Lynch/Nabob	9.40E-06	1.00E+00	9.40E-06	2.59E-05	1.00E+00	2.59E-05	1.25E-04	1.00E+00	1.25E-04
PC335 Nevada-Stewart	1.43E-03	1.00E+00	1.43E-03	3.93E-03	1.00E+00	3.93E-03	1.90E-02	1.00E+00	1.90E-02
PC336 Highland Surprise	5.95E-04	1.00E+00	5.95E-04	1.64E-03	1.00E+00	1.64E-03	7.94E-03	1.00E+00	7.94E-03
PC375 Highland Surp. Waste Rock	1.66E-04	1.00E+00	1.66E-04	4.58E-04	1.00E+00	4.58E-04	2.22E-03	1.00E+00	2.22E-03
PC337 Sidney (Red Cloud)	9.40E-05	1.00E+00	9.40E-05	2.59E-04	1.00E+00	2.59E-04	1.25E-03	1.00E+00	1.25E-03
PC340 Upper Little Pittsburg	3.13E-05	1.00E+00	3.13E-05	8.64E-05	1.00E+00	8.64E-05	4.18E-04	1.00E+00	4.18E-04
PC341 Lower Little Pittsburg	9.40E-05	1.00E+00	9.40E-05	2.59E-04	1.00E+00	2.59E-04	1.25E-03	1.00E+00	1.25E-03
PC343 Nabob 1300 Level	1.03E-03	1.00E+00	1.03E-03	2.85E-03	1.00E+00	2.85E-03	1.38E-02	1.00E+00	1.38E-02
PC344 Big It	1.66E-05	1.00E+00	1.66E-05	4.58E-05	1.00E+00	4.58E-05	2.22E-04	1.00E+00	2.22E-04
PC348 Upper Constitution	1.24E-03	1.00E+00	1.24E-03	3.41E-03	1.00E+00	3.41E-03	1.65E-02	1.00E+00	1.65E-02
PC351 Marmion Tunnel	1.39E-04	1.00E+00	1.39E-04	3.85E-04	1.00E+00	3.85E-04	1.86E-03	1.00E+00	1.86E-03
PC352 Seep Below Nevada Stewart	4.39E-05	1.00E+00	4.39E-05	1.21E-04	1.00E+00	1.21E-04	5.85E-04	1.00E+00	5.85E-04
PC 400 Adit Upstream of Little Pittsburg	6.61E-06	1.00E+00	6.61E-06	1.82E-05	1.00E+00	1.82E-05	8.82E-05	1.00E+00	8.82E-05
	Total Loading		1.05E-02	**Total Loading**		2.91E-02	**Total Loading**		1.41E-01

South Fork Coeur d'Alene River Basin
TMDL Allocations
Cadmium (Cd)

Canyon Creek
URS Greiner Station ID 288

	Discharge cfs	Loading Capacity (lbs/day)	Cadmium Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading 100% (lbs/day)	Safety 10% (lbs/day)	Non-Discrete 65% (lbs/day)	Discrete 25% (lbs/day)	Final Loading Non-Discrete (lbs/day)	Discrete (lbs/day)
7Q10L	7 1	2.57E-02	2.30E-03	0.00E+00	2.34E-02	2.34E-03	1.52E-02	5.85E-03	1.52E-02	5.85E-03
10th Percentile	11	3.98E-02	3.56E-03	0.00E+00	3.63E-02	3.63E-03	2.36E-02	9.07E-03	2.36E-02	9.07E-03
50th Percentile	25	7.70E-02	8.09E-03	0.00E+00	6.89E-02	6.89E-03	4.48E-02	1.72E-02	4.48E-02	1.72E-02
90th Percentile	149	2.97E-01	4.82E-02	0.00E+00	2.49E-01	2.49E-02	1.62E-01	6.21E-02	1.62E-01	6.21E-02

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)		10th Percentile Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)	
CC817 Hecla #3	0.068	0.008	4.85E-05	1.00E+00	4.85E-05		7.51E-05	1.00E+00	7.51E-05	
CC355, GEM	0.260	0 031	1.84E-04	1.00E+00	1.84E-04		2.85E-04	1.00E+00	2.85E-04	
CC816 (Star/Phx Tailings)	2.340	0 283	1.66E-03	1.00E+00	1.66E-03		2.57E-03	1.00E+00	2.57E-03	
CC357 (WP Seep)	0 004	0.000	2 69E-06	1.00E+00	2.69E-06		4.17E-06	1.00E+00	4 17E-06	
CC372 Tam#7	1 590	0.192	1.13E-03	1.00E+00	1.13E-03		1.75E-03	1.00E+00	1.75E-03	
CC353 Hercules #5	1.707	0.207	1 21E-03	1.00E+00	1.21E-03		1.87E-03	1.00E+00	1.87E-03	
CC371 Blackbear Fraction	1 165	0 141	8 25E-04	1.00E+00	8.25E-04		1.28E-03	1.00E+00	1.28E-03	
CC373 Anchor	0.008	0 001	5.67E-06	1.00E+00	5.67E-06		8.78E-06	1.00E+00	8.78E-06	
CC354 Hidden Treasure	0 720	0 087	5.10E-04	1.00E+00	5.10E-04		7.90E-04	1.00E+00	7.90E-04	
Tiger/Poorman	0.400	0.048	2.83E-04	1.00E+00	2.83E-04		4.39E-04	1.00E+00	4.39E-04	
Total Effluent Flow	8 2622			Total Loading	5.85E-03			Total Loading	9.07E-03	

Station ID	50th Percentile Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)		90th Percentile Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)	
CC817 Hecla #3	1.43E-04	1.00E+00	1.43E-04		5.14E-04	1.00E+00	5 14E-04	
CC355, GEM	5.42E-04	1.00E+00	5.42E-04		1 96E-03	1.00E+00	1.96E-03	
CC816 (Star/Phx Tailings)	4.88E-03	1.00E+00	4.88E-03		1.76E-02	1 00E+00	1 76E-02	
CC357 (WP Seep)	7 92E-06	1.00E+00	7.92E-06		2.86E-05	1 00E+00	2 86E-05	
CC372 Tam#7	3.32E-03	1.00E+00	3.32E-03		1.20E-02	1 00E+00	1 20E-02	
CC353 Hercules #5	3.56E-03	1.00E+00	3.56E-03		1.28E-02	1 00E+00	1 28E-02	
CC371 Blackbear Fraction	2.43E-03	1.00E+00	2.43E-03		8.76E-03	1 00E+00	8 76E-03	
CC373 Anchor	1.67E-05	1.00E+00	1 67E-05		6.02E-05	1 00E+00	6 02E-05	
CC354 Hidden Treasure	1.50E-03	1.00E+00	1.50E-03		5.42E-03	1.00E+00	5.42E-03	
Tiger/Poorman	8.34E-04	1.00E+00	8.34E-04		3.01E-03	1 00E+00	3 01E-03	
		Total Loading	1.72E-02			Total Loading	6.21E-02	

South Fork Coeur d'Alene River Basin
TMDL Allocations
Cadmium (Cd)

Ninemile Creek
URS Greiner Station ID 305

	Discharge cfs	Loading Capacity (lbs/day)	Cadmium Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	2	8.81E-03	6.472E-04	0.00E+00	8.17E-03	8.17E-04	5.31E-03	2.04E-03	5.31E-03	2.04E-03
10th Percentile	3	1.32E-02	9.709E-04	0.00E+00	1.22E-02	1.22E-03	7.96E-03	3.06E-03	7.96E-03	3.06E-03
50th Percentile	6.9	2.73E-02	2.233E-03	0.00E+00	2.50E-02	2.50E-03	1.63E-02	6.26E-03	1.63E-02	6.26E-03
90th Percentile	41	1.07E-01	1.327E-02	0.00E+00	9.38E-02	9.38E-03	6.09E-02	2.34E-02	6.09E-02	2.34E-02

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)
NM360 IC #4	0.040	0.020	4.11E-05	1.00E+00	4.11E-05	6.17E-05	1.00E+00	6.17E-05
NM362 IC Waste Rock	1.790	0.902	1.84E-03	1.00E+00	1.84E-03	2.76E-03	1.00E+00	2.76E-03
NM363 IC Tailings Seep	0.004	0.002	4.11E-06	1.00E+00	4.11E-06	6.17E-06	1.00E+00	6.17E-06
NM361 Rex #2	0.020	0.010	2.06E-05	1.00E+00	2.06E-05	3.09E-05	1.00E+00	3.09E-05
NM364 Tamarack 400 Level	0.040	0.020	4.11E-05	1.00E+00	4.11E-05	6.17E-05	1.00E+00	6.17E-05
NM366 Tamarack #5	0.030	0.015	3.09E-05	1.00E+00	3.09E-05	4.63E-05	1.00E+00	4.63E-05
NM368 Rex Tailings	0.020	0.010	2.06E-05	1.00E+00	2.06E-05	3.09E-05	1.00E+00	3.09E-05
NM359 Success #3	0.010	0.005	1.03E-05	1.00E+00	1.03E-05	1.54E-05	1.00E+00	1.54E-05
NM367 Day Rock 100	0.007	0.003	6.99E-06	1.00E+00	6.99E-06	1.05E-05	1.00E+00	1.05E-05
NM369 Duluth	0.0096	0.005	9.87E-06	1.00E+00	9.87E-06	1.48E-05	1.00E+00	1.48E-05
NM370 Silverstar	0.011	0.006	1.13E-05	1.00E+00	1.13E-05	1.70E-05	1.00E+00	1.70E-05
NM374 Success Tailings	0.003	0.002	3.50E-06	1.00E+00	3.50E-06	5.25E-06	1.00E+00	5.25E-06
Total Effluent Flow	1.9848			Total Loading	2.04E-03		Total Loading	3.06E-03

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
NM360 IC #4	1.26E-04	1.00E+00	1.26E-04	4.72E-04	1.00E+00	4.72E-04
NM362 IC Waste Rock	5.64E-03	1.00E+00	5.64E-03	2.11E-02	1.00E+00	2.11E-02
NM363 IC Tailings Seep	1.26E-05	1.00E+00	1.26E-05	4.72E-05	1.00E+00	4.72E-05
NM361 Rex #2	6.31E-05	1.00E+00	6.31E-05	2.36E-04	1.00E+00	2.36E-04
NM364 Tamarack 400 Level	1.26E-04	1.00E+00	1.26E-04	4.72E-04	1.00E+00	4.72E-04
NM366 Tamarack #5	9.46E-05	1.00E+00	9.46E-05	3.54E-04	1.00E+00	3.54E-04
NM368 Rex Tailings	6.31E-05	1.00E+00	6.31E-05	2.36E-04	1.00E+00	2.36E-04
NM359 Success #3	3.15E-05	1.00E+00	3.15E-05	1.18E-04	1.00E+00	1.18E-04
NM367 Day Rock 100	2.14E-05	1.00E+00	2.14E-05	8.03E-05	1.00E+00	8.03E-05
NM369 Duluth	3.03E-05	1.00E+00	3.03E-05	1.13E-04	1.00E+00	1.13E-04
NM370 Silverstar	3.47E-05	1.00E+00	3.47E-05	1.30E-04	1.00E+00	1.30E-04
NM374 Success Tailings	1.07E-05	1.00E+00	1.07E-05	4.02E-05	1.00E+00	4.02E-05
		Total Loading	6.26E-03		Total Loading	2.34E-02

South Fork Coeur d'Alene River Basin
TMDL Allocations
Cadmium (Cd)

Coeur d'Alene River @ Harrison

	Discharge cfs	Loading Capacity (lbs/day)	Cadmium Background (lbs/day)	Used Capacity[1] (lbs/day)	Allocated Loading 100% (lbs/day)	Safety 10% (lbs/day)	Non-Discrete 90% (lbs/day)	Discrete 0% (lbs/day)
7Q10L	239	7.60E-01	1.030E-01	3.51E-01	3.05E-01	3.05E-02	2.75E-01	0.00E+00
10th Percentile	348	1.07E+00	1.502E-01	4.82E-01	4.40E-01	4.40E-02	3.96E-01	0.00E+00
50th Percentile	1,100	2.87E+00	4.746E-01	1.16E+00	1.24E+00	1.24E-01	1.11E+00	0.00E+00
90th Percentile	6,870	1.37E+01	2.964E+00	3.43E+00	7.29E+00	7.29E-01	6.56E+00	0.00E+00

[1] Used Capacity includes total loading allocations for South Fork Coeur d'Alene River and background allocations for the North Fork Coeur d'Alene River

Cadmium Spreadsheet

Cadmium Criteria Associated with Flow/Hardness Relationship

Hardness	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	56	73	57	25	101	25	47
10th	56	73	56	25	96	25	45
50th	45	63	47	25	71	25	36
90th	25	36	25	25	28	25	25

Criteria in ug/l	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	0.671	0.817	0.680	0.369	1.039	0.369	0.590
10th	0.671	0.817	0.671	0.369	1.000	0.369	0.571
50th	0.571	0.733	0.590	0.369	0.800	0.369	0.484
90th	0.369	0.484	0.369	0.369	0.402	0.369	0.369

Criteria in lbs/ft3 **	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	4.19E-08	5.10E-08	4.25E-08	2.31E-08	6.48E-08	2.31E-08	3.68E-08
10th	4.19E-08	5.10E-08	4.19E-08	2.31E-08	6.25E-08	2.31E-08	3.56E-08
50th	3.56E-08	4.57E-08	3.68E-08	2.31E-08	5.00E-08	2.31E-08	3.02E-08
90th	2.31E-08	3.02E-08	2.31E-08	2.31E-08	2.51E-08	2.31E-08	2.31E-08

** conversion factor = 6.24267E-08

South Fork Coeur d'Alene River Basin
Natural Background
Cadmium (Cd)

	Canyon	Ninemile	Wallace	Pine	Pinehurst	Background Enaville	Harrison
Nat. Background in ug/l	0.06	0.06	0.06	0.1	0.08	0.08	0.080
Nat. Background in lbs/ft3	3.7E-09	3.7E-09	3.7E-09	6.2E-09	5.0E-09	5.0E-09	5.0E-09

Lead Spreadsheet

Lead Criteria Associated with Flow/Hardness Relationship

Hardness	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	56	73	57	25	101	25	47
10th	56	73	56	25	96	25	45
50th	45	63	47	25	71	25	36
90th	25	36	25	25	28	25	25

Criteria in ug/l	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	1.331	1.784	1.358	0.541	2.544	0.541	1.096
10th	1.331	1.784	1.331	0.541	2.407	0.541	1.045
50th	1.045	1.517	1.096	0.541	1.730	0.541	0.814
90th	0.541	0.814	0.541	0.541	0.615	0.541	0.541

Criteria in lbs/ft3 **	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	8.31E-08	1.11E-07	8.48E-08	3.38E-08	1.59E-07	3.38E-08	6.84E-08
10th	8.31E-08	1.11E-07	8.31E-08	3.38E-08	1.50E-07	3.38E-08	6.52E-08
50th	6.52E-08	9.47E-08	6.84E-08	3.38E-08	1.08E-07	3.38E-08	5.08E-08
90th	3.38E-08	5.08E-08	3.38E-08	3.38E-08	3.84E-08	3.38E-08	3.38E-08

** conversion factor = 6.2427E-08

Coefficients

a	b
1.2730	4.7050

South Fork Coeur d'Alene River Basin
Natural Background
Lead (Pb)

	Canyon	Ninemile	Wallace	Pine	Pinehurst	background Enaville	Harrison
Nat. Background in ug/l	0.17	0.17	0.17	0.21	0.21	0.21	0.210
Nat. Background in lbs/ft3	1.1E-08	1.1E-08	1.1E-08	1.3E-08	1.3E-08	1.3E-08	1.3E-08

South Fork Coeur d'Alene River Basin
TMDL Allocations
Lead (Pb)

Canyon Creek
URS Greiner Station ID 288

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading 100% (lbs/day)	Allocated Loading Safety 10% (lbs/day)	Allocated Loading Non-Discrete 65% (lbs/day)	Allocated Loading Discrete 25% (lbs/day)	Final Loading Non-Discrete (lbs/day)	Final Loading Discrete (lbs/day)
7Q10L	7.1	5.10E-02	6.510E-03	0.00E+00	4.45E-02	4.45E-03	2.89E-02	1.11E-02	2.89E-02	1.11E-02
10th Percentile	11	7.90E-02	1.009E-02	0.00E+00	6.89E-02	6.89E-03	4.48E-02	1.72E-02	4.48E-02	1.72E-02
50th Percentile	25	1.41E-01	2.292E-02	0.00E+00	1.18E-01	1.18E-02	7.67E-02	2.95E-02	7.67E-02	2.95E-02
90th Percentile	149	4.35E-01	1.366E-01	0.00E+00	2.98E-01	2.98E-02	1.94E-01	7.45E-02	1.94E-01	7.45E-02

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L Dissolved WLA (lbs/day)	7Q10L Translator	7Q10L Total WLA (lbs/day)	10th Percentile Dissolved WLA (lbs/day)	10th Percentile Translator	10th Percentile Total WLA (lbs/day)
CC817 Hecla #3	0.068	0.008	9.21E-05	1.10E+00	1.01E-04	1.43E-04	1.10E+00	1.57E-04
CC355, GEM	0.260	0.031	3.50E-04	1.10E+00	3.85E-04	5.42E-04	1.10E+00	5.96E-04
CC816 (Star/Phx Tailings)	2.340	0.283	3.15E-03	1.10E+00	3.46E-03	4.88E-03	1.10E+00	5.37E-03
CC357 (WP Seep)	0.004	0.000	5.11E-06	1.10E+00	5.63E-06	7.92E-06	1.10E+00	8.72E-06
CC372 Tam#7	1.590	0.192	2.14E-03	1.10E+00	2.35E-03	3.32E-03	1.10E+00	3.65E-03
CC353 Hercules #5	1.707	0.207	2.30E-03	1.10E+00	2.53E-03	3.56E-03	1.10E+00	3.92E-03
CC371 Blackbear Fraction	1.165	0.141	1.57E-03	1.10E+00	1.72E-03	2.43E-03	1.10E+00	2.67E-03
CC373 Anchor	0.008	0.001	1.08E-05	1.10E+00	1.18E-05	1.67E-05	1.10E+00	1.83E-05
CC354 Hidden Treasure	0.720	0.087	9.69E-04	1.10E+00	1.07E-03	1.50E-03	1.10E+00	1.65E-03
Tiger/Poorman	0.400	0.048	5.38E-04	1.10E+00	5.92E-04	8.34E-04	1.10E+00	9.17E-04
Total Effluent Flow	8.2622			Total Loading	1.11E-02		Total Loading	1.72E-02

Station ID	50th Percentile Dissolved WLA (lbs/day)	50th Percentile Translator	50th Percentile Total WLA (lbs/day)	90th Percentile Dissolved WLA (lbs/day)	90th Percentile Translator	90th Percentile Total WLA (lbs/day)
CC817 Hecla #3	2.44E-04	1.10E+00	2.68E-04	6.17E-04	1.10E+00	6.79E-04
CC355, GEM	9.28E-04	1.10E+00	1.02E-03	2.35E-03	1.10E+00	2.58E-03
CC816 (Star/Phx Tailings)	8.35E-03	1.10E+00	9.19E-03	2.11E-02	1.10E+00	2.32E-02
CC357 (WP Seep)	1.36E-05	1.10E+00	1.49E-05	3.43E-05	1.10E+00	3.77E-05
CC372 Tam#7	5.67E-03	1.10E+00	6.24E-03	1.43E-02	1.10E+00	1.58E-02
CC353 Hercules #5	6.09E-03	1.10E+00	6.70E-03	1.54E-02	1.10E+00	1.69E-02
CC371 Blackbear Fraction	4.16E-03	1.10E+00	4.57E-03	1.05E-02	1.10E+00	1.16E-02
CC373 Anchor	2.85E-05	1.10E+00	3.14E-05	7.22E-05	1.10E+00	7.94E-05
CC354 Hidden Treasure	2.57E-03	1.10E+00	2.83E-03	6.50E-03	1.10E+00	7.14E-03
Tiger/Poorman	1.43E-03	1.10E+00	1.57E-03	3.61E-03	1.10E+00	3.97E-03
		Total Loading	2.95E-02		Total Loading	7.45E-02

South Fork Coeur d'Alene River Basin
TMDL Allocations
Lead (Pb)

Ninemile Creek
URS Greiner Station ID 305

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	2	1.92E-02	1.834E-03	0.00E+00	1.74E-02	1.74E-03	1.13E-02	4.35E-03	1.13E-02	4.35E-03
10th Percentile	3	2.89E-02	2.751E-03	0.00E+00	2.61E-02	2.61E-03	1.70E-02	6.53E-03	1.70E-02	6.53E-03
50th Percentile	6.9	5.64E-02	6.327E-03	0.00E+00	5.01E-02	5.01E-03	3.26E-02	1.25E-02	3.26E-02	1.25E-02
90th Percentile	41	1.80E-01	3.759E-02	0.00E+00	1.43E-01	1.43E-02	9.26E-02	3.56E-02	9.26E-02	3.56E-02

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)
NM360 IC #4	0.040	0.020	8.77E-05	1.10E+00	9.65E-05
NM362 IC Waste Rock	1.790	0.902	3.92E-03	1.10E+00	4.32E-03
NM363 IC Tailings Seep	0.004	0.002	8.77E-06	1.10E+00	9.65E-06
NM361 Rex #2	0.020	0.010	4.39E-05	1.10E+00	4.82E-05
NM364 Tamarack 400 Level	0.040	0.020	8.77E-05	1.10E+00	9.65E-05
NM366 Tamarack #5	0.030	0.015	6.58E-05	1.10E+00	7.24E-05
NM368 Rex Tailings	0.020	0.010	4.39E-05	1.10E+00	4.82E-05
NM359 Success #3	0.010	0.005	2.19E-05	1.10E+00	2.41E-05
NM367 Day Rock 100	0.007	0.003	1.49E-05	1.10E+00	1.64E-05
NM369 Duluth	0.0096	0.005	2.10E-05	1.10E+00	2.32E-05
NM370 Silverstar	0.011	0.006	2.41E-05	1.10E+00	2.65E-05
NM374 Success Tailings	0.003	0.002	7.45E-06	1.10E+00	8.20E-06
Total Effluent Flow	1.9848			Total Loading	4.35E-03

Station ID	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)
NM360 IC #4	1.32E-04	1.10E+00	1.45E-04
NM362 IC Waste Rock	5.89E-03	1.10E+00	6.48E-03
NM363 IC Tailings Seep	1.32E-05	1.10E+00	1.45E-05
NM361 Rex #2	6.58E-05	1.10E+00	7.24E-05
NM364 Tamarack 400 Level	1.32E-04	1.10E+00	1.45E-04
NM366 Tamarack #5	9.87E-05	1.10E+00	1.09E-04
NM368 Rex Tailings	6.58E-05	1.10E+00	7.24E-05
NM359 Success #3	3.29E-05	1.10E+00	3.62E-05
NM367 Day Rock 100	2.24E-05	1.10E+00	2.46E-05
NM369 Duluth	3.16E-05	1.10E+00	3.47E-05
NM370 Silverstar	3.62E-05	1.10E+00	3.98E-05
NM374 Success Tailings	1.12E-05	1.10E+00	1.23E-05
		Total Loading	6.53E-03

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)
NM360 IC #4	2.52E-04	1.10E+00	2.78E-04
NM362 IC Waste Rock	1.13E-02	1.10E+00	1.24E-02
NM363 IC Tailings Seep	2.52E-05	1.10E+00	2.78E-05
NM361 Rex #2	1.26E-04	1.10E+00	1.39E-04
NM364 Tamarack 400 Level	2.52E-04	1.10E+00	2.78E-04
NM366 Tamarack #5	1.89E-04	1.10E+00	2.08E-04
NM368 Rex Tailings	1.26E-04	1.10E+00	1.39E-04
NM359 Success #3	6.31E-05	1.10E+00	6.94E-05
NM367 Day Rock 100	4.29E-05	1.10E+00	4.72E-05
NM369 Duluth	6.06E-05	1.10E+00	6.67E-05
NM370 Silverstar	6.94E-05	1.10E+00	7.64E-05
NM374 Success Tailings	2.15E-05	1.10E+00	2.36E-05
		Total Loading	1.25E-02

Station ID	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
NM360 IC #4	7.18E-04	1.10E+00	7.90E-04
NM362 IC Waste Rock	3.21E-02	1.10E+00	3.53E-02
NM363 IC Tailings Seep	7.18E-05	1.10E+00	7.90E-05
NM361 Rex #2	3.59E-04	1.10E+00	3.95E-04
NM364 Tamarack 400 Level	7.18E-04	1.10E+00	7.90E-04
NM366 Tamarack #5	5.39E-04	1.10E+00	5.92E-04
NM368 Rex Tailings	3.59E-04	1.10E+00	3.95E-04
NM359 Success #3	1.80E-04	1.10E+00	1.97E-04
NM367 Day Rock 100	1.22E-04	1.10E+00	1.34E-04
NM369 Duluth	1.72E-04	1.10E+00	1.90E-04
NM370 Silverstar	1.97E-04	1.10E+00	2.17E-04
NM374 Success Tailings	6.10E-05	1.10E+00	6.71E-05
		Total Loading	3.56E-02

South Fork Coeur d'Alene River Basin
TMDL Allocations
Lead (Pb)

South Fork Coeur d'Alene River at Wallace
URS Greiner Station ID 233

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	22	1.62E-01	2.03E-02	6.19E-02	7.97E-02	7.97E-03	5.18E-02	1.99E-02	5.18E-02	1.99E-02
10th Percentile	35	2.51E-01	3.21E-02	9.50E-02	1.24E-01	1.24E-02	8.08E-02	3.11E-02	8.08E-02	3.11E-02
50th Percentile	79	4.67E-01	7.23E-02	1.68E-01	2.26E-01	2.26E-02	1.47E-01	5.65E-02	1.47E-01	5.65E-02
90th Percentile	469	1.37E+00	4.30E-01	4.41E-01	4.98E-01	4.98E-02	3.24E-01	1.24E-01	3.24E-01	1.24E-01

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)
SF 607 Lucky Friday 001	1.27	0.143	2.86E-03	1.20E+00	3.43E-03	4.46E-03	1.20E+00	5.35E-03
SF609 Lucky Friday 003	0.85	0.096	1.91E-03	1.20E+00	2.30E-03	2.98E-03	1.20E+00	3.58E-03
SF328, (Morn waste rock)	1.59	0.180	3.58E-03	1.20E+00	4.29E-03	5.58E-03	1.20E+00	6.69E-03
SF 396 Square Deal	0.08	0.009	1.80E-04	1.20E+00	2.16E-04	2.81E-04	1.20E+00	3.37E-04
SF395, Golconda	0.03	0.003	6.75E-05	1.20E+00	8.10E-05	1.05E-04	1.20E+00	1.26E-04
SF627 STP Mullan	0.413	0.047	9.30E-04	1.20E+00	1.12E-03	1.45E-03	1.20E+00	1.74E-03
SF338 Snowstorm #3	2.00	0.226	4.50E-03	1.20E+00	5.40E-03	7.02E-03	1.20E+00	8.42E-03
SF339 Copper King	0.0564	0.006	1.27E-04	1.20E+00	1.52E-04	1.98E-04	1.20E+00	2.37E-04
SF345 Morning #4	0.0152	0.002	3.42E-05	1.20E+00	4.11E-05	5.33E-05	1.20E+00	6.40E-05
SF346 Morning No. 5	0.0111	0.001	2.50E-05	1.20E+00	3.00E-05	3.89E-05	1.20E+00	4.67E-05
SF347 Star 1200 Level	0.695	0.079	1.56E-03	1.20E+00	1.88E-03	2.44E-03	1.20E+00	2.93E-03
SF349 Grouse	1.82	0.206	4.10E-03	1.20E+00	4.92E-03	6.39E-03	1.20E+00	7.66E-03
SF386 Princeton-Magma	0.0003	0.00003	6.75E-07	1.20E+00	8.10E-07	1.05E-06	1.20E+00	1.26E-06
SF389 Unnamed Adit	0.011	0.001	2.48E-05	1.20E+00	2.97E-05	3.86E-05	1.20E+00	4.63E-05
SF390 Reindeer Queen	0.011	0.001	2.48E-05	1.20E+00	2.97E-05	3.86E-05	1.20E+00	4.63E-05
Total Effluent Flow	8.853			Total Loading	1.99E-02		Total Loading	3.11E-02

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
SF 607 Lucky Friday 001	8.11E-03	1.20E+00	9.73E-03	1.79E-02	1.20E+00	2.14E-02
SF609 Lucky Friday 003	5.43E-03	1.20E+00	6.51E-03	1.19E-02	1.20E+00	1.43E-02
SF328, (Morn waste rock)	1.02E-02	1.20E+00	1.22E-02	2.23E-02	1.20E+00	2.68E-02
SF 396 Square Deal	5.11E-04	1.20E+00	6.13E-04	1.12E-03	1.20E+00	1.35E-03
SF395, Golconda	1.92E-04	1.20E+00	2.30E-04	4.22E-04	1.20E+00	5.06E-04
SF627 STP Mullan	2.64E-03	1.20E+00	3.17E-03	5.81E-03	1.20E+00	6.97E-03
SF338 Snowstorm #3	1.28E-02	1.20E+00	1.53E-02	2.81E-02	1.20E+00	3.37E-02
SF339 Copper King	3.60E-04	1.20E+00	4.32E-04	7.93E-04	1.20E+00	9.51E-04
SF345 Morning #4	9.71E-05	1.20E+00	1.16E-04	2.14E-04	1.20E+00	2.56E-04
SF346 Morning No. 5	7.09E-05	1.20E+00	8.51E-05	1.56E-04	1.20E+00	1.87E-04
SF347 Star 1200 Level	4.44E-03	1.20E+00	5.33E-03	9.77E-03	1.20E+00	1.17E-02
SF349 Grouse	1.16E-02	1.20E+00	1.39E-02	2.56E-02	1.20E+00	3.07E-02
SF386 Princeton-Magma	1.92E-06	1.20E+00	2.30E-06	4.22E-06	1.20E+00	5.06E-06
SF389 Unnamed Adit	7.03E-05	1.20E+00	8.43E-05	1.55E-04	1.20E+00	1.86E-04
SF390 Reindeer Queen	7.03E-05	1.20E+00	8.43E-05	1.55E-04	1.20E+00	1.86E-04
		Total Loading	5.65E-02		Total Loading	1.24E-01

South Fork Coeur d'Alene River Basin
TMDL Allocations
Lead (Pb)

Pine Creek
URS Greiner Station ID 315

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading 100% (lbs/day)	Allocated Loading Safety 10% (lbs/day)	Allocated Loading Non-Discrete 65% (lbs/day)	Allocated Loading Discrete 25% (lbs/day)	Final Loading Non-Discrete (lbs/day)	Final Loading Discrete (lbs/day)
7Q10L	20	5.84E-02	2.265E-02	0.00E+00	3.57E-02	3.57E-03	2.32E-02	8.93E-03	2.32E-02	8.93E-03
10th Percentile	29	8.46E-02	3.285E-02	0.00E+00	5.18E-02	5.18E-03	3.36E-02	1.29E-02	3.36E-02	1.29E-02
50th Percentile	80	2.33E-01	9.061E-02	0.00E+00	1.43E-01	1.43E-02	9.28E-02	3.57E-02	9.28E-02	3.57E-02
90th Percentile	387	1.13E+00	4.383E-01	0.00E+00	6.91E-01	6.91E-02	4.49E-01	1.73E-01	4.49E-01	1.73E-01

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L Dissolved WLA (lbs/day)	7Q10L Translator	7Q10L Total WLA (lbs/day)	10th Percentile Dissolved WLA (lbs/day)	10th Percentile Translator	10th Percentile Total WLA (lbs/day)
PC329 North Amy	0.322	0.479	4.27E-03	1.00E+00	4.27E-03	6.20E-03	1.00E+00	6.20E-03
PC330 Amy	0.005	0.007	6.64E-05	1.00E+00	6.64E-05	9.62E-05	1.00E+00	9.62E-05
PC331 Liberal King	0.005	0.007	6.64E-05	1.00E+00	6.64E-05	9.62E-05	1.00E+00	9.62E-05
PC332 Lookout	0.027	0.040	3.58E-04	1.00E+00	3.58E-04	5.20E-04	1.00E+00	5.20E-04
PC333 Upper Lynch	0.001	0.001	1.33E-05	1.00E+00	1.33E-05	1.92E-05	1.00E+00	1.92E-05
PC334 Lynch/Nabob	0.0006	0.001	7.96E-06	1.00E+00	7.96E-06	1.15E-05	1.00E+00	1.15E-05
PC335 Nevada-Stewart	0.091	0.135	1.21E-03	1.00E+00	1.21E-03	1.75E-03	1.00E+00	1.75E-03
PC336 Highland Surprise	0.038	0.057	5.04E-04	1.00E+00	5.04E-04	7.31E-04	1.00E+00	7.31E-04
PC375 Highland Surp. Waste Rock	0.011	0.016	1.41E-04	1.00E+00	1.41E-04	2.04E-04	1.00E+00	2.04E-04
PC337 Sidney (Red Cloud)	0.006	0.009	7.96E-05	1.00E+00	7.96E-05	1.15E-04	1.00E+00	1.15E-04
PC340 Upper Little Pittsburg	0.002	0.003	2.65E-05	1.00E+00	2.65E-05	3.85E-05	1.00E+00	3.85E-05
PC341 Lower Little Pittsburg	0.006	0.009	7.96E-05	1.00E+00	7.96E-05	1.15E-04	1.00E+00	1.15E-04
PC343 Nabob 1300 Level	0.066	0.098	8.76E-04	1.00E+00	8.76E-04	1.27E-03	1.00E+00	1.27E-03
PC344 Big It	0.001	0.002	1.41E-05	1.00E+00	1.41E-05	2.04E-05	1.00E+00	2.04E-05
PC348 Upper Constitution	0.079	0.117	1.05E-03	1.00E+00	1.05E-03	1.52E-03	1.00E+00	1.52E-03
PC351 Marmion Tunnel	0.009	0.013	1.18E-04	1.00E+00	1.18E-04	1.71E-04	1.00E+00	1.71E-04
PC352 Seep Below Nevada Stewart	0.003	0.004	3.72E-05	1.00E+00	3.72E-05	5.39E-05	1.00E+00	5.39E-05
PC 400 Adit Upstream of Little Pittsburg	0.0004	0.001	5.60E-06	1.00E+00	5.60E-06	8.12E-06	1.00E+00	8.12E-06
Total Effluent Flow	0.672382			**Total Loading**	8.93E-03		**Total Loading**	1.29E-02

Station ID	50th Percentile Dissolved WLA (lbs/day)	50th Percentile Translator	50th Percentile Total WLA (lbs/day)	90th Percentile Dissolved WLA (lbs/day)	90th Percentile Translator	90th Percentile Total WLA (lbs/day)
PC329 North Amy	1.71E-02	1.00E+00	1.71E-02	8.27E-02	1.00E+00	8.27E-02
PC330 Amy	2.65E-04	1.00E+00	2.65E-04	1.28E-03	1.00E+00	1.28E-03
PC331 Liberal King	2.65E-04	1.00E+00	2.65E-04	1.28E-03	1.00E+00	1.28E-03
PC332 Lookout	1.43E-03	1.00E+00	1.43E-03	6.94E-03	1.00E+00	6.94E-03
PC333 Upper Lynch	5.31E-05	1.00E+00	5.31E-05	2.57E-04	1.00E+00	2.57E-04
PC334 Lynch/Nabob	3.19E-05	1.00E+00	3.19E-05	1.54E-04	1.00E+00	1.54E-04
PC335 Nevada-Stewart	4.83E-03	1.00E+00	4.83E-03	2.34E-02	1.00E+00	2.34E-02
PC336 Highland Surprise	2.02E-03	1.00E+00	2.02E-03	9.76E-03	1.00E+00	9.76E-03
PC375 Highland Surp. Waste Rock	5.63E-04	1.00E+00	5.63E-04	2.72E-03	1.00E+00	2.72E-03
PC337 Sidney (Red Cloud)	3.19E-04	1.00E+00	3.19E-04	1.54E-03	1.00E+00	1.54E-03
PC340 Upper Little Pittsburg	1.06E-04	1.00E+00	1.06E-04	5.14E-04	1.00E+00	5.14E-04
PC341 Lower Little Pittsburg	3.19E-04	1.00E+00	3.19E-04	1.54E-03	1.00E+00	1.54E-03
PC343 Nabob 1300 Level	3.50E-03	1.00E+00	3.50E-03	1.70E-02	1.00E+00	1.70E-02
PC344 Big It	5.63E-05	1.00E+00	5.63E-05	2.72E-04	1.00E+00	2.72E-04
PC348 Upper Constitution	4.19E-03	1.00E+00	4.19E-03	2.03E-02	1.00E+00	2.03E-02
PC351 Marmion Tunnel	4.73E-04	1.00E+00	4.73E-04	2.29E-03	1.00E+00	2.29E-03
PC352 Seep Below Nevada Stewart	1.49E-04	1.00E+00	1.49E-04	7.19E-04	1.00E+00	7.19E-04
PC 400 Adit Upstream of Little Pittsburg	2.24E-05	1.00E+00	2.24E-05	1.08E-04	1.00E+00	1.08E-04
		Total Loading	3.57E-02		**Total Loading**	1.73E-01

South Fork Coeur d'Alene River Basin
TMDL Allocations
Lead (Pb)

South Fork Coeur d'Alene River @ Pinhurst
URS Greiner Station ID 271

					Allocated Loading				Final Loading	
	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	100% (lbs/day)	Safety 10% (lbs/day)	Non-Discrete 65% (lbs/day)	Discrete 25% (lbs/day)	Non-Discrete (lbs/day)	Discrete (lbs/day)
7Q10L	68	9.33E-01	7.702E-02	1.15E-01	7.41E-01	7.41E-02	4.81E-01	1.85E-01	4.81E-01	1.85E-01
10th Percentile	97	1.26E+00	1.099E-01	1.76E-01	9.74E-01	9.74E-02	6.33E-01	2.43E-01	6.33E-01	2.43E-01
50th Percentile	268	2.50E+00	3.036E-01	3.69E-01	1.83E+00	1.83E-01	1.19E+00	4.57E-01	1.19E+00	4.57E-01
90th Percentile	1290	4.28E+00	1.461E+00	1.19E+00	1.63E+00	1.63E-01	1.06E+00	4.07E-01	1.06E+00	4.07E-01

Loading Allocations By Source

			7Q10L		
Station ID	Average Discharge (cfs)	Proportion of Discharge	Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)
SF382 Silver Dollar	0.015	0.001	1.85E-04	2.20E+00	4.07E-04
SF393 Western Union (Lower Adit)	0.001	0.0001	1.23E-05	2.20E+00	2.71E-05
SF3 CTP	4.990	0.332	6.15E-02	2.20E+00	1.35E-01
SF620 Page STP	3.870	0.258	4.77E-02	2.20E+00	1.05E-01
SF383 St Joe	0.007	0.0005	8.63E-05	2.20E+00	1.90E-04
SF384 Coeur d'alene (Mineral Point)	0.005	0.0003	6.17E-05	2.20E+00	1.36E-04
SF385 Unnamed Location (adit)	0.001	0.00005	8.63E-06	2.20E+00	1.90E-05
SF600 Caladay	0.210	0.014	2.59E-03	2.20E+00	5.70E-03
SF602 Silver Valley Galena	1.300	0.087	1.60E-02	2.20E+00	3.53E-02
SF623 Smelterville STP	0.421	0.028	5.19E-03	2.20E+00	1.14E-02
SF624 Sunshine 001,SUN-1	3.120	0.208	3.85E-02	2.20E+00	8.46E-02
Silver Valley (Coeur)	0.775	0.052	9.56E-03	2.20E+00	2.10E-02
Consolidated Silver	0.300	0.020	3.70E-03	2.20E+00	8.14E-03
Total Effluent Flow	15.014818			**Total Loading**	1.85E-01

	10th Percentile			50th Percentile			90th Percentile		
Station ID	Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)	Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)	Dissolved WLA (lbs/day)	Translator	Total WLA (lbs/day)
SF382 Silver Dollar	2.43E-04	2.20E+00	5.35E-04	4.57E-04	2.20E+00	1.00E-03	4.06E-04	2.20E+00	8.93E-04
SF393 Western Union (Lower Adit)	1.62E-05	2.20E+00	3.57E-05	3.04E-05	2.20E+00	6.70E-05	2.71E-05	2.20E+00	5.96E-05
SF3 CTP	8.09E-02	2.20E+00	1.78E-01	1.52E-01	2.20E+00	3.34E-01	1.35E-01	2.20E+00	2.97E-01
SF620 Page STP	6.27E-02	2.20E+00	1.38E-01	1.18E-01	2.20E+00	2.59E-01	1.05E-01	2.20E+00	2.31E-01
SF383 St Joe	1.13E-04	2.20E+00	2.50E-04	2.13E-04	2.20E+00	4.69E-04	1.90E-04	2.20E+00	4.17E-04
SF384 Coeur d'alene (Mineral Point)	8.10E-05	2.20E+00	1.78E-04	1.52E-04	2.20E+00	3.35E-04	1.35E-04	2.20E+00	2.98E-04
SF385 Unnamed Location (adit)	1.13E-05	2.20E+00	2.50E-05	2.13E-05	2.20E+00	4.69E-05	1.90E-05	2.20E+00	4.17E-05
SF600 Caladay	3.40E-03	2.20E+00	7.49E-03	6.39E-03	2.20E+00	1.41E-02	5.69E-03	2.20E+00	1.25E-02
SF602 Silver Valley Galena	2.11E-02	2.20E+00	4.64E-02	3.96E-02	2.20E+00	8.71E-02	3.52E-02	2.20E+00	7.74E-02
SF623 Smelterville STP	6.82E-03	2.20E+00	1.50E-02	1.28E-02	2.20E+00	2.82E-02	1.14E-02	2.20E+00	2.51E-02
SF624 Sunshine 001,SUN-1	5.06E-02	2.20E+00	1.11E-01	9.50E-02	2.20E+00	2.09E-01	8.45E-02	2.20E+00	1.86E-01
Silver Valley (Coeur)	1.26E-02	2.20E+00	2.76E-02	2.36E-02	2.20E+00	5.19E-02	2.10E-02	2.20E+00	4.62E-02
Consolidated Silver	4.86E-03	2.20E+00	1.07E-02	9.14E-03	2.20E+00	2.01E-02	8.13E-03	2.20E+00	1.79E-02
		Total Loading	2.43E-01		**Total Loading**	4.57E-01		**Total Loading**	4.07E-01

South Fork Coeur d'Alene River Basin
TMDL Allocations
Lead (Pb)

North Fork Coeur d'Alene River @ Enaville
URS Greiner Station ID 400

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)
7Q10L	165	4.81E-01	1.87E-01
10th Percentile	253	7.38E-01	2.87E-01
50th Percentile	845	2.47E+00	9.57E-01
90th Percentile	5,090	1.49E+01	5.77E+00

South Fork Coeur d'Alene River Basin
TMDL Allocations
Lead (Pb)

Coeur d'Alene River @ Harrison

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity[1] (lbs/day)	Allocated Loading 100% (lbs/day)	Safety 10% (lbs/day)	Non-Discrete 90% (lbs/day)	Discrete 0% (lbs/day)
7Q10L	239	1.41E+00	2.705E-01	9.27E-01	2.14E-01	2.14E-02	1.93E-01	0.00E+00
10th Percentile	348	1.96E+00	3.942E-01	1.26E+00	3.07E-01	3.07E-02	2.76E-01	0.00E+00
50th Percentile	1,100	4.83E+00	1.246E+00	2.79E+00	8.01E-01	8.01E-02	7.21E-01	0.00E+00
90th Percentile	6,870	2.00E+01	7.781E+00	7.39E+00	4.87E+00	4.87E-01	4.39E+00	0.00E+00

[1] Used Capacity includes total loading allocations for South Fork Coeur d'Alene River and background allocations for the North Fork Coeur d'Alene River

Zinc Spreadsheet

Zinc Criteria Associated with Flow/Hardness Relationship

Hardness	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	56	73	57	25	101	25	47
10th	56	73	56	25	96	25	45
50th	45	63	47	25	71	25	36
90th	25	36	25	25	28	25	25

Criteria in ug/l	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	63.9	80.0	64.9	32.3	105.4	32.3	55.1
10th	63.9	80.0	63.9	32.3	101.0	32.3	53.1
50th	53.1	70.7	55.1	32.3	78.2	32.3	44.0
90th	32.3	44.0	32.3	32.3	35.5	32.3	32.3

Criteria in lbs/ft3 **	Canyon	Ninemile	Wallace	Pine	Pinehurst	Enaville	Harrison
7Q10	3.99E-06	5.00E-06	4.05E-06	2.02E-06	6.58E-06	2.02E-06	3.44E-06
10th	3.99E-06	5.00E-06	3.99E-06	2.02E-06	6.30E-06	2.02E-06	3.32E-06
50th	3.32E-06	4.41E-06	3.44E-06	2.02E-06	4.88E-06	2.02E-06	2.75E-06
90th	2.02E-06	2.75E-06	2.02E-06	2.02E-06	2.22E-06	2.02E-06	2.02E-06

** conversion factor = 6.2427E-08

Coefficients

a	b
0.8473	-0.7614

South Fork Coeur d'Alene River Basin
Natural Background
Zinc (Zn)

	Canyon	Ninemile	Wallace	Pine	Pinehurst	background Enaville	Harrison
Nat. Background in ug/l	6.1	6.1	6.1	3.1	6.1	5	5.32
Nat. Background in lbs/ft3	3.8E-07	3.8E-07	3.8E-07	1.9E-07	3.8E-07	3.1E-07	3.3E-07

South Fork Coeur d'Alene River Basin
TMDL Allocations
Zinc (Zn)

Canyon Creek
URS Greiner Station ID 288

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	7.1	2.45E+00	2.336E-01	0.00E+00	2.22E+00	2.22E-01	1.44E+00	5.54E-01	1.44E+00	5.54E-01
10th Percentile	11	3.79E+00	3.619E-01	0.00E+00	3.43E+00	3.43E-01	2.23E+00	8.58E-01	2.23E+00	8.58E-01
50th Percentile	25	7.16E+00	8.225E-01	0.00E+00	6.34E+00	6.34E-01	4.12E+00	1.59E+00	4.12E+00	1.59E+00
90th Percentile	149	2.59E+01	4.902E+00	0.00E+00	2.10E+01	2.10E+00	1.37E+01	5.26E+00	1.37E+01	5.26E+00

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)		10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)	
CC817 Hecla #3	0.068	0.008	4.58E-03	1.00E+00	4.58E-03		7.10E-03	1.00E+00	7.10E-03	
CC355, GEM	0.260	0.031	1.74E-02	1.00E+00	1.74E-02		2.70E-02	1.00E+00	2.70E-02	
CC816 (Star/Phx Tailings)	2.340	0.283	1.57E-01	1.00E+00	1.57E-01		2.43E-01	1.00E+00	2.43E-01	
CC357 (WP Seep)	0.004	0.000	2.55E-04	1.00E+00	2.55E-04		3.95E-04	1.00E+00	3.95E-04	
CC372 Tam#7	1.590	0.192	1.07E-01	1.00E+00	1.07E-01		1.65E-01	1.00E+00	1.65E-01	
CC353 Hercules #5	1.707	0.207	1.14E-01	1.00E+00	1.14E-01		1.77E-01	1.00E+00	1.77E-01	
CC371 Blackbear Fraction	1.165	0.141	7.81E-02	1.00E+00	7.81E-02		1.21E-01	1.00E+00	1.21E-01	
CC373 Anchor	0.008	0.001	5.36E-04	1.00E+00	5.36E-04		8.31E-04	1.00E+00	8.31E-04	
CC354 Hidden Treasure	0.720	0.087	4.83E-02	1.00E+00	4.83E-02		7.48E-02	1.00E+00	7.48E-02	
Tiger/Poorman	0.400	0.048	2.68E-02	1.00E+00	2.68E-02		4.15E-02	1.00E+00	4.15E-02	
Total Effluent Flow	8.2622			Total Loading	5.54E-01			Total Loading	8.58E-01	

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)		90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)	
CC817 Hecla #3	1.31E-02	1.00E+00	1.31E-02		4.36E-02	1.00E+00	4.36E-02	
CC355, GEM	4.99E-02	1.00E+00	4.99E-02		1.66E-01	1.00E+00	1.66E-01	
CC816 (Star/Phx Tailings)	4.49E-01	1.00E+00	4.49E-01		1.49E+00	1.00E+00	1.49E+00	
CC357 (WP Seep)	7.29E-04	1.00E+00	7.29E-04		2.42E-03	1.00E+00	2.42E-03	
CC372 Tam#7	3.05E-01	1.00E+00	3.05E-01		1.01E+00	1.00E+00	1.01E+00	
CC353 Hercules #5	3.28E-01	1.00E+00	3.28E-01		1.09E+00	1.00E+00	1.09E+00	
CC371 Blackbear Fraction	2.24E-01	1.00E+00	2.24E-01		7.42E-01	1.00E+00	7.42E-01	
CC373 Anchor	1.53E-03	1.00E+00	1.53E-03		5.09E-03	1.00E+00	5.09E-03	
CC354 Hidden Treasure	1.38E-01	1.00E+00	1.38E-01		4.58E-01	1.00E+00	4.58E-01	
Tiger/Poorman	7.67E-02	1.00E+00	7.67E-02		2.55E-01	1.00E+00	2.55E-01	
		Total Loading	1.59E+00			Total Loading	5.26E+00	

South Fork Coeur d'Alene River Basin TMDL Allocations Zinc (Zn)	

Ninemile Creek
URS Greiner Station ID 305

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	2	8.63E-01	6.580E-02	0.00E+00	7.98E-01	7.98E-02	5.18E-01	1.99E-01	5.18E-01	1.99E-01
10th Percentile	3	1.30E+00	9.870E-02	0.00E+00	1.20E+00	1.20E-01	7.78E-01	2.99E-01	7.78E-01	2.99E-01
50th Percentile	6.9	2.63E+00	2.270E-01	0.00E+00	2.40E+00	2.40E-01	1.56E+00	6.01E-01	1.56E+00	6.01E-01
90th Percentile	41	9.72E+00	1.349E+00	0.00E+00	8.38E+00	8.38E-01	5.44E+00	2.09E+00	5.44E+00	2.09E+00

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)
NM360 IC #4	0.040	0.020	4.02E-03	1.00E+00	4.02E-03	6.03E-03	1.00E+00	6.03E-03
NM362 IC Waste Rock	1.790	0.902	1.80E-01	1.00E+00	1.80E-01	2.70E-01	1.00E+00	2.70E-01
NM363 IC Tailings Seep	0.004	0.002	4.02E-04	1.00E+00	4.02E-04	6.03E-04	1.00E+00	6.03E-04
NM361 Rex #2	0.020	0.010	2.01E-03	1.00E+00	2.01E-03	3.01E-03	1.00E+00	3.01E-03
NM364 Tamarack 400 Level	0.040	0.020	4.02E-03	1.00E+00	4.02E-03	6.03E-03	1.00E+00	6.03E-03
NM366 Tamarack #5	0.030	0.015	3.01E-03	1.00E+00	3.01E-03	4.52E-03	1.00E+00	4.52E-03
NM368 Rex Tailings	0.020	0.010	2.01E-03	1.00E+00	2.01E-03	3.01E-03	1.00E+00	3.01E-03
NM359 Success #3	0.010	0.005	1.00E-03	1.00E+00	1.00E-03	1.51E-03	1.00E+00	1.51E-03
NM367 Day Rock 100	0.007	0.003	6.83E-04	1.00E+00	6.83E-04	1.02E-03	1.00E+00	1.02E-03
NM369 Duluth	0.0096	0.005	9.65E-04	1.00E+00	9.65E-04	1.45E-03	1.00E+00	1.45E-03
NM370 Silverstar	0.011	0.006	1.11E-03	1.00E+00	1.11E-03	1.66E-03	1.00E+00	1.66E-03
NM374 Success Tailings	0.003	0.002	3.42E-04	1.00E+00	3.42E-04	5.12E-04	1.00E+00	5.12E-04
Total Effluent Flow	1.9848			Total Loading	1.99E-01		Total Loading	2.99E-01

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
NM360 IC #4	1.21E-02	1.00E+00	1.21E-02	4.22E-02	1.00E+00	4.22E-02
NM362 IC Waste Rock	5.42E-01	1.00E+00	5.42E-01	1.89E+00	1.00E+00	1.89E+00
NM363 IC Tailings Seep	1.21E-03	1.00E+00	1.21E-03	4.22E-03	1.00E+00	4.22E-03
NM361 Rex #2	6.05E-03	1.00E+00	6.05E-03	2.11E-02	1.00E+00	2.11E-02
NM364 Tamarack 400 Level	1.21E-02	1.00E+00	1.21E-02	4.22E-02	1.00E+00	4.22E-02
NM366 Tamarack #5	9.08E-03	1.00E+00	9.08E-03	3.16E-02	1.00E+00	3.16E-02
NM368 Rex Tailings	6.05E-03	1.00E+00	6.05E-03	2.11E-02	1.00E+00	2.11E-02
NM359 Success #3	3.03E-03	1.00E+00	3.03E-03	1.05E-02	1.00E+00	1.05E-02
NM367 Day Rock 100	2.06E-03	1.00E+00	2.06E-03	7.17E-03	1.00E+00	7.17E-03
NM369 Duluth	2.90E-03	1.00E+00	2.90E-03	1.01E-02	1.00E+00	1.01E-02
NM370 Silverstar	3.33E-03	1.00E+00	3.33E-03	1.16E-02	1.00E+00	1.16E-02
NM374 Success Tailings	1.03E-03	1.00E+00	1.03E-03	3.59E-03	1.00E+00	3.59E-03
		Total Loading	6.01E-01		Total Loading	2.09E+00

South Fork Coeur d'Alene River Basin
TMDL Allocations
Zinc (Zn)

South Fork Coeur d'Alene River at Wallace
URS Greiner Station ID 233

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	22	7.74E+00	7.27E-01	3.01E+00	4.00E+00	4.00E-01	2.60E+00	9.99E-01	2.60E+00	9.99E-01
10th Percentile	35	1.21E+01	1.15E+00	4.63E+00	6.29E+00	6.29E-01	4.09E+00	1.57E+00	4.09E+00	1.57E+00
50th Percentile	79	2.35E+01	2.60E+00	8.74E+00	1.21E+01	1.21E+00	7.88E+00	3.03E+00	7.88E+00	3.03E+00
90th Percentile	469	8.17E+01	1.54E+01	2.94E+01	3.68E+01	3.68E+00	2.39E+01	9.21E+00	2.39E+01	9.21E+00

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)
SF 607 Lucky Friday 001	1.27	0.143	1.43E-01	1.00E+00	1.43E-01	2.26E-01	1.00E+00	2.26E-01
SF609 Lucky Friday 003	0.85	0.096	9.59E-02	1.00E+00	9.59E-02	1.51E-01	1.00E+00	1.51E-01
SF328, (Morn waste rock)	1.59	0.180	1.79E-01	1.00E+00	1.79E-01	2.82E-01	1.00E+00	2.82E-01
SF 396 Square Deal	0.08	0.009	9.03E-03	1.00E+00	9.03E-03	1.42E-02	1.00E+00	1.42E-02
SF395, Golconda	0.03	0.003	3.39E-03	1.00E+00	3.39E-03	5.33E-03	1.00E+00	5.33E-03
SF627 STP Mullan	0.413	0.047	4.66E-02	1.00E+00	4.66E-02	7.34E-02	1.00E+00	7.34E-02
SF338 Snowstorm #3	2.00	0.226	2.26E-01	1.00E+00	2.26E-01	3.55E-01	1.00E+00	3.55E-01
SF339 Copper King	0.0564	0.006	6.37E-03	1.00E+00	6.37E-03	1.00E-02	1.00E+00	1.00E-02
SF345 Morning #4	0.0152	0.002	1.72E-03	1.00E+00	1.72E-03	2.70E-03	1.00E+00	2.70E-03
SF346 Morning No. 5	0.0111	0.001	1.25E-03	1.00E+00	1.25E-03	1.97E-03	1.00E+00	1.97E-03
SF347 Star 1200 Level	0.695	0.079	7.84E-02	1.00E+00	7.84E-02	1.23E-01	1.00E+00	1.23E-01
SF349 Grouse	1.82	0.206	2.05E-01	1.00E+00	2.05E-01	3.23E-01	1.00E+00	3.23E-01
SF386 Princeton-Magma	0.0003	0.00003	3.39E-05	1.00E+00	3.39E-05	5.33E-05	1.00E+00	5.33E-05
SF389 Unnamed Adit	0.011	0.001	1.24E-03	1.00E+00	1.24E-03	1.95E-03	1.00E+00	1.95E-03
SF390 Reindeer Queen	0.011	0.001	1.24E-03	1.00E+00	1.24E-03	1.95E-03	1.00E+00	1.95E-03
Total Effluent Flow	8.853			Total Loading	9.99E-01		Total Loading	1.57E+00

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
SF 607 Lucky Friday 001	4.35E-01	1.00E+00	4.35E-01	1.32E+00	1.00E+00	1.32E+00
SF609 Lucky Friday 003	2.91E-01	1.00E+00	2.91E-01	8.84E-01	1.00E+00	8.84E-01
SF328, (Morn waste rock)	5.44E-01	1.00E+00	5.44E-01	1.65E+00	1.00E+00	1.65E+00
SF 396 Square Deal	2.74E-02	1.00E+00	2.74E-02	8.32E-02	1.00E+00	8.32E-02
SF395, Golconda	1.03E-02	1.00E+00	1.03E-02	3.12E-02	1.00E+00	3.12E-02
SF627 STP Mullan	1.41E-01	1.00E+00	1.41E-01	4.29E-01	1.00E+00	4.29E-01
SF338 Snowstorm #3	6.84E-01	1.00E+00	6.84E-01	2.08E+00	1.00E+00	2.08E+00
SF339 Copper King	1.93E-02	1.00E+00	1.93E-02	5.86E-02	1.00E+00	5.86E-02
SF345 Morning #4	5.20E-03	1.00E+00	5.20E-03	1.58E-02	1.00E+00	1.58E-02
SF346 Morning No. 5	3.80E-03	1.00E+00	3.80E-03	1.15E-02	1.00E+00	1.15E-02
SF347 Star 1200 Level	2.38E-01	1.00E+00	2.38E-01	7.23E-01	1.00E+00	7.23E-01
SF349 Grouse	6.23E-01	1.00E+00	6.23E-01	1.89E+00	1.00E+00	1.89E+00
SF386 Princeton-Magma	1.03E-04	1.00E+00	1.03E-04	3.12E-04	1.00E+00	3.12E-04
SF389 Unnamed Adit	3.76E-03	1.00E+00	3.76E-03	1.14E-02	1.00E+00	1.14E-02
SF390 Reindeer Queen	3.76E-03	1.00E+00	3.76E-03	1.14E-02	1.00E+00	1.14E-02
		Total Loading	3.03E+00		Total Loading	9.21E+00

South Fork Coeur d'Alene River Basin TMDL Allocations Zinc (Zn)	

Pine Creek
URS Greiner Station ID 315

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	20	3.48E+00	3.344E-01	0.00E+00	3.15E+00	3.15E-01	2.05E+00	7.87E-01	2.05E+00	7.87E-01
10th Percentile	29	5.05E+00	4.849E-01	0.00E+00	4.57E+00	4.57E-01	2.97E+00	1.14E+00	2.97E+00	1.14E+00
50th Percentile	80	1.39E+01	1.338E+00	0.00E+00	1.26E+01	1.26E+00	8.19E+00	3.15E+00	8.19E+00	3.15E+00
90th Percentile	387	6.74E+01	6.471E+00	0.00E+00	6.09E+01	6.09E+00	3.96E+01	1.52E+01	3.96E+01	1.52E+01

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L: Dissolved WLA (lbs/day)	7Q10L: Translator	7Q10L: Total WLA (lbs/day)	10th Percentile: Dissolved WLA (lbs/day)	10th Percentile: Translator	10th Percentile: Total WLA (lbs/day)
PC329 North Amy	0.322	0.479	3.77E-01	1.00E+00	3.77E-01	5.47E-01	1.00E+00	5.47E-01
PC330 Amy	0.005	0.007	5.85E-03	1.00E+00	5.85E-03	8.49E-03	1.00E+00	8.49E-03
PC331 Liberal King	0.005	0.007	5.85E-03	1.00E+00	5.85E-03	8.49E-03	1.00E+00	8.49E-03
PC332 Lookout	0.027	0.040	3.16E-02	1.00E+00	3.16E-02	4.58E-02	1.00E+00	4.58E-02
PC333 Upper Lynch	0.001	0.001	1.17E-03	1.00E+00	1.17E-03	1.70E-03	1.00E+00	1.70E-03
PC334 Lynch/Nabob	0.0006	0.001	7.02E-04	1.00E+00	7.02E-04	1.02E-03	1.00E+00	1.02E-03
PC335 Nevada-Stewart	0.091	0.135	1.07E-01	1.00E+00	1.07E-01	1.54E-01	1.00E+00	1.54E-01
PC336 Highland Surprise	0.038	0.057	4.45E-02	1.00E+00	4.45E-02	6.45E-02	1.00E+00	6.45E-02
PC375 Highland Surp. Waste Rock	0.011	0.016	1.24E-02	1.00E+00	1.24E-02	1.80E-02	1.00E+00	1.80E-02
PC337 Sidney (Red Cloud)	0.006	0.009	7.02E-03	1.00E+00	7.02E-03	1.02E-02	1.00E+00	1.02E-02
PC340 Upper Little Pittsburg	0.002	0.003	2.34E-03	1.00E+00	2.34E-03	3.39E-03	1.00E+00	3.39E-03
PC341 Lower Little Pittsburg	0.006	0.009	7.02E-03	1.00E+00	7.02E-03	1.02E-02	1.00E+00	1.02E-02
PC343 Nabob 1300 Level	0.066	0.098	7.73E-02	1.00E+00	7.73E-02	1.12E-01	1.00E+00	1.12E-01
PC344 Big It	0.001	0.002	1.24E-03	1.00E+00	1.24E-03	1.80E-03	1.00E+00	1.80E-03
PC348 Upper Constitution	0.079	0.117	9.25E-02	1.00E+00	9.25E-02	1.34E-01	1.00E+00	1.34E-01
PC351 Marmion Tunnel	0.009	0.013	1.04E-02	1.00E+00	1.04E-02	1.51E-02	1.00E+00	1.51E-02
PC352 Seep Below Nevada Stewart	0.003	0.004	3.28E-03	1.00E+00	3.28E-03	4.75E-03	1.00E+00	4.75E-03
PC 400 Adit Upstream of Little Pittsburg	0.0004	0.001	4.94E-04	1.00E+00	4.94E-04	7.16E-04	1.00E+00	7.16E-04
Total Effluent Flow	0.672382			**Total Loading**	**7.87E-01**		**Total Loading**	**1.14E+00**

Station ID	50th Percentile: Dissolved WLA (lbs/day)	50th Percentile: Translator	50th Percentile: Total WLA (lbs/day)	90th Percentile: Dissolved WLA (lbs/day)	90th Percentile: Translator	90th Percentile: Total WLA (lbs/day)
PC329 North Amy	1.51E+00	1.00E+00	1.51E+00	7.29E+00	1.00E+00	7.29E+00
PC330 Amy	2.34E-02	1.00E+00	2.34E-02	1.13E-01	1.00E+00	1.13E-01
PC331 Liberal King	2.34E-02	1.00E+00	2.34E-02	1.13E-01	1.00E+00	1.13E-01
PC332 Lookout	1.26E-01	1.00E+00	1.26E-01	6.12E-01	1.00E+00	6.12E-01
PC333 Upper Lynch	4.68E-03	1.00E+00	4.68E-03	2.27E-02	1.00E+00	2.27E-02
PC334 Lynch/Nabob	2.81E-03	1.00E+00	2.81E-03	1.36E-02	1.00E+00	1.36E-02
PC335 Nevada-Stewart	4.26E-01	1.00E+00	4.26E-01	2.06E+00	1.00E+00	2.06E+00
PC336 Highland Surprise	1.78E-01	1.00E+00	1.78E-01	8.61E-01	1.00E+00	8.61E-01
PC375 Highland Surp. Waste Rock	4.96E-02	1.00E+00	4.96E-02	2.40E-01	1.00E+00	2.40E-01
PC337 Sidney (Red Cloud)	2.81E-02	1.00E+00	2.81E-02	1.36E-01	1.00E+00	1.36E-01
PC340 Upper Little Pittsburg	9.37E-03	1.00E+00	9.37E-03	4.53E-02	1.00E+00	4.53E-02
PC341 Lower Little Pittsburg	2.81E-02	1.00E+00	2.81E-02	1.36E-01	1.00E+00	1.36E-01
PC343 Nabob 1300 Level	3.09E-01	1.00E+00	3.09E-01	1.50E+00	1.00E+00	1.50E+00
PC344 Big It	4.96E-03	1.00E+00	4.96E-03	2.40E-02	1.00E+00	2.40E-02
PC348 Upper Constitution	3.70E-01	1.00E+00	3.70E-01	1.79E+00	1.00E+00	1.79E+00
PC351 Marmion Tunnel	4.17E-02	1.00E+00	4.17E-02	2.02E-01	1.00E+00	2.02E-01
PC352 Seep Below Nevada Stewart	1.31E-02	1.00E+00	1.31E-02	6.34E-02	1.00E+00	6.34E-02
PC 400 Adit Upstream of Little Pittsburg	1.98E-03	1.00E+00	1.98E-03	9.56E-03	1.00E+00	9.56E-03
		Total Loading	**3.15E+00**		**Total Loading**	**1.52E+01**

South Fork Coeur d'Alene River Basin
TMDL Allocations
Zinc (Zn)

South Fork Coeur d'Alene River @ Pinehurst
URS Greiner Station ID 271

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity (lbs/day)	Allocated Loading: 100% (lbs/day)	Allocated Loading: Safety 10% (lbs/day)	Allocated Loading: Non-Discrete 65% (lbs/day)	Allocated Loading: Discrete 25% (lbs/day)	Final Loading: Non-Discrete (lbs/day)	Final Loading: Discrete (lbs/day)
7Q10L	68	3.87E+01	2.237E+00	7.15E+00	2.93E+01	2.93E+00	1.90E+01	7.32E+00	1.90E+01	7.32E+00
10th Percentile	97	5.28E+01	3.191E+00	1.09E+01	3.88E+01	3.88E+00	2.52E+01	9.69E+00	2.52E+01	9.69E+00
50th Percentile	268	1.13E+02	8.818E+00	2.47E+01	7.95E+01	7.95E+00	5.17E+01	1.99E+01	5.17E+01	1.99E+01
90th Percentile	1290	2.47E+02	4.244E+01	9.77E+01	1.07E+02	1.07E+01	6.96E+01	2.68E+01	6.96E+01	2.68E+01

Loading Allocations By Source

Station ID	Average Discharge (cfs)	Proportion of Discharge	7Q10L Dissolved WLA (lbs/day)	7Q10L Translator	7Q10L Total WLA (lbs/day)	10th Percentile Dissolved WLA (lbs/day)	10th Percentile Translator	10th Percentile Total WLA (lbs/day)
SF382 Silver Dollar	0.015	0.001	7.31E-03	1.00E+00	7.31E-03	9.68E-03	1.00E+00	9.68E-03
SF393 Western Union (Lower Adit)	0.001	0.0001	4.87E-04	1.00E+00	4.87E-04	6.46E-04	1.00E+00	6.46E-04
SF3 CTP	4.990	0.332	2.43E+00	1.00E+00	2.43E+00	3.22E+00	1.00E+00	3.22E+00
SF620 Page STP	3.870	0.258	1.89E+00	1.00E+00	1.89E+00	2.50E+00	1.00E+00	2.50E+00
SF383 St Joe	0.007	0.0005	3.41E-03	1.00E+00	3.41E-03	4.52E-03	1.00E+00	4.52E-03
SF384 Coeur d'alene (Mineral Point)	0.005	0.0003	2.44E-03	1.00E+00	2.44E-03	3.23E-03	1.00E+00	3.23E-03
SF385 Unnamed Location (adit)	0.001	0.00005	3.41E-04	1.00E+00	3.41E-04	4.52E-04	1.00E+00	4.52E-04
SF600 Caladay	0.210	0.014	1.02E-01	1.00E+00	1.02E-01	1.36E-01	1.00E+00	1.36E-01
SF602 Silver Valley Galena	1.300	0.087	6.34E-01	1.00E+00	6.34E-01	8.39E-01	1.00E+00	8.39E-01
SF623 Smelterville STP	0.421	0.028	2.05E-01	1.00E+00	2.05E-01	2.72E-01	1.00E+00	2.72E-01
SF624 Sunshine 001,SUN-1	3.120	0.208	1.52E+00	1.00E+00	1.52E+00	2.01E+00	1.00E+00	2.01E+00
Silver Valley (Coeur)	0.775	0.052	3.78E-01	1.00E+00	3.78E-01	5.00E-01	1.00E+00	5.00E-01
Consolidated Silver	0.300	0.020	1.46E-01	1.00E+00	1.46E-01	1.94E-01	1.00E+00	1.94E-01
Total Effluent Flow	15.014818			Total Loading	7.32E+00		Total Loading	9.69E+00

Station ID	50th Percentile Dissolved WLA (lbs/day)	50th Percentile Translator	50th Percentile Total WLA (lbs/day)	90th Percentile Dissolved WLA (lbs/day)	90th Percentile Translator	90th Percentile Total WLA (lbs/day)
SF382 Silver Dollar	1.99E-02	1.00E+00	1.99E-02	2.67E-02	1.00E+00	2.67E-02
SF393 Western Union (Lower Adit)	1.32E-03	1.00E+00	1.32E-03	1.78E-03	1.00E+00	1.78E-03
SF3 CTP	6.60E+00	1.00E+00	6.60E+00	8.90E+00	1.00E+00	8.90E+00
SF620 Page STP	5.12E+00	1.00E+00	5.12E+00	6.90E+00	1.00E+00	6.90E+00
SF383 St Joe	9.26E-03	1.00E+00	9.26E-03	1.25E-02	1.00E+00	1.25E-02
SF384 Coeur d'alene (Mineral Point)	6.62E-03	1.00E+00	6.62E-03	8.92E-03	1.00E+00	8.92E-03
SF385 Unnamed Location (adit)	9.26E-04	1.00E+00	9.26E-04	1.25E-03	1.00E+00	1.25E-03
SF600 Caladay	2.78E-01	1.00E+00	2.78E-01	3.74E-01	1.00E+00	3.74E-01
SF602 Silver Valley Galena	1.72E+00	1.00E+00	1.72E+00	2.32E+00	1.00E+00	2.32E+00
SF623 Smelterville STP	5.57E-01	1.00E+00	5.57E-01	7.51E-01	1.00E+00	7.51E-01
SF624 Sunshine 001,SUN-1	4.13E+00	1.00E+00	4.13E+00	5.56E+00	1.00E+00	5.56E+00
Silver Valley (Coeur)	1.03E+00	1.00E+00	1.03E+00	1.38E+00	1.00E+00	1.38E+00
Consolidated Silver	3.97E-01	1.00E+00	3.97E-01	5.35E-01	1.00E+00	5.35E-01
		Total Loading	1.99E+01		Total Loading	2.68E+01

South Fork Coeur d'Alene River Basin
TMDL Allocations
Zinc (Zn)

North Fork Coeur d'Alene River @ Enaville
URS Greiner Station ID 400

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)
7Q10L	165	2.87E+01	4.45E+00
10th Percentile	253	4.41E+01	6.82E+00
50th Percentile	845	1.47E+02	2.28E+01
90th Percentile	5,090	8.86E+02	1.37E+02

South Fork Coeur d'Alene River Basin TMDL Allocations Zinc (Zn)	

Coeur d'Alene River @ Harrison

	Discharge cfs	Loading Capacity (lbs/day)	Zinc Background (lbs/day)	Used Capacity[1] (lbs/day)	Allocated Loading 100% (lbs/day)	Safety 10% (lbs/day)	Non-Discrete 90% (lbs/day)	Discrete 0% (lbs/day)
7Q10L	239	7.10E+01	6.854E+00	3.37E+01	3.04E+01	3.04E+00	2.74E+01	0.00E+00
10th Percentile	348	9.97E+01	9.988E+00	4.56E+01	4.41E+01	4.41E+00	3.97E+01	0.00E+00
50th Percentile	1,100	2.61E+02	3.157E+01	1.02E+02	1.27E+02	1.27E+01	1.14E+02	0.00E+00
90th Percentile	6,870	1.20E+03	1.972E+02	2.44E+02	7.55E+02	7.55E+01	6.79E+02	0.00E+00

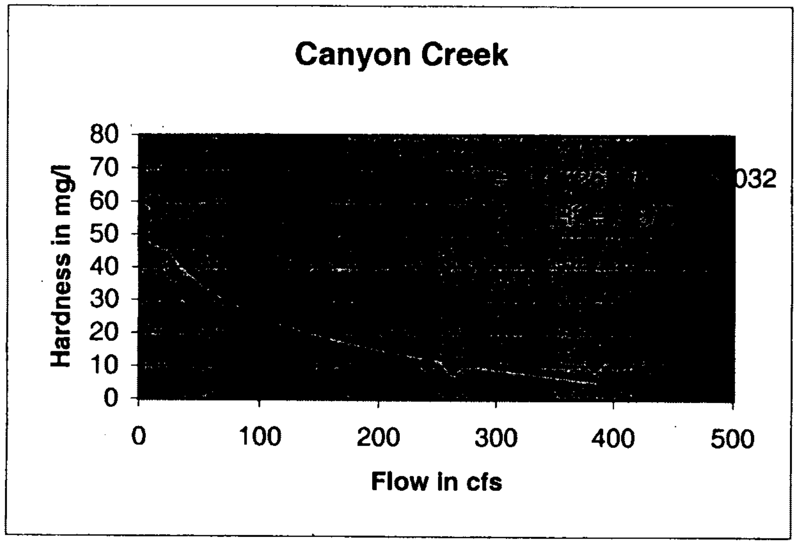
[1] Used Capacity includes total loading allocations for South Fork Coeur d'Alene River and background allocations for the North Fork Coeur d'Alene River

APPENDIX I : HARDNESS DATA

Canyon Creek

											ln(flow)
CC	287	6/7/94 12:00	Hardness	24	mg/l	FLOW	7-Jun-94	63.45	cfs	IDEQ	4.15
CC	287	10/27/93 12:00	Hardness	56	mg/l	FLOW	27-Oct-93	13.28	cfs	IDEQ	2.59
CC	287	12/17/93 12:00	Hardness	72	mg/l	FLOW	17-Dec-93	11.7	cfs	IDEQ	2.46
CC	287	4/19/94 12:00	Hardness	28	mg/l	FLOW	19-Apr-94	300	cfs	IDEQ	5.70
CC	287	7/25/94 12:00	Hardness	48	mg/l	FLOW	25-Jul-94	19.04	cfs	IDEQ	2.95
CC	287	4/7/94 12:00	Hardness	32	mg/l	FLOW	7-Apr-94	37.82	cfs	IDEQ	3.63
CC	287	6/23/94 12:00	Hardness	38	mg/l	FLOW	23-Jun-94	28.96	cfs	IDEQ	3.37
CC	287	9/13/94 12:00	Hardness	52	mg/l	FLOW	13-Sep-94	15.89	cfs	IDEQ	2.77
CC	287	5/4/94 12:00	Hardness	24	mg/l	FLOW	4-May-94	111.05	cfs	IDEQ	4.71
CC	287	2/18/94 12:00	Hardness	60	mg/l	FLOW	18-Feb-94	11.41	cfs	IDEQ	2.43
CC	287	1/20/94 12:00	Hardness	64	mg/l	FLOW	20-Jan-94	13.28	cfs	IDEQ	2.59
CC	287	3/24/94 12:00	Hardness	48	mg/l	FLOW	24-Mar-94	21.13	cfs	IDEQ	3.05
CC	287	5/19/94 12:00	Hardness	16	mg/l	FLOW	19-May-94	102.01	cfs	IDEQ	4.63
CC	287	11/30/93 12:00	Hardness	64	mg/l	FLOW	30-Nov-93	12.62	cfs	IDEQ	2.54
CC	287	8/16/94 12:00	Hardness	52	mg/l	FLOW	16-Aug-94	16.3	cfs	IDEQ	2.79
CC	287	3/8/94 12:00	Hardness	48	mg/l	FLOW	8-Mar-94	22.26	cfs	IDEQ	3.10
CC	288	11/18/98 12:00	Hardness	57	mg/l	FLOWUSGS	18-Nov-98	16	cfs	USGS	2.77
CC	288	5/27/99 9:00	Hardness	11	mg/l	FLOWUSGS	27-May-99	261	cfs	USGS	5.56
CC	288	5/24/99 4:30	Hardness	11	mg/l	FLOWUSGS	24-May-99	384	cfs	USGS	5.95
CC	288	12/28/98 2:15	Hardness	47	mg/l	FLOWUSGS	28-Dec-98	27	cfs	USGS	3.30
CC	288	10/26/98 1:20	Hardness	52	mg/l	FLOWUSGS	26-Oct-98	13	cfs	USGS	2.56
CC	288	3/23/99 8:45	Hardness	31	mg/l	FLOWUSGS	23-Mar-99	97	cfs	USGS	4.57
CC	288	12/15/98 12:25	Hardness	48	mg/l	FLOWUSGS	15-Dec-98	25	cfs	USGS	3.22
CC	288	10/26/98 1:15	Hardness	49	mg/l	FLOWUSGS	26-Oct-98	13	cfs	USGS	2.56
CC	288	4/19/99 11:00	Hardness	22	mg/l	FLOWUSGS	19-Apr-99	138	cfs	USGS	4.93
CC	288	6/15/99 9:15	Hardness	10	mg/l	FLOWUSGS	15-Jun-99	263	cfs	USGS	5.57
CC	288	5/5/99 12:55	Hardness	21	mg/l	FLOWUSGS	5-May-99	84	cfs	USGS	4.43
CC	288	6/2/99 10:30	Hardness	11	mg/l	FLOWUSGS	2-Jun-99	241	cfs	USGS	5.48

min	11.41
max	384



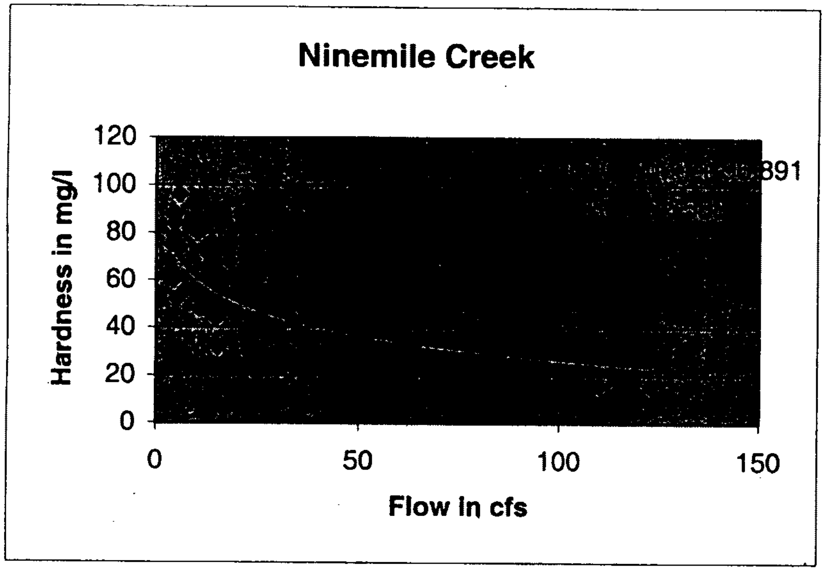
flow tiers	flow	ln(flow)	5% hardness	
7Q10	11	2.40	56	(*)
10th	11	2.40	56	
50th	25	3.22	45	
90th	149	5.00	18	

* prediction calculated using lowest measured flow of 11 cfs

Ninemile Creek

											ln(flow)
NM	305	5/5/99 2:00	Hardness	43	mg/l	:LOWUSG:	5-May-99	34	cfs	USGS	3.53
NM	305	5/27/99 7:45	Hardness	16	mg/l	:LOWUSG:	27-May-99	110	cfs	USGS	4.70
NM	305	3/23/94 12:00	Hardness	84	mg/l	FLOW	23-Mar-94	12.97	cfs	IDEQ	2.56
NM	305	6/23/94 12:00	Hardness	56	mg/l	FLOW	23-Jun-94	7.39	cfs	IDEQ	2.00
NM	305	10/27/98 11:35	Hardness	61	mg/l	:LOWUSG:	27-Oct-98	3.2	cfs	USGS	1.16
NM	305	5/31/99 12:30	Hardness	17	mg/l	:LOWUSG:	31-May-99	55	cfs	USGS	4.01
NM	305	12/10/98 8:05	Hardness	74	mg/l	:LOWUSG:	10-Dec-98	6	cfs	USGS	1.79
NM	305	10/28/93 12:00	Hardness	79	mg/l	FLOW	28-Oct-93	4.7	cfs	IDEQ	1.55
NM	305	6/7/94 12:00	Hardness	48	mg/l	FLOW	7-Jun-94	10.72	cfs	IDEQ	2.37
NM	305	12/16/93 12:00	Hardness	88	mg/l	FLOW	16-Dec-93	4.8	cfs	IDEQ	1.57
NM	305	9/8/94 12:00	Hardness	64	mg/l	FLOW	8-Sep-94	3.91	cfs	IDEQ	1.36
NM	305	3/22/99 2:05	Hardness	56	mg/l	:LOWUSG:	22-Mar-99	78	cfs	USGS	4.36
NM	305	6/15/99 2:15	Hardness	16	mg/l	:LOWUSG:	15-Jun-99	49	cfs	USGS	3.89
NM	305	1/21/99 11:25	Hardness	71	mg/l	:LOWUSG:	21-Jan-99	13	cfs	USGS	2.56
NM	305	8/15/94 12:00	Hardness	60	mg/l	FLOW	15-Aug-94	4.32	cfs	IDEQ	1.46
NM	305	4/19/99 1:00	Hardness	48	mg/l	:LOWUSG:	19-Apr-99	80	cfs	USGS	4.38
NM	305	11/19/98 8:55	Hardness	75	mg/l	:LOWUSG:	19-Nov-98	4	cfs	USGS	1.39
NM	305	4/19/94 12:00	Hardness	46	mg/l	FLOW	19-Apr-94	86.89	cfs	IDEQ	4.46
NM	305	1/24/94 12:00	Hardness	96	mg/l	FLOW	24-Jan-94	5.87	cfs	IDEQ	1.77
NM	305	2/18/94 12:00	Hardness	88	mg/l	FLOW	18-Feb-94	4.11	cfs	IDEQ	1.41
NM	305	5/23/99 1:55	Hardness	24	mg/l	:LOWUSG:	23-May-99	61	cfs	USGS	4.11
NM	305	5/4/94 12:00	Hardness	44	mg/l	FLOW	4-May-94	14.89	cfs	IDEQ	2.70
NM	305	4/7/94 12:00	Hardness	68	mg/l	FLOW	7-Apr-94	18.12	cfs	IDEQ	2.90
NM	305	7/20/94 12:00	Hardness	52	mg/l	FLOW	20-Jul-94	5.16	cfs	IDEQ	1.64
NM	305	5/20/94 12:00	Hardness	32	mg/l	FLOW	20-May-94	15.31	cfs	IDEQ	2.73
NM	305	12/2/93 12:00	Hardness	84	mg/l	FLOW	2-Dec-93	4.7	cfs	IDEQ	1.55
NM	305	5/26/99 8:45	Hardness	16	mg/l	:LOWUSG:	26-May-99	123	cfs	USGS	4.81
NM	305	3/8/94 12:00	Hardness	80	mg/l	FLOW	8-Mar-94	10.44	cfs	IDEQ	2.35

min	3.2
max	123



flow tiers	flow	ln(flow)	5% hardness	
7Q10	**3.2**	1.16	73	(*)
10th	**3.2**	1.16	73	(*)
50th	6.9	1.93	63	
90th	41	3.71	36	

* prediction calculated using lowest measured flow of 3.2 cfs

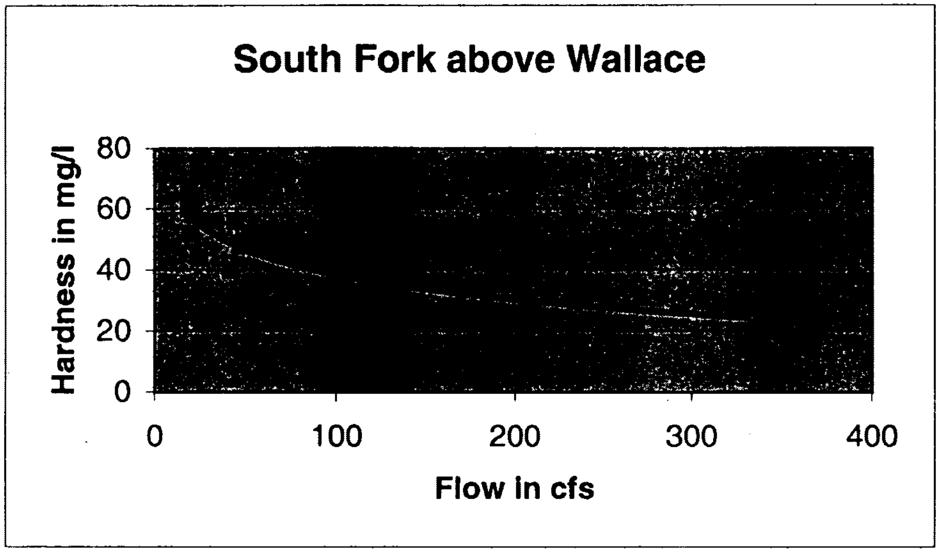
South Fork above Wallace

											ln(flow)
SF	220	10/26/93 12:00	Hardness	58	mg/l	FLOW	26-Oct-93	21.26	cfs	IDEQ	3.06
SF	220	11/30/93 12:00	Hardness	60	mg/l	FLOW	30-Nov-93	19.68	cfs	IDEQ	2.98
SF	220	1/19/94 12:00	Hardness	64	mg/l	FLOW	19-Jan-94	22.52	cfs	IDEQ	3.11
SF	220	6/24/94 12:00	Hardness	40	mg/l	FLOW	24-Jun-94	41.99	cfs	IDEQ	3.74
SF	220	9/9/94 12:00	Hardness	52	mg/l	FLOW	9-Sep-94	19.68	cfs	IDEQ	2.98
SF	220	3/23/94 12:00	Hardness	56	mg/l	FLOW	23-Mar-94	44.55	cfs	IDEQ	3.80
SF	220	7/23/94 12:00	Hardness	44	mg/l	FLOW	23-Jul-94	24.81	cfs	IDEQ	3.21
SF	220	4/6/94 12:00	Hardness	36	mg/l	FLOW	6-Apr-94	133.87	cfs	IDEQ	4.90
SF	220	5/20/94 12:00	Hardness	28	mg/l	FLOW	20-May-94	167.55	cfs	IDEQ	5.12
SF	220	6/8/94 12:00	Hardness	32	mg/l	FLOW	8-Jun-94	76.11	cfs	IDEQ	4.33
SF	220	4/18/94 12:00	Hardness	36	mg/l	FLOW	18-Apr-94	331.49	cfs	IDEQ	5.80
SF	220	8/16/94 12:00	Hardness	60	mg/l	FLOW	16-Aug-94	20.06	cfs	IDEQ	3.00
SF	220	5/3/94 12:00	Hardness	28	mg/l	FLOW	3-May-94	160.83	cfs	IDEQ	5.08
SF	220	3/7/94 12:00	Hardness	48	mg/l	FLOW	7-Mar-94	47.26	cfs	IDEQ	3.86
SF	220	2/15/94 12:00	Hardness	60	mg/l	FLOW	15-Feb-94	18.94	cfs	IDEQ	2.94
SF	220	12/20/93 12:00	Hardness	66	mg/l	FLOW	20-Dec-93	18.94	cfs	IDEQ	2.94

min	18.94
max	331.49

flow tiers	flows	ln(flows)	5% hardness
7Q10	**19**	2.94	55 (*)
10th	21	3.04	54
50th	47	3.85	45
90th	279	5.63	21

* prediction calculated using lowest measured flow of 19 cfs



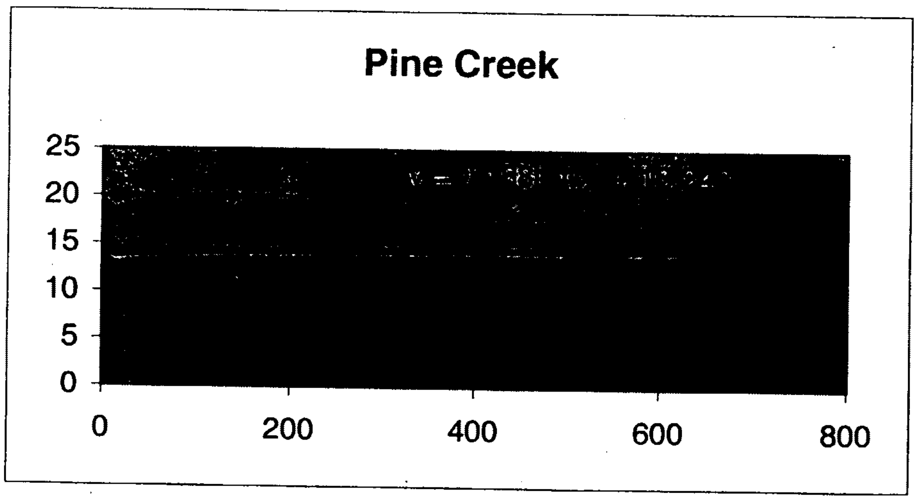
South Fork below Canyon and Ninemile Confluences

flow tiers	flow	flow-weighted 5% hardness
7Q10	**33.2**	57 (**)
10th	35.2	56
50th	78.9	47
90th	469	21

** The combined lowest flows are higher than predicted 7Q10 Therefore, 10th percentile is used for both flow tiers

Pine Creek

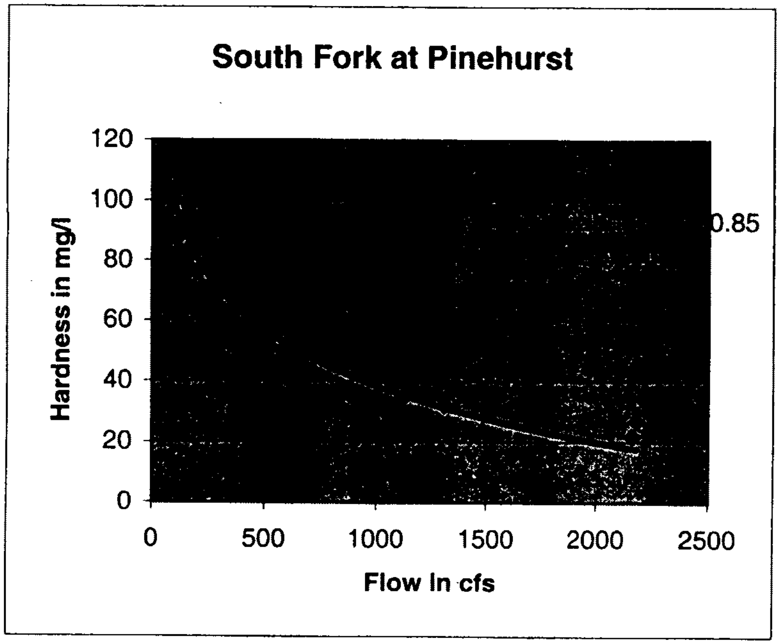
PC	305	6/8/94 12:00	Hardness	8	mg/l	FLOW	8-Jun-94	39.8	cfs	IDEQ
PC	305	9/26/94 12:00	Hardness	8	mg/l	FLOW	26-Sep-94	19.75	cfs	IDEQ
PC	305	8/17/94 12:00	Hardness	4	mg/l	FLOW	17-Aug-94	19.75	cfs	IDEQ
PC	305	1/21/94 12:00	Hardness	16	mg/l	FLOW	21-Jan-94	44.92	cfs	IDEQ
PC	305	10/29/93 12:00	Hardness	20	mg/l	FLOW	29-Oct-93	14.04	cfs	IDEQ
PC	305	2/17/94 12:00	Hardness	20	mg/l	FLOW	17-Feb-94	17.53	cfs	IDEQ
PC	305	3/23/94 12:00	Hardness	20	mg/l	FLOW	23-Mar-94	137.43	cfs	IDEQ
PC	305	4/8/94 12:00	Hardness	12	mg/l	FLOW	8-Apr-94	148.7	cfs	IDEQ
PC	305	4/18/94 12:00	Hardness	16	mg/l	FLOW	18-Apr-94	665.65	cfs	IDEQ
PC	305	5/3/94 12:00	Hardness	8	mg/l	FLOW	3-May-94	135.26	cfs	IDEQ
PC	305	12/21/93 12:00	Hardness	16	mg/l	FLOW	21-Dec-93	21.18	cfs	IDEQ
PC	305	6/24/94 12:00	Hardness	20	mg/l	FLOW	24-Jun-94	25.41	cfs	IDEQ
PC	305	5/19/94 12:00	Hardness	8	mg/l	FLOW	19-May-94	81.81	cfs	IDEQ
PC	305	3/8/94 12:00	Hardness	20	mg/l	FLOW	8-Mar-94	153.41	cfs	IDEQ



South Fork at Pinehurst

											ln(flow)
SF	271	2/17/94 12:00	Hardness	104	mg/l	FLOW	17-Feb-94	122	cfs	IDEQ	4.80
SF	271	6/2/99 7:45	Hardness	22	mg/l	:LOWUSG:	2-Jun-99	2160	cfs	USGS	7.68
SF	271	11/30/93 12:00	Hardness	104	mg/l	FLOW	30-Nov-93	105	cfs	IDEQ	4.65
SF	271	7/23/94 12:00	Hardness	88	mg/l	FLOW	23-Jul-94	116	cfs	IDEQ	4.75
SF	271	12/21/93 12:00	Hardness	92	mg/l	FLOW	21-Dec-93	130	cfs	IDEQ	4.87
SF	271	12/9/98 12:10	Hardness	90	mg/l	:LOWUSG:	9-Dec-98	275	cfs	USGS	5.62
SF	271	12/9/98 12:00	Hardness	85	mg/l	:LOWUSG:	9-Dec-98	275	cfs	USGS	5.62
SF	271	12/30/98 2:45	Hardness	36	mg/l	:LOWUSG:	30-Dec-98	1180	cfs	USGS	7.07
SF	271	4/20/99 2:00	Hardness	27	mg/l	:LOWUSG:	20-Apr-99	2180	cfs	USGS	7.69
SF	271	10/29/93 12:00	Hardness	100	mg/l	FLOW	29-Oct-93	100	cfs	IDEQ	4.61
SF	271	4/18/94 12:00	Hardness	32	mg/l	FLOW	18-Apr-94	1310	cfs	IDEQ	7.18
SF	271	4/13/99 7:30	Hardness	53	mg/l	:LOWUSG:	13-Apr-99	610	cfs	USGS	6.41
SF	271	10/26/98 10:15	Hardness	90	mg/l	:LOWUSG:	26-Oct-98	98	cfs	USGS	4.58
SF	271	11/17/98 12:50	Hardness	96	mg/l	:LOWUSG:	17-Nov-98	162	cfs	USGS	5.09
SF	271	11/17/98 12:55	Hardness	98	mg/l	:LOWUSG:	17-Nov-98	162	cfs	USGS	5.09
SF	271	3/9/99 9:25	Hardness	54	mg/l	:LOWUSG:	9-Mar-99	446	cfs	USGS	6.10
SF	271	2/8/99 3:00	Hardness	51	mg/l	:LOWUSG:	8-Feb-99	527	cfs	USGS	6.27
SF	271	5/6/99 1:30	Hardness	35	mg/l	:LOWUSG:	6-May-99	1130	cfs	USGS	7.03
SF	271	5/20/94 12:00	Hardness	40	mg/l	FLOW	20-May-94	542	cfs	IDEQ	6.30
SF	271	3/7/94 12:00	Hardness	50	mg/l	FLOW	7-Mar-94	580	cfs	IDEQ	6.36
SF	271	6/8/94 12:00	Hardness	52	mg/l	FLOW	8-Jun-94	346	cfs	IDEQ	5.85
SF	271	8/16/94 12:00	Hardness	100	mg/l	FLOW	16-Aug-94	79	cfs	IDEQ	4.37
SF	271	3/23/94 12:00	Hardness	66	mg/l	FLOW	23-Mar-94	502	cfs	IDEQ	6.22
SF	271	4/6/94 12:00	Hardness	40	mg/l	FLOW	6-Apr-94	632	cfs	IDEQ	6.45
SF	271	5/3/94 12:00	Hardness	40	mg/l	FLOW	3-May-94	612	cfs	IDEQ	6.42
SF	271	6/24/94 12:00	Hardness	76	mg/l	FLOW	24-Jun-94	198	cfs	IDEQ	5.29
SF	271	1/21/94 12:00	Hardness	76	mg/l	FLOW	21-Jan-94	205	cfs	IDEQ	5.32
							min	79			

max 2180

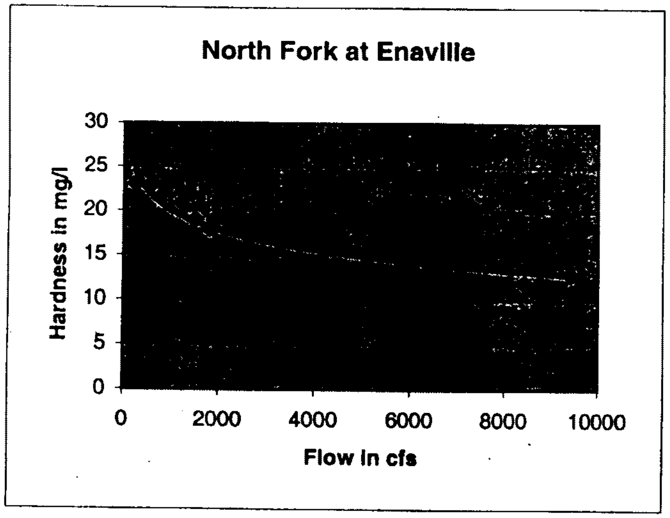


flow tiers	flow	ln(flow)	5% hardness	
7Q10	**79**	4.37	101	(*)
10th	97	4.57	96	
50th	268	5.59	71	
90th	1290	7.16	28	

* prediction calculated using lowest measured flow of 79 cfs

North Fork at Enaville

NF	50	4/20/99 11:20	Hardness	13	mg/l	:LOWUSG:	20-Apr-99	9400	cfs	USGS
NF	50	5/6/99 10:10	Hardness	17	mg/l	:LOWUSG:	6-May-99	4900	cfs	USGS
NF	50	3/8/99 2:45	Hardness	18	mg/l	:LOWUSG:	8-Mar-99	1880	cfs	USGS
NF	50	10/20/98 3:30	Hardness	23	mg/l	:LOWUSG:	20-Oct-98	246	cfs	USGS
NF	50	5/27/99 2:30	Hardness	12	mg/l	:LOWUSG:	27-May-99	8420	cfs	USGS
NF	50	6/2/99 10:15	Hardness	13	mg/l	:LOWUSG:	2-Jun-99	5820	cfs	USGS
NF	50	12/15/98 8:00	Hardness	19	mg/l	:LOWUSG:	15-Dec-98	1900	cfs	USGS
NF	50	11/17/98 9:00	Hardness	23	mg/l	:LOWUSG:	17-Nov-98	595	cfs	USGS
NF	50	2/8/99 12:55	Hardness	19	mg/l	:LOWUSG:	8-Feb-99	1490	cfs	USGS
NF	50	4/13/99 10:30	Hardness	17	mg/l	:LOWUSG:	13-Apr-99	2630	cfs	USGS
NF	50	1/27/99 11:30	Hardness	18	mg/l	:LOWUSG:	27-Jan-99	1800	cfs	USGS



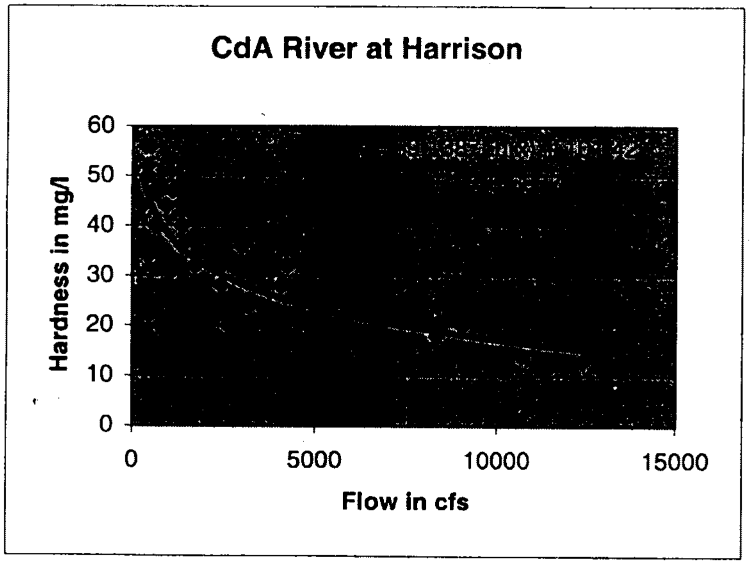
CdA River at Harrison

												ln(flow)
LC	60	3S HARRIS	11/16/98 11:30	Hardness	47	mg/l	:LOWUSG:	16-Nov-98	1100	cfs	USGS	7.00
LC	60	3S HARRIS	4/21/99 11:15	Hardness	14	mg/l	:LOWUSG:	21-Apr-99	10700	cfs	USGS	9.28
LC	60	3S HARRIS	6/17/99 9:45	Hardness	16	mg/l	:LOWUSG:	17-Jun-99	6150	cfs	USGS	8.72
LC	60	3S HARRIS	12/14/98 11:15	Hardness	32	mg/l	:LOWUSG:	14-Dec-98	2440	cfs	USGS	7.80
LC	60	3S HARRIS	3/23/99 12:15	Hardness	17	mg/l	:LOWUSG:	23-Mar-99	7850	cfs	USGS	8.97
LC	60	3S HARRIS	5/27/99 9:00	Hardness	13	mg/l	:LOWUSG:	27-May-99	12400	cfs	USGS	9.43
LC	60	3S HARRIS	5/6/99 1:30	Hardness	18	mg/l	:LOWUSG:	6-May-99	8320	cfs	USGS	9.03

Hardness	44	mg/l	IDEQ	10/6/94	281	cfs	IDEQ	5.64
Hardness	34	mg/l	IDEQ	11/22/94	444	cfs	IDEQ	6.10
Hardness	20	mg/l	IDEQ	12/16/94	774	cfs	IDEQ	6.65
Hardness	20	mg/l	IDEQ	1/12/95	4822	cfs	IDEQ	8.48
Hardness	20	mg/l	IDEQ	2/16/95	2626	cfs	IDEQ	7.87
Hardness	20	mg/l	IDEQ	3/7/95	3326	cfs	IDEQ	8.11
Hardness	24	mg/l	IDEQ	3/23/95	8328	cfs	IDEQ	9.03
Hardness	32	mg/l	IDEQ	4/14/95	4631	cfs	IDEQ	8.44
Hardness	32	mg/l	IDEQ	4/25/95	4235	cfs	IDEQ	8.35
Hardness	24	mg/l	IDEQ	5/11/95	5456	cfs	IDEQ	8.60
Hardness	24	mg/l	IDEQ	5/24/95	3064	cfs	IDEQ	8.03
Hardness	32	mg/l	IDEQ	6/12/95	1723	cfs	IDEQ	7.45
Hardness	36	mg/l	IDEQ	6/28/95	1369	cfs	IDEQ	7.22
Hardness	44	mg/l	IDEQ	7/12/95	934	cfs	IDEQ	6.84
Hardness	40	mg/l	IDEQ	7/26/95	634	cfs	IDEQ	6.45
Hardness	56	mg/l	IDEQ	8/15/95	504	cfs	IDEQ	6.22
Hardness	52	mg/l	IDEQ	9/14/95	414	cfs	IDEQ	6.03
Hardness	40	mg/l	IDEQ	10/18/95	1377	cfs	IDEQ	7.23
Hardness	24	mg/l	IDEQ	11/21/95	3172	cfs	IDEQ	8.06
Hardness	28	mg/l	IDEQ	12/28/95	2430	cfs	IDEQ	7.80
Hardness	20	mg/l	IDEQ	1/18/96	9036	cfs	IDEQ	9.11
Hardness	28	mg/l	IDEQ	2/28/96	4063	cfs	IDEQ	8.31
Hardness	36	mg/l	IDEQ	3/27/96	2986	cfs	IDEQ	8.00
Hardness	28	mg/l	IDEQ	4/18/96	7272	cfs	IDEQ	8.89
Hardness	24	mg/l	IDEQ	5/9/96	3508	cfs	IDEQ	8.16
Hardness	32	mg/l	IDEQ	6/20/96	1733	cfs	IDEQ	7.46
Hardness	40	mg/l	IDEQ	7/23/96	711	cfs	IDEQ	6.57

Hardness	50	mg/l	IDEQ	8/21/96	427	cfs	IDEQ	6.06
Hardness	56	mg/l	IDEQ	9/26/96	368	cfs	IDEQ	5.91

min	281
max	12400



flow tiers	flow	ln(flow)	5% hardness	
7Q10	**281**	5.64	47	(*)
10th	348	5.85	45	
50th	1100	7.00	36	
90th	6870	8.83	19	

* prediction calculated using lowest measured flow of 281 cfs

APPENDIX J : TRANSLATOR DATA

Canyon Creek

Site ID		Date	Method	Metal	Result	Diss/Total		sqrt	arcsine
					(ug/L)				
CC	288	09-Nov-97	Dissolved	Cadmium	20.2				
CC	288	09-Nov-97	Total	Cadmium	18.2				
CC	287	05-Oct-91	Dissolved	Cadmium	21.6				
CC	287	05-Oct-91	Total	Cadmium	20.8				
CC	287	27-Oct-93	Total	Cadmium	22				
CC	287	27-Oct-93	Dissolved	Cadmium	26				
CC	287	30-Nov-93	Total	Cadmium	22				
CC	287	30-Nov-93	Dissolved	Cadmium	26				
CC	287	17-Dec-93	Total	Cadmium	33	0.94		0.97	1.32
CC	287	17-Dec-93	Dissolved	Cadmium	31				
CC	287	20-Jan-94	Dissolved	Cadmium	33	0.87		0.93	1.20
CC	287	20-Jan-94	Total	Cadmium	38				
CC	287	18-Feb-94	Total	Cadmium	30	0.93		0.97	1.31
CC	287	18-Feb-94	Dissolved	Cadmium	28				
CC	287	08-Mar-94	Total	Cadmium	26				
CC	287	08-Mar-94	Dissolved	Cadmium	27				
CC	287	24-Mar-94	Total	Cadmium	26				
CC	287	24-Mar-94	Dissolved	Cadmium	27				
CC	287	07-Apr-94	Total	Cadmium	18	0.94		0.97	1.33
CC	287	07-Apr-94	Dissolved	Cadmium	17				
CC	287	19-Apr-94	Total	Cadmium	8.6	0.81		0.90	1.12
CC	287	19-Apr-94	Dissolved	Cadmium	7				
CC	287	04-May-94	Total	Cadmium	8.2				
CC	287	04-May-94	Dissolved	Cadmium	8.3				
CC	287	19-May-94	Dissolved	Cadmium	7.5	0.97		0.99	1.41
CC	287	19-May-94	Total	Cadmium	7.7				
CC	287	07-Jun-94	Dissolved	Cadmium	11	0.92		0.96	1.28
CC	287	07-Jun-94	Total	Cadmium	12				
CC	287	23-Jun-94	Dissolved	Cadmium	13	0.93		0.96	1.30
CC	287	23-Jun-94	Total	Cadmium	14				
CC	287	25-Jul-94	Total	Cadmium	18	0.89		0.94	1.23
CC	287	25-Jul-94	Dissolved	Cadmium	16				
CC	287	16-Aug-94	Total	Cadmium	19				
CC	287	16-Aug-94	Dissolved	Cadmium	20				
CC	287	13-Sep-94	Dissolved	Cadmium	20	0.95		0.98	1.35
CC	287	13-Sep-94	Total	Cadmium	21				
CC	287	16-Oct-94	Total	Cadmium	21	0.95		0.98	1.35
CC	287	16-Oct-94	Dissolved	Cadmium	20				
CC	287	16-Nov-94	Dissolved	Cadmium	32	1.00		1.00	1.57
CC	287	16-Nov-94	Total	Cadmium	32				
CC	287	13-Dec-94	Total	Cadmium	38				
CC	287	13-Dec-94	Dissolved	Cadmium	41				
CC	287	10-Jan-95	Dissolved	Cadmium	38	0.97		0.99	1.41
CC	287	10-Jan-95	Total	Cadmium	39				
CC	287	09-Feb-95	Dissolved	Cadmium	19	1.00		1.00	1.57
CC	287	09-Feb-95	Total	Cadmium	19				

CC	287	08-Mar-95	Total	Cadmium	16	0.94		0.97	1.32
CC	287	08-Mar-95	Dissolved	Cadmium	15				
CC	287	22-Mar-95	Dissolved	Cadmium	21	0.88		0.94	1.21
CC	287	22-Mar-95	Total	Cadmium	24				
CC	287	12-Apr-95	Dissolved	Cadmium	15	1.00		1.00	1.57
CC	287	12-Apr-95	Total	Cadmium	15				
CC	287	25-Apr-95	Dissolved	Cadmium	12	1.00		1.00	1.57
CC	287	25-Apr-95	Total	Cadmium	12				
CC	287	10-May-95	Dissolved	Cadmium	7.8	1.00		1.00	1.57
CC	287	10-May-95	Total	Cadmium	7.8				
CC	287	23-May-95	Total	Cadmium	7	0.99		0.99	1.45
CC	287	23-May-95	Dissolved	Cadmium	6.9				
CC	287	13-Jun-95	Dissolved	Cadmium	7				
CC	287	13-Jun-95	Total	Cadmium	6.8				
CC	287	27-Jun-95	Total	Cadmium	8.4	1.00		1.00	1.57
CC	287	27-Jun-95	Dissolved	Cadmium	8.4				
CC	287	11-Jul-95	Dissolved	Cadmium	11	0.92		0.96	1.28
CC	287	11-Jul-95	Total	Cadmium	12				
CC	287	25-Jul-95	Dissolved	Cadmium	14	1.00		1.00	1.57
CC	287	25-Jul-95	Total	Cadmium	14				
CC	287	14-Aug-95	Total	Cadmium	18	0.94		0.97	1.33
CC	287	14-Aug-95	Dissolved	Cadmium	17				
CC	287	13-Sep-95	Dissolved	Cadmium	20	1.00		1.00	1.57
CC	287	13-Sep-95	Total	Cadmium	20				
CC	287	18-Oct-95	Dissolved	Cadmium	200				
CC	287	18-Oct-95	Total	Cadmium	21				
CC	287	21-Nov-95	Total	Cadmium	13	0.85		0.92	1.17
CC	287	21-Nov-95	Dissolved	Cadmium	11				
CC	287	27-Dec-95	Total	Cadmium	18	1.00		1.00	1.57
CC	287	27-Dec-95	Dissolved	Cadmium	18				
CC	287	17-Jan-96	Total	Cadmium	27	0.96		0.98	1.38
CC	287	17-Jan-96	Dissolved	Cadmium	26				
CC	287	29-Feb-96	Dissolved	Cadmium	15	1.00		1.00	1.57
CC	287	29-Feb-96	Total	Cadmium	15				
CC	287	28-Mar-96	Dissolved	Cadmium	15	0.94		0.97	1.32
CC	287	28-Mar-96	Total	Cadmium	16				
CC	287	17-Apr-96	Dissolved	Cadmium	9	0.95		0.97	1.34
CC	287	17-Apr-96	Total	Cadmium	9.5				
CC	287	08-May-96	Total	Cadmium	12	0.92		0.96	1.28
CC	287	08-May-96	Dissolved	Cadmium	11				
CC	287	19-Jun-96	Total	Cadmium	5.8	1.00		1.00	1.57
CC	287	19-Jun-96	Dissolved	Cadmium	5.8				
CC	287	24-Jul-96	Dissolved	Cadmium	14	1.00		1.00	1.57
CC	287	24-Jul-96	Total	Cadmium	14				
CC	287	21-Aug-96	Dissolved	Cadmium	23	0.96		0.98	1.37
CC	287	21-Aug-96	Total	Cadmium	24				
CC	287	26-Sep-96	Total	Cadmium	23				
CC	287	26-Sep-96	Dissolved	Cadmium	24				
CC	287	09-Nov-97	Dissolved	Cadmium	19.8				
CC	287	09-Nov-97	Total	Cadmium	17.8				
CC	287	13-Jan-98	Total	Cadmium	31	0.98		0.99	1.42

CC	287	13-Jan-98	Dissolved	Cadmium	30.3				
CC	288	13-Jan-98	Total	Cadmium	31.5	0.97		0.99	1.40
CC	288	13-Jan-98	Dissolved	Cadmium	30.6				
CC	287	14-May-98	Dissolved	Cadmium	5.2				
CC	287	14-May-98	Total	Cadmium	5.1				
CC	288	14-May-98	Total	Cadmium	5.2				
CC	288	14-May-98	Dissolved	Cadmium	5.4				
CC	288	17-May-98	Total	Cadmium	6.7	1.00		1.00	1.57
CC	288	17-May-98	Dissolved	Cadmium	6.7				
		1999 Data							
			Cadmium						
			Dissolved	Total					
CC	288	02-Jun-99	4.4	5		0.88		0.94	1.22
CC	288	05-Aug-99	12	12.6		0.95238095		0.98	1.35
CC	288	08-Jul-99	5	5.4		0.92592593		0.96	1.30
CC	288	15-Dec-98	28	31		0.90322581		0.95	1.25
CC	288	15-Jun-99	3.6	4		0.9		0.95	1.25
CC	288	19-Apr-99	14	15		0.93333333		0.97	1.31
CC	288	23-Mar-99	26	26		1		1.00	1.57
CC	288	24-May-99	5.8	11		0.52727273		0.73	0.81
CC	288	27-May-99	4.8	5		0.96		0.98	1.37
CC	288	28-Dec-98	30	32		0.9375		0.97	1.32
CC	288	30-Aug-99	15	15		1		1.00	1.57
					count	49.00			
							std dev		0.16
							calc		1.64
							re-trans		1.00
							95th		1.00
							trans		1.00
CC	287	13-Jun-95	Dissolved	Lead	27	0.73		0.85	1.02
CC	287	13-Jun-95	Total	Lead	37				
CC	287	05-Oct-91	Total	Lead	55	0.36		0.60	0.65
CC	287	05-Oct-91	Dissolved	Lead	20				
CC	287	27-Oct-93	Total	Lead	56	0.98		0.99	1.44
CC	287	27-Oct-93	Dissolved	Lead	55				
CC	287	30-Nov-93	Dissolved	Lead	34	0.55		0.74	0.83
CC	287	30-Nov-93	Total	Lead	62				
CC	287	17-Dec-93	Dissolved	Lead	46	0.82		0.91	1.13
CC	287	17-Dec-93	Total	Lead	56				
CC	287	20-Jan-94	Dissolved	Lead	38	0.64		0.80	0.93
CC	287	20-Jan-94	Total	Lead	59				
CC	287	18-Feb-94	Dissolved	Lead	36	0.69		0.83	0.98
CC	287	18-Feb-94	Total	Lead	52				
CC	287	08-Mar-94	Dissolved	Lead	38	0.69		0.83	0.98
CC	287	08-Mar-94	Total	Lead	55				
CC	287	24-Mar-94	Total	Lead	53	0.70		0.84	0.99
CC	287	24-Mar-94	Dissolved	Lead	37				
CC	287	07-Apr-94	Total	Lead	47	0.74		0.86	1.04

CC	287	07-Apr-94	Dissolved	Lead	35				
CC	287	19-Apr-94	Total	Lead	383	0.06		0.24	0.24
CC	287	19-Apr-94	Dissolved	Lead	22				
CC	287	04-May-94	Dissolved	Lead	28	0.67		0.82	0.96
CC	287	04-May-94	Total	Lead	42				
CC	287	19-May-94	Dissolved	Lead	26	0.76		0.87	1.06
CC	287	19-May-94	Total	Lead	34				
CC	,287	07-Jun-94	Dissolved	Lead	29	0.74		0.86	1.04
CC	287	07-Jun-94	Total	Lead	39				
CC	287	23-Jun-94	Total	Lead	49	0.69		0.83	0.98
CC	287	23-Jun-94	Dissolved	Lead	34				
CC	287	25-Jul-94	Total	Lead	55	0.76		0.87	1.06
CC	287	25-Jul-94	Dissolved	Lead	42				
CC	287	16-Aug-94	Total	Lead	62	0.74		0.86	1.04
CC	287	16-Aug-94	Dissolved	Lead	46				
CC	287	13-Sep-94	Total	Lead	53	0.68		0.82	0.97
CC	287	13-Sep-94	Dissolved	Lead	36				
CC	287	16-Oct-94	Dissolved	Lead	31	0.62		0.79	0.91
CC	287	16-Oct-94	Total	Lead	50				
CC	287	16-Nov-94	Dissolved	Lead	40	0.68		0.82	0.97
CC	287	16-Nov-94	Total	Lead	59				
CC	287	13-Dec-94	Total	Lead	54	0.72		0.85	1.02
CC	287	13-Dec-94	Dissolved	Lead	39				
CC	287	10-Jan-95	Total	Lead	137	0.29		0.54	0.57
CC	287	10-Jan-95	Dissolved	Lead	40				
CC	287	09-Feb-95	Total	Lead	44	0.59		0.77	0.88
CC	287	09-Feb-95	Dissolved	Lead	26				
CC	287	08-Mar-95	Dissolved	Lead	22	0.71		0.84	1.00
CC	287	08-Mar-95	Total	Lead	31				
CC	287	22-Mar-95	Total	Lead	66	0.52		0.72	0.80
CC	287	22-Mar-95	Dissolved	Lead	34				
CC	287	12-Apr-95	Dissolved	Lead	27	0.59		0.77	0.87
CC	287	12-Apr-95	Total	Lead	46				
CC	287	25-Apr-95	Dissolved	Lead	22	0.61		0.78	0.90
CC	287	25-Apr-95	Total	Lead	36				
CC	287	10-May-95	Dissolved	Lead	23	0.28		0.53	0.56
CC	287	10-May-95	Total	Lead	82				
CC	287	23-May-95	Total	Lead	33	0.67		0.82	0.96
CC	287	23-May-95	Dissolved	Lead	22				
CC	287	27-Jun-95	Total	Lead	36	0.72		0.85	1.02
CC	287	27-Jun-95	Dissolved	Lead	26				
CC	287	11-Jul-95	Dissolved	Lead	34	0.77		0.88	1.07
CC	287	11-Jul-95	Total	Lead	44				
CC	287	25-Jul-95	Total	Lead	45	0.73		0.86	1.03
CC	287	25-Jul-95	Dissolved	Lead	33				
CC	287	14-Aug-95	Total	Lead	58	0.62		0.79	0.91
CC	287	14-Aug-95	Dissolved	Lead	36				
CC	287	13-Sep-95	Dissolved	Lead	38	0.73		0.85	1.03
CC	287	13-Sep-95	Total	Lead	52				
CC	287	18-Oct-95	Dissolved	Lead	48	0.11		0.34	0.34
CC	287	18-Oct-95	Total	Lead	424				

CC	287	21-Nov-95	Total	Lead	680	0.07		0.26	0.26
CC	287	21-Nov-95	Dissolved	Lead	45				
CC	287	27-Dec-95	Dissolved	Lead	55	0.51		0.71	0.79
CC	287	27-Dec-95	Total	Lead	108				
CC	287	17-Jan-96	Dissolved	Lead	223	0.88		0.94	1.21
CC	287	17-Jan-96	Total	Lead	254				
CC	287	29-Feb-96	Total	Lead	282	0.16		0.40	0.41
CC	287	29-Feb-96	Dissolved	Lead	45				
CC	287	28-Mar-96	Dissolved	Lead	53	0.54		0.74	0.83
CC	287	28-Mar-96	Total	Lead	98				
CC	287	17-Apr-96	Dissolved	Lead	55	0.40		0.64	0.69
CC	287	17-Apr-96	Total	Lead	136				
CC	287	08-May-96	Dissolved	Lead	66	0.30		0.55	0.58
CC	287	08-May-96	Total	Lead	219				
CC	287	19-Jun-96	Dissolved	Lead	36	0.49		0.70	0.77
CC	287	19-Jun-96	Total	Lead	74				
CC	287	24-Jul-96	Total	Lead	132	0.50		0.71	0.79
CC	287	24-Jul-96	Dissolved	Lead	66				
CC	287	21-Aug-96	Dissolved	Lead	94	0.30		0.55	0.58
CC	287	21-Aug-96	Total	Lead	314				
CC	287	26-Sep-96	Total	Lead	588	0.17		0.41	0.42
CC	287	26-Sep-96	Dissolved	Lead	98				
CC	288	09-Nov-97	Dissolved	Lead	49.9	0.64		0.80	0.93
CC	288	09-Nov-97	Total	Lead	77.5				
CC	287	09-Nov-97	Dissolved	Lead	50.8	0.68		0.82	0.97
CC	287	09-Nov-97	Total	Lead	74.7				
CC	287	13-Jan-98	Dissolved	Lead	24.7	0.83		0.91	1.14
CC	288	13-Jan-98	Dissolved	Lead	29.9				
CC	288	13-Jan-98	Total	Lead	115	0.64		0.80	0.93
CC	287	13-Jan-98	Total	Lead	179				
CC	288	14-May-98	Dissolved	Lead	25.3	0.52		0.72	0.80
CC	287	14-May-98	Total	Lead	48.8				
CC	288	14-May-98	Total	Lead	51.1	0.50		0.71	0.79
CC	287	14-May-98	Dissolved	Lead	25.7				
CC	288	17-May-98	Total	Lead	64.3				
CC	288	17-May-98	Dissolved	Lead	66.1				
		1999 Data							
			Lead						
			Dissolved	Total					
CC	288	02-Jun-99	23	99		0.23232323		0.48	0.50
CC	288	05-Aug-99	31	58.9		0.52631579		0.73	0.81
CC	288	05-May-99	22	55		0.4		0.63	0.68
CC	288	08-Jul-99	20	33.2		0.60240964		0.78	0.89
CC	288	15-Dec-98	29	52		0.55769231		0.75	0.84
CC	288	15-Jun-99	18	150		0.12		0.35	0.35
CC	288	18-Nov-98	32	49		0.65306122		0.81	0.94
CC	288	19-Apr-99	22	370		0.05945946		0.24	0.25
CC	288	23-Mar-99	40	120		0.33333333		0.58	0.62
CC	288	24-May-99	26	2000		0.013		0.11	0.11
CC	288	26-Oct-98	31	43		0.72093023		0.85	1.01

CC	288	27-May-99	17	250		0.068		0.26	0.26
CC	288	28-Dec-98	31	230		0.13478261		0.37	0.38
CC	288	30-Aug-99	37	50.5		0.73267327		0.86	1.03
					count	66.00			
							std dev		0.27
							calc		1.27
							re-trans		0.95
							95th		0.91
							trans		1.10
CC	287	22-Mar-95	Total	Zinc	3970	0.92		0.96	1.28
CC	287	22-Mar-95	Dissolved	Zinc	3640				
CC	287	05-Oct-91	Total	Zinc	3430				
CC	287	05-Oct-91	Dissolved	Zinc	3440				
CC	287	27-Oct-93	Dissolved	Zinc	3470				
CC	287	27-Oct-93	Total	Zinc	3420				
CC	287	30-Nov-93	Dissolved	Zinc	3980	0.98		0.99	1.44
CC	287	30-Nov-93	Total	Zinc	4050				
CC	287	17-Dec-93	Total	Zinc	5180				
CC	287	17-Dec-93	Dissolved	Zinc	5440				
CC	287	20-Jan-94	Dissolved	Zinc	5240				
CC	287	20-Jan-94	Total	Zinc	5050				
CC	287	18-Feb-94	Dissolved	Zinc	4740				
CC	287	18-Feb-94	Total	Zinc	4620				
CC	287	08-Mar-94	Total	Zinc	4460	1.00		1.00	1.50
CC	287	08-Mar-94	Dissolved	Zinc	4440				
CC	287	24-Mar-94	Total	Zinc	4600				
CC	287	24-Mar-94	Dissolved	Zinc	4660				
CC	287	07-Apr-94	Dissolved	Zinc	2440				
CC	287	07-Apr-94	Total	Zinc	2350				
CC	287	19-Apr-94	Dissolved	Zinc	1050	0.90		0.95	1.24
CC	287	19-Apr-94	Total	Zinc	1170				
CC	287	04-May-94	Dissolved	Zinc	1200				
CC	287	04-May-94	Total	Zinc	1160				
CC	287	19-May-94	Dissolved	Zinc	1010				
CC	287	19-May-94	Total	Zinc	1000				
CC	287	07-Jun-94	Dissolved	Zinc	1570				
CC	287	07-Jun-94	Total	Zinc	1520				
CC	287	23-Jun-94	Dissolved	Zinc	1720				
CC	287	23-Jun-94	Total	Zinc	1690				
CC	287	25-Jul-94	Dissolved	Zinc	2490				
CC	287	25-Jul-94	Total	Zinc	2390				
CC	287	16-Aug-94	Total	Zinc	2850				
CC	287	16-Aug-94	Dissolved	Zinc	2940				
CC	287	13-Sep-94	Total	Zinc	2880				
CC	287	13-Sep-94	Dissolved	Zinc	3020				
CC	287	16-Oct-94	Total	Zinc	3430				

CC	287	16-Oct-94	Dissolved	Zinc	3480				
CC	287	16-Nov-94	Total	Zinc	5500				
CC	287	16-Nov-94	Dissolved	Zinc	5610				
CC	287	13-Dec-94	Total	Zinc	6640				
CC	287	13-Dec-94	Dissolved	Zinc	6730				
CC	287	10-Jan-95	Dissolved	Zinc	6370				
CC	287	10-Jan-95	Total	Zinc	6320				
CC	287	09-Feb-95	Total	Zinc	3230				
CC	287	09-Feb-95	Dissolved.	Zinc	3380				
CC	287	08-Mar-95	Total	Zinc	2530				
CC	287	08-Mar-95	Dissolved	Zinc	2550				
CC	287	12-Apr-95	Total	Zinc	2550	0.98		0.99	1.43
CC	287	12-Apr-95	Dissolved	Zinc	2500				
CC	287	25-Apr-95	Dissolved	Zinc	2100	1.00		1.00	1.57
CC	287	25-Apr-95	Total	Zinc	2100				
CC	287	10-May-95	Total	Zinc	905	0.95		0.98	1.35
CC	287	10-May-95	Dissolved	Zinc	861				
CC	287	23-May-95	Dissolved	Zinc	802				
CC	287	23-May-95	Total	Zinc	786				
CC	287	13-Jun-95	Dissolved	Zinc	906	0.99		0.99	1.45
CC	287	13-Jun-95	Total	Zinc	919				
CC	287	27-Jun-95	Dissolved	Zinc	1260				
CC	287	27-Jun-95	Total	Zinc	1220				
CC	287	11-Jul-95	Total	Zinc	1690				
CC	287	11-Jul-95	Dissolved	Zinc	1700				
CC	287	25-Jul-95	Total	Zinc	1770				
CC	287	25-Jul-95	Dissolved	Zinc	1790				
CC	287	14-Aug-95	Total	Zinc	2490				
CC	287	14-Aug-95	Dissolved	Zinc	2580				
CC	287	13-Sep-95	Dissolved	Zinc	2800				
CC	287	13-Sep-95	Total	Zinc	2780				
CC	287	18-Oct-95	Total	Zinc	3020	0.97		0.98	1.40
CC	287	18-Oct-95	Dissolved	Zinc	2930				
CC	287	21-Nov-95	Total	Zinc	1960	0.85		0.92	1.18
CC	287	21-Nov-95	Dissolved	Zinc	1670				
CC	287	27-Dec-95	Dissolved	Zinc	2580				
CC	287	27-Dec-95	Total	Zinc	2500				
CC	287	17-Jan-96	Dissolved	Zinc	3870				
CC	287	17-Jan-96	Total	Zinc	3830				
CC	287	29-Feb-96	Dissolved	Zinc	2310	0.97		0.99	1.41
CC	287	29-Feb-96	Total	Zinc	2370				
CC	287	28-Mar-96	Dissolved	Zinc	2220	1.00		1.00	1.50
CC	287	28-Mar-96	Total	Zinc	2230				
CC	287	17-Apr-96	Total	Zinc	1230	0.99		1.00	1.48
CC	287	17-Apr-96	Dissolved	Zinc	1220				
CC	287	08-May-96	Dissolved	Zinc	1650	0.99		1.00	1.49
CC	287	08-May-96	Total	Zinc	1660				
CC	287	19-Jun-96	Total	Zinc	836				
CC	287	19-Jun-96	Dissolved	Zinc	843				
CC	287	24-Jul-96	Total	Zinc	1550	1.00		1.00	1.57
CC	287	24-Jul-96	Dissolved	Zinc	1550				

CC	287	21-Aug-96	Total	Zinc	3730	0.70		0.84	0.99
CC	287	21-Aug-96	Dissolved	Zinc	2620				
CC	287	26-Sep-96	Total	Zinc	2770	0.95		0.98	1.35
CC	287	26-Sep-96	Dissolved	Zinc	2640				
CC	287	09-Nov-97	Dissolved	Zinc	2610	0.95		0.97	1.34
CC	288	09-Nov-97	Dissolved	Zinc	2680				
CC	288	09-Nov-97	Total	Zinc	2750	1.00		1.00	1.57
CC	287	09-Nov-97	Total	Zinc	2680				
CC	287	13-Jan-98	Dissolved	Zinc	4200	0.95		0.98	1.35
CC	288	13-Jan-98	Total	Zinc	4410				
CC	287	13-Jan-98	Total	Zinc	4270	0.99		0.99	1.45
CC	288	13-Jan-98	Dissolved	Zinc	4210				
CC	287	14-May-98	Dissolved	Zinc	688				
CC	288	14-May-98	Total	Zinc	675				
CC	287	14-May-98	Total	Zinc	641				
CC	288	14-May-98	Dissolved	Zinc	673				
CC	288	17-May-98	Total	Zinc	5410	0.87		0.93	1.20
CC	288	17-May-98	Dissolved	Zinc	4700				
		1999 Data							
			Zinc						
			Dissolved	Total					
CC	288	02-Jun-99	571	570					
CC	288	05-Aug-99	1480	1390					
CC	288	05-May-99	1290	1300		0.99230769		1.00	1.48
CC	288	08-Jul-99	702	664					
CC	288	15-Dec-98	4330	4500		0.96222222		0.98	1.38
CC	288	15-Jun-99	451	470		0.95957447		0.98	1.37
CC	288	18-Nov-98	4270	3900					
CC	288	19-Apr-99	1830	1900		0.96315789		0.98	1.38
CC	288	23-Mar-99	3630	3600					
CC	288	24-May-99	671	1400		0.47928571		0.69	0.76
CC	288	26-Oct-98	2380	2300					
CC	288	27-May-99	604	660		0.91515152		0.96	1.28
CC	288	28-Dec-98	4440	4200					
CC	288	30-Aug-99	1790	1780					
					count	28.00			
							std dev		0.18
							calc		1.65
							re-trans		1.00
							95th		0.99
							trans		1.01
		Note:	Samples with dissolved analyte > total analyte were removed from the analysis.						

Ninemile Creek									
Site ID		Date	Method	Parameter	Result	Diss/Total		sqrt	arcsine
					ug/l				
NM	305	11-Nov-97	Total	Cadmium	27.4				
NM	305	11-Nov-97	Dissolved	Cadmium	29.5				
NM	305	15-May-91	Total	Cadmium	9	0.99		0.99	1.47
NM	305	15-May-91	Dissolved	Cadmium	8.9				
NM	305	16-May-91	Total	Cadmium	7.7	0.96		0.98	1.37
NM	305	16-May-91	Dissolved	Cadmium	7.4				
NM	305	03-Oct-91	Total	Cadmium	19				
NM	305	03-Oct-91	Dissolved	Cadmium	27				
NM	305	04-Oct-91	Total	Cadmium	22.8	0.96		0.98	1.36
NM	305	04-Oct-91	Dissolved	Cadmium	21.8				
NM	305	28-Oct-93	Total	Cadmium	22				
NM	305	28-Oct-93	Dissolved	Cadmium	26				
NM	305	02-Dec-93	Dissolved	Cadmium	22	0.96		0.98	1.36
NM	305	02-Dec-93	Total	Cadmium	23				
NM	305	16-Dec-93	Dissolved	Cadmium	29				
NM	305	16-Dec-93	Total	Cadmium	26				
NM	305	24-Jan-94	Dissolved	Cadmium	20				
NM	305	24-Jan-94	Total	Cadmium	19				
NM	305	18-Feb-94	Total	Cadmium	25				
NM	305	18-Feb-94	Dissolved	Cadmium	26				
NM	305	08-Mar-94	Total	Cadmium	24				
NM	305	08-Mar-94	Dissolved	Cadmium	26				
NM	305	23-Mar-94	Total	Cadmium	21				
NM	305	23-Mar-94	Dissolved	Cadmium	22				
NM	305	07-Apr-94	Dissolved	Cadmium	23	0.92		0.96	1.28
NM	305	07-Apr-94	Total	Cadmium	25				
NM	305	19-Apr-94	Total	Cadmium	28	0.79		0.89	1.09
NM	305	19-Apr-94	Dissolved	Cadmium	22				
NM	305	20-May-94	Dissolved	Cadmium	19	0.95		0.97	1.35
NM	305	20-May-94	Total	Cadmium	20				
NM	305	07-Jun-94	Total	Cadmium	25				
NM	305	07-Jun-94	Dissolved	Cadmium	26				
NM	305	23-Jun-94	Dissolved	Cadmium	24	1.00		1.00	1.57
NM	305	23-Jun-94	Total	Cadmium	24				
NM	305	20-Jul-94	Total	Cadmium	22				
NM	305	20-Jul-94	Dissolved	Cadmium	23				
NM	305	15-Aug-94	Total	Cadmium	21	1.00		1.00	1.57
NM	305	15-Aug-94	Dissolved	Cadmium	21				
NM	305	08-Sep-94	Dissolved	Cadmium	32				
NM	305	08-Sep-94	Total	Cadmium	30				
NM	305	28-Oct-94	Dissolved	Cadmium	27				
NM	305	28-Oct-94	Total	Cadmium	25				
NM	305	15-Nov-94	Total	Cadmium	48	1.00		1.00	1.57
NM	305	15-Nov-94	Dissolved	Cadmium	48				
NM	305	13-Dec-94	Total	Cadmium	45	0.98		0.99	1.42
NM	305	13-Dec-94	Dissolved	Cadmium	44				
NM	305	10-Jan-95	Total	Cadmium	38	0.92		0.96	1.29

NM	305	10-Jan-95	Dissolved	Cadmium	35				
NM	305	09-Feb-95	Dissolved	Cadmium	27	1.00		1.00	1.57
NM	305	09-Feb-95	Total	Cadmium	27				
NM	305	07-Mar-95	Dissolved	Cadmium	30				
NM	305	07-Mar-95	Total	Cadmium	26				
NM	305	22-Mar-95	Total	Cadmium	23				
NM	305	22-Mar-95	Dissolved	Cadmium	24				
NM	305	13-Apr-95	Total	Cadmium	27	0.96		0.98	1.38
NM	305	13-Apr-95	Dissolved	Cadmium	26				
NM	305	25-Apr-95	Dissolved	Cadmium	25	1.00		1.00	1.57
NM	305	25-Apr-95	Total	Cadmium	25				
NM	305	09-May-95	Total	Cadmium	16				
NM	305	09-May-95	Dissolved	Cadmium	18				
NM	305	23-May-95	Dissolved	Cadmium	16				
NM	305	23-May-95	Total	Cadmium	15				
NM	305	12-Jun-95	Dissolved	Cadmium	16				
NM	305	12-Jun-95	Total	Cadmium	15				
NM	305	27-Jun-95	Dissolved	Cadmium	22				
NM	305	27-Jun-95	Total	Cadmium	20				
NM	305	11-Jul-95	Dissolved	Cadmium	20	1.00		1.00	1.57
NM	305	11-Jul-95	Total	Cadmium	20				
NM	305	26-Jul-95	Dissolved	Cadmium	23	1.00		1.00	1.57
NM	305	26-Jul-95	Total	Cadmium	23				
NM	305	14-Aug-95	Total	Cadmium	27	1.00		1.00	1.57
NM	305	14-Aug-95	Dissolved	Cadmium	27				
NM	305	13-Sep-95	Dissolved	Cadmium	25	0.93		0.96	1.30
NM	305	13-Sep-95	Total	Cadmium	27				
NM	305	18-Oct-95	Dissolved	Cadmium	38				
NM	305	18-Oct-95	Total	Cadmium	36				
NM	305	21-Nov-95	Total	Cadmium	26	0.96		0.98	1.37
NM	305	21-Nov-95	Dissolved	Cadmium	25				
NM	305	27-Dec-95	Total	Cadmium	23				
NM	305	27-Dec-95	Dissolved	Cadmium	24				
NM	305	17-Jan-96	Dissolved	Cadmium	19	0.95		0.97	1.35
NM	305	17-Jan-96	Total	Cadmium	20				
NM	305	29-Feb-96	Total	Cadmium	16				
NM	305	29-Feb-96	Dissolved	Cadmium	17				
NM	305	28-Mar-96	Dissolved	Cadmium	17	0.94		0.97	1.33
NM	305	28-Mar-96	Total	Cadmium	18				
NM	305	17-Apr-96	Total	Cadmium	20	1.00		1.00	1.57
NM	305	17-Apr-96	Dissolved	Cadmium	20				
NM	305	08-May-96	Dissolved	Cadmium	16	0.94		0.97	1.33
NM	305	08-May-96	Total	Cadmium	17				
NM	305	19-Jun-96	Dissolved	Cadmium	19				
NM	305	19-Jun-96	Total	Cadmium	14				
NM	305	24-Jul-96	Total	Cadmium	20	1.00		1.00	1.57
NM	305	24-Jul-96	Dissolved	Cadmium	20				
NM	305	21-Aug-96	Dissolved	Cadmium	22				
NM	305	21-Aug-96	Total	Cadmium	21				
NM	305	26-Sep-96	Dissolved	Cadmium	20	1.00		1.00	1.57
NM	305	26-Sep-96	Total	Cadmium	20				

NM	305	15-May-98	Total	Cadmium	11.2	1.00		1.00	1.57
NM	305	15-May-98	Dissolved	Cadmium	11.2				
NM	305	17-May-98	Total	Cadmium	12.5	0.94		0.97	1.33
NM	305	17-May-98	Dissolved	Cadmium	11.8				
	1999 USGS Data			Cadmium					
				Dissolved	Total				
NM	305	USGS	01-Sep-99	21					
NM	305	USGS	04-Aug-99	17	17.7	0.96045198		0.98	1.37
NM	305	USGS	05-May-99	16	17	0.94117647		0.97	1.33
NM	305	USGS	07-Jul-99	10	10.6	0.94339623		0.97	1.33
NM	305	USGS	10-Dec-98	31	39	0.79487179		0.89	1.10
NM	305	USGS	15-Jun-99	6	6	1		1.00	1.57
NM	305	USGS	19-Apr-99	14	17	0.82352941		0.91	1.14
NM	305	USGS	19-Nov-98	39					
NM	305	USGS	21-Jan-99	22	21				
NM	305	USGS	22-Mar-99	12	14	0.85714286		0.93	1.18
NM	305	USGS	23-May-99	8.3	9	0.92222222		0.96	1.29
NM	305	USGS	26-May-99	6.5	9	0.72222222		0.85	1.02
NM	305	USGS	27-May-99	6.4	7	0.91428571		0.96	1.27
NM	305	USGS	27-Oct-98	28	31	0.90322581		0.95	1.25
NM	305	USGS	31-May-99	6.4	6				
						39.00			
							std dev		0.16
							calc		1.65
							re-trans		1.00
							95th		0.99
							trans		1.01
NM	305	09-Feb-95	Dissolved	Lead	73	0.68		0.83	0.97
NM	305	09-Feb-95	Total	Lead	107				
NM	305	15-May-91	Total	Lead	42	0.33		0.58	0.62
NM	305	15-May-91	Dissolved	Lead	14				
NM	305	16-May-91	Dissolved	Lead	14	0.35		0.59	0.63
NM	305	16-May-91	Total	Lead	40				
NM	305	03-Oct-91	Dissolved	Lead	15	0.38		0.62	0.67
NM	305	03-Oct-91	Total	Lead	39				
NM	305	04-Oct-91	Total	Lead	51	0.47		0.69	0.76
NM	305	04-Oct-91	Dissolved	Lead	24				
NM	305	28-Oct-93	Dissolved	Lead	29	0.73		0.85	1.02
NM	305	28-Oct-93	Total	Lead	40				
NM	305	02-Dec-93	Dissolved	Lead	30	0.63		0.79	0.91
NM	305	02-Dec-93	Total	Lead	48				
NM	305	16-Dec-93	Dissolved	Lead	40	0.63		0.79	0.91
NM	305	16-Dec-93	Total	Lead	64				
NM	305	24-Jan-94	Total	Lead	68	0.50		0.71	0.79
NM	305	24-Jan-94	Dissolved	Lead	34				
NM	305	18-Feb-94	Total	Lead	73	0.47		0.68	0.75
NM	305	18-Feb-94	Dissolved	Lead	34				
NM	305	08-Mar-94	Total	Lead	108	0.43		0.65	0.71

NM	305	08-Mar-94	Dissolved	Lead	46				
NM	305	23-Mar-94	Dissolved	Lead	53	0.61		0.78	0.90
NM	305	23-Mar-94	Total	Lead	87				
NM	305	07-Apr-94	Total	Lead	85	0.67		0.82	0.96
NM	305	07-Apr-94	Dissolved	Lead	57				
NM	305	19-Apr-94	Total	Lead	442	0.11		0.33	0.34
NM	305	19-Apr-94	Dissolved	Lead	48				
NM	305	20-May-94	Dissolved	Lead	4	0.80		0.89	1.11
NM	305	20-May-94	Total	Lead	5				
NM	305	07-Jun-94	Dissolved	Lead	54	0.82		0.90	1.13
NM	305	07-Jun-94	Total	Lead	66				
NM	305	23-Jun-94	Dissolved	Lead	52	0.75		0.87	1.05
NM	305	23-Jun-94	Total	Lead	69				
NM	305	20-Jul-94	Total	Lead	55	0.89		0.94	1.23
NM	305	20-Jul-94	Dissolved	Lead	49				
NM	305	15-Aug-94	Total	Lead	44	0.80		0.89	1.10
NM	305	15-Aug-94	Dissolved	Lead	35				
NM	305	08-Sep-94	Dissolved	Lead	26	0.65		0.81	0.94
NM	305	08-Sep-94	Total	Lead	40				
NM	305	28-Oct-94	Dissolved	Lead	30	0.57		0.75	0.85
NM	305	28-Oct-94	Total	Lead	53				
NM	305	15-Nov-94	Total	Lead	134	0.67		0.82	0.96
NM	305	15-Nov-94	Dissolved	Lead	90				
NM	305	13-Dec-94	Total	Lead	91	0.66		0.81	0.95
NM	305	13-Dec-94	Dissolved	Lead	60				
NM	305	10-Jan-95	Dissolved	Lead	54	0.27		0.52	0.55
NM	305	10-Jan-95	Total	Lead	200				
NM	305	07-Mar-95	Dissolved	Lead	61	0.64		0.80	0.93
NM	305	07-Mar-95	Total	Lead	95				
NM	305	22-Mar-95	Dissolved	Lead	60	0.36		0.60	0.64
NM	305	22-Mar-95	Total	Lead	168				
NM	305	13-Apr-95	Dissolved	Lead	58	0.55		0.74	0.83
NM	305	13-Apr-95	Total	Lead	106				
NM	305	25-Apr-95	Total	Lead	79	0.81		0.90	1.12
NM	305	25-Apr-95	Dissolved	Lead	64				
NM	305	09-May-95	Dissolved	Lead	64	0.59		0.77	0.88
NM	305	09-May-95	Total	Lead	108				
NM	305	23-May-95	Total	Lead	87	0.62		0.79	0.91
NM	305	23-May-95	Dissolved	Lead	54				
NM	305	12-Jun-95	Dissolved	Lead	62	0.75		0.86	1.04
NM	305	12-Jun-95	Total	Lead	83				
NM	305	27-Jun-95	Total	Lead	103	0.70		0.84	0.99
NM	305	27-Jun-95	Dissolved	Lead	72				
NM	305	11-Jul-95	Dissolved	Lead	72	0.71		0.84	1.01
NM	305	11-Jul-95	Total	Lead	101				
NM	305	26-Jul-95	Total	Lead	100	0.75		0.87	1.05
NM	305	26-Jul-95	Dissolved	Lead	75				
NM	305	14-Aug-95	Total	Lead	61				
NM	305	14-Aug-95	Dissolved	Lead	74				
NM	305	13-Sep-95	Dissolved	Lead	50	0.50		0.70	0.78
NM	305	13-Sep-95	Total	Lead	101				

NM	305	18-Oct-95	Dissolved	Lead	91	0.83		0.91	1.14
NM	305	18-Oct-95	Total	Lead	110				
NM	305	21-Nov-95	Total	Lead	196	0.34		0.58	0.62
NM	305	21-Nov-95	Dissolved	Lead	67				
NM	305	27-Dec-95	Dissolved	Lead	43	0.62		0.79	0.91
NM	305	27-Dec-95	Total	Lead	69				
NM	305	17-Jan-96	Dissolved	Lead	65	0.59		0.77	0.88
NM	305	17-Jan-96	Total	Lead	110				
NM	305	29-Feb-96	Dissolved	Lead	39	0.40		0.63	0.68
NM	305	29-Feb-96	Total	Lead	98				
NM	305	28-Mar-96	Dissolved	Lead	39	0.75		0.87	1.05
NM	305	28-Mar-96	Total	Lead	52				
NM	305	17-Apr-96	Dissolved	Lead	45	0.41		0.64	0.70
NM	305	17-Apr-96	Total	Lead	109				
NM	305	08-May-96	Total	Lead	89	0.45		0.67	0.73
NM	305	08-May-96	Dissolved	Lead	40				
NM	305	19-Jun-96	Total	Lead	46	0.80		0.90	1.11
NM	305	19-Jun-96	Dissolved	Lead	37				
NM	305	24-Jul-96	Total	Lead	57	0.70		0.84	0.99
NM	305	24-Jul-96	Dissolved	Lead	40				
NM	305	21-Aug-96	Dissolved	Lead	36	0.73		0.86	1.03
NM	305	21-Aug-96	Total	Lead	49				
NM	305	26-Sep-96	Total	Lead	46	0.80		0.90	1.11
NM	305	26-Sep-96	Dissolved	Lead	37				
NM	305	11-Nov-97	Dissolved	Lead	41.6	0.87		0.93	1.21
NM	305	11-Nov-97	Total	Lead	47.6				
NM	305	15-May-98	Dissolved	Lead	25.5	0.64		0.80	0.93
NM	305	15-May-98	Total	Lead	39.7				
NM	305	17-May-98	Total	Lead	61.6	0.77		0.88	1.07
NM	305	17-May-98	Dissolved	Lead	47.2				
	1999 USGS Data			Lead					
				Diss	Total				
NM	305	USGS	01-Sep-99	29					
NM	305	USGS	04-Aug-99	33	48.2	0.6846473		0.83	0.97
NM	305	USGS	05-May-99	26	52	0.5		0.71	0.79
NM	305	USGS	07-Jul-99	29	45.6	0.63596491		0.80	0.92
NM	305	USGS	10-Dec-98	36	68	0.52941176		0.73	0.81
NM	305	USGS	15-Jun-99	25	81	0.30864198		0.56	0.59
NM	305	USGS	19-Apr-99	13	260	0.05		0.22	0.23
NM	305	USGS	19-Nov-98	36	50				
NM	305	USGS	21-Jan-99	44	54				
NM	305	USGS	22-Mar-99	23	330	0.06969697		0.26	0.27
NM	305	USGS	23-May-99	23	220	0.10454545		0.32	0.33
NM	305	USGS	26-May-99	23	800	0.02875		0.17	0.17
NM	305	USGS	27-May-99	23	270	0.08518519		0.29	0.30
NM	305	USGS	27-Oct-98	29	47	0.61702128		0.79	0.90
NM	305	USGS	31-May-99	22	100				
						61.00			
							std dev		0.25

							calc		1.25
							re-trans		0.95
							95th		0.90
							trans		1.11
NM	305	08-Sep-94	Dissolved	Zinc	4840				
NM	305	08-Sep-94	Total	Zinc	4560				
NM	305	15-May-91	Dissolved	Zinc	1940				
NM	305	15-May-91	Total	Zinc	1800				
NM	305	16-May-91	Dissolved	Zinc	1990				
NM	305	16-May-91	Total	Zinc	1900				
NM	305	03-Oct-91	Total	Zinc	3120	0.85		0.92	1.17
NM	305	03-Oct-91	Dissolved	Zinc	2640				
NM	305	04-Oct-91	Dissolved	Zinc	4550				
NM	305	04-Oct-91	Total	Zinc	4490				
NM	305	28-Oct-93	Dissolved	Zinc	4510				
NM	305	28-Oct-93	Total	Zinc	4490				
NM	305	02-Dec-93	Dissolved	Zinc	4260	0.98		0.99	1.43
NM	305	02-Dec-93	Total	Zinc	4350				
NM	305	16-Dec-93	Total	Zinc	4590				
NM	305	16-Dec-93	Dissolved	Zinc	4830				
NM	305	24-Jan-94	Total	Zinc	3830				
NM	305	24-Jan-94	Dissolved	Zinc	4210				
NM	305	18-Feb-94	Total	Zinc	4020				
NM	305	18-Feb-94	Dissolved	Zinc	4070				
NM	305	08-Mar-94	Total	Zinc	3730				
NM	305	08-Mar-94	Dissolved	Zinc	3760				
NM	305	23-Mar-94	Dissolved	Zinc	3810				
NM	305	23-Mar-94	Total	Zinc	3750				
NM	305	07-Apr-94	Dissolved	Zinc	3940				
NM	305	07-Apr-94	Total	Zinc	3840				
NM	305	19-Apr-94	Dissolved	Zinc	3590	0.94		0.97	1.33
NM	305	19-Apr-94	Total	Zinc	3810				
NM	305	20-May-94	Total	Zinc	2390				
NM	305	20-May-94	Dissolved	Zinc	2520				
NM	305	07-Jun-94	Dissolved	Zinc	3160				
NM	305	07-Jun-94	Total	Zinc	3000				
NM	305	23-Jun-94	Dissolved	Zinc	3300				
NM	305	23-Jun-94	Total	Zinc	3250				
NM	305	20-Jul-94	Dissolved	Zinc	2610				
NM	305	20-Jul-94	Total	Zinc	2600				
NM	305	15-Aug-94	Dissolved	Zinc	2280				
NM	305	15-Aug-94	Total	Zinc	2260				
NM	305	28-Oct-94	Total	Zinc	3780				
NM	305	28-Oct-94	Dissolved	Zinc	3890				
NM	305	15-Nov-94	Dissolved	Zinc	6800	0.97		0.98	1.39
NM	305	15-Nov-94	Total	Zinc	7020				
NM	305	13-Dec-94	Total	Zinc	7170				
NM	305	13-Dec-94	Dissolved	Zinc	7390				

NM	305	10-Jan-95	Dissolved	Zinc	5500	0.99		0.99	1.46
NM	305	10-Jan-95	Total	Zinc	5570				
NM	305	09-Feb-95	Dissolved	Zinc	4590				
NM	305	09-Feb-95	Total	Zinc	4370				
NM	305	07-Mar-95	Dissolved	Zinc	4760	0.99		1.00	1.49
NM	305	07-Mar-95	Total	Zinc	4790				
NM	305	22-Mar-95	Dissolved	Zinc	3990	0.94		0.97	1.33
NM	305	22-Mar-95	Total	Zinc	4240				
NM	305	13-Apr-95	Total	Zinc	4840	0.97		0.98	1.39
NM	305	13-Apr-95	Dissolved	Zinc	4690				
NM	305	25-Apr-95	Total	Zinc	4900	0.97		0.98	1.39
NM	305	25-Apr-95	Dissolved	Zinc	4740				
NM	305	09-May-95	Total	Zinc	2860	0.92		0.96	1.29
NM	305	09-May-95	Dissolved	Zinc	2640				
NM	305	23-May-95	Dissolved	Zinc	2070				
NM	305	23-May-95	Total	Zinc	2050				
NM	305	12-Jun-95	Total	Zinc	2210				
NM	305	12-Jun-95	Dissolved	Zinc	2290				
NM	305	27-Jun-95	Dissolved	Zinc	2930	1.00		1.00	1.51
NM	305	27-Jun-95	Total	Zinc	2940				
NM	305	11-Jul-95	Total	Zinc	2910				
NM	305	11-Jul-95	Dissolved	Zinc	2920				
NM	305	26-Jul-95	Total	Zinc	3030				
NM	305	26-Jul-95	Dissolved	Zinc	3080				
NM	305	14-Aug-95	Total	Zinc	3380				
NM	305	14-Aug-95	Dissolved	Zinc	3470				
NM	305	13-Sep-95	Dissolved	Zinc	2560	0.96		0.98	1.36
NM	305	13-Sep-95	Total	Zinc	2680				
NM	305	18-Oct-95	Total	Zinc	5800				
NM	305	18-Oct-95	Dissolved	Zinc	5920				
NM	305	21-Nov-95	Total	Zinc	4210	1.00		1.00	1.57
NM	305	21-Nov-95	Dissolved	Zinc	4210				
NM	305	27-Dec-95	Dissolved	Zinc	3800				
NM	305	27-Dec-95	Total	Zinc	3690				
NM	305	17-Jan-96	Total	Zinc	2760	0.98		0.99	1.41
NM	305	17-Jan-96	Dissolved	Zinc	2830				
NM	305	29-Feb-96	Total	Zinc	2810				
NM	305	29-Feb-96	Dissolved	Zinc	2970				
NM	305	28-Mar-96	Dissolved	Zinc	2830				
NM	305	28-Mar-96	Total	Zinc	2730				
NM	305	17-Apr-96	Total	Zinc	3310				
NM	305	17-Apr-96	Dissolved	Zinc	3350				
NM	305	08-May-96	Dissolved	Zinc	2910				
NM	305	08-May-96	Total	Zinc	2900				
NM	305	19-Jun-96	Dissolved	Zinc	1790				
NM	305	19-Jun-96	Total	Zinc	1760				
NM	305	24-Jul-96	Dissolved	Zinc	2470				
NM	305	24-Jul-96	Total	Zinc	2440				
NM	305	21-Aug-96	Dissolved	Zinc	2790				
NM	305	21-Aug-96	Total	Zinc	2780				
NM	305	26-Sep-96	Dissolved	Zinc	2540				

NM	305	26-Sep-96	Total	Zinc	2500				
NM	305	11-Nov-97	Total	Zinc	5140				
NM	305	11-Nov-97	Dissolved	Zinc	5180				
NM	305	15-May-98	Dissolved	Zinc	1960	0.92		0.96	1.28
NM	305	15-May-98	Total	Zinc	2130				
NM	305	17-May-98	Dissolved	Zinc	2370	0.35		0.59	0.63
NM	305	17-May-98	Total	Zinc	6750				
1999 USGS Data				Zinc					
				Dissolved	Total				
NM	305	USGS	01-Sep-99	3570					
NM	305	USGS	04-Aug-99	2280	2250				
NM	305	USGS	05-May-99	2690	2600				
NM	305	USGS	07-Jul-99	1570	1760	0.89204545		0.94	1.24
NM	305	USGS	10-Dec-98	6640	7000	0.94857143		0.97	1.34
NM	305	USGS	15-Jun-99	864	870	0.99310345		1.00	1.49
NM	305	USGS	19-Apr-99	2400	2600	0.92307692		0.96	1.29
NM	305	USGS	19-Nov-98	7460	7100				
NM	305	USGS	21-Jan-99	3820	3800				
NM	305	USGS	22-Mar-99	2010	2300	0.87391304		0.93	1.21
NM	305	USGS	23-May-99	1240	1300	0.95384615		0.98	1.35
NM	305	USGS	26-May-99	981	1500	0.654		0.81	0.94
NM	305	USGS	27-May-99	1020	1100	0.92727273		0.96	1.30
NM	305	USGS	27-Oct-98	4850					
NM	305	USGS	31-May-99	974	950				
						24.00			
							std dev		0.21
							calc		1.69
							re-trans		0.99
							95th		0.99
							trans		1.01
Note:	Samples with dissolved analyte > total analyte were removed from the analysis.								

South Fork Wallace (all values in ug/l)

			Diss Cd	Tot Cd	Diss/Tot	Sqrt	Arcsine	Diss Pb	Tot Pb	Diss/Tot	Sqrt	Arcsine	Diss Zn	Tot Zn	Diss/Tot	Sqrt	Arcsine
SF	233	09-Nov-97	9.19	8.3				21.5	30.6	0.70	0.84	0.99	1330	1420	0.94	0.97	1.32
SF	233	13-May-98	2.8	2.7				10	21.7	0.46	0.68	0.75	443	447	0.99	1.00	1.48
SF	233	04-Sep-97	7.6	7.7	0.99	0.99	1.46	26	77	0.34	0.58	0.62	964	965	1.00	1.00	1.54
SF	233	13-Aug-97	5.7	5.8	0.98	0.99	1.44	20	43	0.47	0.68	0.75	789	798	0.99	0.99	1.46
SF	233	15-May-97		5.9					885					805			
SF	233	17-Apr-97	7.6	7.6	1.00	1.00	1.57	19	55	0.35	0.59	0.63	1170	1160			
SF	233	17-Dec-96	13	13	1.00	1.00	1.57	21	34	0.62	0.79	0.90	2280	2190			
SF	233	17-Oct-97	9.4	9.5	0.99	0.99	1.47	22	45	0.49	0.70	0.77	1400	1350			
SF	233	18-Dec-97	16	28	0.57	0.76	0.86	474	2160	0.22	0.47	0.49	1810	2450	0.74	0.86	1.03
SF	233	19-Feb-97	11	11	1.00	1.00	1.57	18	52	0.35	0.59	0.63	1630	1670	0.98	0.99	1.42
SF	233	19-Mar-98	8.4	9	0.93	0.97	1.31	21	44	0.48	0.69	0.76	1210	1260	0.96	0.98	1.37
SF	233	22-Jan-98	9.8	9.7				15	36	0.42	0.65	0.70	1480	1440			
SF	233	24-Apr-98	5	7	0.71	0.85	1.01	14	460	0.03	0.17	0.18	628	805	0.78	0.88	1.08
SF	233	24-Jul-97	4.4	4.6	0.96	0.98	1.36	18	39	0.46	0.68	0.75	704	666			
SF	233	25-Jun-97	2.8	2.9	0.97	0.98	1.38	13	21	0.62	0.79	0.91	453	414			
SF	233	25-Nov-97	8.8	9.6	0.92	0.96	1.28	21	54	0.39	0.62	0.67	1330	1300			
SF	233	26-Feb-98	13	13	1.00	1.00	1.57	13	26	0.50	0.71	0.79	1510	1500			
SF	233	26-Nov-96	12	12	1.00	1.00	1.57	23	27	0.85	0.92	1.18	2140	2100			
SF	233	27-Mar-97	8.2	8.3	0.99	0.99	1.46	21	38	0.55	0.74	0.84	1250	1220			
SF	233	29-Jan-97	11	10				17	24	0.71	0.84	1.00	1430	1440	0.99	1.00	1.49
SF	233	29-Oct-96	12	13	0.92	0.96	1.29	31	70	0.44	0.67	0.73	1680	1710	0.98	0.99	1.44
SF	233	24-May-99	2.4	4	0.60	0.77	0.89	8.8	480	0.02	0.14	0.14	319	560	0.57	0.75	0.86
				std dev		0.23			std dev		0.24			std dev		0.22	
				calc		1.74			calc		1.12			calc		1.68	
				re-trans		0.99			re-trans		0.90			re-trans		0.99	
				95th		0.97			95th		0.81			95th		0.99	
				trans		1.03			trans		1.23			trans		1.01	

Pine Creek

Site ID		Date	Method	Parameter	Result	Diss/Tot		sqrt	arcsine
					ug/l				
PC	305	14-May-91	Dissolved	Cadmium	0.2	1.00		1.00	1.57
PC	305	14-May-91	Total	Cadmium	0.2				
PC	305	03-Oct-91	Dissolved	Cadmium	0.2	1.00		1.00	1.57
PC	305	03-Oct-91	Total	Cadmium	0.2				
PC	305	29-Oct-93	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	29-Oct-93	Total	Cadmium	0.25				
PC	305	01-Dec-93	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	01-Dec-93	Dissolved	Cadmium	0.25				
PC	305	21-Dec-93	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	21-Dec-93	Dissolved	Cadmium	0.25				
PC	305	21-Jan-94	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	21-Jan-94	Dissolved	Cadmium	0.25				
PC	305	17-Feb-94	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	17-Feb-94	Total	Cadmium	0.25				
PC	305	08-Mar-94	Total	Cadmium	0.25				
PC	305	08-Mar-94	Dissolved	Cadmium	0.6				
PC	305	23-Mar-94	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	23-Mar-94	Dissolved	Cadmium	0.25				
PC	305	08-Apr-94	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	08-Apr-94	Dissolved	Cadmium	0.25				
PC	305	18-Apr-94	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	18-Apr-94	Dissolved	Cadmium	0.25				
PC	305	03-May-94	Dissolved	Cadmium	0.7	0.54		0.73	0.82
PC	305	03-May-94	Total	Cadmium	1.3				
PC	305	19-May-94	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	19-May-94	Total	Cadmium	0.25				
PC	305	08-Jun-94	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	08-Jun-94	Dissolved	Cadmium	0.25				
PC	305	24-Jun-94	Dissolved	Cadmium	0.4				
PC	305	24-Jun-94	Total	Cadmium	0.3				
PC	305	17-Aug-94	Total	Cadmium	0.5	0.50		0.71	0.79
PC	305	17-Aug-94	Dissolved	Cadmium	0.25				
PC	305	26-Sep-94	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	26-Sep-94	Dissolved	Cadmium	0.25				
PC	305	05-Oct-94	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	05-Oct-94	Total	Cadmium	0.25				
PC	305	16-Nov-94	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	16-Nov-94	Total	Cadmium	0.25				
PC	305	14-Dec-94	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	14-Dec-94	Dissolved	Cadmium	0.25				
PC	305	10-Jan-95	Dissolved	Cadmium	1.5				
PC	305	10-Jan-95	Total	Cadmium	1.4				
PC	305	09-Feb-95	Total	Cadmium	1.1	0.82		0.90	1.13
PC	305	09-Feb-95	Dissolved	Cadmium	0.9				
PC	305	22-Mar-95	Dissolved	Cadmium	1.2	0.55		0.74	0.83
PC	305	22-Mar-95	Total	Cadmium	2.2				
PC	305	14-Apr-95	Total	Cadmium	2.5	0.40		0.63	0.68

PC	305	14-Apr-95	Dissolved	Cadmium	1				
PC	305	27-Apr-95	Dissolved	Cadmium	3.2				
PC	305	27-Apr-95	Total	Cadmium	1.2				
PC	305	11-May-95	Dissolved	Cadmium	2				
PC	305	11-May-95	Total	Cadmium	1.4				
PC	305	24-May-95	Dissolved	Cadmium	0.5	0.63		0.79	0.91
PC	305	24-May-95	Total	Cadmium	0.8				
PC	305	12-Jun-95	Total	Cadmium	0.5	0.50		0.71	0.79
PC	305	12-Jun-95	Dissolved	Cadmium	0.25				
PC	305	27-Jun-95	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	27-Jun-95	Dissolved	Cadmium	0.25				
PC	305	11-Jul-95	Total	Cadmium	0.25				
PC	305	11-Jul-95	Dissolved	Cadmium	0.3				
PC	305	25-Jul-95	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	25-Jul-95	Dissolved	Cadmium	0.25				
PC	305	14-Aug-95	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	14-Aug-95	Total	Cadmium	0.25				
PC	305	13-Sep-95	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	13-Sep-95	Total	Cadmium	0.25				
PC	305	18-Oct-95	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	18-Oct-95	Total	Cadmium	0.25				
PC	305	22-Nov-95	Dissolved	Cadmium	0.6	1.00		1.00	1.57
PC	305	22-Nov-95	Total	Cadmium	0.6				
PC	305	27-Dec-95	Total	Cadmium	1	0.80		0.89	1.11
PC	305	27-Dec-95	Dissolved	Cadmium	0.8				
PC	305	18-Jan-96	Total	Cadmium	0.7				
PC	305	18-Jan-96	Dissolved	Cadmium	1.1				
PC	305	28-Feb-96	Total	Cadmium	0.6				
PC	305	28-Feb-96	Dissolved	Cadmium	0.604				
PC	305	27-Mar-96	Dissolved	Cadmium	0.7				
PC	305	27-Mar-96	Total	Cadmium	0.6				
PC	305	18-Apr-96	Total	Cadmium	0.25	1.00		1.00	1.57
PC	305	18-Apr-96	Dissolved	Cadmium	0.25				
PC	305	08-May-96	Total	Cadmium	0.5	1.00		1.00	1.57
PC	305	08-May-96	Dissolved	Cadmium	0.5				
PC	305	19-Jun-96	Total	Cadmium	0.6	1.00		1.00	1.57
PC	305	19-Jun-96	Dissolved	Cadmium	0.6				
PC	305	24-Jul-96	Total	Cadmium	0.8	1.00		1.00	1.57
PC	305	24-Jul-96	Dissolved	Cadmium	0.8				
PC	305	21-Aug-96	Dissolved	Cadmium	0.25	1.00		1.00	1.57
PC	305	21-Aug-96	Total	Cadmium	0.25				
PC	305	26-Sep-96	Dissolved	Cadmium	0.9				
PC	305	26-Sep-96	Total	Cadmium	0.25				
PC	305	04-Feb-97	Dissolved	Cadmium	3	1.00		1.00	1.57
PC	305	04-Feb-97	Total	Cadmium	3				
PC	305	24-Apr-97	Dissolved	Cadmium	3	1.00		1.00	1.57
PC	305	24-Apr-97	Total	Cadmium	3				
PC	305	12-Oct-97	Dissolved	Cadmium	5				
PC	305	12-Oct-97	Total	Cadmium	4				
PC	305	17-Feb-98	Total	Cadmium	4	1.00		1.00	1.57
PC	305	17-Feb-98	Dissolved	Cadmium	4				

						38.00				
							std dev			0.29
							calc			1.91
							re-trans			0.94
							95th			0.89
							trans			1.12
PC	305	19-May-94	Dissolved	Lead	1.5	0.25			0.50	0.52
PC	305	19-May-94	Total	Lead	6					
PC	305	14-May-91	Total	Lead	3	1.00			1.00	1.57
PC	305	14-May-91	Dissolved	Lead	3					
PC	305	03-Oct-91	Dissolved	Lead	1	1.00			1.00	1.57
PC	305	03-Oct-91	Total	Lead	1					
PC	305	29-Oct-93	Dissolved	Lead	6	1.00			1.00	1.57
PC	305	29-Oct-93	Total	Lead	6					
PC	305	01-Dec-93	Dissolved	Lead	1.5	0.12			0.34	0.35
PC	305	01-Dec-93	Total	Lead	13					
PC	305	21-Dec-93	Dissolved	Lead	1.5	0.60			0.77	0.89
PC	305	21-Dec-93	Total	Lead	2.5					
PC	305	21-Jan-94	Total	Lead	2.5	0.60			0.77	0.89
PC	305	21-Jan-94	Dissolved	Lead	1.5					
PC	305	17-Feb-94	Dissolved	Lead	1.5	0.60			0.77	0.89
PC	305	17-Feb-94	Total	Lead	2.5					
PC	305	08-Mar-94	Dissolved	Lead	1.5	0.60			0.77	0.89
PC	305	08-Mar-94	Total	Lead	2.5					
PC	305	23-Mar-94	Total	Lead	2.5	0.60			0.77	0.89
PC	305	23-Mar-94	Dissolved	Lead	1.5					
PC	305	08-Apr-94	Total	Lead	2.5	0.60			0.77	0.89
PC	305	08-Apr-94	Dissolved	Lead	1.5					
PC	305	18-Apr-94	Dissolved	Lead	1.5	0.60			0.77	0.89
PC	305	18-Apr-94	Total	Lead	2.5					
PC	305	03-May-94	Total	Lead	2.5	0.60			0.77	0.89
PC	305	03-May-94	Dissolved	Lead	1.5					
PC	305	08-Jun-94	Total	Lead	5	0.30			0.55	0.58
PC	305	08-Jun-94	Dissolved	Lead	1.5					
PC	305	24-Jun-94	Dissolved	Lead	1.5	0.60			0.77	0.89
PC	305	24-Jun-94	Total	Lead	2.5					
PC	305	17-Aug-94	Dissolved	Lead	2.5	1.00			1.00	1.57
PC	305	17-Aug-94	Total	Lead	2.5					
PC	305	26-Sep-94	Total	Lead	8	0.19			0.43	0.45
PC	305	26-Sep-94	Dissolved	Lead	1.5					
PC	305	05-Oct-94	Total	Lead	2.5	0.60			0.77	0.89
PC	305	05-Oct-94	Dissolved	Lead	1.5					
PC	305	16-Nov-94	Dissolved	Lead	1.5	0.60			0.77	0.89
PC	305	16-Nov-94	Total	Lead	2.5					
PC	305	14-Dec-94	Total	Lead	2.5	0.60			0.77	0.89
PC	305	14-Dec-94	Dissolved	Lead	1.5					
PC	305	10-Jan-95	Dissolved	Lead	5	0.21			0.46	0.47
PC	305	10-Jan-95	Total	Lead	24					
PC	305	09-Feb-95	Total	Lead	10	0.15			0.39	0.40

PC	305	09-Feb-95	Dissolved	Lead	1.5				
PC	305	22-Mar-95	Dissolved	Lead	4	0.44		0.67	0.73
PC	305	22-Mar-95	Total	Lead	9				
PC	305	14-Apr-95	Dissolved	Lead	1.5	0.30		0.55	0.58
PC	305	14-Apr-95	Total	Lead	5				
PC	305	27-Apr-95	Total	Lead	2.5	0.60		0.77	0.89
PC	305	27-Apr-95	Dissolved	Lead	1.5				
PC	305	11-May-95	Dissolved	Lead	3				
PC	305	11-May-95	Total	Lead	2.5				
PC	305	24-May-95	Total	Lead	2.5	0.60		0.77	0.89
PC	305	24-May-95	Dissolved	Lead	1.5				
PC	305	12-Jun-95	Dissolved	Lead	1.5	0.30		0.55	0.58
PC	305	12-Jun-95	Total	Lead	5				
PC	305	27-Jun-95	Total	Lead	2.5	0.60		0.77	0.89
PC	305	27-Jun-95	Dissolved	Lead	1.5				
PC	305	11-Jul-95	Total	Lead	2.5	0.60		0.77	0.89
PC	305	11-Jul-95	Dissolved	Lead	1.5				
PC	305	25-Jul-95	Total	Lead	2.5				
PC	305	25-Jul-95	Dissolved	Lead	4				
PC	305	14-Aug-95	Total	Lead	2.5	0.60		0.77	0.89
PC	305	14-Aug-95	Dissolved	Lead	1.5				
PC	305	13-Sep-95	Total	Lead	8	0.50		0.71	0.79
PC	305	13-Sep-95	Dissolved	Lead	4				
PC	305	18-Oct-95	Dissolved	Lead	2.5	1.00		1.00	1.57
PC	305	18-Oct-95	Total	Lead	2.5				
PC	305	22-Nov-95	Total	Lead	2.5	0.60		0.77	0.89
PC	305	22-Nov-95	Dissolved	Lead	1.5				
PC	305	27-Dec-95	Dissolved	Lead	1.5	0.60		0.77	0.89
PC	305	27-Dec-95	Total	Lead	2.5				
PC	305	18-Jan-96	Dissolved	Lead	4	0.50		0.71	0.79
PC	305	18-Jan-96	Total	Lead	8				
PC	305	28-Feb-96	Dissolved	Lead	1.5	0.30		0.55	0.58
PC	305	28-Feb-96	Total	Lead	5				
PC	305	27-Mar-96	Total	Lead	5	0.60		0.77	0.89
PC	305	27-Mar-96	Dissolved	Lead	3				
PC	305	18-Apr-96	Dissolved	Lead	11	0.85		0.92	1.17
PC	305	18-Apr-96	Total	Lead	13				
PC	305	08-May-96	Total	Lead	6	0.67		0.82	0.96
PC	305	08-May-96	Dissolved	Lead	4				
PC	305	19-Jun-96	Dissolved	Lead	5	0.50		0.71	0.79
PC	305	19-Jun-96	Total	Lead	10				
PC	305	24-Jul-96	Total	Lead	7	0.71		0.85	1.01
PC	305	24-Jul-96	Dissolved	Lead	5				
PC	305	21-Aug-96	Total	Lead	5	0.30		0.55	0.58
PC	305	21-Aug-96	Dissolved	Lead	1.5				
PC	305	26-Sep-96	Dissolved	Lead	1.5	0.21		0.46	0.48
PC	305	26-Sep-96	Total	Lead	7				
PC	305	04-Feb-97	Dissolved	Lead	1.5	0.11		0.34	0.35
PC	305	04-Feb-97	Total	Lead	13.1				
PC	305	24-Apr-97	Total	Lead	12.2	0.12		0.35	0.36
PC	305	24-Apr-97	Dissolved	Lead	1.5				

PC	305	12-Oct-97	Total	Lead	3	1.00		1.00	1.57
PC	305	12-Oct-97	Dissolved	Lead	3				
PC	305	17-Feb-98	Total	Lead	3	1.00		1.00	1.57
PC	305	17-Feb-98	Dissolved	Lead	3				
						47.00			
							std dev		0.35
							calc		1.45
							re-trans		0.99
							95th		0.99
							trans		1.01
PC	305	27-Apr-95	Dissolved	Zinc	104	0.95		0.97	1.34
PC	305	27-Apr-95	Total	Zinc	110				
PC	305	14-May-91	Total	Zinc	20	1.00		1.00	1.57
PC	305	14-May-91	Dissolved	Zinc	20				
PC	305	03-Oct-91	Total	Zinc	30				
PC	305	03-Oct-91	Dissolved	Zinc	46				
PC	305	29-Oct-93	Dissolved	Zinc	131				
PC	305	29-Oct-93	Total	Zinc	117				
PC	305	01-Dec-93	Dissolved	Zinc	108				
PC	305	01-Dec-93	Total	Zinc	107				
PC	305	21-Dec-93	Total	Zinc	124	0.93		0.96	1.30
PC	305	21-Dec-93	Dissolved	Zinc	115				
PC	305	21-Jan-94	Total	Zinc	105	0.98		0.99	1.43
PC	305	21-Jan-94	Dissolved	Zinc	103				
PC	305	17-Feb-94	Total	Zinc	91				
PC	305	17-Feb-94	Dissolved	Zinc	95				
PC	305	08-Mar-94	Total	Zinc	133				
PC	305	08-Mar-94	Dissolved	Zinc	135				
PC	305	23-Mar-94	Dissolved	Zinc	121				
PC	305	23-Mar-94	Total	Zinc	117				
PC	305	08-Apr-94	Total	Zinc	96				
PC	305	08-Apr-94	Dissolved	Zinc	104				
PC	305	18-Apr-94	Total	Zinc	60	0.95		0.97	1.35
PC	305	18-Apr-94	Dissolved	Zinc	57				
PC	305	03-May-94	Total	Zinc	74	0.96		0.98	1.37
PC	305	03-May-94	Dissolved	Zinc	71				
PC	305	19-May-94	Total	Zinc	76	0.96		0.98	1.37
PC	305	19-May-94	Dissolved	Zinc	73				
PC	305	08-Jun-94	Total	Zinc	83				
PC	305	08-Jun-94	Dissolved	Zinc	86				
PC	305	24-Jun-94	Total	Zinc	68				
PC	305	24-Jun-94	Dissolved	Zinc	78				
PC	305	17-Aug-94	Dissolved	Zinc	89	1.00		1.00	1.57
PC	305	17-Aug-94	Total	Zinc	89				
PC	305	26-Sep-94	Total	Zinc	99				
PC	305	26-Sep-94	Dissolved	Zinc	100				
PC	305	05-Oct-94	Dissolved	Zinc	98	0.98		0.99	1.43
PC	305	05-Oct-94	Total	Zinc	100				
PC	305	16-Nov-94	Dissolved	Zinc	129				

PC	305	16-Nov-94	Total	Zinc	110				
PC	305	14-Dec-94	Dissolved	Zinc	124	0.96		0.98	1.37
PC	305	14-Dec-94	Total	Zinc	129				
PC	305	10-Jan-95	Dissolved	Zinc	402				
PC	305	10-Jan-95	Total	Zinc	374				
PC	305	09-Feb-95	Total	Zinc	225	1.00		1.00	1.50
PC	305	09-Feb-95	Dissolved	Zinc	224				
PC	305	22-Mar-95	Dissolved	Zinc	202	0.93		0.96	1.30
PC	305	22-Mar-95	Total	Zinc	218				
PC	305	14-Apr-95	Total	Zinc	178	0.85		0.92	1.18
PC	305	14-Apr-95	Dissolved	Zinc	152				
PC	305	11-May-95	Dissolved	Zinc	77	0.80		0.90	1.11
PC	305	11-May-95	Total	Zinc	96				
PC	305	24-May-95	Dissolved	Zinc	82	0.98		0.99	1.42
PC	305	24-May-95	Total	Zinc	84				
PC	305	12-Jun-95	Dissolved	Zinc	85	0.98		0.99	1.42
PC	305	12-Jun-95	Total	Zinc	87				
PC	305	27-Jun-95	Dissolved	Zinc	88				
PC	305	27-Jun-95	Total	Zinc	87				
PC	305	11-Jul-95	Dissolved	Zinc	85	0.99		0.99	1.46
PC	305	11-Jul-95	Total	Zinc	86				
PC	305	25-Jul-95	Total	Zinc	89	1.00		1.00	1.57
PC	305	25-Jul-95	Dissolved	Zinc	89				
PC	305	14-Aug-95	Dissolved	Zinc	101	0.99		1.00	1.47
PC	305	14-Aug-95	Total	Zinc	102				
PC	305	13-Sep-95	Total	Zinc	104	0.93		0.97	1.31
PC	305	13-Sep-95	Dissolved	Zinc	97				
PC	305	18-Oct-95	Total	Zinc	107	0.98		0.99	1.43
PC	305	18-Oct-95	Dissolved	Zinc	105				
PC	305	22-Nov-95	Dissolved	Zinc	123				
PC	305	22-Nov-95	Total	Zinc	112				
PC	305	27-Dec-95	Total	Zinc	157	0.95		0.97	1.34
PC	305	27-Dec-95	Dissolved	Zinc	149				
PC	305	18-Jan-96	Total	Zinc	138	0.92		0.96	1.28
PC	305	18-Jan-96	Dissolved	Zinc	127				
PC	305	28-Feb-96	Dissolved	Zinc	198	0.49		0.70	0.77
PC	305	28-Feb-96	Total	Zinc	406				
PC	305	27-Mar-96	Total	Zinc	199				
PC	305	27-Mar-96	Dissolved	Zinc	280				
PC	305	18-Apr-96	Total	Zinc	134	0.96		0.98	1.38
PC	305	18-Apr-96	Dissolved	Zinc	129				
PC	305	08-May-96	Total	Zinc	131				
PC	305	08-May-96	Dissolved	Zinc	152				
PC	305	19-Jun-96	Total	Zinc	108				
PC	305	19-Jun-96	Dissolved	Zinc	186				
PC	305	24-Jul-96	Dissolved	Zinc	106				
PC	305	24-Jul-96	Total	Zinc	102				
PC	305	21-Aug-96	Total	Zinc	104	0.93		0.97	1.31
PC	305	21-Aug-96	Dissolved	Zinc	97				
PC	305	26-Sep-96	Dissolved	Zinc	114				
PC	305	26-Sep-96	Total	Zinc	111				

PC	305	04-Feb-97	Total	Zinc	153	0.84		0.91	1.15
PC	305	04-Feb-97	Dissolved	Zinc	128				
PC	305	24-Apr-97	Total	Zinc	136	0.82		0.90	1.13
PC	305	24-Apr-97	Dissolved	Zinc	111				
PC	305	12-Oct-97	Dissolved	Zinc	80	1.00		1.00	1.57
PC	305	12-Oct-97	Total	Zinc	80				
PC	305	17-Feb-98	Dissolved	Zinc	230	1.00		1.00	1.57
PC	305	17-Feb-98	Total	Zinc	230				
						30.00			
							std dev		0.17
							calc		1.64
							re-trans		1.00
							95th		1.00
							trans		1.00
	Note:	Samples with dissolved analyte > total analyte were removed from the analysis.							

South Fork Pinehurst

Site ID		Date	Method	Parameter	Result	Diss/Tot		sqrt	arcsine
					ug/l				
SF	271	04-Nov-97	Total	Cadmium	8.5				
SF	271	04-Nov-97	Dissolved	Cadmium	9.83				
SF	271	14-May-91	Total	Cadmium	2.9	0.97		0.98	1.38
SF	271	14-May-91	Dissolved	Cadmium	2.8				
SF	271	15-May-91	Dissolved	Cadmium	2.5	0.89		0.94	1.24
SF	271	15-May-91	Total	Cadmium	2.8				
SF	271	16-May-91	Total	Cadmium	2.5	0.96		0.98	1.37
SF	271	16-May-91	Dissolved	Cadmium	2.4				
SF	271	17-May-91	Total	Cadmium	2.9	0.76		0.87	1.06
SF	271	17-May-91	Dissolved	Cadmium	2.2				
SF	271	18-May-91	Dissolved	Cadmium	1.6	0.08		0.28	0.28
SF	271	18-May-91	Total	Cadmium	20.9				
SF	271	01-Oct-91	Total	Cadmium	15	0.61		0.78	0.89
SF	271	01-Oct-91	Dissolved	Cadmium	9.1				
SF	271	02-Oct-91	Total	Cadmium	14	0.86		0.93	1.18
SF	271	02-Oct-91	Dissolved	Cadmium	12				
SF	271	03-Oct-91	Dissolved	Cadmium	14				
SF	271	03-Oct-91	Total	Cadmium	8				
SF	271	04-Oct-91	Total	Cadmium	9	1.00		1.00	1.57
SF	271	04-Oct-91	Dissolved	Cadmium	9				
SF	271	05-Oct-91	Dissolved	Cadmium	8.1	0.90		0.95	1.25
SF	271	05-Oct-91	Total	Cadmium	9				
SF	271	29-Oct-93	Dissolved	Cadmium	8.8	0.99		0.99	1.46
SF	271	29-Oct-93	Total	Cadmium	8.9				
SF	271	30-Nov-93	Total	Cadmium	10.4	0.96		0.98	1.37
SF	271	30-Nov-93	Dissolved	Cadmium	10				
SF	271	21-Dec-93	Total	Cadmium	11.8				
SF	271	21-Dec-93	Dissolved	Cadmium	12.4				
SF	271	21-Jan-94	Dissolved	Cadmium	9.5	0.97		0.98	1.39
SF	271	21-Jan-94	Total	Cadmium	9.8				
SF	271	17-Feb-94	Total	Cadmium	14	1.00		1.00	1.57
SF	271	17-Feb-94	Dissolved	Cadmium	14				
SF	271	07-Mar-94	Total	Cadmium	7.2				
SF	271	07-Mar-94	Dissolved	Cadmium	7.8				
SF	271	23-Mar-94	Total	Cadmium	7.1	1.00		1.00	1.57
SF	271	23-Mar-94	Dissolved	Cadmium	7.1				
SF	271	06-Apr-94	Total	Cadmium	5.7				
SF	271	06-Apr-94	Dissolved	Cadmium	6.3				
SF	271	18-Apr-94	Dissolved	Cadmium	2.7	0.59		0.77	0.87
SF	271	18-Apr-94	Total	Cadmium	4.6				
SF	271	03-May-94	Dissolved	Cadmium	5				
SF	271	03-May-94	Total	Cadmium	4.8				
SF	271	20-May-94	Total	Cadmium	4.8				
SF	271	20-May-94	Dissolved	Cadmium	5.2				
SF	271	08-Jun-94	Total	Cadmium	6.7	1.00		1.00	1.57
SF	271	08-Jun-94	Dissolved	Cadmium	6.7				
SF	271	24-Jun-94	Dissolved	Cadmium	7.2	0.99		0.99	1.45
SF	271	24-Jun-94	Total	Cadmium	7.3				

SF	271	23-Jul-94	Dissolved	Cadmium	7.2	0.86		0.93	1.18
SF	271	23-Jul-94	Total	Cadmium	8.4				
SF	271	16-Aug-94	Dissolved	Cadmium	7.8	0.91		0.95	1.26
SF	271	16-Aug-94	Total	Cadmium	8.6				
SF	271	09-Sep-94	Dissolved	Cadmium	10.1	0.95		0.98	1.35
SF	271	09-Sep-94	Total	Cadmium	10.6				
SF	271	05-Oct-94	Dissolved	Cadmium	11	0.92		0.96	1.28
SF	271	05-Oct-94	Total	Cadmium	12				
SF	271	16-Nov-94	Dissolved	Cadmium	18	0.95		0.97	1.34
SF	271	16-Nov-94	Total	Cadmium	19				
SF	271	14-Dec-94	Total	Cadmium	16				
SF	271	14-Dec-94	Dissolved	Cadmium	17				
SF	271	10-Jan-95	Total	Cadmium	13	0.77		0.88	1.07
SF	271	10-Jan-95	Dissolved	Cadmium	10				
SF	271	09-Feb-95	Dissolved	Cadmium	7	0.99		0.99	1.45
SF	271	09-Feb-95	Total	Cadmium	7.1				
SF	271	07-Mar-95	Total	Cadmium	7.6				
SF	271	07-Mar-95	Dissolved	Cadmium	8.3				
SF	271	23-Mar-95	Total	Cadmium	8.8	0.90		0.95	1.25
SF	271	23-Mar-95	Dissolved	Cadmium	7.9				
SF	271	14-Apr-95	Total	Cadmium	8.6	0.86		0.93	1.19
SF	271	14-Apr-95	Dissolved	Cadmium	7.4				
SF	271	27-Apr-95	Dissolved	Cadmium	6	0.88		0.94	1.22
SF	271	27-Apr-95	Total	Cadmium	6.8				
SF	271	11-May-95	Dissolved	Cadmium	4.6	0.96		0.98	1.37
SF	271	11-May-95	Total	Cadmium	4.8				
SF	271	24-May-95	Total	Cadmium	6.6	0.64		0.80	0.92
SF	271	24-May-95	Dissolved	Cadmium	4.2				
SF	271	13-Jun-95	Dissolved	Cadmium	5.2	0.90		0.95	1.24
SF	271	13-Jun-95	Total	Cadmium	5.8				
SF	271	28-Jun-95	Total	Cadmium	6	0.97		0.98	1.39
SF	271	28-Jun-95	Dissolved	Cadmium	5.8				
SF	271	12-Jul-95	Dissolved	Cadmium	8.6	0.99		0.99	1.46
SF	271	12-Jul-95	Total	Cadmium	8.7				
SF	271	26-Jul-95	Total	Cadmium	10	1.00		1.00	1.57
SF	271	26-Jul-95	Dissolved	Cadmium	10				
SF	271	15-Aug-95	Dissolved	Cadmium	10.2				
SF	271	15-Aug-95	Total	Cadmium	9.8				
SF	271	14-Sep-95	Dissolved	Cadmium	8.5	0.97		0.98	1.39
SF	271	14-Sep-95	Total	Cadmium	8.8				
SF	271	11-May-98	Dissolved	Cadmium	3.1	0.89		0.94	1.23
SF	271	11-May-98	Total	Cadmium	3.5				
SF	271	18-May-98	Total	Cadmium	4.5	0.93		0.97	1.31
SF	271	18-May-98	Dissolved	Cadmium	4.2				
1999 Data				Cd					
				Diss	Tot				
SF	271	USGS	02-Jun-99	2.1	3	0.70		0.84	0.99
SF	271	USGS	06-May-99	3.8	4	0.95		0.97	1.35
SF	271	USGS	07-Sep-99	7.5	8	0.94		0.97	1.32
SF	271	USGS	08-Feb-99	11	11	1.00		1.00	1.57

SF	271	USGS	09-Aug-99	7.4	8	0.93		0.96	1.29
SF	271	USGS	09-Dec-98	13	13	1.00		1.00	1.57
SF	271	USGS	09-Mar-99	8.7	9	0.97		0.98	1.39
SF	271	USGS	13-Apr-99	6.2	7	0.89		0.94	1.23
SF	271	USGS	15-Jul-99	4.2	5	0.84		0.92	1.16
SF	271	USGS	17-Nov-98	15	16	0.94		0.97	1.32
SF	271	USGS	20-Apr-99	3	4	0.75		0.87	1.05
SF	271	USGS	25-May-99	1.5	5	0.30		0.55	0.58
SF	271	USGS	26-Oct-98	11	14	0.79		0.89	1.09
SF	271	USGS	27-May-99						
SF	271	USGS	30-Dec-98	4.9	6	0.82		0.90	1.13
						50.00			
							std dev		0.25
							calc		1.67
							re-trans		0.99
							squared		0.99
							translator		1.01
SF	271	07-Mar-94	Total	Lead	23	0.22		0.47	0.49
SF	271	07-Mar-94	Dissolved	Lead	5				
SF	271	14-May-91	Total	Lead	41	0.07		0.27	0.27
SF	271	14-May-91	Dissolved	Lead	3				
SF	271	15-May-91	Dissolved	Lead	3	0.11		0.33	0.33
SF	271	15-May-91	Total	Lead	28				
SF	271	16-May-91	Total	Lead	24	0.13		0.35	0.36
SF	271	16-May-91	Dissolved	Lead	3				
SF	271	17-May-91	Total	Lead	15	0.20		0.45	0.46
SF	271	17-May-91	Dissolved	Lead	3				
SF	271	18-May-91	Dissolved	Lead	3	0.02		0.13	0.13
SF	271	18-May-91	Total	Lead	169				
SF	271	01-Oct-91	Dissolved	Lead	3	0.15		0.39	0.40
SF	271	01-Oct-91	Total	Lead	20				
SF	271	02-Oct-91	Dissolved	Lead	1	0.05		0.21	0.21
SF	271	02-Oct-91	Total	Lead	22				
SF	271	03-Oct-91	Total	Lead	18	0.06		0.24	0.24
SF	271	03-Oct-91	Dissolved	Lead	1				
SF	271	04-Oct-91	Total	Lead	18	0.06		0.24	0.24
SF	271	04-Oct-91	Dissolved	Lead	1				
SF	271	05-Oct-91	Total	Lead	21	0.10		0.31	0.31
SF	271	05-Oct-91	Dissolved	Lead	2				
SF	271	29-Oct-93	Total	Lead	17	0.09		0.30	0.30
SF	271	29-Oct-93	Dissolved	Lead	1.5				
SF	271	30-Nov-93	Dissolved	Lead	1.5	0.07		0.26	0.26
SF	271	30-Nov-93	Total	Lead	23				
SF	271	21-Dec-93	Dissolved	Lead	1.5	0.10		0.32	0.32
SF	271	21-Dec-93	Total	Lead	15				
SF	271	21-Jan-94	Dissolved	Lead	1.5	0.12		0.34	0.35
SF	271	21-Jan-94	Total	Lead	13				
SF	271	17-Feb-94	Total	Lead	16	0.09		0.31	0.31

SF	271	17-Feb-94	Dissolved	Lead	1.5				
SF	271	23-Mar-94	Dissolved	Lead	7	0.33		0.58	0.62
SF	271	23-Mar-94	Total	Lead	21				
SF	271	06-Apr-94	Dissolved	Lead	6	0.27		0.52	0.55
SF	271	06-Apr-94	Total	Lead	22				
SF	271	18-Apr-94	Dissolved	Lead	6	0.03		0.18	0.18
SF	271	18-Apr-94	Total	Lead	195				
SF	271	03-May-94	Total	Lead	16	0.50		0.71	0.79
SF	271	03-May-94	Dissolved	Lead	8				
SF	271	20-May-94	Total	Lead	24	0.33		0.58	0.62
SF	271	20-May-94	Dissolved	Lead	8				
SF	271	08-Jun-94	Dissolved	Lead	6	0.30		0.55	0.58
SF	271	08-Jun-94	Total	Lead	20				
SF	271	24-Jun-94	Dissolved	Lead	3	0.17		0.41	0.42
SF	271	24-Jun-94	Total	Lead	18				
SF	271	23-Jul-94	Total	Lead	2.5	0.60		0.77	0.89
SF	271	23-Jul-94	Dissolved	Lead	1.5				
SF	271	16-Aug-94	Dissolved	Lead	2.5	0.10		0.32	0.33
SF	271	16-Aug-94	Total	Lead	24				
SF	271	09-Sep-94	Total	Lead	24	0.06		0.25	0.25
SF	271	09-Sep-94	Dissolved	Lead	1.5				
SF	271	05-Oct-94	Dissolved	Lead	3	0.12		0.34	0.35
SF	271	05-Oct-94	Total	Lead	26				
SF	271	16-Nov-94	Total	Lead	17	0.09		0.30	0.30
SF	271	16-Nov-94	Dissolved	Lead	1.5				
SF	271	14-Dec-94	Dissolved	Lead	12	0.50		0.71	0.79
SF	271	14-Dec-94	Total	Lead	24				
SF	271	10-Jan-95	Dissolved	Lead	10	0.08		0.28	0.28
SF	271	10-Jan-95	Total	Lead	127				
SF	271	09-Feb-95	Total	Lead	25	0.28		0.53	0.56
SF	271	09-Feb-95	Dissolved	Lead	7				
SF	271	07-Mar-95	Total	Lead	23	0.48		0.69	0.76
SF	271	07-Mar-95	Dissolved	Lead	11				
SF	271	23-Mar-95	Dissolved	Lead	10	0.21		0.46	0.48
SF	271	23-Mar-95	Total	Lead	47				
SF	271	14-Apr-95	Dissolved	Lead	9	0.35		0.59	0.63
SF	271	14-Apr-95	Total	Lead	26				
SF	271	27-Apr-95	Dissolved	Lead	0.8	0.02		0.15	0.15
SF	271	27-Apr-95	Total	Lead	36				
SF	271	11-May-95	Dissolved	Lead	10	0.15		0.39	0.40
SF	271	11-May-95	Total	Lead	65				
SF	271	24-May-95	Total	Lead	22	0.50		0.71	0.79
SF	271	24-May-95	Dissolved	Lead	11				
SF	271	13-Jun-95	Dissolved	Lead	11	0.35		0.60	0.64
SF	271	13-Jun-95	Total	Lead	31				
SF	271	28-Jun-95	Total	Lead	21	0.24		0.49	0.51
SF	271	28-Jun-95	Dissolved	Lead	5				
SF	271	12-Jul-95	Total	Lead	22	0.32		0.56	0.60
SF	271	12-Jul-95	Dissolved	Lead	7				
SF	271	26-Jul-95	Dissolved	Lead	6	0.19		0.44	0.46
SF	271	26-Jul-95	Total	Lead	31				

SF	271	15-Aug-95	Total	Lead	27	0.06		0.24	0.24
SF	271	15-Aug-95	Dissolved	Lead	1.5				
SF	271	14-Sep-95	Total	Lead	25	0.06		0.24	0.25
SF	271	14-Sep-95	Dissolved	Lead	1.5				
SF	271	04-Nov-97	Total	Lead	28.2	0.13		0.36	0.37
SF	271	04-Nov-97	Dissolved	Lead	3.64				
SF	271	11-May-98	Dissolved	Lead	5.3	0.09		0.30	0.31
SF	271	11-May-98	Total	Lead	58.4				
SF	271	18-May-98	Total	Lead	32.6	0.13		0.37	0.38
SF	271	18-May-98	Dissolved	Lead	4.4				
1999 Data				P b					
				Diss	Tot				
SF	271	USGS	02-Jun-99	3.6	130	0.03		0.17	0.17
SF	271	USGS	06-May-99	5	44	0.11		0.34	0.34
SF	271	USGS	07-Sep-99	4.5	19	0.24		0.49	0.51
SF	271	USGS	08-Feb-99	3.3	16	0.21		0.45	0.47
SF	271	USGS	09-Aug-99	7.9	26	0.30		0.55	0.58
SF	271	USGS	09-Dec-98	3.3	34	0.10		0.31	0.32
SF	271	USGS	09-Mar-99	5.1	15	0.34		0.58	0.62
SF	271	USGS	13-Apr-99	3.6	21	0.17		0.41	0.43
SF	271	USGS	15-Jul-99	6.7	29	0.23		0.48	0.50
SF	271	USGS	17-Nov-98	5.7	63	0.09		0.30	0.31
SF	271	USGS	20-Apr-99	5.4	190	0.03		0.17	0.17
SF	271	USGS	25-May-99	4.6	790	0.01		0.08	0.08
SF	271	USGS	26-Oct-98	14	150	0.09		0.31	0.31
SF	271	USGS	27-May-99	2.8					
SF	271	USGS	30-Dec-98	2.7	200	0.01		0.12	0.12
					count	59.00			
							std dev		0.19
							calc		0.71
							re-trans		0.65
							squared		0.43
							translator		2.34
SF	271	13-Jun-95	Dissolved	Zinc	908	0.98		0.99	1.42
SF	271	13-Jun-95	Total	Zinc	929				
SF	271	14-May-91	Dissolved	Zinc	513	0.95		0.98	1.35
SF	271	14-May-91	Total	Zinc	538				
SF	271	15-May-91	Total	Zinc	503				
SF	271	15-May-91	Dissolved	Zinc	508				
SF	271	16-May-91	Total	Zinc	565				
SF	271	16-May-91	Dissolved	Zinc	585				
SF	271	17-May-91	Dissolved	Zinc	498	0.93		0.97	1.31
SF	271	17-May-91	Total	Zinc	534				
SF	271	18-May-91	Dissolved	Zinc	345	0.65		0.81	0.94
SF	271	18-May-91	Total	Zinc	531				
SF	271	01-Oct-91	Dissolved	Zinc	2640				
SF	271	01-Oct-91	Total	Zinc	2530				
SF	271	02-Oct-91	Total	Zinc	2560				

SF	271	02-Oct-91	Dissolved	Zinc	2620				
SF	271	03-Oct-91	Total	Zinc	2700	0.96		0.98	1.37
SF	271	03-Oct-91	Dissolved	Zinc	2590				
SF	271	04-Oct-91	Dissolved	Zinc	2920				
SF	271	04-Oct-91	Total	Zinc	2830				
SF	271	05-Oct-91	Dissolved	Zinc	2810				
SF	271	05-Oct-91	Total	Zinc	2660				
SF	271	29-Oct-93	Dissolved	Zinc	2350				
SF	271	29-Oct-93	Total	Zinc	2290				
SF	271	30-Nov-93	Dissolved	Zinc	2310				
SF	271	30-Nov-93	Total	Zinc	2290				
SF	271	21-Dec-93	Dissolved	Zinc	2100	0.98		0.99	1.42
SF	271	21-Dec-93	Total	Zinc	2150				
SF	271	21-Jan-94	Total	Zinc	1640				
SF	271	21-Jan-94	Dissolved	Zinc	1660				
SF	271	17-Feb-94	Dissolved	Zinc	2460				
SF	271	17-Feb-94	Total	Zinc	2370				
SF	271	07-Mar-94	Total	Zinc	1040				
SF	271	07-Mar-94	Dissolved	Zinc	1060				
SF	271	23-Mar-94	Dissolved	Zinc	1160				
SF	271	23-Mar-94	Total	Zinc	1130				
SF	271	06-Apr-94	Total	Zinc	828	0.99		0.99	1.47
SF	271	06-Apr-94	Dissolved	Zinc	819				
SF	271	18-Apr-94	Total	Zinc	606	0.69		0.83	0.98
SF	271	18-Apr-94	Dissolved	Zinc	417				
SF	271	03-May-94	Total	Zinc	718				
SF	271	03-May-94	Dissolved	Zinc	737				
SF	271	20-May-94	Total	Zinc	752				
SF	271	20-May-94	Dissolved	Zinc	788				
SF	271	08-Jun-94	Dissolved	Zinc	1130				
SF	271	08-Jun-94	Total	Zinc	1120				
SF	271	24-Jun-94	Total	Zinc	1360	1.00		1.00	1.57
SF	271	24-Jun-94	Dissolved	Zinc	1360				
SF	271	23-Jul-94	Dissolved	Zinc	1380	0.95		0.98	1.35
SF	271	23-Jul-94	Total	Zinc	1450				
SF	271	16-Aug-94	Dissolved	Zinc	1510	0.94		0.97	1.33
SF	271	16-Aug-94	Total	Zinc	1600				
SF	271	09-Sep-94	Total	Zinc	2400				
SF	271	09-Sep-94	Dissolved	Zinc	2450				
SF	271	05-Oct-94	Total	Zinc	2540	0.99		1.00	1.48
SF	271	05-Oct-94	Dissolved	Zinc	2520				
SF	271	16-Nov-94	Dissolved	Zinc	2030	0.99		0.99	1.45
SF	271	16-Nov-94	Total	Zinc	2060				
SF	271	14-Dec-94	Total	Zinc	2030	1.00		1.00	1.50
SF	271	14-Dec-94	Dissolved	Zinc	2020				
SF	271	10-Jan-95	Total	Zinc	1140	0.91		0.96	1.27
SF	271	10-Jan-95	Dissolved	Zinc	1040				
SF	271	09-Feb-95	Total	Zinc	1010				
SF	271	09-Feb-95	Dissolved	Zinc	1030				
SF	271	07-Mar-95	Total	Zinc	1250	1.00		1.00	1.57
SF	271	07-Mar-95	Dissolved	Zinc	1250				

SF	271	23-Mar-95	Dissolved	Zinc	901	0.97		0.99	1.40
SF	271	23-Mar-95	Total	Zinc	927				
SF	271	14-Apr-95	Total	Zinc	1040	0.96		0.98	1.37
SF	271	14-Apr-95	Dissolved	Zinc	1000				
SF	271	27-Apr-95	Total	Zinc	927	0.98		0.99	1.42
SF	271	27-Apr-95	Dissolved	Zinc	906				
SF	271	11-May-95	Total	Zinc	622	0.80		0.90	1.11
SF	271	11-May-95	Dissolved	Zinc	499				
SF	271	24-May-95	Dissolved	Zinc	646	0.98		0.99	1.42
SF	271	24-May-95	Total	Zinc	660				
SF	271	28-Jun-95	Total	Zinc	1100	1.00		1.00	1.57
SF	271	28-Jun-95	Dissolved	Zinc	1100				
SF	271	12-Jul-95	Dissolved	Zinc	1480				
SF	271	12-Jul-95	Total	Zinc	1470				
SF	271	26-Jul-95	Total	Zinc	1850				
SF	271	26-Jul-95	Dissolved	Zinc	1860				
SF	271	15-Aug-95	Total	Zinc	1950	0.98		0.99	1.45
SF	271	15-Aug-95	Dissolved	Zinc	1920				
SF	271	14-Sep-95	Dissolved	Zinc	1790	0.97		0.98	1.39
SF	271	14-Sep-95	Total	Zinc	1850				
SF	271	04-Nov-97	Total	Zinc	1670	0.92		0.96	1.29
SF	271	04-Nov-97	Dissolved	Zinc	1540				
SF	271	11-May-98	Dissolved	Zinc	502	0.88		0.94	1.21
SF	271	11-May-98	Total	Zinc	572				
SF	271	18-May-98	Dissolved	Zinc	674	0.96		0.98	1.36
SF	271	18-May-98	Total	Zinc	704				
1999 Data									
SF	271	USGS	02-Jun-99	317	360	0.88		0.94	1.22
SF	271	USGS	06-May-99	601	590				
SF	271	USGS	07-Sep-99	1340	1400	0.96		0.98	1.36
SF	271	USGS	08-Feb-99	1180	1300	0.91		0.95	1.26
SF	271	USGS	09-Aug-99	1210	1100				
SF	271	USGS	09-Dec-98	175	1800	0.10		0.31	0.32
SF	271	USGS	09-Mar-99	1310	1200				
SF	271	USGS	13-Apr-99	979	950				
SF	271	USGS	15-Jul-99	714	660				
SF	271	USGS	17-Nov-98	191	2100	0.09		0.30	0.31
SF	271	USGS	20-Apr-99	453	540	0.84		0.92	1.16
SF	271	USGS	25-May-99	227	670	0.34		0.58	0.62
SF	271	USGS	26-Oct-98	2130	2300	0.93		0.96	1.30
SF	271	USGS	27-May-99	274	450	0.61		0.78	0.90
SF	271	USGS	30-Dec-98	661	700	0.94		0.97	1.33
						36.00			
							std dev		0.15
							calc		1.51
							re-trans		1.00
							squared		1.00
							translator		1.00

Spokane River

Date	Diss Cd	Diss Pb	Diss Zn	Total Cd	Total Pb	Total Zn		Cd ratio	Cd sqrt	Cd arcsine	Pb ratio	Pb sqrt	Pb arcsine	Zn ratio	Zn sqrt	Zn arcsine
95/10/02	0.11	0.17	51.2	0.16	1.4	48.4		0.688	0.829	0.978	0.121	0.348	0.356			
95/12/04	0.29	0.21	92.1	0.47	3.7	102		0.617	0.786	0.904	0.057	0.238	0.241	0.903	0.950	1.254
96/02/05	0.38	1.15	94.5	0.46	5.4	89.6		0.826	0.909	1.141	0.213	0.461	0.480			
96/04/09	0.37	3.87	86.1	0.4	14.8	82.3		0.925	0.962	1.293	0.261	0.511	0.537			
96/06/03	0.28	1.64	66.5	0.34	5.6	67.1		0.824	0.907	1.137	0.293	0.541	0.572	0.991	0.996	1.476
96/08/05	0.28	0.21	46.1	0.45	1.4	45.7		0.622	0.789	0.909	0.150	0.387	0.398			
96/10/08	0.22	0.23	50.2	0.18	1.2	46.9					0.192	0.438	0.453	1.070	1.000	1.571
96/12/03	0.25	0.34	81.6	0.3	1.5	78.6		0.833	0.913	1.150	0.227	0.476	0.496			
97/02/04	0.34	0.91	105	0.34	3.1	110		1.000	1.000	1.571	0.294	0.542	0.573	0.955	0.977	1.356
97/06/03	0.34	1.65	78.9	0.45	9.1	91		0.756	0.869	1.054	0.181	0.426	0.440	0.867	0.931	1.198
97/07/08	0.16	0.38	40.4	0.22	1.6	47		0.727	0.853	1.021	0.238	0.487	0.509	0.860	0.927	1.187
97/08/05	0.16	0.13	45.3	0.18	1	44		0.889	0.943	1.231	0.130	0.361	0.369			
97/10/06*	0.11	0.2	46.2	0.1	0.9	42					0.222	0.471	0.491	1.100	1.000	1.571
97/11/03*	0.17	0.23	61	0.19	1	50.8		0.895	0.946	1.240	0.230	0.480	0.500			
97/12/08*	0.29	0.18	82	0.35	1.1	82.4		0.829	0.910	1.144	0.164	0.405	0.416	0.995	0.998	1.501
98/02/02*	0.33	0.12	102	0.3	0.8	83.4					0.150	0.387	0.398	1.223	1.000	1.571
98/03/02*	0.32	0.15	97.1	0.31	0.8	81.7					0.188	0.433	0.448	1.188	1.000	1.571
98/04/14*	0.36	0.64	96	0.36	2.2	96.9		1.000	1.000	1.571	0.291	0.539	0.570	0.991	0.995	1.474
98/06/08*	0.27	0.36	67.1	0.28	1.6	58.3		0.964	0.982	1.381	0.225	0.474	0.494			
98/08/03*	0.13	0.1	42.3	0.16	0.9	40.1		0.813	0.901	1.123	0.111	0.333	0.340			
1999 Data									Cd			Pb			Zn	
Date	Diss Cd	Diss Pb	Diss Zn	Total Cd	Total Pb	Total Zn		ratio	sqrt	arcsine	ratio	sqrt	arcsine	ratio	sqrt	arcsine
07-Jun-99	0.26	0.77	62	0.31	6.3	57		0.839	0.916	1.158	0.122	0.350	0.357			
07-Sep-99	0.15	0.21	32	0.16	1.7	36		0.938	0.968	1.318	0.124	0.351	0.359	0.889	0.943	1.231
09-Aug-99	0.14	0.08	37	0.19	1.2	39.8		0.737	0.858	1.032	0.067	0.258	0.261	0.930	0.964	1.302
10-Feb-99			82			89								0.921	0.960	1.287
11-Mar-99	0.16		85	0.36		85		0.444	0.667	0.730				1.000	1.000	1.571
11-May-99			72			76								0.947	0.973	1.339
12-Apr-99	0.34	0.28	88	0.39	2.5	89		0.872	0.934	1.205	0.112	0.335	0.341	0.989	0.994	1.465
12-Jul-99	0.22	0.18	45	0.23	1.6	47.2		0.957	0.978	1.361	0.113	0.335	0.342	0.953	0.976	1.353
13-Nov-98	0.19			0.19				1.000	1.000	1.571						
16-Dec-98	0.22	0.1	77	0.28	0.8	77		0.786	0.886	1.090	0.125	0.354	0.361	1.000	1.000	1.571
28-Jan-99	0.35		91	0.35		96		1.000	1.000	1.571				0.948	0.974	1.341

Count	29	26	30	29	26	30										
* - Provisional data. Lab QC only.								std dev		0.320			0.122			0.336
								calc		1.676			0.612			1.895
								re-trans		0.994			0.575			0.948
								squared		0.989			0.330			0.898
								translator		1.011			3.029			1.113
Note:	Samples with dissolved analyte > total analyte were removed from the analysis.															

APPENDIX K : TMDL FEASIBILITY AT THE BUNKER HILL CTP

Introduction

This appendix summarizes the approach taken, and the results to date, for developing compliance strategies for the Total Maximum Daily Load (TMDL) allocation assigned to the Central Treatment Plant (CTP), which treats the drainage from the Bunker Hill Mine in Kellogg, Idaho.

Approach

The following summarizes the TMDL compliance approach to date:

- A hydrologic comparison of recorded flows from the Kellogg Tunnel (KT) of the Bunker Hill Mine and at the Pinehurst gauge on the South Fork of the Coeur d'Alene river was conducted, because the Pinehurst gauge will be used to measure TMDL compliance for the CTP. The allowable monthly average discharge of cadmium, lead, and zinc is dependent on river flow rate.

- Sampling of the current CTP effluent for dissolved metals was initiated. This was done to determine the capability of the existing lime high density sludge treatment process to remove dissolved cadmium, lead, and zinc. Previously only total cadmium, lead, and zinc of the effluent were monitored.

- Additional treatment technologies (sulfide precipitation, iron co-precipitation, and ion exchange) were reviewed and tested in the laboratory for their ability to produce treated water of sufficient quality for TMDL compliance. Emphasis was placed on technologies that could complement the existing lime high density sludge process.

- Source control measures, which could reduce the recharge of surface and groundwater to the mine, were identified with the goal of reducing the amount of flow and pollutant loads requiring treatment.

- A computer model was developed to evaluate compliance with the TMDL assuming different mine water flow rates, treatment plant sizes, effluent concentrations, water management and storage facilities, and river flows.

Results to Date

- The hydrologic evaluation found little correlation between historic mine and river flows on a daily basis. This is likely due in part to the hydrologic differences between the South Fork's large east-west trending watershed and the north-aspect watersheds that overlay the mine, and in part to historic in-mine water management activities. This lack of a correlation necessitated selection of representative annual data sets of KT and river flows for computer modeling.

- Several source control measures have been identified which have potential to reduce both the peak and base flow rates from the mine. These measures may allow for operation of smaller scale treatment equipment.

- The computer model is being used to evaluate sizes of treatment equipment needed depending on the amount of source control that is achieved. The model is also used to evaluate use of pre-treatment storage of mine water for either peak flow reduction or contingency storage in the event of treatment plant shutdown, mine flood, or other unforeseen event.

- The computer model results show that as long as the CTP effluent concentrations of cadmium, lead, and zinc are below certain threshold values, that the TMDL load allocations do not restrict discharges below the design flow of the treatment plant. This reduces the need for large volumes of pre-treatment storage for TMDL compliance.
  Dissolved metals sampling of the CTP effluent indicates that the existing treatment process may be sufficient to achieve compliance with the TMDL with addition of filtration. Average CTP effluent concentrations of dissolved metals collected during treatability sampling are as follows:

Cadmium:	0.50 mg/L
Lead:	0.1 mg/L
Zinc:	18 mg/L

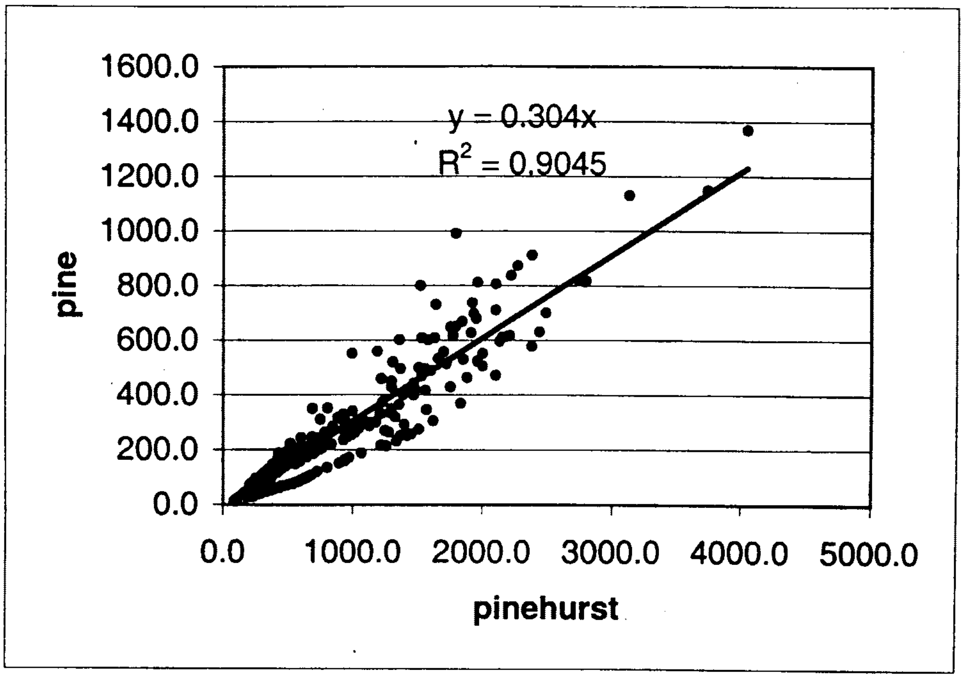
- Laboratory treatability testing has evaluated addition of sulfide precipitation, iron co-precipitation, and ion exchange to the existing lime high density sludge treatment process to further reduce concentrations of dissolved cadmium, lead, and zinc. The addition of soluble sulfide into the lime neutralization process was selected for follow-on testing during the summer of 2000 because it performed as good or better than the other technologies, plus it was considered to be the most cost effective. Dissolved metals were lowered to the following concentrations using sulfide addition during laboratory testing:

  Cadmium: 0.07mg/L
  Lead: < 0.32 mg/L
  Zinc: 15 mg/L

- Filtration of the CTP effluent using either media or micro filters will be needed to reduce suspended metal in the CTP effluent. Both media and micro filtration will be tested during the summer of 2000.

APPENDIX L : RIVER FLOW REGRESSIONS

Flow Regression
Pine Creek vs South Fork Pinehurst

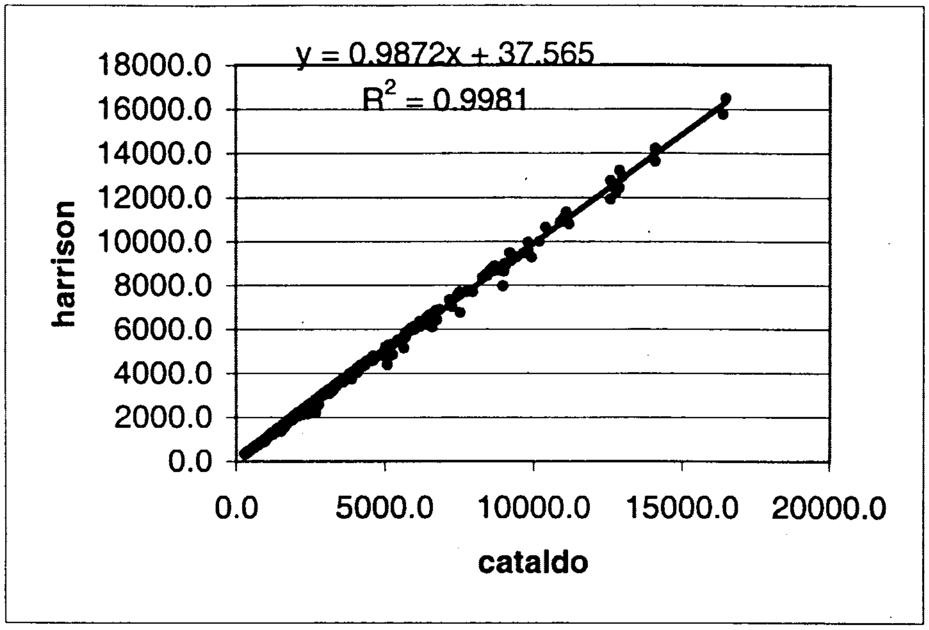


Tier Estimates

	7Q10	10th	50th	90th
Pinehurst	68	97	268	1290
Pine	20.4	29.1	80.4	387.0

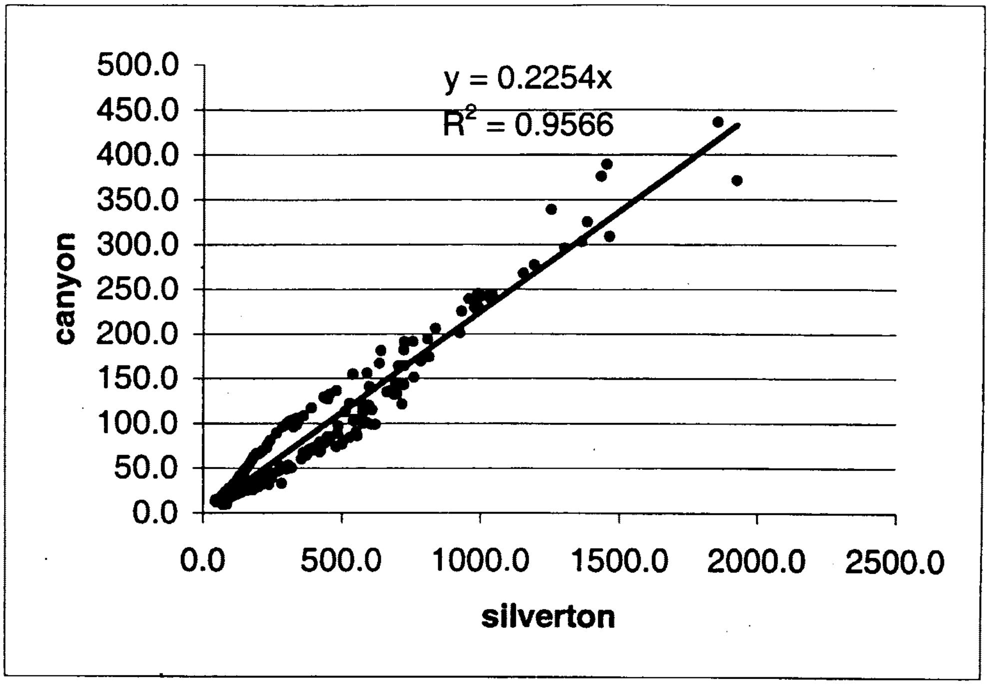
Source: USGS 1999 Sampling
Daily values from 10/01/98 thru 09/30/99

Flow Regression
Harrison vs Cataldo



Source: USGS 1999 Sampling
Daily values from 10/01/98 thru 09/30/99

Flow Regression
Canyon Creek vs Silverton

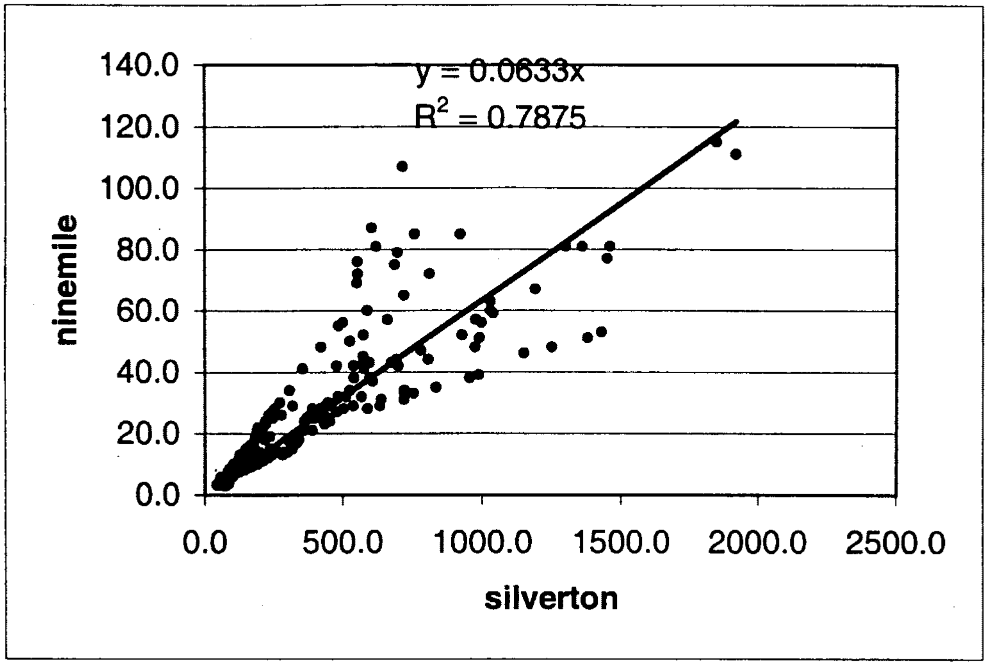


Tier Estimates

	7Q10	10th	50th	90th
Silverton	31	48	109	649
Canyon	7.1	11.0	25.1	149.3

Source: USGS 1999 Sampling
Daily values from 10/01/98 thru 09/30/99

Flow Regression
Ninemile vs Silverton



Tier Estimates

	7Q10	10th	50th	90th
Silverton	31	48	109	649
9Mile	2.0	3.0	6.9	41.1

Source: USGS 1999 Sampling
Daily values from 10/01/98 thru 09/30/99

Total Maximum Daily Load for Dissolved Cadmium, Lead, and Zinc in the Coeur d'Alene River Basin

Response to Comments

August 2000

U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Idaho Department of Environmental Quality
1410 North Hilton
Boise, Idaho 83706

INTRODUCTION

On April 15, 1999, the Environmental Protection Agency (EPA) and Idaho Department of Environmental Quality (DEQ) released a draft TMDL for Dissolved Cadmium, Lead, and Zinc in the Surface Waters of the Coeur d'Alene River Basin. The agencies held a 120-day public comment period on the TMDL that closed on August 14, 1999. During the comment period, EPA and DEQ held public meetings and hearings in Wallace, Osburn, and Coeur d'Alene. The agencies have also participated in a number of meetings organized by interested parties regarding the TMDL and/or related issues. In producing this document, the agencies reviewed approximately 300 comment letters as well as testimony from public hearings, petitions, and other information received during the comment period.

EPA and DEQ received several comments relevant to Superfund program activities that are not pertinent to the Coeur d'Alene Basin TMDL. Because these comments are not pertinent to the TMDL, they are not addressed in the Response to Comments for the TMDL. EPA notes that most of these comments have already received responses in the context of EPA's on-going Remedial Investigation/Feasibility Study (RI/FS). Further opportunities for public comment concerning Superfund activities in the Coeur d'Alene Basin will be provided continuously through EPA's participation in public meetings, circulation of draft documents, and other outreach efforts.

CHANGES TO THE TMDL RESULTING FROM PUBLIC INPUT

Public comments on the draft TMDL have led to a number of changes and improvements to the TMDL. The following is a general description of the most significant changes. The responses to individual comments and the revised Technical Support Document for this TMDL describe these changes in more detail.

1) The relationship between river flow and hardness has been built into the TMDL loading capacities for the South Fork Coeur d'Alene River and tributaries. The available data indicates that river hardness descreases with increased river flow at these sites. This results in higher water quality criteria and thus higher loading capacities during low flow conditions at these target sites.

2) Natural background metals concentrations have been revised upward (but not exceeding the Gold Book criteria) based on significant new information and analyses received since the release of the draft TMDL.

3) The approach for determining performance-based wasteload allocations has been revised. Rather than quantifying current performance in the TMDL, the TMDL now contains a narrative requirement for performance-based allocations to be established in the NPDES permitting process. This allows additional time for sampling and analysis to establish accurate estimates of current performance.

4) The allocation method related to performance-based allocations has been revised. For the South Fork and tributaries, loading capacity made available by

establishment of performance-based allocations will be reserved for future growth (new or expanding facilities). For the Spokane River, loading capacity made available by establishment of performance-based allocations will be allocated to municipal stormwater discharges.

5) While the TMDL elements are still established at four flow tiers, a narrative statement added to the TMDL will provide flexibility to incorporate additional flow tiers as part of implementation in NPDES permits.

REGULATORY OPTIONS

A wide range of concerns about the draft TMDL were raised in the comments and at the public meetings. Foremost was the concern about the potential impact of the TMDL on the local economy. Based on this concern, EPA and DEQ have evaluated the regulatory relief mechanisms established in the Idaho water quality standards and options for integrating these mechanisms into the NPDES permitting process.

Regulatory Relief Mechanisms in The Idaho Water Quality Standards

The Clean Water Act and implementing regulations include a number of mechanisms that can provide regulatory relief to affected parties under special circumstances. Mechanisms in the Idaho water quality standards include use-attainability analysis, site-specific criteria, and variances.

Use Attainability Analysis

"Designated Uses" are those beneficial uses specified in the water quality standards for each waterbody or segment whether or not they are being attained (40 CFR 131.3). The designated use driving the TMDL analysis in the Coeur d'Alene basin is established in the Idaho water quality standards as "maintenance of viable communities of aquatic organisms" (generally referred to as the "cold water biota" use).

A "Use Attainability Analysis (UAA) must be completed to support a downgrade to the beneficial uses of a waterbody. A UAA is defined as a structured scientific assessment of the factors affecting the attainment of the designated beneficial use, which may include physical, chemical, biological, and economic factors (40 CFR 131.3 and 40 CFR 131.10(j)). In a UAA, a state or authorized tribe (i.e., a tribe with approved water quality standards) evaluates the "attainability" of the beneficial uses established in the water quality standards for a particular water. It provides the technical basis for a formal change to a use designation in the state water quality standards. States and tribes must obtain EPA approval of any changes that result in less stringent water quality standards, and EPA must conduct Endangered Species Act (ESA) consultations for the approval action.

To achieve the goals of the Clean Water Act, states must seek to attain "fishable" and "swimmable" goals for its waters. Specifically, states accomplish these goals by establishing specific beneficial use categories (e.g., aquatic biota, contact recreation) and subcategories (e.g., cold water biota, warm water biota) in their water quality standards. Numeric criteria for toxic pollutants (such as dissolved metals) are established to assure attainment of the designated use. These criteria are used in regulatory activities such as impaired waters listings, TMDLs, and NPDES permits. For example, an NPDES permit is developed such that the numeric criteria are met in the receiving water, thereby protecting the uses of the waterbody.

For toxic pollutants, the feasibility of achieving the criteria to fully protect aquatic life (e.g., Gold Book criteria) is a frequent concern to dischargers. The Clean Water Act and implementing regulations allow for the creation of use subcategories in a state's standards. A use subcategory is a refinement or clarification to a specific use classification. The state selects the level of specificity it desires for identifying designated uses and subcategories of uses (see EPA's 1995 Water Quality Standards Handbook, Section 2.3).

A state must conduct a UAA whenever it wishes to adopt subcategories of uses which require less stringent criteria (40 CFR 131.10(j)(2)). For the South Fork Coeur d'Alene River, this requirement would apply to the application of the state of Idaho's "Partial Cold Water Biota Use" subcategory, because it would represent a relaxation in the water quality standards from the cold water biota use classification.

A change to the use classification requires a clear and thorough technical basis for the less stringent use designation, the associated numeric criteria, and the delineation of specific waters/segments to which it applies. The scale and complexity of the pollution problem in the Coeur d'Alene basin presents a particularly complex UAA challenge. In order to establish alternative uses and criteria to protect those uses, the state would need to predict the expected quality of basin waters after clean-up actions are completed. To obtain these predictions, DEQ would need to predict the feasibility, effectiveness, and funding of control actions for all discrete and non-discrete sources. The cumulative TMDL and RI/FS work to date is only a beginning to such an endeavor.

Based on the above considerations, EPA and DEQ do not believe a UAA will be a feasible regulatory relief mechanism in the Coeur d'Alene basin in the near future.

Site-Specific Criteria

States can adopt Site-Specific Criteria (SSC) for a specific waterbody to replace the statewide water quality criteria (which, in Idaho, are based EPA national criteria guidance). SSC are developed to provide a more refined level of protection for aquatic life at the site, taking into account such site-specific conditions as the species composition and water quality characteristics (Standards Handbook, Section 3.7). An SSC must fully protect the designated use (e.g., cold water biota), and must be formally adopted into the state water quality standards and approved by EPA prior to its use in regulatory actions. In addition, EPA must complete Endangered Species Act consultation on any approval action. Because state agencies usually do not have funding available for SSC development work, this work is typically funded by NPDES dischargers seeking relief from statewide water quality criteria.

In the Coeur d'Alene basin, SSC have been under development for some time for the South Fork Coeur d'Alene River segment above Wallace (upstream of the Canyon Creek confluence). This effort has included extensive toxicity testing with a representative suite of resident species to determine the metals levels that will fully support aquatic biota in this segment. This work has been funded by the state of Idaho and Hecla Mining Company.

EPA and DEQ have evaluated the impact of a potential SSC on the TMDL. The draft SSC for the Wallace segment would not have any effect on the TMDL allocations, because Idaho water quality criteria would still be applied in the impaired segments downstream of the Wallace segment. Meeting these downstream criteria would require the same calculations and wasteload allocations in the TMDL. On the other hand, an SSC for the entire South Fork mainstem (from Pinehurst to the Montana border) could affect the TMDL allocations, because the dilution from the North Fork would allow for higher metals concentrations than Idaho water quality criteria in the South Fork.

Some affected parties have commented that the agencies should also be developing SSC for the waters downstream from this segment. Development of SSC for the entire South Fork would require an analysis of the biological community structure and water chemistry (hardness, etc) downstream of Wallace. This work has not been funded by the state or mining companies to date. Even if the testing and analyses indicate a substantially higher tolerance in resident species for dissolved metals, the degree of regulatory relief provided by such an SSC would be governed by the available dilution from the North Fork (at the confluence with the South Fork).

Variance

A variance is a temporary waiver from a water quality standard in an NPDES permit that is specific to a discharger and pollutant. Variance provisions are a part of a state's water quality standards and allow for relief from a water quality standard when specific conditions (see below) apply to the pollution problem and/or affected dischargers. Variance provisions are also included in EPA's 1997 promulgation of cold water biota uses in the South Fork watershed.

Under Idaho water quality standards, variances remain in effect for a period of five years or the life of the permit. Upon expiration of a variance, the discharger must either meet the standard or must re-apply for the variance. In considering a re-application for a variance, the discharger must demonstrate "reasonable progress" toward achieving the standard. This is consistent with EPA guidance for variances in the Water Quality Standards Handbook (Section 5.3). Like other changes to water quality standards, any variance action by a state must be approved by EPA. EPA must also consult on its approval action in accordance with the Endangered Species Act.

In order to obtain a variance, the discharger must demonstrate that meeting the standard is unattainable based on one or more of the following grounds:

1. Naturally occurring pollutant concentrations prevent the attainment of the standard.

2. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the standard.

3. Human caused conditions or sources of pollution prevent the attainment of the standard and cannot be remedied or would cause more environmental damage to correct than to leave in place.

4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the standard, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the standard.

5. Physical conditions related to the natural features of the water body, unrelated to water quality, preclude attainment of the standard.

6. Controls more stringent than technology-based effluent limitations would result in substantial and widespread economic and social impact.

In the case of the Coeur d'Alene basin, EPA and DEQ believe the sixth variance criterion may be applicable to the municipal dischargers in the basin. During the comment period, EPA and DEQ noted the significant level of concern about the potential impact of the TMDL on the local economy. In particular, public and local officials raised concerns about the potential impact of increased sewage treatment costs on residential sewage rates in communities along the South Fork. Based on new information about the source of metals contamination in the municipal discharges and potential costs of metals reductions, EPA and DEQ believe that these dischargers may be appropriate candidates for variances based on a showing of widespread economic harm (criterion #6 above).

Conclusions

Based on the above considerations, EPA and DEQ have come to the following conclusions:

1. Use Attainability Analysis (UAA) is not likely to be feasible in the near future. A successful UAA and Use Subcategory promulgation cannot be started until completion of Superfund cleanup plans with specific remedial actions and expected water quality improvements.

2. Site Specific Criteria (SSC) continue to be an option for the upper part of the basin, but SSC will only affect the TMDL if applied to the entire South Fork. Based on proposed criteria to date and the applicability of Gold Book criteria downstream, SSC applied to the entire South Fork will provide only limited relief for discrete sources. Nevertheless, if SSC are eventually adopted by the state and approved by EPA, the TMDL would be revised accordingly.

3. Variances should be pursued by those facilities that can make showings of (1) widespread economic harm due to pending permit requirements and (2) reasonable further progress toward achieving water quality goals. If justified, variances could provide a higher degree of regulatory relief than SSC for facilities in the Coeur d'Alene basin.

Coordination of Permitting and Standards Actions

EPA is developing new NPDES permits for the operating facilities in the basin. The public process for NPDES permit issuance is similar to the process for the issuance of the Coeur d'Alene TMDL. EPA develops a draft permit and supporting documentation, releases it for public comment for a minimum 30 days, responds to substantive comments, and revises the draft permit where appropriate based on public comments. Prior to issuance of the final permit, EPA requests state certification that the final permit will achieve Idaho water quality standards in accordance with Section 401 of the Clean Water Act. EPA also conducts ESA consultation for each permit.

EPA and DEQ believe water quality standards and permitting activities can be integrated in a manner that strikes a balance between the needs for timely permit issuance and regulatory flexibility. At this time, each affected facility has an opportunity to affect its permit requirements by (1) committing to a course of action with respect to the options for regulatory relief, and (2) developing and submitting adequate information to the agencies in support of its proposals.

The agencies plan to pursue the following schedule of actions to implement the TMDL and any changes to water quality standards into the NPDES permits. Note that actions should be pursued concurrently where feasible.

1. EPA and DEQ issue final TMDLs

2. EPA begins development of NPDES permits for operating facilities in the basin.

3. Affected facilities decide whether or not to commit resources toward variances and/or expanded site specific criteria (e.g., for mainstem South Fork from Pinehurst to headwaters).

4. Based on decisions made by the facilities, EPA and DEQ provide guidance regarding the required information needed to support the selected standards action. For example, the agencies would help interpret the "reasonable progress" requirement for a facility seeking a variance.

5. At any time in the permit issuance process or after the permit is final, if SSC affecting the TMDL are promulgated by the State of Idaho and approved by EPA, the TMDL will be modified accordingly. The permit would also be modified as appropriate.

Similarly, at any time in the permit issuance process or after the permit is final, if a variance is promulgated by the State of Idaho and approved by EPA, the NPDES permit will be modified accordingly.

6. After completing the public process and obtaining state certification, EPA issues the NPDES permits. The permit limits for cadmium, lead, and zinc will be based upon either wasteload allocations in the TMDL or an approved variance. Thus, depending on the timing and the actions taken by the facility, these permits would contain either TMDL wasteload allocations or alternate requirements based on an approved variance.

   Permit limits for non-TMDL parameters will be based on technology-based effluent guidelines and applicable water quality criteria.

7. For a facility that needs time to design and install improvements to meet the permit limits, a compliance schedule can be authorized in the permit by the State for up to 5 years. The compliance schedule includes milestones for progress toward full compliance with the permit limits.

RESPONSES TO INDIVIDUAL COMMENTS

EPA and DEQ have endeavored to collect, review, and respond to each substantive comment on the proposed TMDL. The agencies received approximately 300 comment letters and substantial hearing testimony on the draft TMDL. In some cases, the exact phrasing of detailed comments is presented. In other cases, in order to develop a response to comments document of reasonable length, it was necessary to group similar comments and paraphrase comments. To the best abilities of the agencies, this "distillation" of comments was performed in a manner that preserved the substance of each comment. In grouping comments, the agencies either paraphrased the issue or incorporated the exact phrasing from the particular comment in the group that most succintly captured the issue and relevant information.

EPA and DEQ received several comments relevant to Superfund program activities that are not pertinent to this TMDL action under the Clean Water Act. Because these comments are not pertinent to the TMDL, they are not addressed in this Response to Comments.

For each comment pertinent to the TMDL, one or more letter numbers is provided to indicate the individual or organization that submitted the comment. In Appendix A, a Comments Log is included. This lists the commenters and their letter number.

Administrative Record files containing copies of each comment letter are available for review at EPA's Seattle office and DEQ's Coeur d'Alene office.

1.0 Water Quality Standards

1.1 Appropriateness of Gold Book Criteria

Comment #1 Letter(s) 207

The Department of Ecology in the State of Washington supports the TMDL approach that assures that the Water Quality Standards of Washington will be met as the Spokane River crosses into Washington. It is imperative that this goal remains clear in any subsequent versions of the TMDL.

Response: EPA and DEQ agree. The final TMDL Technical Support Document (hereafter referred to as the "TMDL TSD") retains this water quality goal.

Comment #2 Letter(s) 274

The toxicity of metals is related to their bioavailability, which in turn is mediated by inorganic and organic ligands in the water column. Some of the inorganic ligands form insoluble precipitates (particulates) with metal ions, while others form soluble complexes that are less bioavailable than the free metal. Free metal ions are considered to be the most toxic form of metals and are thus likely to be the toxic form that drives the EPA water quality criteria for cadmium, lead, and zinc. It is important to understand that the EPA water quality criteria for these metals were developed from laboratory toxicity tests in extremely low solids, low organic content waters, which are often not representative of the chemistry of many streams and lakes.

Response: EPA and DEQ generally agree as to the description of metal toxicity and chemistry. However, it is the responsibility of EPA laboratories to develop protective water quality criteria applicable to a wide range of conditions across the nation. Site specific conditions can be addressed through scientific analyses in support of a site specific criterion. The assertion that the criteria are not representative is not supported in the case of cadmium, which appears to be toxic to aquatic life in the South Fork at levels similar to the national cadmium criterion.

Comment #3 Letter(s) 255, 266

The term "dissolved metal" is an operational rather than strict definition of "dissolved". In practice, the dissolved fraction measured includes all matter passing a 0.45 micron filter. Non-toxic colloidal particles will pass through a 0.45 micron filter and are equated with toxic forms of the metal. Thus the analytical procedure being used may be grossly overstating the true dissolved metals levels in the stream. This concept is proven by the existing healthy aquatic community in the South Fork of the Coeur d'Alene River above Wallace even though the Gold Book criteria are routinely exceeded. The USGS has noted that true dissolved metals are those that pass through a 0.001 micron filter - metal forms 450 times smaller than the 0.45 micron operational definition of "dissolved".

Hecla directed a contract laboratory to mix metal salt solutions (chlorides of lead, zinc, & cadmium) used for the testing in the Gold Book criteria derivation process. These solutions were then filtered through a 0.02 micron filter (the smallest readily available to the contract laboratory). Virtually all the metal passed through the 0.02 micron filter. EPA must address this scientific shortcoming in the Gold Book criteria to account for the coincidental measurement of nontoxic colloidal particles in the current "operational" definition of "dissolved" metals. "Dissolved" should be based upon filtration through at least a 0.02 micron (and perhaps a 0.001 micron) filter. EPA's application of Gold Book criteria must be adjusted accordingly.

Response: The TMDL does not establish water quality standards or the methods for measuring dissolved metals but is based on standards adopted by the State of Idaho. The Idaho water quality criteria for metals are established for the "dissolved" portion of the sample, defined as the portion passing through a 0.45 micron filter. This filtration technique is the standard method used in criteria development, ambient sampling programs, and permitting programs under the Clean Water Act. The agencies do not anticipate a change to the 40 CFR 136 approved methods for measuring dissolved metals.

Comment #4 Letter(s) 272

The interchangeable use of total recoverable and dissolved do not necessarily represent the bioavailable portion of the metal that impact uses of the water resource. EPA/IDEQ need to take a very close look at this relationship along with flows, sediment loading and other conditions during sampling when assessing potential impacts.

Response: The TMDL does not use total recoverable and dissolved interchangeably. In presenting water quality data in the TMDL TSD, EPA depicted current water quality in terms of dissolved metals to the extent possible. The dissolved fraction is a better representation of the bioavailable portion of the metal in the water column. This understanding is reflected in the Idaho water quality standards, which specify the use of dissolved metals criteria. The TMDL establishes allocations using the dissolved criteria, but it also translates these dissolved wasteload allocations into total recoverable wasteload allocations for the discrete sources. This translation from dissolved to total recoverable is necessitated by the water quality standards and NPDES permit regulations. EPA and DEQ note that there is a 1:1 relationship between the dissolved and total recoverable values for cadmium and zinc, because these metals are almost entirely in the dissolved phase in Coeur d'Alene Basin waters.

Comment #5 Letter(s) 278, 281

The proposed TMDL only addresses the dissolved quotient of metals loading to the river system. This ignores the fact that bound metals and metals-contaminated sediments also impact water quality and the health of cold water biota.

Response: EPA and DEQ acknowledge that this TMDL does not directly address sediment quality. At this time, water quality standards for the states of Idaho and Washington do not contain sediment quality criteria for freshwater systems. Therefore, for a sediment-metals TMDL to be developed, the first step would be to establish site-specific criteria for metals in river/lake sediments. Given the current level of effort needed to address the water column contamination and criteria, DEQ does not currently have sufficient resources to develop sediment quality criteria. While no sediment quality criteria are established, the implementation of this water-column TMDL should signficantly reduce the release and downstream migration of particulate metals from both discrete and non-discrete sources. This in turn should improve overall sediment quality in the basin.

Comment #6 Letter(s) 7, 9, 11, 20, 23, 26, 27, 30, 32, 34, 35, 38, 39, 40, 47, 48, 49, 50, 51, 52, 53, 54, 55, 102, 107, 109, 112, 113, 119, 230, 244, 246, 252, 265, 268, 291, C3, C9, C14, C15, C16, C24, O3, O6, O11, W11, W14

The use of the "Gold Book" standards for implementing the proposed TMDLs in the Coeur d'Alene River is unreasonable and the standards are not attainable, due to the mineralized character of the area. Considering the mineralization, it is unlikely that the water quality goals established in the TMDL are warranted.

Response: This statement rests on the assertion that the natural background metals concentrations in the Coeur d'Alene Basin are higher than Gold Book criteria concentrations due to the mineralized character of the area. The information available to EPA and DEQ does not support this assertion (see discussion in the TMDL TSD and also in this document under Natural Background Conditions). EPA and DEQ acknowledge that natural background levels of the three metals at issue are elevated in this basin compared to many other basins, and the natural loadings reduce the loading capacity available for allocation. However, the estimated natural background concentrations and loadings are well below the Gold Book criteria.

Comment #7 Letter(s) 58, 114, 120, 122, 126, 127, 128, 165, 167, 197, 199, 206, 211, 212, 213, 214, 217, 219, 220, 221, 222, 223, 224, 226, 229, 231, 232, 234, 235, 241, 242, 245, 250, 253, 254, 259, 260, 264, 273, 275, 276, 278, 281, 286, 306, 307, C10, C12, O7, O8, O13, O14

Support TMDL requirements to clean up river basin. They will protect public health and aquatic organisms while enabling future generations to enjoy a clean and healthy environment.

Response: EPA and DEQ acknowledge the comment.

Comment #8 Letter(s) 4, 7, 10, 11, 12, 13, 15, 16, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40, 42, 43, 44, 45, 46, 47, 48, 49, 52, 54, 55, 56, 57, 60, 61, 64, 67, 68, 71, 73, 102, 107, 110, 111, 112, 115, 119, 209, 215, 225, 227, 233, 236, 237, 238, 239, 243, 244, 246, 247, 248, 249, 257, 261, 271, 274, 280, 283, 293, 294, 297, 298, 300, 301, 302, 303, 308, 309, C5, C6, C13, C14, C17, C24, C25, O1, O2, O20, O21, O27, O28, W3, W4, W7, W8, W10, W15, W16

Implementing the proposed TMDLs based on the "Gold Book" standards would create undue economic hardship on the local businesses and residents, and would make it difficult or impossible to attract new business. The TMDL should consider the economic impacts of using Gold Book standards versus site-specific criteria.

Response: The Clean Water Act requires that TMDLs be based on applicable water quality standards. The water quality standards used as the basis for the TMDL are those adopted by the State of Idaho. Further, there is no requirement that a TMDL include an economic impact analysis. Nonetheless, EPA and DEQ have evaluated the potential relief provided by finalizing site-specific criteria in the basin. While site-specific criteria may provide relief for sources if they are less stringent than Gold Book criteria, they are established based on biological testing and not an economic analysis. Therefore, the relief provided by site-specific criteria can be limited. See discussion of site-specific criteria and other relief mechanisms under Regulatory Options.

Comment #9 Letter(s) 274

EPA should not establish a TMDL based on water quality standards for cadmium and zinc that the Agency itself now recognizes is overly stringent and has in fact modified. On December 10, 1998, EPA published revised water quality criteria in the Federal Register that represent a significant change in the water quality criteria for cadmium (0.80 μg/l at hardness of 25 mg/1) and a smaller difference for zinc (36.5 μg/l at hardness of 25 mg/1). See 63 Fed. Reg. 68353, 68357-59 (Dec. 10, 1998). EPA has nonetheless ignored its own science and developed the proposed TMDL based on water quality standards that are clearly outdated. Any TMDL that is developed should be based on the best and most up-to-date science.

Response: EPA periodically updates national water quality criteria guidance based on updated scientific information and analysis. States and tribes are responsible for updating or revising state or tribal water quality standards, and they may elect to adopt EPA's national criteria. TMDLs are governed by the applicable state water quality standards, not federal criteria recommendations. The Coeur d'Alene Basin TMDL correctly applies the water quality criteria that are currently applicable to these waters in the Idaho water quality standards.

Comment #10 Letter(s) C13, C16

The TMDL limits are based on extremely stringent water quality criteria which do not consider the characteristics of the native Coeur d'Alene aquatic species and their habitat.

Response: EPA and DEQ do not view the Gold Book criteria as "extremely stringent"; in fact, they are adopted in all the EPA Region 10 states (Alaska, Idaho, Washington, and Oregon) for protection of aquatic life. However, EPA and DEQ concur with the comment that the TMDL is not based on site-specific criteria. Rather, it is based on water quality criteria adopted by the State of Idaho for all state waters. These statewide criteria are based on EPA's nationally-developed water quality criteria recommendations. Site specific criteria that reflect specific habitats or species within the Coeur d'Alene basin have not been adopted by the State of Idaho (See discussion under Regulatory Options).

1.2 Hardness Assumptions

Comment #1 Letter(s) 272, 274

There was apparently no effort made to determine whether hardness varies as a function of stream flow. In this proposed TMDL, Region 10 proposes to have different wasteload allocations as a function of stream flow. Hardness and other inorganic constituents often are correlated to stream flow, *e.g.*, at high stream flows hardness concentrations are lower. If hardness is inversely correlated to stream flow, then the 5th percentile values chosen by EPA are likely to be too conservative for the low flow conditions in the streams, resulting in overly conservative target criteria. This in turn will make the WLA and LA values too conservative at low flow. Region 10 should evaluate all of the available hardness data to determine whether the concentrations are correlated to stream flow. If they are, EPA should develop separate hardness concentrations for each stream flow category that it uses in the TMDL.

There is generally an inverse relationship between stream flow and hardness. It is logical that during low stream flows, the streams will receive a greater percentage of their flow from groundwater and from effluents which may also have a groundwater origin, and as such will be harder water. The proposed TMDL clearly recognizes and credits the addition of loading capacity associated with the harder water in the effluents of the municipalities that discharge to the Spokane River. The same phenomenon holds true for the other dischargers to the South Fork Coeur d'Alene system and needs to be appropriately accommodated by the TMDL.

The TMDL TSD shows that varied hardness values occur in sections of the South Fork. However, EPA and DEQ in effect set the hardness value of 25 mg/l as a ceiling rather than a floor value. For the South Fork target sites, EPA and DEQ use available data to calculate 5th percentile hardness values. Because some of these values fall below the minimum recommended hardness values for the derivation of criteria limits, the draft TMDL uses the minimum 25 mg/l hardness value throughout. However, it is unclear why a 5th percentile hardness was selected. What guidance or rules state that such an approach to selecting hardness is warranted or justified? The only apparent reasoning offered in the TMDL TSD appears in the sentences following Table 6-2, which state, "Toxicity increases as hardness decreases. For this reason, hardness based water quality criteria are most stringent at low hardness levels." This rationale is insufficient to justify this approach. Use of a single value (25 mg/1) to characterize the natural hardness dynamics of the system discounts the effects of flow, seasonal variation, and source differences on hardness and yields excessively stringent criteria. The derivation of criteria for use in determining the total loading capacity at a target site must consider the changes in hardness that occur with changes in these factors.

Response: In response to this comment, EPA and DEQ have revisited the seasonal variation of hardness. EPA has obtained sufficient information to discern a clear relationship between river flow and hardness in the South Fork and tributaries. The available data indicates that river hardness clearly decreases with increased river flow at these sites. This feature of the streams calls for higher water quality criteria and thus higher loading capacities during low flow conditions at these target sites.

Since the TMDL elements are flow-based for the Coeur d'Alene River and tributaries, EPA has incorporated the flow/hardness relationship into the TMDL. At each target site showing a flow/hardness relationship, a linear regression between ln(flow) and hardness was performed using the available data for the target site. The resulting regression equation is used to predict hardness values at the flow tiers. The lower bound of a 90th percentile confidence interval for the regression equation is used in the prediction. Hardness values were not estimated outside the range of available data, which did not include flows at or below the 7Q10 flows. Table 6-4 of the revised TMDL TSD lists the flows, hardness values, and resulting criteria applied in the TMDL. The data and regression calculations for those sites that show a flow/hardness relationship is included in Appendix I of the TMDL TSD.

The use of 5th percentile hardness values is a guideline of the NPDES permitting program at EPA Region 10 to provide an adequate level of conservatism when implementing water quality criteria.

Comment #2 Letter(s) 266, 284,.295

The proposed TMDL should discuss the reasons for the low and high hardness values. For example, were these values related to seasonality or flow regimes or water hardness of effluent?

Response: As described above, EPA has obtained sufficient information to discern a clear relationship between river flow and hardness (hardness decreases with increased river flow) in the South Fork and tributaries. High-hardness mining discharges are likely a contributing factor to the higher hardness values observed instream during low flow.

Comment #3 Letter(s) 267

The State of Washington's use of hardness values less than 25 mg/l in calculating Gold Book criteria is not technically defensible, because the total recoverable criterion is less than the dissolved criterion when hardness is less than 25 mg/l. It is evident that the dissolved conversion factor cannot be applied at this hardness value. EPA and DEQ should use a minimum river hardness of 25 mg/l for $CaCO_3$ for the Spokane River at the state line.

Response: The State of Washington's water quality standards apply to the Spokane River at the Idaho/Washington border. The same Gold Book criteria equations that apply to Idaho waters also apply to Washington waters. However, the Washington water quality standards allow for the use of a hardness value below the lower limit of 25 mg/l established in the Idaho water quality standards. The State of Washington used a value below 25 mg/l in its approved TMDL for the Spokane River. EPA and DEQ believe it is reasonable and consistent to use the lower hardness value (20 mg/l) to calculate the dissolved metal goals for the Spokane River at the state line. It should be noted that this goal does not have a direct affect on the wasteload allocations for the communities in Idaho along the Spokane River, which are based on the hardness of the effluents and not the hardness of the river.

Comment #4 Letter(s) 266

It is unclear from the tables and text how the tiers and seasonality are accounted for in the hardness values of Table 6-2. Is the "9" for the "South Fork at Pinehurst" value an outlier that should be excluded from the data set? The number of samples ("n") should be stated in the table so an independent evaluation can be made.

Response: EPA has included more detailed and updated database information about hardness in the revised TMDL TSD. For the Pinehurst site, the commenter has correctly identified a sample value that the agencies believe is an outlier that should be excluded from the data set (the updated information does not include that data point).

Comment #5 Letter(s) 284

The Pine Creek site's water hardness of 8 mg/l is well below the 25 mg/l that is being used to calculate the criterion. The proposed TMDL may underestimate the toxicity of the metals related to the Pine Creek site.

Response: It is recognized that the hardness of the water is less than 25 mg/l as calcium carbonate in some instances. However, in accordance with the Idaho water quality standards, a minimum hardness value of 25 mg/l is used in calculating freshwater aquatic life criteria for metals, even if the actual ambient hardness is less than 25 mg/l.

Comment #6 Letter(s) 244

Does EPA realize that the water is generally high in iron and a lower than neutral pH, which affect water hardness?

Response: EPA and DEQ are using direct measurements of hardness to establish the TMDL elements. It is therefore unnecessary, for purposes of developing the TMDL, to evaluate the relationship between iron, pH, and hardness.

Comment #7 Letter(s) 274

The TMDL TSD incorrectly interprets the National Toxics Rule with respect to minimum hardness. The National Toxics Rule in Section 131.36 (c)(4)(I) sets a range of ***not to be exceeded values*** for hardness when calculating criteria (from 25 to 400 mg/1) with 25 mg/l being the minimum hardness value if the ambient hardness falls below 25 mg/l and 400 mg/l being the maximum hardness if the ambient hardness is greater than 400 mg/l. However, establishing this range does not mean that the minimum hardness value should be used throughout, and this especially should not be done when hardness values are greater than 25 mg/l. As shown in Table 6-2 of the TMDL TSD, hardness in various surface waters of the Basin exceeds 25 mg/l.

Response: Idaho was removed from the Toxics Rule; therefore, the TMDL is based on the metals criteria adopted by the State of Idaho, which incorporate the NTR criteria by reference (including the 25 mg/l lower bound on hardness). EPA and DEQ disagree that the TMDL TSD misinterprets the state's criteria.

The lower end of the acceptable hardness range (25 mg/l) is used when the actual river hardness is below 25 mg/l.

Comment #8 Letter(s) 266, 272, 274

Hardness values used in determining applicable water quality criteria are too conservative for the actual conditions which exist in the river system. Data collected as part of the overall Basin studies suggest the hardness continues to increase down river. For this reason, the recommended hardness value of 25 is too conservative and is on the far edge hardness curve (extrapolated data), making it unreliable.

The hardness values presented by EPA for the South Fork through the Spokane River include values only from the South Fork Basin. Available data show, for example, that hardness levels in the mainstream of the Coeur d'Alene River can be twice those found in South Fork. It is extremely important to characterize correctly the hardness of the waters included in this TMDL. Using an appropriate hardness of 40 mg/l to characterize receiving water conditions rather than an inappropriate 25 mg/l hardness would increase the metals criteria and available metal loading potentials for cadmium by 41%, for zinc by 49%, and for lead by 70%. These differences would likely produce significantly different levels of economic impacts in the affected communities.

Response: See discussion above regarding adjustments to the hardness values used in the TMDL.

The commenters did not supply the data alleged to show higher hardness levels in the mainstem CdA River than in the South Fork. The TMDL is developed using direct sampling information. The data available to EPA and DEQ indicate that mainstem Coeur d'Alene River has lower hardness levels than the South Fork (e.g., at Pinehurst). The low hardness in the North Fork dilutes the hardness in the South Fork at the confluence.

Comment #9 Letter(s) 284

Further discussion is needed regarding the municipal dischargers along the Spokane River, whose effluent water hardness levels are greater than the ambient water hardness levels. What is the distance and effect of their effluent on the receiving waters? What is the attenuation of the water hardness and its resulting effects on the toxicity of the metals in the Spokane River?

Response: It can be shown that the mixture of the effluent and mainstem waters will not result in any local criteria exceedances. A detailed analysis of the relationship between the water quality criteria equations and the mixing of two waters with different hardness levels is included in the approved State of Washington TMDL. EPA and DEQ relied on this analysis in applying the effluent criterion approach for the Spokane River.

Comment #10 Letter(s) 274

Table 6-2 [of the TSD] presents the hardness data used to develop the proposed TMDL. One problem with the data presentation in Table 6-2 is that the report does not indicate how many hardness analyses were available for each target site. The number of samples is important, because it is used to determine the confidence intervals on the statistics developed from the data sets including the standard deviation, the mean, and the 5th percentile. Without this information, it is impossible to determine whether the estimates of the 5th percentile are reliable. EPA did not actually use the 5th percentile hardness concentrations in its analysis, but instead used default hardness concentrations of 25 mg/l for all CdA streams and 20 mg/l for the Spokane River. However, understanding the reliability of the measured hardness concentrations is essential to determining whether the default hardness concentrations and the target water quality criteria are reasonable. Also, EPA states that the 5th percentile is below 25 mg/l for target site 228; this is incorrect, the percentile value is 28 mg/l.

EPA should show how many samples are available for hardness in each water body and should calculate the confidence intervals on the relevant statistics that it proposes to use in the TMDL. At a minimum, the confidence interval on the means, standard deviations, and 5th percentile values are needed.

Response: EPA has significantly revised the section on hardness in the TMDL TSD and added an appendix including hardness data and charts to better depict the hardness information.

1.3 Site-Specific Criteria

Comment #1

The Federal Clean Water Act provides for site-specific criteria to be used instead of the Gold Book, because the law recognizes the Gold Book standards are not always necessary to protect water uses for fishing and swimming.

Response: EPA and DEQ acknowledge that the Clean Water Act implementing regulations do allow states to adopt site-specific criteria (40 CFR 131.11) in appropriate cases.

Comment #2 Letter(s) 33, 93, 202, 243, 244, 252, 272, C7, C13, C16, C18, O15, W2, W8, W12, W15, W19

The Gold Book criteria are not appropriate or necessary because the Coeur d'Alene Basin already supports a healthy fishery in areas with good habitat. Fisheries are thriving in sections of the stream system where water quality exceeds the criteria, indicating a different standard can be established that meets all the goals and objectives of improving the water quality without impacting the local economy

Response: The TMDL must be based upon the currently applicable water quality standards (which include the beneficial use and the water quality criteria to protect that use). In the Coeur d'Alene Basin, the currently applicable criteria are those adopted by the state of Idaho.

EPA and DEQ believe the relative health of the fishery in the basin is dependent upon both habitat and water quality. In many areas, aquatic life uses are impaired by both habitat loss and metals contamination. While focused on water quality in this TMDL, the agencies recognize the importance of physical habitat to the fishery. The current site-specific criteria work includes an evaluation of the water quality necessary to support a healthy fishery in areas with relatively good physical habitat. Upon completion, this work could lead to changes in the applicable state criteria and modifications of the TMDL. See discussion of site-specific criteria under Regulatory Options.

Comment #3 Letter(s) 11, 13, 15, 20, 32, 33, 41, 42, 48, 49, 53, 76, 94, 112, 113, 119, 233, 242, 243, 244, 247, 248, 251, 252, 266, 268, 271, 279, 284, 285, 287, 288, 289, 290, 291, 292, 295, 297, 302, C1, C2, C7, C8, C13,

C15, C18, C19, C20, C21, C22, C23, C25, O1, O11, O19, O20, O23, W3, W5, W8, W9, W13, W17, W18, W20, W21, W22, W23

Existing information about site-specific conditions should be further studied to provide data for developing reasonable water quality criteria.

Response: EPA and DEQ are continuing to review the data being generated for site-specific criteria in this basin. See discussion of Site-Specific Criteria under Regulatory Options.

Comment #4 Letter(s) 272

EPA states on Page 3 of the TMDL that 'the dissolved cadmium, lead, and zinc exceed water quality standards that protect fish and other aquatic life.' This statement is not completely accurate. Federal water quality regulations were established as a base or guideline letting the states set limits that meet their site-specific conditions. Regulations allow new standards to be developed based on site-specific conditions as long as they protect the uses of the water resource. In other states, EPA has approved water quality standards that are not consistent with Gold Book standards but still meet the intent of the regulations and protect the use of the resources, which includes protection of fish. This basic concept should be an important aspect to setting TMDLs. When a resource is identified as 'impacted,' programs should be developed that emphasize site-specific conditions to resolve complex local issues.

Response: EPA and DEQ believe that the quote from the TMDL TSD is accurate. The commenter is correct in noting that states and tribes have the authority to establish water quality standards and that standards can vary across the country while still meeting the intent of the Clean Water Act. DEQ does not have funding to develop site-specific "programs" for each TMDL. However, the agencies encourage affected parties to collect information and perform analyses to improve TMDL development.

Comment #5 Letter(s) 266

Appropriate numeric criteria are under development. In fact, an agreement to conduct the site-specific criteria study has been in place since 1993, and the study is continuing. It is, however, disturbing to review the TMDL documents where the public is led to believe that this study is and has been only a state activity. EPA is a signatory to the site-specific study agreement and has actively participated in the process from the beginning.

Response: EPA has reviewed and commented on study plans and data evaluations to improve the likelihood that the resulting criteria will be approved.

Comment #6 Letter(s) 266

The Clean Water Act mandates the development of site-specific criteria at Sec. 304(a)(1).

Response: The Clean Water Act does not mandate the development of site-specific criteria at Section 304(a)(1). This section authorizes EPA's development of national criteria guidance. The most recent criteria guidance is known as the "Gold Book". Site-specific are allowable but not mandated under the regulations at 40 CFR 11.11(b).

Comment #7 Letter(s) 266

Federal regulations allow for the development of site-specific numeric criteria at 40 CFR 131.11 (b) as follows: "In establishing criteria, States should: (1) Establish numerical values based on: (i) 304(a) Guidance; or (ii) 304(a) Guidance modified to reflect site-specific conditions; or (iii) Other scientifically defensible methods."

In addition, State regulations approved by EPA at IDAPA 16.01.02.275 allow for both the "resident species procedure" and "other scientifically defensible procedures" - both of which are being used to develop the site-specific criteria for the South Fork of the Coeur d'Alene River. These criteria must be developed prior to, and utilized for, the TMDL for the South Fork of the Coeur d'Alene River.

Response: EPA and DEQ agree that states have a number of options in establishing water quality criteria, including a variety of procedures to establish site-specific criteria. However, EPA and DEQ do not agree that site-specific criteria must be developed prior to issuance of a TMDL for the South Fork. Site specific criteria for the upper South Fork (above Wallace) have not been promulgated into the Idaho water quality standards. DEQ expects the promulgation for this portion of the river to begin this year and be completed in 2001. Any further application of the site specific criteria is three to five years in the future.

Comment #8 Letter(s) 267

EPA/DEQ should provide some rationale for rejecting the work completed toward developing site-specific criteria.

Response: EPA and DEQ have not rejected the work completed toward developing site-specific criteria. See previous comment regarding the current status of site-specific criteria.

Comment #9 Letter(s) 274

The use of biological monitoring to establish ecological goals makes sense so long as EPA and DEQ implement the following procedures:

1. If reference sites are included, their selection should include considerations of altered habitat and other anthropogenic effects that may influence the populations and communities of organisms.

2. Appropriate statistical considerations should be included for the purposes of comparisons between the reference and the assessment areas such that overly strict alpha levels are not used. Use of x 0.05, rather than x 0.1 or 0.2, would more likely result in a type I error. Such error would potentially indicate that effects have occurred when, in reality, no effects occurred. Using biological criteria can quickly generate issues of ecological versus statistical significance.

3. Clear guidance must be provided on how the data will be collected. Then, when comparison are made, data integrity would be maintained due to consistent and reliable data collection.

4. Clear and concise definitions of target goals are developed. Too often vague definitions of ecological goals are established that are not clearly measurable and thus, determination of attainment is then not clear.

Response: EPA and DEQ will consider these issues if a biological monitoring program is developed.

Comment #10 Letter(s) 274

The absence of any provision for accounting for bioavailability is a major deficiency of the proposed TMDL. Even if it were determined that modeling of the transformation and transport of these metals in the subject watersheds cannot be performed successfully because of data limitations, it is still possible to incorporate bioavailability of metals into the TMDL by allowing the use of water effect ratio (WER) studies to adjust the target criteria to reflect site-specific water chemistry. EPA has issued guidance on how to determine and use WERs for metals, and specifically included the WER provisions in the National Toxics Rule. In fact, because Region 10 is basing the TMDL on the metals criteria in the National Toxics Rule, it has erred by not including the WER provisions in the TMDL. The use of a site-specific WER is no different than the application of a site-specific hardness value, which EPA has included in this proposed TMDL.

EPA should consider as a minimum measure that the WER methodology of the National Toxics Rule be included in any final TMDL. The inclusion of the WER methodology will formally recognize that dischargers or groups of dischargers can develop site-specific WERs to account for the bioavailability of metals in their discharges and the receiving waters.

Response: EPA and DEQ agree that the regulations allow for water effect ratios (WERs) to be developed for Idaho waters. However, the commenter does not indicate how WERs would be developed or applied in this basin, and the agencies are not aware of any effort to date by affected parties to generate analyses and laboratory data to support WERs in this basin. Therefore, EPA and DEQ do not agree that the absence of "WER provisions" in the TMDL is in error.

Comment #11 Letter(s) 266, 270, 272

The State of Idaho's proposal to establish "biological end points" as a measure of site-specific water quality standards has two potential problems. First, how does the State propose to account for stream habitat alteration in determining an appropriate biological end point? Especially since highway construction has impacted most of the South Fork from Mullan to Pinehurst, including riparian zones and associated vegetation. Second, it could take several years after appropriate metal concentrations have been established in the South Fork for an acceptable biological community to become established. What numeric standard would the State propose until the biological end-point is reached? The State must recognize that there are a variety of problems that could affect biological establishment in the South Fork, other than water-borne pollutants. The details of such a proposal should be subject to public comment prior to implementation.

Response: EPA and DEQ agree that both physical habitat and water quality will play a role in improving aquatic life communities. Biological endpoints would not replace the numeric metals criteria, but biological monitoring and evaluation would provide information on the improvement in the aquatic life communities over the long term.

1.4 Beneficial Use for Coeur d'Alene Basin Waters

Comment #1 Letter(s) 274

When EPA promulgated a cold water biota designated use for South Fork, Canyon Creek and Shields Gulch, it did so even though it recognized that the concentrations of metals in these water bodies regularly and significantly exceed the Gold Book criteria for such use. EPA claimed that, at least in the South Fork, the presence of aquatic life indicated that aquatic organisms had adjusted to the higher metals levels in the stream. While Asarco disagrees with EPA's conclusions, the Agency cannot "have it both ways." It cannot assert that organisms have adapted to higher metals levels and designate a use on that basis, but then promulgate a TMDL that assumes lower metals concentrations must be achieved in order to sustain the designated use.

Response: The presence of aquatic life does not necessarily indicate that the aquatic life use (i.e., cold water biota) is fully supported. Different aquatic species and life stages exhibit different tolerances for habitat and water quality impairments. Thus, while certain species at certain life stages may reside in a impaired river segment, others are absent because of the degree of impairment. The water quality criteria are not necessarily established to sustain a designated use at its existing condition, for that condition may be impaired. Rather, they are established to fully support all aquatic species and life stages, some of which may be absent due to ongoing impairments.

Comment #2 Letter(s) 70

EPA's national policy of applying cold water biota and the associated Gold Book water quality standards to any water body containing fish without considering any other watershed conditions is arbitrary and scientifically invalid.

Response: Uses and criteria applicable to waters of the State are determined by the State when it adopts its water quality standards. States can adopt criteria less stringent than EPA guidance values if it can demonstrate scientific validity (40 CFR 131.11).

Comment #3 Letter(s) 255

The "Cold Water Biota" designation for the South Fork of the Coeur d'Alene River may not be appropriate. The "Cool Water Biota" designation under development by DEQ may be more appropriate.

Response: In the absence of a use attainability analysis that justifies a lower use than full aquatic life protection, the cold water biota use is the appropriate designation for the South Fork. See also the discussion of use attainability analysis under Regulatory Options.

Comment #4 Letter(s) 205, 272, C22, O16, W8, W21

No reference has been made to any scientific assessment of use protection and the ability to attain all uses designated for the stream system. The South Fork is heavily impacted from other activities in addition to mining which may have permanently limited the ability to meet uses as designated in the rules. The interstate highway has virtually changed the stream system into a channel designed to carry water through this narrow section. Without fish habitat, only a limited fish population can be present. However, it is important to note that no information is presented that suggests the agencies have looked at scientific data on the attainability of uses in all reaches of the stream system. More information should be developed to assess stream conditions and uses prior to setting TMDLs.

Response: There is no legal requirement to perform a use attainability analysis as part of a TMDL. In the absence of a use attainability analysis that justifies a lower use than full aquatic life protection, the cold water biota use must be fully protected in basin waters to meet the requirements of the Clean Water Act. The regulations require that any TMDL achieve the currently applicable uses and criteria in the state water quality standards. See discussion of Use Attainability Analysis under Regulatory Options.

Comment #5 Letter(s) 266

The TMDL lists two full pages of data sources in Table 5-1. This data set does not provide evidence that "cold water biota" is an "existing use" for all portions of the South Fork of the Coeur d'Alene River, Canyon Creek, Ninemile Creek, or Government Gulch.

Response: EPA and DEQ provided water quality-related data pertinent to the TMDL in Table 5-1; it was not intended to provide biological information pertinent to the existing aquatic life use. The TMDL does not establish the beneficial use, but rather establishes allocations to achieve the applicable water quality criteria and thereby protect the beneficial use. The applicable criteria are those adopted by the State of Idaho.

1.5 National Toxics Rule

Comment #1 Letter(s) 266

The TMDL states that "Idaho was unable to issue and submit the TMDLs to EPA for approval, however, for a number of reasons, including the fact that the State could not use site-specific criteria while Idaho was still subject to the federally promulgated National Toxics Rule (NTR)." We find no authority in either the CWA or the legislative history of the CWA to support a position that Congress intended to punish NTR states by disallowing site-specific criteria in those states. Indeed, EPA has approved Idaho regulations specifically allowing for the development of site-specific criteria as specifically allowed for under the CWA. Offering up the NTR as an excuse circumvents direct Congressional intent to develop "criteria for water quality accurately reflecting the latest scientific knowledge."

Response: This is primarily a comment on the provisions of the national NTR rulemaking and not the Coeur d'Alene River Basin TMDL. Since Idaho was removed from the National Toxics Rule on April 12, 2000 (FR 19659), the state can now adopt site-specific criteria in waters of the state.

Comment #2 Letter(s) C4

Idaho should be removed from the National Toxics Rule.

Response: Idaho was removed from the National Toxics Rule on April 12, 2000 (FR 19659). EPA is continuing to consult with the National Marine Fisheries Service and U.S. Fish and Wildlife Service under the Endangered Species Act on the Idaho water quality standards, including the state's adopted metals criteria for cadmium, lead, and zinc implemented in this TMDL.

Comment #3 Letter(s) 266

In the partial settlement agreement in the NTR litigation, EPA admitted that the duration and return frequencies of the Gold Book criteria had absolutely no scientific basis. The agreement entered into with the court by EPA directed EPA to develop the appropriate science for the correct frequency and duration of Gold Book criteria. EPA has failed to comply with this court directive and must not apply either acute or chronic Gold Book criteria until the science is developed. Indeed, the instream flow used in the TMDL for 'worst case' scenario is a 7Q10 flow correlated to the chronic value. Upon development of adequate science for the frequency and duration of the Gold Book criteria, in compliance with full APA requirements, the correct instream flow tiers may then be developed.

Response: Idaho was removed from the National Toxics Rule on April 12, 2000 (FR19659). The TMDL is developed using the currently applicable water quality criteria. The standards which are the basis for the TMDL are those adopted by the State of Idaho. The establishment of a 7Q10 low flow tier is both reasonable and consistent with Idaho water quality standards (IDAPA 16.01.02, Section 210.02) and EPA's Technical Support Document for Water Quality-based Controls (EPA, 1992).

Comment #4 Letter(s) 266

The statement by EPA in the rulemaking that "The total recoverable metals method is an intermediate method which uses a weak acid treatment to dissolve readily soluble solids and filtration to remove residual solids" is not true. The numerous scientific faults in this statement include:

- The pH of the sample prepared for total recoverable metals is subjected to a pH of approximately 0.1 SU. This is an extremely strong, not weak, acid! Once again, pH is a logarithmic scale, thus a biota protection standard for pH of up to 9 SU instream vs. the pH of the analysis procedure is over eight orders of magnitude more acidic.
- The sample is subjected to temperatures that would also kill all aquatic life prior to filtration and analysis.
- The filtration step has the "dissolved" metals shortcomings discussed above.

Response: This comment apparently refers to a statement in an EPA rulemaking (which has already been subject to public comment) and not in the TMDL documents. The TMDL wasteload allocations are established and monitored in a manner consistent with the metals requirements in the NPDES program. EPA must express metals limits as total recoverable in NPDES permits by regulation (40 CFR 122.45). The methods for compliance monitoring in NPDES permits are also established by regulation (40 CFR 136).

1.6 Antidegradation

Comment #1 Letter(s) 266, 274

The TMDL states in "Step 8" that in certain cases "the assigned allocation is set at the current discharge level" and that "EPA believes this allocation step is consistent with the anti-degradation requirements." The CWA Section 303(d) does not mandate a "zero increase in discharge." The legislative history of the CWA does not support this position. Idaho's antidegradation policy applicable to these waters does not mean "zero." Idaho's antidegradation policy applicable to waters other than "high quality" or "outstanding resource waters" reads "Maintenance of Existing Uses for All Waters. The existing in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected." As discussed in our previous comments, the majority of the waters affected by the proposed TMDL do not have "existing uses" upon which the TMDL is based. Further, the "level of water quality" is a range, not an absolute "zero" baseline.

EPA and DEQ incorrectly allocate loads to a number of sources based on current discharges where those sources are already meeting their WLAs. They base this requirement on a purported policy against anti-degradation. This is an incorrect reading of anti-degradation requirements. Anti-degradation prohibits the relaxation of permit limits or new discharges to impaired waters, except in prescribed circumstances. It does not require sources that achieve greater reductions than what is already required by their permits to maintain these lower discharge levels.

Response: This step in the allocation process does not require reductions in current discharges from affected facilities. The intent of anti-degradation requirements is to prevent further water quality degradation, except in prescribed circumstances. EPA and DEQ believe that allocating loads based on current performance for sources that are already meeting their WLAs is consistent with intent of anti-degradation provisions. Otherwise, some sources would be assigned allocations that allow for an increase in discharges, which could further degrade water quality. In the agencies' view, this outcome is not reasonable and would run counter to the intent of anti-degradation provisions and the goal of the TMDL.

Comment #2 Letter(s) 272

The 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. While EPA suggests natural background metal concentrations are not significant, natural mineralization in this area cannot support this assumption. Anti-degradation does not seem applicable because this natural metal loading which does occur, would naturally degrade water as it flows downstream. TMDLs should be based on site-specific criteria and conditions not based on an inappropriate anti-degradation rule.

Response: The TMDL is not based on anti-degradation rules, though EPA and DEQ believe one step in the allocation method is consistent with anti-degradation provisions (see comment above). Anti-degradation policy is focused on actions that may degrade water quality from its current condition. Natural background concentrations would only impact an anti-degradation analysis if they were higher than the discharge concentration (i.e., the discharge was cleaner than the natural condition of the receiving water). As discussed in the Natural Background section, estimated natural conditions in the Coeur d'Alene River basin are below Gold Book concentrations.

2.0 TMDL

Comment #1 Letter(s) C4, C13

EPA, the State of Idaho and local stakeholders should develop an alternative TMDL which will (1) protect water quality and the regional economy; (2) establish attainable milestones; and (3) be based on data that reflects the local conditions of the watershed.

Response: As noted by EPA and DEQ, the TMDL can be modified in the future based on new information or changes to the applicable water quality criteria.

Comment #2 Letter(s) 262, C7, W12

We believe that EPA has taken an extremely conservative approach to establishing TMDLs because of the limitations of the data. We think EPA should develop an alternative TMDL that incorporates the data collection programs that are currently underway.

Response: The final TMDL incorporates all of the information available to EPA and DEQ from data collection programs in the basin, including data collected during and after the close of the comment period (e.g., USGS data collected in 1999). Incorporation of additional hardness data generally resulted in higher allocations to sources.

Comment #3 Letter(s) 274

In moving ahead with a TMDL for the Coeur d'Alene River, EPA and DEQ are ignoring the important findings and recommendations of the National Advisory Council for Environmental Policy & Technology Development, *Report of the Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program* (July 1998). In that report, the federal advisory committee identified two categories of "extremely difficult problems" where "water quality standard nonattainment is due in part, or entirely, to . . . historic problems." *Report* at 46. The TMDL for the Coeur d'Alene Basin involves both of these "extremely difficult problems." The first problem includes, among other circumstances, areas involving interstate freeways, contaminated sediments where clean-up would do more harm than good, urban impervious surfaces, waste sites where complete removal is impracticable, and channelization right up to the bank. *Report* at 46. These problems are prevalent in the Coeur d'Alene Basin.

The second "extremely difficult problem" includes the following, all of which also arise in the Coeur d'Alene Basin: small dams, culverts, abandoned roads, abandoned railways, abandoned mines, contaminated sediments, urban stormwater runoff, combined sewer overflows, sanitary sewer overflows, land clearing activities, active CERCLA cleanup sites, extreme stream modification (*e.g.*, channelization and loss of habitat), and operation and management of dams and channels. *Report* at 47.

Not only should the coexistence of these "extremely difficult problems" in the Coeur d'Alene Basin counsel against proceeding with this TMDL, the many, varied types of problems within each category should as well. By taking on TMDL development for the Coeur d'Alene Basin, EPA and DEQ are trying to address one of the most complex and difficult TMDL problems in the country. Yet the agencies appear to be ignoring the complexity and difficulty of this situation by developing a simplistic loading analysis that ignores most of the fundamental problems identified in the TMDL Report.

Response: EPA and DEQ are required to develop a TMDL for the Coeur d'Alene Basin pursuant to the court approved TMDL schedule for Idaho. The agencies acknowledge the complexity of the pollution problems in the basin and are committed to working through the regulatory relief mechanisms when appropriate. The agencies disagree that the TMDL ignores fundamental problems in the basin. On the contrary, in addition to fully satisfying the regulatory requirements pertaining to TMDLs, this TMDL has helped answer a number of important questions about the pollution problems in this basin. It has also provided a framework for coordination of Clean Water Act and CERCLA activities in the basin.

Comment #4 Letter(s) 30, 44, 46

The EPA is proposing TMDL criteria that require the Coeur d' Alene River to be cleaner than our own drinking water. Is this reasonable?

Response: The TMDL is based on criteria adopted by the State of Idaho in its water quality standards. For the three metals (cadmium, lead, and zinc), the Idaho water quality standards for protection of aquatic life are more stringent than the standards for protection of drinking water. This is reasonable, because the available scientific information indicates that these metals are toxic to aquatic life at levels that are safe for human consumption.

2.1 Source Identification

Comment #1 Letter(s) 266, 274

The draft TMDL inflates the numbers of true point sources by including traditional non-point sources as "discrete" point sources. The draft TMDL includes as "point" sources historic adits on hillsides where there is no outfall. The TMDL presumes that all "pollutants" contained in this seepage to groundwater "discharges" to the receiving water even though there is no outfall involved. EPA defines an "outfall" as follows: The place where an effluent is discharged into receiving waters.

In addition, the TMDL proposes that a pile of rocks along a stream is also a "point" source. Any "pollutants" in the waters in the area of the rock pile is presumed, in the TMDL, to come from that pile of rocks, rather than from either natural background sources or historically deposited materials in the streambed and banks. Here again, an outfall is absent. If indeed a pile of earth material is a point source, there should be a wasteload allocation for the largest "point" source in the basin, Interstate Highway 90.

The simple fact of the matter is that the law requires point sources operating under technology-based effluent limitation guidelines, and to our knowledge there are only two such point sources operating in the basin where lead, zinc, and cadmium are discharged under a technology-based effluent limitation guideline.

Response: EPA and DEQ maintain that the source categorizations and terminology in the TMDL are legally accurate.

As discussed in the TMDL TSD, the definition of "point source" includes waste piles. These "waste pile" point sources may discharge to receiving waters via surface water runoff and/or seepage, reaching the receiving water via overland flow, through a pipe, or through a groundwater hydraulic connection. Regarding the question of seepage to groundwater, the TMDL is not based on a presumption that all pollutants contained in...seepage to groundwater enter the receiving water. Rather, the TMDL presumes that some fraction of the dissolved metals seeping into groundwater enters the downgradient receiving water. In these cases, it is reasonable and prudent to assign an allocation to the source.

As described in the TMDL TSD, the agencies do not possess sufficient information to identify wasteload allocations for waste pile sources at this time. If individual wasteload allocations for individual waste piles are developed in the future, tailings materials incorporated into the highway would be considered for inclusion.

The Clean Water Act requires both technology-based <u>and water quality-based effluent limitations</u> in NPDES permits, and point sources must obtain NPDES permits whether or not they are covered by national technology-based guidelines.

Comment #2 Letter(s) 274

The TMDL fails to adequately identify a number of point sources, thereby making it impossible for the public and Asarco to comment on those point sources. For example, the TMDL includes unnamed adits "Unnamed Adit - Deadman Gulch (SF 389)" and "Unnamed Adit (SF 385)" that are impossible to locate. Anyone owning property on which these adits are located would have no notice that EPA and DEQ intend to include them in the TMDL and require an NPDES permit for them. The descriptions of point source locations in Appendix B are also wholly inadequate for locating the different sampling stations. Some descriptions are too vague to provide the public with notice of the location. Others are left completely blank.

Furthermore, some of the identified point sources do not appear to correspond to actual identifiable flows or discharges. For example, Asarco personnel attempted to identify the Mineral Point discharge and were unable to find any flow from the Mineral Point Mine adit. Consequently, Asarco is uncertain to which point source EPA is assigning loads. Likewise, the TMDL lists the Rainbow (SF 392) as a point source but this point source is routed to the Osburn Tailings Pond and does not discharge to surface waters.

The failure of EPA to identify adequately large number of point sources makes it impossible for the owners of property where these point sources are allegedly located to provide meaningful comment. How can a property owner dispute data such as flow and concentration if the owner cannot even find the point source?

Response: EPA and DEQ provided source identification numbers, source names, and detailed maps in the TMDL TSD. The sheer number of sources and sampling locations, as well as the remoteness of some locations, increases the potential for errors in the database and/or maps. EPA and DEQ (with additional coverage by the local press) have clearly provided notice of the TMDL to property owners in the Coeur d'Alene River basin. The mine owner is responsible for identifying sources under its ownership and providing information to the agencies to correct any errors in the source listings or maps.

EPA and DEQ note that SF385 and SF389 are clearly located on the maps provided in the draft TMDL TSD. Adit SF385 is located in the East Fork of Two Mile Creek, northeast of Osburn. Adit SF389 is located on a fork of Deadman Gulch, northeast of Mullan.

EPA and DEQ concur that the Rainbow adit (SF 392) was routed to the Osburn Tailings Pond in April 1998. This adit has been removed from the final TMDL wasteload allocations accordingly.

Regarding the Mineral Point adit, it is clear that Asarco does not dispute the existence of this adit. However, its flowrate is less certain. Asarco has not provided information to improve the agencies' database, other than to point out that a single reconnaisance found zero adit flow. It is possible that this adit is an intermittent discharge or that the database is in error. EPA and DEQ presume that Asarco does not wish to eliminate the wasteload allocation for this adit based on its reconnaisance. Therefore, the wasteload allocation for this source remains unchanged in the final TMDL. If future monitoring confirms that this adit does not discharge at any time, its allocation can be reserved for future growth.

Comment #3 Letter(s) 30, 44, 46, 270

EPA failed to consider the natural metal concentration of public drinking water in the basin. Although the water provided by the various water districts meets federal Safe Drinking Water Act requirements, historic sample results indicate metal concentrations in excess of the proposed TMDL standards. Paragraph 4, page 44 of the TSD states "Possible sources of metals to these systems [municipalities] include inflow/infiltration of runoff through tailings material to the collection system, illicit connections, high residential loads, and /or leaching of metals into wastewater in unlined ponds constructed from tailings materials." Drinking water data collected from the Pinehurst Water District and the Kingston Water district showed lead and zinc concentrations above both the Gold Book water quality criteria and the proposed TMDL limits. "Clean drinking water" is not mentioned or addressed in the TMDL as a possible source of metals to the municipalities. The EPA needs to evaluate the possibility that the clean public drinking water in the Silver Valley does not meet the criteria proposed in this TMDL. The Clean Water Act does not require facilities to treat water below naturally occurring background concentrations.

Response: Drinking water data was not provided to the agencies, but EPA and DEQ agree that water systems likely carry a measurable metals load that ultimately enters the sewage collection systems. Any drinking water sources of metals are addressed by the wasteload allocations for the municipal sewage treatment plants. Based on the available information from the sewage treatment plants along the South Fork, the primary source of metals appears to be infiltration into the collection system of contaminated groundwater (migrating through floodplain tailings). The contribution from the drinking water supply is believed to be relatively minor, because drinking water sources are located outside of the Bunker Hill site.

Comment #4 Letter(s) 38, 65

The EPA is not addressing additional point sources, such as the Bunker Hill Superfund site, abandoned mine dumps, and riverside tailings dumps, because there are no financial gains in pursuing these major sources.

Response: Contrary to this comment, EPA is pursuing a number of cleanup actions and point source controls in the basin in areas where cost recovery is not a factor in the action. EPA is performing the cleanup at the Bunker Hill complex at a cost of nearly $130 million to the federal government. EPA and DEQ are currently evaluating remedies for meeting the TMDL allocations in the Bunker Hill CTP discharge, and the agencies are now conducting treatability tests for this discharge.

Comment #5 Letter(s) 266

The TMDL states that "In the Spokane River, between the lake and the state line, the only identified sources of metals are three municipal treatment plants." The proposed TMDL would lead the public to believe that the only sources of the metals would be mining, a minor amount of natural background and POTWs. However, in EPA's December 1983 document *Results of the Nationwide Urban Runoff Program* (NURP), the sampling data set results for lead and zinc from urban runoff show 90th percentile levels of lead at 350 ppb and zinc at 500 ppb. Extremely high metals levels occur nationwide where there are no mining operations.

Response: While EPA and DEQ do not have any discharge characterization data for urban stormwater in the Coeur d'Alene Basin, the agencies agree that urban stormwater is a likely source of metals to the river network. For the upper part of the basin, this source would be included in the non-discrete gross allocation (similar to intermittent runoff from a waste pile). For the Spokane River, EPA and DEQ have included language that establishes a stormwater allocation equivalent to the difference between the calculated wasteload allocation and the current performance for the three municipalities (Coeur d'Alene, Post Falls, and Hayden Lake). This approach satisfies the following considerations:

1. For planning purposes, it is prudent to establish a mechanism for stormwater allocations at this time.
2. The allocation method for the Spokane River, using current discharge performance and the effluent-based criterion as an upper bound, allows for allocations for both sewage treatment plants and urban runoff that meet water quality standards in the Spokane River.

Comment #6 Letter(s) 266

The statement is made in the proposed TMDL that "The South Fork has been heavily impacted by historic and ongoing mining activities below Daisy Gulch." This is not true. The egregious nature of this statement is witnessed by EPA's calculations of both the carrying capacity of the South Fork drainage and the minute fraction attributable to the "ongoing mining activities" at the Lucky Friday, Coeur/Galena, and Sunshine operations. Once again, the impacts to the basin are clearly from historic impacts and natural background levels of metals. The CWA is prospective in application and any retroactive application is not in accordance with law. There is nothing in the law or legislative history indicating Congressional intent to punish current point source dischargers for historic activities.

Response: EPA and DEQ disagrees with the suggestion that ongoing mining operations do not contribute to the water quality problems in the South Fork, and that only historic and natural background conditions are sources of impairment (see discussion of Natural Background Conditions). As stated elsewhere in the TMDL Technical Support Document, EPA believes the operating mines contribute significant metals loads to the river system and have feasible options for reducing these loads.

Comment #7 Letter(s) 240, 282, 296

Lead sulfide and its associated oxidized minerals are very resistant to dissolution and resist leaching into groundwater. The lead present in the groundwater, river water, and lake bottom water is most probably not derived from the mine tailings.

Response: Lead sulfide is very resistant to dissociation in water, but its oxidation products (lead sulfite and sulfate) dissociate more readily in water.

Comment #8 Letter(s) 295

The TMDL doesn't address groundwater which is an important component of water quality. What are the groundwater conditions of the whole region, not just those identified as point source discharges?

Response: The TMDL addresses groundwater contamination by assigning allocations (which require reduction of metals loads) to sources which are contributing to the groundwater contamination . The gross allocations for non-discrete sources apply to all sources contributing metals to surface waters either directly or indirectly via groundwater.

Comment #9 Letter(s) 266

DEQ, in both the state TMDL for the basin and historic documents, concluded that non-point sources are responsible for over 90% of the metal load to the system. In the joint TMDL with EPA, DEQ appears to reverse its historic position.

Response: The calculation of nonpoint source percentages in earlier state TMDL documents was based on existing data when these documents were developed. The draft TMDL included a more detailed evaluation of the discrete source contributions to the overall metals loadigs in the South Fork and tributaries. While the earlier DEQ estimates differed from the later EPA/DEQ estimates due to the use of different datasets and interpretations, both evaluations came to the same general conclusion that a majority of the loading is from non-discrete sources. The gross allocation between discrete and non-discrete sources in the joint TMDL is based on an interpretation of mixing zone provisions in Idaho's water quality standards.

Comment #10 Letter(s) 266

The TMDL states that "the URSG efforts . . . include parallel sampling of abandoned adit discharges." There is a real question as to whether these "adit discharges" were sampled at outfalls. If they were not, the implication is that the adit must meet a fraction of the Gold Book standard.

Response: Some of the adit sampling in question was conducted at the adit entrance and not necessarily at an outfall discharging directly into the stream. As EPA and DEQ note in the final TMDL TSD, it is assumed that some fraction of the metals in an adit discharge eventually enters the adjacent stream. Like other discrete sources, adits were allocated a wasteload allocation on the basis of the measured flowrate of the discharge. EPA and DEQ do not see any implication that the adit therefore must meet a fraction of the Gold Book standard.

Comment #11 Letter(s) 205,207, 284, 295

If heavy metals currently suppress algae growth, will the removal of these metals from the water result in the eutrophication of Lake Coeur d'Alene?

Because of increased development pressure around Lake Coeur d'Alene . . . specific requirements for implementation of a lake nutrient management plan is needed to guarantee that the lake does not eventually become eutrophic and the water column does not become anoxic above contaminated lake sediments.

Any TMDL must also include an enforceable nutrient management plan to protect Lake Coeur d'Alene from future remobilization of metals as the result of anoxia due to accelerated eutrophication.

Response: EPA and DEQ have added an appendix to the TMDL TSD describing the latest studies of metals fluxes from lake sediments. Based on our current understanding of the lake dynamics, EPA and DEQ believe the long-term risk for a substantial release of metals from lakebed sediments is low because (1) Coeur d'Alene Lake's large assimilative capacity for nutrients makes it unlikely that an anoxic hypolimnion will develop, and (2) core samples did not release larger metals loads under anoxic conditions (in fact, cadmium and zinc fluxes were negative in the tests). In this context, EPA and DEQ believe it is reasonable to finalize this TMDL. However, the agencies agree that continued monitoring and analysis of the lake condition is needed as cleanup proceeds to detect any increased eutrophication. If it is determined in the future that nutrient loading reductions are necessary to maintain oligotrophic conditions in the lake, the TMDL can be modified to include requirements on nutrient sources.

Comment #12 Letter(s) 267

Recent studies of Coeur d'Alene Lake suggest that it is unlikely that metals will re-mobilize from the lake bottom to the water column under anoxic conditions because most of the lead, zinc, iron and arsenic are bound as sulfates. This is contrary to the conclusion presented in the TMDL (*i.e.*, metals in oxide form; better to maintain aerobic conditions). The results of these studies should be considered in developing the final version of the TMDL.

Response: See comment above. USGS is near completion on a report of a study in August 1999. Preliminary findings are discussed in an appendix to the final TMDL TSD.

2.2 Target Sites

Comment #1 Letter(s) 272, 274

Data in Table 5-2 of the TSD (current conditions at TMDL target sites) indicate that sufficiently sensitive analytical methods were not used in at least some of the CdA basin studies. Data for dissolved cadmium at stations NF at Enaville and Coeur d'Alene Lake have reported minimum concentrations of "<1 μg/l"; the target water quality criterion is 0.38 μg/l. Similarly, the data for dissolved lead at these same two stations are reported as <1 μg/l while the target criterion is stated to be 0.54 μg/l.

Response: The water quality targets in the final TMDL are no longer single values; they are ranges based on the range of hardness levels at a particular target site. For the Harrison site, cadmium targets range from 0.37 ug/l to 0.59 ug/l and lead targets range from 0.54 ug/l to 1.1 ug/l, depending on the river flow.

In the final TMDL TSD, EPA and DEQ have noted and addressed the limitations in the North Fork data with respect to detection levels for cadmium and lead. EPA has estimated background metals concentrations for the North Fork using the most recent monitoring information from the USGS (October 1998 to September 1999). As in previous samplings, The North Fork was below the detection limits for dissolved cadmium (1 ug/l) and dissolved lead (1 ug/l). Assuming similar natural characteristics of the North and South Forks, EPA and DEQ have set the North Fork background values equal to the South Fork natural background estimates for cadmium (.06 ug/l) and lead (.18 ug/l). For zinc, the background value was set at the maximum detected concentration in the North Fork (5 ug/l).

Comment #2 Letter(s) 2

A target site should be added to address Milo Creek.

Response: Given the scale of this TMDL, it is not practical at this time to establish target sites on each creek and gulch delivering metals to the South Fork. The agencies acknowledge that Milo Creek is clearly one of several important tributaries in the Kellogg area that warrant further evaluation during TMDL implementation and/or later refinement of the TMDL.

Comment #3 Letter(s) 65, 87

EPA should examine mining sources in Beaver Creek and Eagle Creek (tributaries to the North Fork).

Response: TMDL allocations are not established for the North Fork because it does not exceed water quality standards for dissolved cadmium, lead, and zinc. Nevertheless, EPA and DEQ support further evaluation and control of the mining sites in the North Fork watershed. Improvements in water quality of the North Fork would benefit downstream waters.

2.3 Attenuation of Metals - Upland Adits

Comment #1 Letter(s) 270, 272

EPA's assumption that the full flow and metal load carried by all discrete point sources in the basin eventually enters surface waters (even if those sources do not directly enter surface waters) is overly conservative. It ignores basic geochemistry to assume that dissolved metals in a water column move through soils without retardation, soil attenuation, or plant uptake. Also, it cannot be assumed that 100% of all water discharged onto the land surface eventually ends up in surface waters. Evapotranspiration, soil absorption and potential aquifer recharge need to be taken into consideration for all discharges that do not visibly enter surface waters. Data should be collected at each site to quantify the true load to the system. EPA could then eliminate those discrete sources that do not directly discharge to surface waters and re-assign the point source loading to appropriate point sources.

Response: EPA and DEQ acknowledge that there may be attenuation of metals in an adit discharge when its pathway to the receiving water is overland or through soils. However, the agencies disagree that this attenuation must be quantified before setting an allocation for the source. The allocation is based on the source flowrate and not its current metals loading to the system.

The allocation applies to the loading of the source to the receiving water. EPA and DEQ anticipate that an adit that does not directly discharge to a receiving water will be regulated (based on the TMDL wasteload allocations) and monitored at the point closest to the receiving water where compliance monitoring can be conducted. If it is demonstrated during permitting that an adit portal discharge is attenuated downgradient from the compliance monitoring location and prior to reaching the receiving water, the limits that apply to the adit portal source can be adjusted upward while remaining consistent with the TMDL wasteload allocations. The permittee will bear the burden of demonstrating the attenuation of the source. If this analysis demonstrates that the source has been given an allocation greater than its current loading to the river, the remainder would be reserved for future growth. (See related discussion under Method of Allocation - CDA River and Tributaries).

2.4 Attenuation of Metals - Instream Reactions

Comment #1 Letter(s) 41, 255, 270, 272, 274, C18

By not incorporating fate and transport mechanisms for metals into the TMDL analysis, Region 10 has developed unnecessarily conservative allowable loadings. There are demonstrated methodologies for considering metals transformation processes in TMDL studies. Recent research has added to the capability to determine the influence of humic substances on metal binding, modeling metal speciation in aquatic systems, and modeling of metals partitioning to suspended solids. Removal of metals from stream flows in the Basin as a result of natural attenuation has been well documented in a 1996 study by A.J. Paulson for the U.S. Bureau of Mines.

The proposed TMDL does not consider any of these approaches, although any or all of them would result in increased allowable WLAs and LAs. Given that the proposed TMDL will have extremely large economic effects on all affected parties, this failure to thoroughly evaluate and apply current scientific knowledge is unjustifiable.

Response: EPA and DEQ have further evaluated the fate and transport mechanisms that warrant consideration in the TMDL and has added an appendix with a discussion of this topic to the TMDL TSD.

Chemical/physical processes such as adsorption and precipitation can potentially remove dissolved metals from the water column. These processes involve complex and dynamic interactions between metal species in the presence of other waterbody consituents. Since the water quality criteria are not established for specific metal complexes (e.g., cadmium sulfate) but rather for the sum of metal ions (e.g., dissolved cadmium), which can be directly measured, it is not important to evaluate physical/chemical processes that may occur in the water column or sediments for the TMDL. However, it is important to determine the amount of total metal and dissolved metal to calculate translators. Fortunately, for the Coeur d'Alene River and tributaries, there is a sufficient body of paired river samples (dissolved vs. particulate metal) to directly calculate the translators at the target sites. The data refect actual conditions, so there is no need to predict how fate and transport may have resulted in these actual conditions.

The results of EPA/DEQ's evaluation of metals translators are consistent with the findings in the report on Moon Creek by Paulson. The available paired samples indicate that dissolved cadmium and zinc are not appreciably removed from the water column in Coeur d'Alene Basin waters, while dissolved lead is removed to the particulate form between the headwaters and lower basin. This transformation (or attenuation) of dissolved lead toward particulate lead is addressed by the calculated translator. The translator is applied to wasteload allocations for lead in the TMDL.

Comment #2 Letter(s) 274

Because no attempt is made in the TMDL to simulate current loading levels and resulting water quality for comparison to measured ambient data, there is no way to evaluate how overly conservative the allowable loadings are.

Response: The large number and varied types of metals sources in this basin precludes a detailed simulation of all source loadings at the present time. At the same time, EPA and DEQ disagree that there is no way to evaluate the loading capacities and allocations established in the TMDL. The TMDL TSD sets forth the parameters used to calculate each of the TMDL elements, and raw data and graphs for key parameters (e.g., hardness, flow, translators) are included in the appendices. Attenuation processes are quantified in the TMDL translators, using direct measurements of total and dissolved metals in the river network at the target sites.

Comment #3 Letter(s) 274

The TMDL ignores most of EPA's recommendations on the factors that should be considered in developing WLAs and LAs for metals.

Response: This TMDL is consistent with the statutory and regulatory requirements of the Clean Water Act and EPA guidance publications. EPA included a discussion of several factors and options that were considered for developing allocations in an appendix to the TMDL TSD. The commenter has not identified a relevant factor that was ignored in the TMDL.

Comment #4 Letter(s) 272, 274, C18

Physical and chemical metal transformation mechanisms may have particular importance at higher stream flows, where more suspended solids are likely to be transported in discharges and the streams. When streams carry high loadings of suspended solids, the metals associated with particulates may represent a high proportion of the total metals loading. The proposed TMDL does not consider this aspect of metals transport, and in fact does not present or use any suspended solids data in the analysis and assumes that all of the metals in the surface water at all stream flows are in the dissolved form. This assumption is not scientifically supportable in the absence of data demonstrating its accuracy. In fact, sedimentation, resuspension, and partitioning of metals are well documented as dominant factors in determining metals concentrations in water columns and assessing the toxicity of such metals to resident aquatic biota.

Response: The Idaho water quality standards for metals are expressed in the dissolved form (based on bioavailability). Therefore, allocations of dissolved metals loadings to sources is both reasonable and necessary. EPA has not asserted that "all of the metals in the surface water at all stream flows are in the dissolved form". Rather, EPA has provided information on the concentrations of dissolved metals in the river network for comparison to the water quality standards. In addition, contrary to the assertion in the comment, EPA and DEQ have considered particulate versus dissolved metals in the water column (partitioning in ambient suspended solids) by calculating dissolved-to-total-recoverable translators. This calculation does indicate that cadmium and zinc are almost entirely in the dissolved form in the surface waters of this basin.

Comment #5 Letter(s) 41, 255, 270, 272, 274

Water quality toxicity test work that established the Federal Water Quality Criteria was 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. 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 seasonally in the river.

Response: The TMDL is based on the water quality criteria adopted by the State into the Idaho water quality standards. EPA and DEQ have further evaluated the fate and transport mechanisms that warrant consideration in the TMDL and has added an appendix with a discussion of this topic to the TMDL TSD.

The available paired samples indicate that dissolved cadmium and zinc are not appreciably removed from the water column in Coeur d'Alene Basin waters, while dissolved lead is removed to the particulate form between the headwaters and lower basin. This transformation (or attenuation) of dissolved lead toward particulate lead is addressed by the calculated translator. The translator is applied to wasteload allocations for lead in the TMDL.

EPA and DEQ acknowledge that the Gold Book criteria are based on laboratory bioassays (using laboratory water), and that constituents in river waters may affect the relative toxicity of metals. SSC development work has examined the dissolved metal concentration at which the resident aquatic species in the South Fork Coeur d'Alene River (above Wallace) can be supported. The SSC testing has been conducted using river water from South Fork.

Comment #6 Letter(s) 274

The most significant flaw in the proposed TMDL calculation of loading capacity is that Region 10 has based it on a purely theoretical mass balance and has made no quantitative attempt to consider the complex transport and transformation processes that affect in-stream metals concentrations under a range of stream flow regimes. There is no calibration or validation of the mass balance approach using ambient and discharge data for the target metals--it simply assumes that each of the dissolved metals is completely conservative in the aqueous environment (*i.e.*, additive).

Response: EPA and DEQ acknowledge that our understanding of the fate and transport mechanisms in the Coeur d'Alene basin is incomplete. Nevertheless, the agencies believe that the mass balance approach (or "conservation of mass" approach) in the TMDL is the best available method to develop the TMDL. Furthermore, the agencies disagree that no attempt has been made to quantify fate and transport processes affecting metals discharged to the rivers. The translators developed in the TMDL quantify the transformation processes occurring in the river network between dissolved and particulate metals; the translators are calculated using ambient data at the target sites. See also technical evaluation of fate and transport in an appendix to TMDL TSD.

Comment #7 Letter(s) 274

The TMDL assumes that 100% of the cadmium and zinc in the discharges is in the dissolved form, because a total recoverable metal:dissolved metal partitioning coefficient of 1.0 is used to set permit limits for point sources. This assumption that dissolved:particulate transformations of these metals is not important is not scientifically tenable, given the existing knowledge of metals behavior in surface water environments.

Response: The translators (equal to 1.0) for cadmium and zinc are not based on an assumption that partitioning of these metals is not important. Rather, they are calculated from the available dissolved and total recoverable data (paired samples) in the basin, which indicates that cadmium and zinc in basin waters is almost entirely in the dissolved form .

Comment #8 Letter(s) 233

One of the non-point sources presently contributing dissolved metals to the river are thousands of tons of oxidized mine tailings and metal precipitates incorporated into the active bed load of the Coeur d'Alene River. If water is treated to lower concentrations than the equilibrium and discharged into the river to contact the tailings, then the metals will dissolve out of the tailings until equilibrium is reached. Setting discharge limits lower than the equilibrium will not lower the dissolved metals concentration by a measurable amount.

Response: The equilibrium of metals in the water column can be affected by numerous factors and physical/chemical changes. It is likely that changes to a wastewater (reduced metals and changes to other chemical properties (e.g., pH)) due to wastewater treatment will result in complex changes in the local equilibrium near the discharge point. EPA and DEQ do not have sufficient information or resources to evaluate the variety of potential outcomes of these changes at each discharge site. Such an effort would be further complicated by changes to the receiving water itself due to floodplain cleanup actions.

EPA and DEQ also note that available data for the Coeur d'Alene River indicates that downstream improvement in water quality is dominated by the dilution process, where cleaner tributaries (particularly the North Fork) dilute the metals originating in the South Fork and tributaries. This would suggest that it is reasonable to expect a direct improvement in water quality from reduced individual discharges.

2.5 Natural Background Conditions

Comment #1 | Letter(s) | 274

EPA's database for determining background concentrations is scant and of questionable applicability. It relies on data from one location to characterize background concentrations throughout a 1,500 square mile area. Furthermore, the TMDL TSD fails to indicate the flow conditions present when these data samples were taken. As the TMDL itself acknowledges, metals concentrations will vary considerably as flow conditions change. It is technically, scientifically, and legally unsupportable to base the TMDL for the entire Basin on such a limited and poorly documented data set.

Response: EPA and DEQ agree that the natural background estimates in the draft TMDL were based on limited data and analysis. The agencies have reviewed a number of recent technical analyses regarding estimated natural background conditions to improve this element of the TMDL. Improved estimates, based on the analysis of over 40 sites, have been incorporated into the TMDL TSD and calculations.

Comment #2 | Letter(s) | 47, 49, 52, 63, 64, 68, O10

What studies has the EPA conducted to evaluate erosion rates and the resulting calculated metal flowrates from rocks and ore bodies in the Silver Valley?

Response: The natural background estimates are based on direct measurements of metals in surface waters of the basin. Additionally, the Maest report referenced in the TMDL TSD includes an evaluation of baseline geochemistry data for the Coeur d'Alene River basin. The report noted that the areal extent of potential exposed ore bodies would be a very small fraction area of the entire watersheds, indicating that the effect of ore body erosion on natural background water quality would be minor.

Comment #3 | Letter(s) | 87

Is the North Fork being monitored at Enaville simply to provide background comparison for the South Fork?

Response: No. The North Fork monitoring has a direct affect on the TMDL allocations, because metals loadings from this tributary must be subtracted from the loading capacity available for allocation in the mainstem Coeur d'Alene River.

Comment #4 | Letter(s) | 266, 274

Where the TMDL addresses "Natural Background Conditions," it leads the reader to believe that areas outside mineralized areas (where mineralization is insufficient to support mining activities) should represent "natural background conditions" within the mineralized areas. This is inherently incorrect. Indeed, natural mineralized conditions may exceed Gold Book criteria. The highly mineralized nature of the South Fork of the Coeur d'Alene mining district is well documented in numerous USGS professional papers that are known, or should be known, by EPA during the ongoing RI/FS process. One such USGS example would be the "Geochemical-Exploration Studies in the Coeur d'Alene District, Idaho and Montana" (USGS Professional Paper 1116). The obvious result of a highly mineralized area is an effect on water quality. DEQ has monitoring data for seeps above Shoshone Park (above the mineralized area) showing exceedences of chronic Gold Book criteria for all three metals. It is a fact that the South Fork of the Coeur d'Alene River and its tributaries flow through one of the most highly mineralized areas in the United States. Mineralized outcrops occur throughout the basin. The physical structure of the valley contains numerous faults and fractures and many of these faults and fractures occur in mineralized zones. It is obvious that surface water would reflect the characteristics of the basin through which it flows.

The *Removal Work Plan for 1994 Ninemile Drainage Projects* (May 10, 1994) document (developed as a cooperative effort by DEQ, Idaho State Natural Resource Damage Trustees, Hecla, BLM, Coeur d'Alene Basin Restoration Project, & Coeur d'Alene Tribe) contains excavation logs with both lead and zinc analysis results of alluvium (below the tailings, tailings/sand/alluvium mix, and organic layers) ranging as high as 10,000 ppm for both parameters. Similar results of elevated metal levels in the alluvium are also found in Canyon Creek as documented in the *Canyon Creek - Woodland Park Response Action 1995-1996 Tailings Removal and Stream - Floodplain Stabilization Work Plan*. The same entities sponsoring the Ninemile Creek work also were involved with the corresponding Canyon Creek action except that EPA was also involved as a participant in the Canyon Creek work plan. It is clear that the water and sediments in mineralized areas will have metals levels elevated above those which occur in non-mineralized areas (and which are used for background in this TMDL).

Other mineralized areas, such as the Red Dog mine, are examples where the streams, prior to mining, had elevated levels of metals. Natural background levels of metals in stream sediments in the Red Dog area include zinc concentrations up to 5,900 ppm and lead concentrations up to 36,300 ppm. Natural background water quality in the Red Dog area streams include zinc levels as high as 24.0 ppm and lead as high as 0.286 ppm. The point is that "cold water biota," as clearly explained in comments above, cannot be the appropriate use designation any more than Gold Book criteria can apply "throughout the basin" in a highly mineralized area. It is important to note that, as we understand other situations, EPA has recognized the fact of naturally elevated levels of parameters in certain areas where EPA has an "economic" consideration (Summitville, New World, Moab).

Response: The revised natural background estimates are based on a broader analysis that includes samples from over 40 sites, including numerous mineralized areas in the basin.

Comment #5 Letter(s) 37, 77

In your bulletin (page 5), there are no authors or indication of where the information was obtained to make the statement that "To date, EPA has seen no compelling information to indicate that metals concentrations are naturally high in the CdA rivers and streams."

Response: At the time of the proposal, EPA's administrative record for the TMDL contained no studies of the natural background condition of Coeur d'Alene rivers and streams. Since that time, four reports about natural background conditions have been produced by technical experts. EPA and DEQ have included references to these reports and an analysis of their conclusions in the TMDL TSD chapter on natural background conditions.

Comment #6 Letter(s) 87

In determining natural background conditions, has the EPA tested hillside spring runoff from erosion channels before it mixes with mine tailings and other obvious metal sources?

Response: EPA has not conducted this kind of monitoring. Because of the large scale of this TMDL, EPA and DEQ do not consider discrete runoff sampling to be a practicable method to establish natural background conditions throughout the basin. EPA and DEQ rely on a larger scale analysis of river/creek water quality and regional geochemistry information to evaluate natural background conditions.

Comment #7 Letter(s) 51, 70, 274

EPA has asserted that the water samples taken at Larson represent natural background levels that could be attained throughout the South Fork. This conclusion is inaccurate, as these samples were collected outside the area naturally high in minerals, and therefore will not show elevated levels of lead, zinc, or cadmium.

Response: The natural background estimates used in the final TMDL no longer rely on the Larson station. See natural background section in the final TMDL TSD.

Comment #8 Letter(s) 272

Elevated lead and zinc values have been monitored in Lake Creek and Shields Gulch above mining impacts. This data clearly identifies that natural background contributions to the system do exist, at least within the defined mineralized area of Silver Valley. It would be expected that others in the Basin have similar data to support a natural background condition. However, this background data should not be removed from the allocation but [used to demonstrate] that higher levels of metals do exist and do not necessarily impact the biological communities.

Response: The commenter has not supplied the agencies with data for Lake Creek and Shields Gulch; therefore, the agencies can neither confirm nor refute the assertion about those creeks. Nevertheless, EPA and DEQ have clearly recognized in the TMDL development that there are natural background contributions to the system. The revised natural background estimates used in the final TMDL are based on large data set of surface water samples. It is unlikely that data for two additional creeks would significantly change these estimates.

The suggestion that background contributions should not be subtracted from the loading capacity is not consistent with the requirements of the Clean Water Act. Natural background metals loads must be subtracted from the loading capacity to insure that the allocations do not exceed the loading capacity of the system.

Comment #9 Letter(s) 262, 272, 274

Four separate sampling events were used to determine background conditions which represent a limited time period of 1991, 1997, and 1999 and only during the months of May, October, and November. In the case of cadmium and lead, all background concentrations were below the detection limit of the analytical methods used for collecting ambient surface water data. Therefore, Region 10 selected one-half the minimum reported detection limit for these two metals. Although this is a commonly accepted assumption, it highlights the concern about the use of a sufficiently sensitive analytical method for measuring ambient metals at trace concentrations. The detection limits used to calculate the background concentrations were 0.1 μg/l for lead and 0.04 μg/l for cadmium. The concentrations used for background were thus 0.05 μg/l and 0.02 μg/l for lead and cadmium, respectively. These two "background" concentrations represent 9% and 5% of the respective water quality criteria used in the TMDL study. These are not insignificant background loadings in the context of this TMDL. If the background concentrations had been determined with the most sensitive analytical methods for lead and cadmium given in Table 1 of Method 1669, the detection limits would have been 0.0081 μg/l and 0.0024 μg/l for lead and cadmium, respectively. Thus, it is possible that the background concentrations for these two metals could be over 10 times lower than those used in the proposed TMDL. This change in background concentration would represent a significant change in the allowable loadings of cadmium and lead in all of the surface waters of the CdA basin.

In the case of zinc, there were measurable concentrations above the detection limits used in the study. Region 10 selected the maximum detected zinc concentration in the entire data base (6.78 μg/l) to apply as the natural background concentration to all streams in the basin. This concentration represents over 21% of the zinc water quality criterion used in the TMDL and thus reduces the allowable loading by this amount. This selection is overly conservative and is not scientifically supported in the TMDL TSD.

Metals data collected with sampling and analytical methods that generate data sets with minimum detection limits that are above the applicable water quality criteria are not an adequate foundation for the TMDL. This is also true for NPDES permit limits set at a fraction of the water quality criteria.

Response: EPA and DEQ agree that detection levels are an important constraint in analyzing natural background (low contamination) conditions. Background estimates would be improved at some locations by employing analytical procedures that achieve lower detection levels. However, a significant body of sampling data is available to obtain estimates of natural background conditions. The agencies have reviewed a number of recent technical analyses regarding estimated natural background conditions to improve this element of the TMDL. Improved estimates, based on larger data sets and lower detection limits, have been incorporated into the TMDL TSD and calculations.

Regarding permit limits, EPA and DEQ note that the total recoverable wasteload allocations are expressed as loads for the mining sources. Therefore, the allocations cannot be directly compared against the water quality criteria. If it is demonstrated during permit development that compliance monitoring will be constrained by limits of detection, appropriate conditions will be included in permits to address the constraints.

Comment #10 Letter(s) 47, 87

Why does the EPA assume that because there are few surface outcroppings of ore that surface runoff metal content would be negligible?

Response: In the draft TMDL, EPA and DEQ based the natural background estimates on river sampling at the Larson site. EPA and DEQ also made a general observation that the mines in the basin are underground mines, and that metals contributions from a relatively small number of natural outcroppings would be significantly diluted by clean water from the rest of the basin. The final TMDL estimates for natural background are based not on general observations but rather on actual river/creek sampling at over 40 sites in the basin.

Comment #11 Letter(s) 255

Considering the mineralization of the area, the goal of the TMDL appears to be to elevate the water quality in the river above its pre-mining condition.

Response: Based on the agencies' analysis, pre-mining (natural background) metals levels were lower than the TMDL goal (Gold Book criteria levels).

Comment #12 Letter(s) 274

The background data used in the TMDL analysis are an extremely important component of the allowable loading analysis. In the case of zinc, over 21% of the allowable loading is taken by the assumed "natural background." It is important that the background loadings of these three metals be based on reliable analytical data, and it is not. Region 10 and DEQ must arrange to collect new background samples from suitable sites using appropriate sampling and detection limits. In selecting suitable sites, EPA cannot simply select locations above areas of historic mining. It stands to reason that background concentrations of metals would be higher in areas where there were sufficient ore deposits to justify mining than in areas where there were not. Because background effects are important to the overall loading allowances, resampling is a requirement for a valid TMDL, not just an improvement.

Response: EPA and DEQ concur that the background analysis is an important component of the TMDL. The revised natural background estimates are based on a broader analysis that includes samples from over 40 sites, including numerous mineralized areas in the basin. The agencies disagree that new sampling is required for a valid TMDL.

Comment #13 Letter(s) 274

The TMDL should examine the entire data base of background data and, as appropriate, use elevated background data only for those streams where the elevated concentrations are found. Other streams should be assigned background concentrations that are more appropriately defined as natural.

Response: As discussed above, EPA and DEQ have incorporated analyses of larger data sets in its revised natural background estimates.

Comment #14 Letter(s) 7, 68

Mud in the walls of the Cataldo mission contains 1,000 ppm lead, indicating high natural background levels of metals in the basin.

Response: EPA and DEQ cannot verify the results of mission wall sampling by other parties. When estimating background metals levels in rivers, it is preferable to collect and analyze river water samples rather than rely on surrogate analyses of materials in historic buildings. The natural background estimates used in the final TMDL are based on direct measurements of metals levels found in rivers in both mineralized and non-mineralized areas in the basin.

2.6 Flow Tiers

Comment #1 Letter(s)

In developing the low flow analysis, EPA used 1991 data (Silverton) rather than 1997 data because there was lower variability in the MFG 1991 data. Generally, Agency policy and guidance support using more recent data rather than older data to support risk-related decisions because they are more representative of current conditions. It is not clear how the uncertainty in the TMDL decision-making process is affected by using these different data sets.

Response: EPA and DEQ believe that the general rule of thumb to use the most recent information applies more to contaminant data than to flow data, because contaminant levels may be influenced by human activities or natural processes. In this case, EPA/DEQ's use of 1991 versus 1997 flow data was an appropriate attempt to use data from a sampling period with stable flows.

EPA and DEQ have revised the flow tier values in the TMDL for Canyon Creek, Ninemile Creek, and Pine Creek based on extensive flow monitoring at these sites by the USGS in 1999 (see discussion of flow estimation in the TMDL TSD). Because the South Fork above Wallace was not monitored by USGS, the estimates for this tributary (and its contribution to the Wallace target site flows) remain unchanged. EPA and DEQ believe sufficient flow data is available to provide reasonably accurate flow tiers for calculation of the TMDL elements.

Comment #2 Letter(s) 241

There is concern that the TMDL did not take into account the increase in water yields from rain-on-snow events in watersheds "above the South Fork of the Coeur d'Alene River" that have been clearcut. The final document should discuss the effects (direct, indirect and cumulative) of increased peak flows to the South Fork, North Fork, and Little North Fork from past logging and road building in relation to the proposed TMDL.

Response: EPA and DEQ disagree that the TMDL does not address peak flows. The flow-tier approach constrains source allocations to an equal or lower flow condition (and loading capacity) than the actual condition. This approach provides a margin of safety during peak runoff periods.

Comment #3 Letter(s) 259, 278

estimation method is more technically supported than the use of actual stream flow measurements. The drainage area ratio approach cited in the comment, using appropriate watershed geomorphological parameters, is an accepted method of estimating flows when flow data are not available. In this case, however, EPA and DEQ do possess flow data for the ungauged tributaries. In the TMDL, the method selected for establishing flows for ungauged tributaries capitalizes on this available data and therefore provides direct rather than modeled estimates of flow ratios.

Comment #9 Letter(s) 267

The 7Q10 value of 211 cfs for the Spokane River at Post Falls dam is incorrect. The policy of the Avista Dam (built in 1981) is to release 300 cfs (per EPA's request). The data therefore should be recalculated using 1982-1999 data to reflect the current condition.

Response: Since the release of the draft TMDL, EPA reissued NPDES permits for municipalities along the Spokane River in Idaho. During this process, EPA and DEQ responded to concerns about Spokane River low flows. The flow record from 1960 to 1998 was used to recalculate the 7Q10. The recalculated value is 329 cfs, and the TMDL TSD table has been revised accordingly.

EPA and DEQ note that the design flow values for the Spokane River at Post Falls were included for information purposes only. They are not used in the calculated of TMDL allocations.

2.7 Margin of Safety

Comment #1 Letter(s) 255, 266, 274

The so-called "margin of safety" in the proposed TMDL is expressed as "10%." EPA must, by law, meet the "reasonable" test for its actions to be neither arbitrary nor capricious. DEQ is limited to an "adequate" margin of safety. What appears to be hidden "margins of safety" plus the stated "10%" results in a margin of safety that is arbitrary and capricious, as well as excessive.

A 10 percent margin of safety is appropriate if other estimates do not build margins of safety as well. However, it is apparent that multiple layers of safety are added in each component of the TMDL allocation process. When considering all assumptions, a safety factor on the order of 40 percent is realized in the proposed TMDL. If point sources only contribute approximately 5 percent of the total loading, the number is even higher. Multiple layers of safety are found in:

* 65/25 allocation (point sources only account for approx. 5 percent);
* Hardness data suggests average values would be significantly higher - which improves overall total loading capacity of the system;
* Permit limitations - daily maximum vs. monthly averages;
* Using the 5th percentile on Total Recoverable:Dissolved ratios instead of averages overstates bioavailability of metals;
* No consideration to site-specific conditions - increase loading capacity; and
* Using the lowest flow conditions for each tier (four) to establish allowable loading capacity - underestimates actual loading capacities.

Response: Federal regulations governing TMDLs require that they be established with a margin of safety to account for these uncertainties and insure the TMDL will achieve water quality standards. Each element of the TMDL is developed with some degree of uncertainty. While some uncertainties can be addressed using conservative analyses and assumptions, others are cannot addressed in that fashion.

For this reason, the margin of safety for this TMDL consists of a combination of conservative assumptions used in building the TMDL elements and a small, explicit margin of safety equal to 10% of the loading capacity. The TMDL TSD includes a list of conservative assumptions and a discussion of the uncertainties considered in establishing this dual margin of safety.

EPA and DEQ disagree that the use of 65/25 allocation, establishment of permit limitations, and use of statewide water quality criteria provide any margin of safety. Since hardness values have been significantly changed in the revision to a flow-hardness relationship in the TMDL elements, they are not considered to provide a margin of safety (see discussion in the TMDL TSD). Flow tiers also cannot be said to provide a consistent margin of safety, since the actual flow could be equal to the flow tier value in a given month.

Comment #2 Letter(s) 266, 274

The Gold Book criteria have built-in safety factors due to both the mathematical manipulations of the data and the inclusion of highly sensitive laboratory organisms not native to, nor could they survive in, the South Fork of the Coeur d'Alene River. For example, there does not appear to be any science behind the "divide by 2" concept in deriving Gold Book values. The use of criteria developed through testing non-native organisms raised in a laboratory does not comply with the Congressional mandate of "criteria for water quality accurately reflecting the latest scientific knowledge." This represents another "margin of safety" as evidenced by the healthy aquatic community in the South Fork of the Coeur d'Alene River above Wallace even though the Gold Book criteria are routinely exceeded.

Response: While EPA and DEQ agree that the Gold Book criteria are developed using conservative assumptions, the margin of safety in the TMDL addresses the uncertainty in achieving the applicable water quality criterion adopted by the State of Idaho. The concern raised in the comment can be addressed in the water quality standards process through site-specific criteria.

The "divide by 2" step in criteria development is used to calculate acute criteria. The TMDL calculations are based on chronic criteria. The derivation of these chronic criteria do not include the "divide by 2" step referenced in the comment. Therefore, the reference to the "divide by 2" step in the comment is not pertinent to this TMDL. For clarification, EPA notes that the "divide by 2" step is based on scientific principle. It is employed to convert the criteria from an LC50 basis (where concentrations would be lethal to 50% of the organisms) to a value that approximates an LC0 (non-lethal). Without this step, the criteria would not be adequately protective of the most sensitive species.

Comment #3 Letter(s) 266, 274

The TMDL suggests that the total recoverable metals procedure is reflective of conditions a particle would endure in the real world. Indeed, the TMDL states that "EPA has calculated the ratio of total recoverable metal to dissolved metal for each sample taken at or near a target, and then calculated an estimated 5th percentile ratio in order to assure compliance with water quality standards." The limited data set was reduced by 95% to guarantee that virtually all metals in the discharges were equated with "dissolved" metals. This procedure is another hidden margin of safety which ignores 95% of the data and any seasonality, resulting in a very stringent translator.

Response: The Idaho water quality standards for metals are expressed as dissolved metal concentrations. Consistent with the letter of the applicable NPDES regulation, permit limits must be expressed as total recoverable metals (40 CFR 122.45). Therefore, it is appropriate to translate dissolved wasteload allocations into total recoverable wasteload allocations. EPA has published national guidance on translators (referenced in TMDL TSD), and the method used in this TMDL is consistent with that guidance. To insure that the final wasteload allocations (in total recoverable metal) achieve the dissolved criteria at all times, it is reasonable to use a conservative estimate (5th percentile) of the translator. This approach addresses seasonal critical conditions and is one of the conservative assumptions forming the margin of safety.

Comment #4 Letter(s) 272

Upstream allocations discussed in the TMDL (page 25) are appropriate when considering downstream target sites. However, it is important that flow data and other information are accurate to allow appropriate allocation of metal loading. Without this, it tends to cause a multiplying effect of safety factors to the estimates as allocations occur downstream.

Response: EPA and DEQ have adjusted the flow tiers based on the available data, including more recent USGS sampling (see also responses under Flow Tiers).

Comment #5 Letter(s) 266

Part of the excessive margin of safety is hidden in the TMDL's distortion of the "mixing zone" concept. In the way the mixing zone concept is being misrepresented, the TMDL would lead the public to believe that the discharged metals are only allowed to occur in a 25% swath of the stream! The fact of the matter is that a TMDL is the load for the entire stream.

Response: The use of the mixing zone guidelines (as a basis to allocate 25% of the loading capacity to discrete sources) in the gross allocation has no bearing on the margin of safety. EPA and DEQ disagree that the draft TMDL TSD is misleading and does not address the entire stream. The document clearly sets forth the allocation of not only 25% of the loading capacity to discrete sources but also 65% to non-discrete sources and 10% to a margin of safety.

2.8 Method of Allocation - CdA River and Tributaries

Comment #1 Letter(s) 224, 255, 262, 270

The proposed TMDL does not account for any growth in the Silver Valley, including new connections to the municipalities. EPA provides limits for the municipal dischargers along the Spokane River that allow for "future growth" while denying such an allowance for the municipalities and industries in the Silver Valley.

The last paragraph on page 31 of the TMDL TSD states that for those point sources currently meeting their load allocation, the reduced allocations are "subtracted from the total discrete point source gross allocation and added to the non-point source allocation." In other words, point source load allocation is arbitrarily transferred to the non-point source allotment. Any point source loading assigned to but not used by a particular point source should be reassigned to other point sources within the [allotment category].

The TMDL should not reallocate excess point source allocations to non-point sources. Instead, the excess allocations should be reserved for point sources. This reserve would serve two objectives: (1) it would allow growth of point sources in the basin, if that is desired; and (2) until that time, it would add to the margin of safety.

Response: EPA and DEQ agree that a process for establishing a reserve allocation for future growth is needed for the South Fork and tributaries (the concentration-based allocations allow for future growth on the Spokane River). If it is determined that a source has been given an allocation greater than its current loading to the river, the remainder will be set aside as a reserve and made available to new or expanding facilities. EPA and DEQ note that a formal TMDL modification must be completed to quantify the reserve and make it available for allocation to a new or expanding source. In the meantime, consistent with the comments above, any unused allocation adds to the margin of safety.

Rather than establish individual performance-based allocations in the TMDL, the TMDL has been revised to contain the calculated allocation and companion language that requires use of performance-based limits in NPDES permits when the allocation is greater than the current loading from the source. The actual performance-based limits will be developed as part of the NPDES permit development; this allows additional time for sampling and analysis of current performance. Reserve loading from the source in question can be allocated to the general future growth reserve "account"after issuance of a final NPDES permit containing performance-based loadings for a particular source. Allocation of the future growth reserve to individual sources will require formal modification of the TMDL.

Comment #2 Letter(s) 267

The TMDL does not adequately address the uncertainties associated with the analytical determinations at these low concentrations. The TMDL should account for analytical limitations in establishing wasteload allocations.

Response: A TMDL must establish allocations that achieve the water quality standards. EPA and DEQ recognize that in some instances, EPA's permitting program may need to address analytical limitations (e.g., detection limits for the metals) in developing permit limits and monitoring requirements. This is a relatively common issue in NPDES permitting, driven by low level water quality criteria concentrations for some parameters (including some metals). EPA and DEQ do not have adequate information on each source to address this issue in the TMDL, but the issue can be addressed in the permitting process.

Comment #3 Letter(s) 267, 274

The TMDL should not require loading concentrations below water quality standards. The TMDL must allocate loading capacity among sources that use, or need to use, that capacity. The TMDL fails to understand or implement this concept. If a pollutant source does not use or need to use any loading capacity, then that source does not require any allocation of the capacity. (Such a discharge might not even require a permit limit if the data showed it had no reasonable potential to exceed an applicable standard.) No discharger, however, should receive an allocation of less than the water quality standards, which is in essence a zero share of the loading capacity.

The folly of the agencies' approach is demonstrated by the fact that whenever a limit below the applicable criterion is imposed, the discharger may need (at great cost) to cease any discharge in order to meet the limit. In some cases, this would result in a net loss (not gain) of assimilative capacity for the very parameters the TMDL is addressing. If the municipalities of Coeur d'Alene, Post Falls and Hayden Lake all ceased their discharges, the Spokane River would lose loading capacity for metals, rather than gain it. Similarly, if all of the dischargers to Ninemile Creek went to zero discharge to meet the requirements developed for 7Q10, 10th and 50th percentile flows, this would result in less loading capacity than if they had to meet limits based on a zero share of loading capacity, *i.e.*, based on compliance with the criteria at the end-of-pipe. Because the TMDL imposes such extreme limits, the creek would be worse off. Moreover, while the TMDL says that it is allocating a 25% share of the loading capacity to the point source dischargers, it actually allocates a less than 0% share of the loading capacity since it requires point sources to comply at the end of their discharge pipes with limits that are more stringent than the applicable water quality criteria. Consequently, the TMDL is overly restrictive and technically flawed.

Response: This comment focuses on concentrations associated with the assigned allocations. The TMDL, however, establishes wasteload allocations expressed not as concentrations but rather as loads (lbs/day). Therefore, the general assertion that the TMDL requires "point sources to comply at the end of their discharge pipes with limits that are more stringent than the applicable water quality criteria" is not accurate. In addition, two factors make up an effluent metals load: flow and metals concentration. A facility can reduce either flows or metals concentrations, or both, to reduce the load. If a facility reduces its flows, via recycling or other water management measures, the allowable discharge concentration can be proportionally higher to achieve the same loading level.

In the context of significant reductions required of many sources, EPA and DEQ maintain that it is not reasonable to allocate more load to a source than it is currently discharging. This would run counter to the goal of improving water quality throughout the basin. The TMDL provides for establishment of performance-based limits for this reason.

EPA and DEQ acknowledge that reductions or cessation of a relatively clean wastewater discharge could reduce the dilution of metals in the river in the short term (it is unclear whether the Ninemile Creek dischargers referenced fit into this category). This is fundamentally a concern about timing of implementation actions rather than a deficiency of the allocation method itself. See Timing of Implementation and Permitting Actions for further comment and discussion.

EPA and DEQ agree that if the municipalities along the Spokane River ceased discharging, the river would lose loading capacity. Conversely, however, increasing their discharged metals concentrations would degrade water quality. Therefore, assigning performance-based allocations is appropriate.

Comment #4 Letter(s) 267, 272, 274

A number of sources in the Coeur d'Alene Basin apparently already meet their assigned load allocations. For these sources, including small seeps and adits as well as permitted point sources like the Galena Mine (zinc) and Caladay Mine (zinc), EPA and DEQ are proposing to set their load allocations based on their current discharge levels. This approach is fundamentally flawed and contrary to EPA's own guidance for establishing performance-based effluent limits ("PBLs"). EPA and DEQ do not appear to have adequate, statistically valid data for establishing such performance-based discharge limits.

EPA and DEQ's approach is especially inappropriate for currently unpermitted sources. Setting wasteload allocations based on a limited data set is rife with practical and statistical problems. First, in order to set PBLs, an agency must have a data set that is "independent" and "uncorrelated" (EPA, *Technical Support Document for Water Quality-Based Toxics Control*, Appendix E). The data must all fit the normal or log normal distributions. EPA's data do not satisfy these criteria. EPA and DEQ cannot set performance-based limits in the absence of any performance data.

Setting WLAs based on current discharges at 50% flow is technically and legally unsupportable. For a number of sources that currently meet their WLAs, the TMDL sets WLAs based on the discharger's effluent concentration at 50% flow, then scales that number proportionately to the 7Q10, 10% and 90% flows. This methodology is unreasonable and illogical for sources where the flow and/or discharge concentration do not vary or vary minimally with stream flow rate. A source whose effluent concentration and volume do not vary with flow rate would be virtually assured of permit violations if its WLA is set at the 50% flow concentration and then scaled down to the 7Q10 and 10% flow rate. For example, the Galena Mill is assigned a zinc source loading concentration of 36.1 $\mu g/l$ at 50% flow based on its actual current discharge. The TMDL then requires the Galena Mill to achieve an effluent concentration of 7.96 $\mu g/l$ when the flow is at the 7Q10 level. What this means, in effect, is that the Galena Mill will have to find ways to ensure it meets a 7.96 $\mu g/l$ discharge concentration, even though EPA and DEQ have nowhere demonstrated that the Mill's ability to achieve metals loadings that are lower than its allocation at the 50% stream flow can be replicated at lower stream flows.

Reviewing a site's status and re-apportioning allocation on one tier is inappropriate. All data should be reviewed before reducing a discharger's limits. If insufficient data is available, a phased approach would allow collection of this data and determine growth requirements for each project and the ability to reduce loading through cost effective techniques.

The TMDL assigns Spokane River municipalities a performance-based criterion for the three metals to prevent significant increases in metals discharges. The performance criteria are based on grab samples. These grab samples are not adequate to accurately characterize the plant's long-term discharges with a reasonable level of confidence. Uncertainties associated with the analytical determinations at low concentrations compounds the problem. Finally, setting the performance criteria so far below the water quality criteria will mean that slight exceedances will result in NPDES violations negating the NPDES intent that "only a significant increase in concentration will trigger an exceedance."

The chance for the Coeur d'Alene POTW to exceed the cadmium limit expressed in the TMDL depends on the statistical distribution pattern of the metals concentration. Under a normal distribution, there is little chance of exceeding the limits. However, there is over a 10 percent chance of exceeding the limit if the concentrations are log normally distributed. This means that the TMDL limits could regularly be exceeded even if the distribution of cadmium concentration does not change over time. This is contrary to the intent of the NPDES permits to...ensure that only a significant increase in the metals concentrations will trigger an exceedance."

Response: Based on the above concerns about quantification of performance-based allocations, quantified wasteload allocations based on performance have been removed from the TMDL and replaced by a narrative requirement. EPA and DEQ agree that the TMDL can and should provide flexibility for additional evaluation to establish performance-based allocations. Because of the need for case-by-case evaluations of performance and the number and variety of sources, the TMDL has been revised to include the calculated allocation and companion language that requires use of performance-based limits in NPDES permits when the calculated allocation is greater than the current loading from the source. This approach defers the case-by-case evaluation of current performance to the permitting process, thereby allowing additional time for sampling and analysis of current performance at each source.

Comment #5 Letter(s) 274

An allocation scheme that relies entirely on flow is inequitable and results in wholly arbitrary allocations. While flow-based allocation schemes may make sense in circumstances where all point sources are similar, it makes little sense where there is a significant variability in the different types and locations of point sources. It implicitly treats all sources as equivalent even though there are significant differences. For example, it treats a waste rock pile as the equivalent of a mine that is employing hundreds of miners and supporting thousands of families. It treats an adit with low metals concentration the same as one with high metals concentrations. It treats a mine producing ore the same as one that was shut down decades ago. It treats municipal wastewater discharges the same as an old mine adit. This overly simplistic approach to setting a TMDL ignores the complexity of the Basin and the unique problems that each type of source will face to meet the wasteload allocations (WLAs).

Response: EPA and DEQ recognize that there is variety in the types of sources in the basin, and the TMDL recognizes this variety in establishing allocations by source category. EPA and DEQ have used effluent flow as an objective, rather than arbitrary, basis for allocating loadings to discrete sources. This approach is relatively simplistic but also reasonable, given that (1) a measureable flow is a distinguishing feature of discrete sources, (2) metal loading is directly proportional to flow, and (3) treatment costs are largely driven by a facility's design flow. EPA and DEQ believe the alternative allocation process implied by the commenter, where each type of source and unique situation factors into the individual allocation decisions, would not provide an objective basis for distribution of allocations to sources.

Comment #6 Letter(s) 233

EPA should conduct current metal equilibrium concentrations in the Coeur d'Alene River and base reasonable effluent limitations on these values.

Response: The wasteload allocations in a TMDL must, in combination with load allocations and a margin of safety, achieve water quality standards.

Comment #7 Letter(s) 266

The mixing zone was never intended to be utilized this way. Idaho's regulatory definition of mixing zone is "a defined area or volume of the receiving water surrounding or adjacent to a wastewater discharge where the receiving water, as a result of the discharge, may not meet all applicable water quality criteria or standards. It is considered a place where wastewater mixes with receiving water and not as a place where effluents are treated." By the very definition, the criteria do not have to be met in the mixing zone.

The arbitrary and capricious (as well as preposterous) nature of this approach can be highlighted with an example of a situation where point sources truly are the source of the impairment, as intended by Congress under CWA Sec. 303(d)(1). If several point sources all discharged the total load of pollutant "X" and there was no natural background, under the TMDL's approach, all point sources would only be allocated 25% of the actual carrying capacity of the receiving water, less the 10% margin of safety. The unsuspecting regulated public would comply with this nefarious scheme by installing costly and unnecessary treatment that would result in instream water quality 77.5% below the applicable standard! If the water quality is consistently below the applicable standard, even at 99% of the applicable criteria, the water would not be impaired at all and would not belong on the 303(d)(1) list.

EPA has long attempted to intrude in the mixing zone arena, which is a state-only issue as guaranteed by Congress at CWA Sec. 101(b). EPA admits as much in *In the Matter of Star-Kist Caribe, Inc.*, where the EPA Administrator said "whether limited forms of relief such as variances, mixing zones and compliance schedules should be granted are purely matters of state law, which EPA has no authority to override" (NPDES Appeal No. 88-5, at 15-16 (1990)). The CWA has not been amended since 1990. In addition, if DEQ is attempting to apply a new regulatory concept to the mixing zone regulations, Idaho APA requirements must be met.

Response: EPA and DEQ have discussed a number of options for determining the percentage of the loading capacity to be allocated to point sources. EPA and DEQ are not directly applying the mixing zone regulation in this TMDL, and the agencies do not take the position that the state's 25% mixing zone guideline dictates the percentage of the loading capacity to be allocated to point sources. Rather, this guideline reflects state policy on the use of river flow for assimilation of point source discharges, allowing up to 25% of the flow for this purpose. Because loading capacity is directly proportional to the river flow, there is a nexus between mixing zones and TMDL allocations. Therefore, it is reasonable to analogize to this guideline and allow the use of the guideline maximum of 25% of the loading capacity for point source discharges. This analogy provides a reasonable, objective policy basis for distributing the river's loading capacity between discrete point sources and non-discrete sources.

The commenter presents a hypothetical situation that is fundamentally different than the Coeur d'Alene TMDL. The presence of significant nonpoint sources (e.g., tailings deposits in the floodplain) in this basin must be addressed in the allocation process. The agencies believe the use of an objective basis (i.e., the mixing zone guideline for point sources) to divide the loading capacity among discrete and non-discrete sources is reasonable in this TMDL.

Comment #8 Letter(s) 270, 272

Using the State mixing zone rules to determine load allocation is not appropriate or applicable for a loading-based approach. The TSD defines the loading capacity of a waterbody as based on exceedance of water quality criteria. IDEQ mixing zone guidelines specify water quality can be exceeded in 25 percent of the river's flow. This does not equate to 25 percent allocation to point sources. In fact, it would be much higher. If EPA/IDEQ are to develop loading in this manner, allowable concentrations above the criteria need to be developed to be consistent with mixing zone guidelines which will result in higher loadings than proposed in the TMDL and still will be consistent with regulations.

Response: See response to previous comment.

Comment #9 Letter(s) 52, 63, 266, 267, 270, 272, O1, O19

Allowing municipalities to be treated as a tributary due to higher hardness of the groundwater ultimately discharged is no different than the mine situation. Mines pump groundwater with a higher hardness than the stream system. Consideration should be given to allowing increased hardness due to groundwater discharges and actual stream hardness.

EPA's arbitrary application of hardness based effluent criteria to some permittees but not others covered under the same proposed TMDL is inappropriate. The EPA (second paragraph, page 34 of the TSD) and State of Washington's TMDL state that the "Mixture of [a higher hardness] tributary and [a lower hardness] mainstem waters would not result in any local criteria exceedance." Why do the scientific principles applied to the dilution of high hardness tributary water to the Spokane River mainstem not apply to high hardness tributary [effluent] waters in the South Fork of the Coeur d'Alene River? Dilution principles are, after all, universal in their applicability.

Why does the EPA have a different standard for Hayden, CdA, and Post Falls than the mines?

Not all ore bodies have been discovered in the Coeur d'Alene mining district because only about 10 cubic miles of rock have been explored. If a new orebody is discovered, is it the intent of the EPA to prevent it from being mined? For example, in the allocation of the TMDLs, the point sources will have an allocated quantity. Does the new mine get a zero quantity, or do the other point sources have to reduce their discharge because of the new mine coming on stream? It is noted that sewers can be expanded while maintaining a certain concentration of metals thus increasing their daily discharge. Why are the mines treated differently?

Some NPDES permit holders covered under this TMDL discharge water with a considerably higher hardness than any receiving waters in the Coeur d'Alene River basin. There is no scientifically defensible reason why the dilution principles applied to the tributaries in the Spokane River should not apply to the South Fork. Therefore, EPA should either 1) further evaluate the possibility of applying the same hardness based effluent criteria to [all] NPDES permit holders in the basin or 2) produce scientifically valid reasons why such criteria cannot be used for other NPDES permits issued in the CdA basin.

Response: Assignment of allocations in the South Fork is a distinctly different technical challenge than allocation in the Spokane River. The Spokane River allocation requires only the assignment of wasteload allocations to three discrete sources. This contrasts with the South Fork watershed, where EPA and DEQ must quantify an allocation for mining wastes in piles and in the floodplain. If EPA and DEQ were to assign wasteload allocations using effluent hardness in the South Fork, the leftover loading capacity available for these non-discrete sources must be quantified. Since EPA and DEQ have no data on "nonpoint source hardness" (a concept with questionable practicality), this leftover fraction must be calculated as the loading capacity at a number of flow conditions minus the wasteload allocations and margin of safety. This is precisely the method used in the TMDL, albeit without using effluent hardness as the allocation method for discrete sources.

Another difference with the Spokane River is that the mining sources along the South Fork are distinctly different than municipal sources with respect to flow and hardness variability. Adits drain inner mine workings, and may or may not show significant swings in effluent flow and hardness based on the characteristics of the surrounding geology and hydrology within the mine. Unfortunately, EPA and DEQ do not have sufficient information to characterize the variability in flow and hardness of many of these mining sources. For some sources, EPA and DEQ have only one or two samples, and EPA and DEQ have not received any data for most of the unpermitted adits during the comment period.

Despite the data constraints, EPA and DEQ have nonetheless reviewed the limited available information to evaluate the feasibility and outcome of an effluent hardness approach to the allocations in the South Fork. Discharges were assigned a concentration based on the measured effluent hardness.

EPA and DEQ used average effluent and river flows in this evaluation. Based on this evaluation, the effluent hardness approach allocates a large fraction of the loading capacity to the discrete sources, and a commensurably low fraction to nonpoint sources. EPA and DEQ do not believe it is reasonable to assign most of the loading capacity to discrete sources given the extent of nonpoint sources in the basin.

Even if EPA and DEQ believed this method provided a reasonable allocation outcome in the South Fork under average flowrates, completing the allocation process for the full range of river flows would require assignment of individual effluent flowrates at each river flow tier to calculate loads. As discussed in the Technical Support Document, EPA and DEQ do not have sufficient information to estimate these effluent flowrates for a majority of discrete mining sources. EPA and DEQ could in this case arbitrarily assume a relationship for effluent flow with respect to river flow or use a single average effluent flowrate for all river flowrates. This exercise introduces enough uncertainty and error into the calculations as to defeat the purpose of using effluent hardness as the allocation method in the first place.

Comment #10 Letter(s) 251

EPA's allocation to "conventional" point sources (mining operations, sewer districts, etc.) and to "non-conventional" point sources places unattainable requirements on the conventional sources. Further, the data used to justify the specific allocations for these non-conventional sources "is laughable when subjected to normal scientific and statistical criteria."

Response: EPA and DEQ have used the best available information to establish the allocations, recognized the data limitations that constrain the TMDL calculations. EPA and DEQ note that affected parties have had ample opportunity (including a 120-day comment period) to submit additional information to fill data gaps.

Comment #11 Letter(s) 259

The inclusion of "non-traditional" point sources is a good first step in assessing loadings but EPA and DEQ should take the next step and devise a strategy to reduce loadings from these point sources.

Response: EPA and DEQ are not prescribing particular technologies in the TMDL, but the agencies agree that one of the first implementation steps is to evaluate measures that reduce loadings from different types of sources (inactive adits, waste piles, etc.). Ultimately, the application of specific measures and technologies to a source is under the responsibility and control of the mine owner or land management agency.

Comment #12 Letter(s) 272, 274

The method of allocating 25 percent of the load to point sources is without scientific merit.

Response: The use of a 25% gross allocation to discrete sources is a policy decision by the agencies, based on legal and technical considerations (these are discussed in the TMDL TSD). The allocation method is not selected on the basis of a scientific determination.

Comment #13 Letter(s) 272

Given that the loading from point sources is on the order of 5 percent of the total load to the system (based on average loads/average discharges), it is unwarranted to place such extreme restrictions on point sources without addressing non-point sources and the ability to cost effectively remediate the situation. Addressing point sources in this manner could result in millions of dollars of expenditures for little or no significant improvement in water quality. The low concentrations (based on allocations and flows) at the end-of-the-pipe are not consistent with the 25 percent point source allocation. Certain growth allowances merit some consideration, but the 0.5 percent allocation is overly conservative.

Response: Because of the number of sources and limited data, EPA and DEQ have low confidence in the estimates of metals contributions from discrete versus non-discrete sources. Nevertheless, in the TMDL TSD, EPA made an attempt to develop such estimates for informational purposes. For all metals and sites, EPA estimates that the individual discrete source contributions vary widely depending on the target site and metal under evaluation. At the Pinehurst target site, the discrete source contributions were estimated at 28% for cadmium and 12% for zinc (lead estimates were highly variable).

Contrary to the comment, EPA and DEQ have addressed non-point sources by establishing gross allocations for non-discrete sources (which include nonpoint source tailings in the floodplain) in the TMDL.

It is not clear to EPA and DEQ how the concentrations associated with the allocations are not consistent with the 25 percent allocation. Regardless, the TMDL allocates a load and not the associated concentration.

It is also not clear to EPA and DEQ what is meant by the "0.5 percent allocation".

Comment #14 Letter(s) 272

There is little basis for any of the allocations. More information is needed to fully assess loading from all sources in the Basin.

Response: EPA and DEQ have set forth in detail the basis for the allocation calculations employed in the TMDL. The data limitations do not preclude the issuance of a sound TMDL.

Comment #15 Letter(s) 272

The allocation based on flow is not a fair or equitable method of distributing load allocations. No consideration is given to current concentrations or metal loading and seasonable variability to flows and concentrations. Incrementally lower removal requirements become extremely expensive. Some consideration should be given to weighting allocation based on flows, concentrations and seasonal variations for a more equitable allocating method to point sources.

Response: EPA and DEQ disagree that distributing allocations based on effluent flow is inequitable. It is unclear to the agencies how the commenter would factor both flow and current discharge concentrations into the allocation method. Seasonal variation has been considered and addressed through the use of flow-based allocations.

Comment #16 Letter(s) 207

Given the uncertainty of the sources of metals in the upper system, the approach of allocating 25% of the TMDL to the point sources is understandable. However, there should be much more explanation and verifications using evaluation of mass loadings to substantiate the assumptions that lead to these allocations. There should also be some recommendations on future information needs to confirm the original assumptions and more explanation into how allocations between point and non-point sources may change if it is revealed that these assumptions are incorrect.

Response: The sheer number of sources (both point and nonpoint), and a lack of data for some sources, inhibits a detailed characterization of the relative contribution of discrete source loadings to the overall contamination problem over the full range of conditions. As stated in the TMDL Technical Support Document, EPA and DEQ believe a uniform 25% gross allocation to discrete sources for all metals is both straightforward and reasonable. EPA and DEQ used Idaho's mixing zone guidelines as a basis to propose a 25% gross allocation, not an assumption about the current contribution of point sources (see discussion of method of allocation in the TMDL TSD).

Comment #17 Letter(s) 266

The TMDL asks for comments on "The sufficiency of the wasteload allocations and NPDES permit limits for the Coeur d'Alene River facilities expressed as monthly average loadings of metal." We would ask why EPA is choosing this approach when EPA's *Technical Support Document for Water Quality-based Toxics Control* (1991) explicitly recommends against this approach, for numerous reasons, at Section 5.3.1? We would again point out that if all true point sources were eliminated, the receiving water would still not meet the inappropriate Gold Book criteria.

Response: EPA continues to support and apply the guidance in the Technical Support Document for Water Quality-based Control (1991) to individual NPDES permits in Idaho. In the case of the metals contamination problem in the Coeur d'Alene basin, the TMDL is addressing a large number of point sources rather than a single source. EPA and DEQ believe that the TMDL margin of safety adequately addresses the combined variability of multiple discharges, eliminating the need for applying this portion of the 1991 guidance.

EPA and DEQ agree that eliminating the all discrete point sources would not be sufficient to meet the Gold Book criteria. However, eliminating all waste piles and nonpoint sources would also not be sufficient to meet the criteria. This highlights the scale of the metals problem and points to the need to reduce both discrete and non-discrete loadings in this basin.

Comment #18 Letter(s) 274

The most appropriate method for gross allocation of allowable loads derived from a TMDL is to base these allocations on the relative existing contributions. The TMDL TSD states that this approach was considered but rejected because the percentage of contribution from point sources varied substantially between target sites and metals. In fact, this is the very reason that the gross allocation should be made on a relative contribution basis, for each watershed (target site) and metal. Region 10's examples of point source contributions (from 7% for cadmium in Pine Creek to 100% for zinc above Wallace) clearly demonstrate that the gross allocations must be based on existing loadings of each metal to each watershed. For example, in the stream segment above Wallace the proposed 25%:65% point:non-point source allocations would require point sources to have zinc loading limits that are only 28% of what should be allowed, because the effective margin of safety would be 75% (there are essentially no non-point source contributions). Conversely, in Pine Creek the non-point sources would be assigned allowable cadmium loadings that are reduced by 22% because the point source gross allocation is larger than its actual contribution.

The allocation method should not end with the gross allocation between point and non-point sources. The next step for each stream segment should be to evaluate the technical feasibility of achieving the allocated loadings for each type of source. If the gross allocation results in unachievable discharge levels, or would require excessively costly solutions for either point or non-point sources, then the allocation should be reevaluated, considering these treatability factors to maximize the economic efficiency of the TMDL. A cost-effective approach will require balancing the required load reductions between point and non-point sources.

Response: EPA and DEQ disagree that gross allocations are more appropriately based on relative existing contributions from discrete and non-discrete sources. The estimates of relative contribution between discrete and non-discrete sources are rough estimates based on very limited data, because monitoring efforts to date have not been designed to determine these relative contributions. The estimates were performed only for average conditions and not the full range of flow conditions. Also, based on general feasibility considerations, EPA and DEQ are concerned that the relatively low contributions from discrete sources at some target sites (such as the Pine Creek example cited in the comment) might result in unachievable discrete source allocations if they were based on the percent contribution.

EPA and DEQ acknowledge that if the estimates for the non-discrete source contributions of zinc at the Wallace target site reflect actual conditions over the full range of flow conditions (which is highly uncertain), the gross allocation would be adding to the margin of safety for zinc at that site.

While EPA and DEQ agree that technical feasibility of achieving the allocated loadings is an important issue (see comments under Feasibility of Allocations), an evaluation of technical feasibility is not required to establish a TMDL. TMDLs are required to achieve water quality standards. While the agencies do not have adequate information or resources to evaluate the feasibility of each allocation and make case-by-case adjustments to the allocations at this time, EPA and DEQ have evaluated the regulatory relief mechanisms (particularly variances) that may be available to individual sources that cannot achieve the allocations.

Comment #19 Letter(s) 266, 274

A number of point sources (waste rock piles, mine adits) will have lower flows during drier months (more akin to non-point sources) while other point sources (*e.g.*, mines, mills, sewage treatment plants) will experience a less significant decrease in flow.

Yet EPA and DEQ have apparently not considered this issue in setting the TMDL. Rather, the agencies have assumed that during low flow, all point sources and non-point sources will continue to discharge at the same relative concentrations. EPA and DEQ should revise the TMDL to take into account this potentially significant factor. For example, point sources could be given a larger WLA during low flow events when non-point source loadings are small.

Response: EPA recognized in the TMDL TSD that average flowrates do not take into account that individual sources and source categories likely vary differently with climatic events (and resulting stream flow variations). In an attempt to correlate individual source types to stream flow, EPA compared data from NPDES-permitted adit sources with long-term flow measurements to the corresponding stream flow data for the USGS Station at Elizabeth Park. While EPA observed some increased source flow under high stream flow conditions, these relationships were not consistent and varied significantly by source. Similarly, EPA found that flows in the Bunker Hill Kellogg Tunnel and the South Fork Coeur d'Alene River are poorly correlated (CH2M Hill, 2000). Since source flows do not necessarily correlate to river flows, EPA has allocated loadings among discrete sources using a single flow ratio (based on average flow rates) for all river flow tiers.

The comment implies that the gross allocation should be adjusted for each flowrate based on the relative contribution of discrete and non-discrete sources. As described above, EPA and DEQ do not agree that this is a better method of allocation (See below for a more detailed response to this comment).

Comment #20 Letter(s) 274

Recognizing that a source may discharge up to the criteria levels without using any of the stream's loading capacity is important for the TMDL. The TMDL already understands this in the case of the municipal dischargers to the Spokane River. When a discharger is meeting the water quality standard at the end-of-pipe, it is neither adding to nor taking away any of the stream's loading capacity. The capacity used in such a situation is just equal to the capacity that is added to the stream by the volume of flow and the hardness of the discharge.

If discharges do not vary in hardness from the hardness used to determine the wasteload allocations, then the discharges do not increase the loading capacity of the receiving stream as a result of their hardness. In these circumstances, a TMDL must allow the discharges 100% of the capacity that they have added by their own flow, plus some portion of the stream's loading capacity, if any, that is independent of the discharge's additional flow. The effect of this is to allocate a greater percentage of the capacity to the point sources during the periods of low stream flow than at times of higher stream flow. This approach makes sense in view of the dichotomy between point source discharges during low flow and non-point discharges during high flow that is recognized in the Basin.

Any allocation of loading capacity must fully credit the addition of capacity as a result the addition of flow. Such an allowance is most significant at times of low stream flow, when non-point contributions are minimal. Hence, the TMDL should provide higher allocations to point sources when non-point source contributions would be minimal.

Response: As stated above, EPA and DEQ disagree that gross allocations are more appropriately based on relative existing contributions from discrete and non-discrete sources. The agencies have not performed a data evaluation (nor has the commenter supplied one) that supports the stated assumptions about relative contribution of discrete and non-discrete sources during different flow regimes.

EPA and DEQ recognize that by adding flow to the receiving water, a wastewater discharge increases the receiving water's loading capacity (which is equal to flow multiplied by the criterion). However, there is no requirement in the TMDL regulations that a source must be allocated a minimum loading equal to the increment of loading capacity added by its flow. In fact, in certain watersheds, it is reasonable to set an allocation below this amount or even at zero. For example, a source may be able to cease discharge during certain times of the year by employing land application or wastewater storage.

Comment #21 Letter(s) 274

The TMDL ignores the dichotomy between point source discharges during low flow and non-point discharges during high flow. In allocating 25% and 65% of the total loading to point sources and non-point sources, respectively, EPA assumes that the ratio of point and non-point source contributions remains constant and that the ratio within the point source category also remains the same. This assumption is unsupported and contrary to EPA's own guidance, which states: "The design flows under which the TMDL is determined can significantly alter its value. This phenomenon results in a somewhat unusual dichotomy. The design flow for aquatic life protection most applicable to point source loadings (WLAs) usually involve low-flow events (*e.g.*, 7Q10) because the volumes associated with point sources generally do not decrease with decreased stream flow. As a result, the highest concentrations associated with specific point source loads would be expected under low flow conditions. Conversely, elevated non-point source pollutant loadings (*i.e.*, urban, agricultural) generally correspond to storm events. In fact, agricultural and urban run-off are often minimal or nonexistent in the absence of precipitation (*i.e.*, non-existent under low-flow drought conditions)."

Response: The allocation method is not based on a presumption that the contribution of discrete and non-discrete sources remain constant; the only presumption is that it is reasonable to apply the same gross allocation to the full range of flow conditions in the river. The quoted, general guidance (no citation was provided) is valid for many pollution problems across the country (e.g., fecal coliform bacteria pollution). It is not necessarily valid for the metals contamination in the Coeur d'Alene River basin. For example, non-point source contributions of dissolved metals from tailings wastes in the bed/banks of the river do not necessarily correspond to storm events as do urban stormwater and agricultural runoff.

Comment #22 Letter(s) 274

On page 20 of the TMDL TSD, EPA and DEQ state that "the total loading capacity is calculated by multiplying the river flow rate by the water quality criterion concentration. . . ." They make this statement as if this were the only method for determining the loading capacity when EPA's own guidance states, "The loading capacity of TMDLs have been determined in many different ways" (*Technical Support Document for Water Quality-Based Toxics Control* at 68 (Mar. 1991)).

EPA's *Technical Support Document* lists 19 different methods for developing wasteload allocations. *Id.* at 69.) EPA also admits that there may be others. In spite of the many different allocation schemes, the TMDL includes minimal explanation of why the agencies selected the allocation they did. Indeed, it is not evident whether EPA and DEQ even considered a number of allocation methods that are applicable to the Coeur d'Alene Basin. The lack of discussion of this issue makes meaningful comment on the proposed method impossible because neither the public nor the regulated community can respond to EPA's and DEQ's undisclosed decision making. EPA and DEQ should review the different allocation methods available and select the most appropriate method after giving the public and regulated community the opportunity to review and comment on it.

Response: EPA and DEQ acknowledge that loading capacity estimates can be performed in a variety of ways. In particular, the agencies considered the merits of further evaluation and adjustment of the loading capacity based on in-stream attenuation (See comments under Attenuation). The approach used to calculate loading capacity in this TMDL is a straightforward, reasonable approach that is consistent with the guidance in the Technical Support Document for Water Quality-Based Toxics Control.

The TMDL TSD acknowledges that there are a plethora of methods for allocating the loading capacity to sources. EPA included an appendix in the document listing several general methods considered in developing the TMDL. Additional discussion was provided in the body of the document (e.g., EPA discussed various alternatives for the gross allocation to discrete/non-discrete sources). EPA and DEQ specifically solicited comments on the proposed allocation method, and the vast majority of comments provided meaningful input on the same alternatives EPA identified in the appendix (e.g., methods based on effluent flow, technical feasibility, effluent trading, etc).

EPA and DEQ have conducted the very process recommended in this comment. The agencies have reviewed the different allocation methods available and selected the most appropriate method after giving the public and regulated community the opportunity to review and comment on it.

Comment #23 Letter(s) 270

Insufficient data were used to estimate loading from most of the discrete point sources listed in Table H-I of the TSD. [Twenty-five of the discrete point sources were sampled only once; another 24 were sampled twice.] Data obtained from [only] one or two sampling events were used to estimate the loading from those particular sources. [T]he use of one or two data points to calculate metal loading is statistically invalid and not sufficient to adequately calculate point source load contributions. Section 303 of the Clean Water Act specifies that TMDL establishment shall take into account seasonal variation . . . one or two samples [could not] adequately represent seasonal variation as required in the Clean Water Act.

Response: While EPA and DEQ recognize that there are limitations in the available data for discrete sources, the agencies find no basis in the assertion that the data is insufficient to develop a TMDL. The agencies also note that no additional source flow data was submitted during the public comment period.

Since the TMDL has been changed to replace numeric performance-based allocations with a narrative requirement (which will allow for further characterization during permitting), loading estimates are no longer a factor in establishing wasteload allocations for discrete sources.

Seasonal variation was addressed by establishing flow-based loading capacities and allocations (see comments under Flow Tiers)

Comment #24 Letter(s) 266

The TMDL states that one option could include end-of-pipe Gold Book criteria concentrations. The fishable/swimmable goal of the CWA is to be met in the nation's waters and not in 100% effluent. EPA cannot circumvent Congressional intent, ignore economics, and ignore technology cost effectiveness under the guise of some nonexistent authority of CWA Sec. 303(d).

Response: EPA and DEQ are required under the Clean Water Act to establish allocations in a TMDL sufficient to achieve the applicable Idaho water quality standards (which are the same as the Gold Book criteria). Also, there is no statutory or regulatory requirement to consider cost effectiveness or economics in establishing allocations. While EPA and DEQ considered applying the water quality standard at end-of-pipe, this was not the selected approach in the proposed or final TMDL.

2.9 Method of Allocation - Spokane River

Comment #1 Letter(s) 205

The TMDL program, at least as I understand it, would result in a limitation on the metals in the effluent from the sewage treatment plants of Coeur d'Alene, Hayden Lake, and Post Falls, which would fix the discharges at the present level, even though the discharges have metals at concentrations lower than the receiving waters of the Spokane River. This does not appear to be appropriate. This effectively limits or even punishes the cities due to the historical conduct of other persons (*i.e.*, mining companies).

Response: EPA and DEQ believe that setting the allocations at the current discharge level is appropriate. These concentration-based allocations are not expected to result in capital costs or growth restrictions for the Spokane River dischargers, provided the facilities continue to manage industries discharging to their collection systems.

Comment #2 Letter(s) 267

EPA should consider setting effluent concentrations at a level high enough to assure compliance with the standard and the dischargers' NPDES permit (suggest effluent concentration at 90% of the standard) using the mean hardness rather than minimum values.

Response: For discharges below the effluent-based criterion, EPA and DEQ believe that setting the allocations at the current discharge level is appropriate. In calculating the effluent-based criterion, use of the mean hardness would not be a conservative approach and would not insure that the resulting allocation achieves the criteria in the effluent/receiving water mixture at all times.

Comment #3 Letter(s) 267

The effluent-based criteria calculations are unclear and confusing. The document should present the appropriate translator as well as a detailed explanation showing the method(s) of calculations and the corresponding assumptions.

Response: EPA referenced the detailed technical analysis in the State of Washington's Spokane River TMDL as the technical basis of the effluent-based criteria approach. The TMDL includes the equations (from the Washington analysis) used to calculate the wasteload allocations. The Washington TMDL is part of the record for this TMDL and is available for review upon request.

2.10 Legal Issues

Comment #1

Letter(s) 266,274

The Clean Water Act does not authorize EPA to list under section 303(d)(1) or establish TMDLs for water bodies like the Coeur d'Alene Basin that are dominated by non-point sources of pollutants.

Response: EPA disagrees with this comment for the following reasons. EPA's position, articulated below, has been upheld in the case of Pronsolino v. Marcus, 91 F. Supp.1337 2d (N.D. Ca. 2000).

A. Section 303(d) Clearly Provides that TMDLs Must Account for Nonpoint Sources

1. Congress' Placement of the TMDL Provisions of the 1972 Amendments in Section 303 Demonstrates That TMDLs Are An Integral Part of a Water Quality-Based Approach That by Its Nature Accounts for All Sources of Pollutants

Section 303 of the Act is entitled: "Water Quality Standards and Implementation Plans." Congress' decision to place the TMDL-related provisions of the 1972 Amendments in Section 303 plainly demonstrates that Congress intended TMDLs to be part of a water quality-based approach that, by its nature, is not limited to particular sources. As the Ninth Circuit explained, under the water quality-based approach EPA and the States "work backward from an over polluted body of water and determine which entities were responsible." NRDC, 915 F.2d at 1316. As a component of the water quality-based approach, the TMDL process must account for both point and nonpoint sources of pollution. As explained in EPA's Standards Handbook: "The TMDL process is a rational method for weighing the competing pollution concerns and developing an integrated pollution reduction strategy for point and nonpoint sources. The TMDL process allows States to take a holistic view of their water quality problems from the perspective of instream conditions." Numerous courts have examined the language of Section 303(d) and recognized the integrated characteristics of the TMDL process as part of a water quality-based approach.(13)

As one court within the Ninth Circuit explained:

> EPA's regulatory program for water protection focuses on two potential sources of pollution: point sources and nonpoint sources. Point source pollution was addressed in the 1972 amendments to the Act, where Congress prohibited the discharge of any pollutant from any point source into certain waters unless that discharge complies with the Act's specific requirements. Secs. 301(a) and 502(12), 33 U.S.C. §§ 1311(a) and 1362(12). Under this approach, compliance is focused on technology-based controls for limiting the discharge of pollutants through the National Pollution Discharge Elimination System ("NPDES") permit process.
>
> When these requirements are found insufficient to clean up certain rivers, streams or smaller water segments, the Act requires use of a water-quality based approach. States are required to identify such waters and designate them as "water quality limited." The states are then to establish a priority ranking for these waters, and in accordance with that ranking, to establish more stringent pollution limits called "total maximum daily loads" or "TMDLs." 33 U.S.C. §§ 1313(d)(1)(A), (C). TMDLs are the greatest amount of a pollutant the water body can receive daily without violating a state's water quality standard.

The TMDL calculations help ensure that the cumulative impacts of multiple point source discharges are accounted for, and are evaluated in conjunction with pollution from other nonpoint sources. States are then required to take whatever additional cleanup actions are necessary, which can include further controls on both point and nonpoint pollution sources. As a recent GAO report concluded, the TMDL process:

> provides a comprehensive approach to identifying and resolving water pollution problems regardless of the sources of pollution. If implemented, the TMDL process can provide EPA and the states with a complete listing of key water pollutants, the source of the pollutants, information on the amount of

pollutants that need to be reduced, options between point and/or nonpoint approaches, costs to clean up, and situations where it may not be feasible to meet water quality standards. Alaska Ctr. for the Env't v. Reilly, 762 F.Supp. 1422, 1424 (W.D.Wash. 1991)()(footnote omitted).

On appeal, the Ninth Circuit recognized this interpretation and explained that

> "Congress and the EPA have already determined that establishing TMDLs is an effective tool for achieving water quality standards in waters impacted by nonpoint source pollution." Alaska Ctr. for the Env't v. Browner, 20 F.3d at 985; accord Dioxin, 57 F.3d at 1520 ("[A] TMDL represents the cumulative total of all . . . loading attributed to nonpoint sources, natural background sources, and . . . the total load allocated to individual point sources.).(14)

2. The Elements of a TMDL Must Account for Loads from Nonpoint Sources Because Congress Directed That TMDL Calculations Be Performed For All Waters

In addition to the structure of the Act, Congress' intent that TMDLs account for nonpoint sources is clear from its use of the term "total maximum daily load" in Section 303. It is a maxim of statutory construction "that identical words used in different parts of the same act are intended to have the same meaning." Commissioner v. Lundy, 516 U.S. 235, 250 (1996) (quoting Sullivan v. Stroop, 496 U.S. 478, 484 (1990)). Congress used the term "total maximum daily load" several times throughout Section 303(d). In Section 303(d)(1)(C), Congress required "[e]ach State [to] establish for [listed] waters . . . . the total maximum daily load . . .." 33 U.S.C. § 1313(d)(1)(C). In Section 303(d)(3), Congress addressed all remaining waters not on the 303(d) List: "For the specific purpose of developing information, each State shall identify all waters within its boundaries which it has not identified under paragraph (1)(A) and (1)(B) of this subsection and estimate for such waters the total maximum daily load . . . ." 33 U.S.C. § 1313(d)(3). When the waters on the 303(d) List are added to the waters identified under subsection (d)(3), every water in a state is accounted for, and therefore Sections (d)(1) and (d)(3) together require TMDL calculations for all waters. Given that "all waters" obviously include those impaired by nonpoint sources, even those impaired exclusively by nonpoint sources, Congress unambiguously intended for "total maximum daily loads" to account for nonpoint source impairments. Accordingly, TMDLs established under Section 303(d)(1)(C), such as the Garcia River TMDL, must account for nonpoint source impairments.

3. Sections 303(d)(1)(C) and 303(d)(2) Require That TMDLs Be Established "To Implement the Applicable Water Quality Standards," Which Is Not Always Possible Without Accounting for Impairments Caused By Nonpoint Sources

The legislative history to Section 303(d) also plainly supports the notion that TMDLs must account for nonpoint sources of pollution. In both Sections 303(d)(1)(C) and 303(d)(2), Congress expressly stated that "loads" (i.e., TMDLs) must be established to implement the applicable water quality standard. Section 303(d)(1)(C) provides in pertinent part:

> Each State shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 1314(a)(2) of this title as suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. 33 U.S.C. § 1313(d)(1)(C).

In addition, Section 303(d)(2) states:

> If the Administrator [of EPA] disapproves such identification and load, he shall not later than thirty days after the date of such disapproval identify such waters in such State and establish such loads for such waters as he determines necessary to implement the water quality standards applicable to such waters and upon such identification and establishment the State shall incorporate them into its current plan under subsection (e) of this section. 33 U.S.C. § 1313(d)(2).

The House Committee Report on the bill that introduced Section 303(d) into the 1972 Amendments plainly states, however, that point source controls alone are inadequate to implement applicable water quality standards:

> Any required more stringent effluent limitations will be set on the basis of that reduction in the quantity and quality of the discharge of pollutants which would be required to make the total discharge load in the receiving waters from municipal and industrial sources consistent with water quality standards. This should not be interpreted to mean that such more stringent industrial and municipal effluent limitations will, in themselves, bring about a meeting of water quality standards for receiving waters. The Committee clearly recognizes that non-point sources of pollution are a major contributor to water quality problems. H.R. Rep. No. 92-911, at 105-06 , Att. 3 at 792-93.

Thus, while in Sections 303(d)(1)(C) and (d)(2) Congress directed that TMDLs must be established to implement the applicable water quality standard for a water, in the accompanying Committee Report, Congress made plain that point source controls were inadequate to this task and expressly recognized that "non-point sources of pollution are a major contributor to water quality problems."

As Professor Houck correctly explains:

> It is logical that the committee report describes only municipal and industrial sources as needing additional "emissions limitations" because these are the only sources directly subject to emissions limitations under the Act. The committee goes on to recognize, however, that water quality standards were also violated by nonpoint sources in a "major" way. This sentence implies the obvious: there is no way to determine the appropriate contributions from, and limitations on, municipal and industrial point sources without considering these nonpoint sources as well. How a state would choose to allocate its limits among point and nonpoint source contributors would, at least in the first instance, be up to states to decide. But the only logical sources were a big fact of life in achieving water quality standards, and they would have to be included in the assessments of polluted waters and their TMDL allocations. Were they not included, a process to ensure that municipal and industrial limits were "consistent with water quality standards" would make no sense; it literally could not be done. Oliver A. Houck, TMDLs: The Resurrection of Water Quality Standards-Based Regulation Under the Clean Water Act, 27 Envtl. L. Rep. 10329, 10337 n.100 (1997), Att. 10.

It is clear then that Congress intended TMDLs to account for nonpoint sources.

B. The Structure of the Act and the Plain Language of Section 303(d) Demonstrate That Congress Did Not Intend to Exclude Waters Impaired by Nonpoint Sources From the Section 303(d) List

Section 303(d)(1)(A) sets forth the criteria for the Section 303(d) List:

> Each State shall identify those waters within its boundaries for which the effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) of this title are not stringent enough to implement any water quality standard applicable to such waters. 33 U.S.C. § 1313(d)(1)(A).

On its face, this provision does not exclude from the 303(d) List waters impaired by nonpoint sources. Any water (whether impacted by point sources, nonpoint sources, or both) may fail to meet applicable water quality standards because the effluent limitations identified in Section 303(d)(1)(A) alone are inadequate to the task. Indeed, the Ninth Circuit already has upheld EPA's interpretation that the effluent limitations referred to in Section 303(d)(1)(A) do not limit listing under Section 303(d) to waters where those controls have been applied and found not to be stringent enough to achieve water quality standards. In Dioxin, the Ninth Circuit upheld a TMDL for the Columbia River upon challenge by pulp mills and environmental groups. The pulp mills attempted to persuade the Court that Section 303(d)(1)(A) had a plain meaning contrary to EPA's interpretation:

> The Mills focus particular attention on the present tense language of § 1313(d)(1)(A), i.e., "the effluent limitations of § 1311...are not stringent enough to implement any water quality standard applicable to such waters . . . ." The Mills argue that the "plain language" of the provision prohibits

EPA from developing TMDLs prior to the proven failure of technology-based limitations. 57 F.3d at 1526.

The Ninth Circuit flatly rejected the Mills' argument because it found that "EPA's interpretation is reasonable and not contrary to congressional intent." Id. at 1527. The Court held:

> [the technology limitations identified in Section 303(d)(1)(A)] are not required by § 1313(d) for dioxin because the limitations required by the provisions of § 1311, as a matter of law, "are not stringent enough" to achieve established water quality standards. Nowhere does the Act prohibit the EPA from listing waters as impaired and implementing TMDLs for toxic pollutants pursuant to § 1313(d). Id. at 1528.

In the same way, nowhere does the Act prohibit EPA from listing waters as impaired and establishing TMDLs for nonpoint source impaired waters pursuant to Section 303(d). Therefore, as the Ninth Circuit has held, the application of the technology-based limitations identified in Section 303(d)(1)(A) is not a condition precedent to 303(d) listing. Like the TMDL at issue in Dioxin, TMDLs for waters with nonpoint sources are not prohibited based on the absence of applicable technology-based requirements. All that is necessary for 303(d) listing is that the technology-based limitations identified in Section 303(d) be inadequate to achieve water quality standards. As the District Court in Dioxin held, those limitations function as a "minimum level" for the 303(d) List.

In addition, the structure of the Act makes clear that waters impacted by nonpoint sources should not be excluded from the 303(d) List. It is no surprise that Congress chose to condition Section 303(d) listing on the insufficiency of effluent limitations because the water quality-based approach is to be invoked when the technology-based approach fails to achieve standards. See NRDC, 915 F.2d at 1317 ("Congress supplemented the "technology-based" limitations with "water-quality-based" limitations. See CWA §§ 302, 303, 33 U.S.C. §§ 1312, 1313."). The 303(d) List therefore identifies the waters where a technology-based approach will not achieve standards and where resort to a water quality-based approach is necessary, a structure which mirrors the compromise that Congress struck in the 1972 Amendments between the technology-based and water quality-based strategies with passage of Section 303. The purpose of Section 303 and its place within the Act as part of the source neutral, water quality-based approach therefore establishes that Congress could not have intended the 303(d) List to exclude nonpoint source impaired waters.

C. EPA's Interpretation that Congress Intended the Listing of Waters Pursuant to Section 303(d)(1) Without Regard to the Source of Impairment and Establishment of TMDLs for Those Water Is Reasonable and Entitled to Deference

As demonstrated above, it is clear from the language, structure, and legislative history of the Act that Congress plainly intended that TMDL calculations account for nonpoint source contributions and did not expressly exclude waters impaired by nonpoint sources from the Section 303(d) List. Moreover, a restrictive reading of Section 303(d) is disfavored because the Act is intended to protect public health and safety. In any event, EPA's interpretation that waters impaired by nonpoint sources can be included on the Section 303(d) List and that TMDL calculations can account for nonpoint source contributions is entitled to deference because it is based on a reasonable reading of the language, structure, and legislative history of the Act. Chevron, 467 U.S. at 842-4. According to the Supreme Court, "[t]he court need not conclude that the agency construction was the only one it permissibly could have adopted to uphold the construction, or even the reading the court would have reached if the question initially had arisen in a judicial proceeding." Chevron, 467 U.S. at 843, n. 11. Rather, as the Ninth Circuit stated, "[a] court should accept the 'reasonable' interpretation of a statute chosen by an administrative agency except when it is clearly contrary to the intent of Congress." Dioxin, 57 F.3d at 1525(citing Chevron, 467 U.S. at 842-44). Deference to the agency's interpretation is especially warranted where, as here, the agency charged with administering the CWA is required to exercise its "ecological judgment" and "technical expertise" about how best to achieve Congress' objectives of protecting aquatic ecosystems. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121, 134 (1985). Thus, EPA's interpretation is reasonable and not contrary to Congress' intent.

EPA's interpretation of Section 303(d) is entitled to deference because, as explained in detail above, it is consistent with the structure, language, legislative history, and attainment of the overarching goals of the Clean Water Act. Nonpoint source impaired waters can satisfy the criteria for 303(d) listing (i.e., the technology-based limitations identified in Section 303(d) are inadequate to achieve water quality standards), and therefore EPA's interpretation that such waters can be included on the 303(d) List is reasonable. Congress also did not expressly exclude nonpoint source contributions from TMDL calculations. To the contrary, the language of Section 303(d) demonstrates that Congress clearly intended that TMDL calculations be performed for all waters, a position that is consistent with the structure of the Act and the legislative history for Section 303(d). EPA's interpretation also fulfills the goals of the Act. The stated objective of the Clean Water Act "is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a)(1). The legislative history to Section 303(d) emphasized "that non-point sources of pollution are a major contributor to water quality problems,", and in hearings leading up to Section 303(d)'s enactment, the Senate expressed its fear that nonpoint sources of pollution would prevent attainment of the Act's goal:

> One of the most significant aspects of this year's hearings on the pending legislation was the information presented on the degree to which nonpoint sources contribute to water pollution. Agricultural runoff, animal wastes, soil erosion, fertilizers, pesticides and other farm chemicals that are a part of runoff, construction runoff and siltation from mines and acid mine drainage are major contributors to the Nation's water pollution problem. Little has been done to control this major source of pollution.
>
> It has become clearly established that the waters of the Nation cannot be restored and their quality maintained unless the very complex and difficult problem of nonpoint sources is addressed. S. Rep. No. 92-414, at 39 (1971), reprinted in 1972 USCCAN 3668, 3705.

Thus, Congress recognized that the primary goals and objectives of the CWA cannot be realized without an effective means to identify and address nonpoint sources of pollution. When viewed in this light, EPA's interpretation that waters impaired by nonpoint sources can be included on the Section 303(d) List and that TMDL calculations can account for nonpoint source contributions is not only reasonable, it is necessary to achieve the stated objectives of the Act.

DEQ is also acting pursuant to state water quality law, Idaho Code section 39-3601 et.seq.. State law clearly requires TMDLs address both point and nonpoint sources of pollutants.

Comment #2

Letter(s) 274

EPA does not have authority to issue a TMDL for waters within the boundaries of the Coeur d'Alene Reservation.

Response: EPA disagrees. EPA is using its discretionary authority under section 303(d) to issue TMDLs in Indian country where no tribe has been authorized and where EPA has not found a state to have demonstrated jurisdiction to issue TMDLs. A portion of Lake Coeur d'Alene and the St. Joe River have been determined to lie within the boundaries of the Coeur d'Alene Indian Reservation. See United State of America et. al. v. State of Idaho, 210 F.3d. 1067 (9th Cir., 2000). Under the authority of CWA section 518(e), EPA may approve tribes to carry out the responsibilities of CWA section 303. However, at this time, the Coeur d'Alene Tribe has not been approved to exercise this authority. Therefore, to the extent that the above mentioned waterbodies lie within reservation boundaries, EPA, rather than the State of Idaho, has the authority to develop TMDLs for those waters. It is acknowledged that ownership and jurisdiction over portions of the submerged lands underlying waters covered by this basin-wide TMDL are contested between the State of Idaho, United States and/or Coeur d'Alene Tribe. This TMDL is not intended as a waiver or admission of ownership or jurisdiction regarding the contested submerged lands by any of those parties. EPA has coordinated with the Coeur d'Alene tribe in developing the TMDL.

EPA's discretionary authority derives from the CWA and its overall scheme and purposes. The main objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. 33 U.S.C. § 1251(a). Congress intended TMDLs to play an important role in achieving this objective. See 33 U.S.C. § 1313(d) (imposing short deadlines for state and EPA action). Thus, while states have primary responsibility for many CWA programs, see 33 U.S.C. § 1251(b), including the TMDL program, it would be anomalous and contrary to the objectives of the CWA if states could stymie the implementation of section 303(d) simply by refusing to submit TMDLs as required by Congress. E.g., Scott v. City of Hammond, 741 F.2d 992, 997 (7th Cir. 1984) (stating that the court did not believe that Congress could have intended to allow the states to prevent the implementation of TMDLs through inaction); Alaska Center, 762 F. Supp. at 1428 (same); ACA II at 628 (same).[1]] .

Similarly, EPA believes that Congress would not have left EPA powerless to act where tribes chose not to apply for authorization and issue TMDLs. In this instance, the Coeur d'Alene tribe has not submitted TMDLs for the portion of Lake Coeur d'Alene and the St. Joe River that are within Indian Country. In view of Congress's push for state action, the TMDLs' place in the statutory scheme, and Idaho's schedule for developing TMDLs for the state Coeur d'Alene basin waters, EPA believes it is reasonable and necessary for EPA to step in to develop the complementary TMDLs for the portions of the waters that are within Indian Country. Indeed, it would frustrate the purposes of the CWA if EPA lacked authority to do anything but sit idly by. Section 303(d) does not explicitly address this situation. Therefore, in order to fill the gap left by Congress, EPA has determined that it possesses authority to develop TMDLs in these circumstances where necessary to enable the agency to fulfill its statutory responsibility to administer the CWA.

In developing this basinwide TMDL, EPA has utilized federally recommended "Gold Book" water quality criteria for those waters within Indian Country. EPA also considered the water quality standards of the downstream jurisdiction (Idaho) at the border. Those water quality standards are identical to EPA's Gold Book water quality criteria guidance. This approach ensures consistency within the basin and assures that the standards of the downstream state waters of Idaho and Washington will be met.

Comment #3 Letter(s) 266, 274

EPA and DEQ cannot establish TMDLs for water bodies that are not included in Idaho's section 303(d) lists and cannot impose requirements on sources discharging into segments that are not on the section 303(d) list..

Response: EPA has developed TMDL for the Coeur d'Alene Basin to address water quality impairments in 28 water bodies that appear on Idaho's 1998 section 303(d) list for metals. The TMDL thus directly relates to the listed waters and the causes of impairment in those waters. Therefore, the commenter's threshold assumption is incorrect.

Specifically, the TMDL is established using nine target sites. With the exception of two target sites, each target site is located on a segment listed on the current Idaho 303(d) list. The two target sites on unlisted waters (North Fork of the Coeur d'Alene River and St. Joe River) are established only for tracking purposes and allocation of loading capacity through the river network. That EPA and DEQ are not establishing TMDLs on these two unlisted waters is evidenced by the absence of any allocations for sources on these waters. .

To achieve water quality standards, the TMDL must address all sources of dissolved metals to waters at a given target site. In the South Fork and tributaries, the loading capacity at each target site is allocated to all identified sources of dissolved metals that are upgradient from the target site. Thus, while the TMDL addresses impairment on listed waters, the allocations includes sources in upstream watersheds that are tributary to the listed waterbody. Some of these smaller, upstream watersheds are not on the 303(d) list (Note that omissions in the 303(d) list are to be expected in this case, because the

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[1/] This understanding of congressional intent prompted these courts to find a nondiscretionary duty for EPA to act; at a minimum, it implies that EPA has authority to act.

contamination extends across a lage geographic area and water quality monitoring is extending to more remote tributaries over time. See also discussion in TMDL TSD on scope of the TMDL). Nevertheless, sources in these watersheds discharge dissolved metals to the upstream watershed, and the stream network then transports the metals downstream to the waters at the target site location. For example, the Star 1200 adit discharges dissolved metals to Grouse Creek, a tributary to the South Fork above Wallace that is not yet included on the Idaho 303(d) list. Grouse Creek flows into the South Fork upstream from the Wallace target site. Since the metals from the Star adit ultimately reach the Wallace target site, this adit is included in the wasteload allocations for that target site, even though the creek immediately adjacent to the adit portal is not alisted waterbody.

It is neither practical nor equitable to limit TMDL allocations only to those sources that discharge directly into 303(d) listed waters. From a practical standpoint, the agency issuing the TMDL may have a wide range of information sources for waters and sources in a given watershed. From a facility inspection, for example, the agency collect information clearly identifying a major source of pollutants to a downstream 303(d)-listed waterbody. But the same agency may not have information for the waterbody to which the source discharges for inclusion on the 303(d) list. It would be inappropriate and contrary to the goals of the Clean Water Act to either ignore this source in a TMDL for the downstream water or delay action until samples of the waterbody adjacent to the source could be collected for 303(d) list administration.

In terms of equity, if the agency failed to consider and subsequently control this upstream source in the TMDL allocations, its unregulated discharges could severely (and unfairly) impact allocations for downstream sources. In order to establish an equitable and effective TMDL, all known sources contributing loadings to the impaired water must be addressed in the TMDL allocations.

Idaho and EPA are authorized to adopt this approach because of the requirement in section 303(d)(1)(C) that TMDLs be established at levels necessary to implement applicable water quality standards. Absent controls on upstream sources, EPA would lack the assurance that the TMDL for downstream waters would result in the attainment of water quality standards. EPA also notes that the comment cites the decision in NRDC v. Fox, 30 F. Supp. 2d 369 (S.D.N.Y. 1998). The question presented there was whether EPA had a duty to approve or disapprove TMDLs for waters on the state's § 303(d) list. Notwithstanding the commenter's assertions to the contrary, the court's holding that EPA does indeed have such a duty is irrelevant to the issue presented here i.e., whether a TMDL may assign wasteload allocations to sources that discharge to waters within the jurisdiction of the TMDL authority but that do not appear on the relevant § 303(d) list. As discussed above, EPA has such authority under section 303(d)(1)(C), and nothing in the Fox decision undercuts it.

Comment #4

Letter(s) 266,272,274

Idaho Code Section 39-3611 limits controls on point sources in this TMDL.

Response: The limitations on point source controls in 39-3611 are not applicable under either state or federal law to the TMDL for the South Fork Coeur d'Alene River for the following reasons.

Under State law, Idaho Code section 39-3611 applies to waterbodies 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 SFCDA river that occurred prior to 1972, there are also continuing and post-1972 discharges that have contributed and continue to contribute to the nonattainment of state water quality standards in the Coeur d'Alene basin.

Application of section 39-3611 to the Coeur d'Alene TMDL would not comply with the CWA, because even if the point source contribution of metals is less than 25% of the total load _ the load contributed by point sources alone exceeds the loading capacity of the South Fork Coeur d'Alene river by a considerable amount. Therefore, if the TMDL could not assure reductions in current loadings from the point sources (reflected as restrictive wasteload allocations), the TMDL could not assure compliance with state water quality standards and would not comply with the requirements of section 303(d) of the CWA.

Furthermore, , if as a result of the application of 39-3611, the allocations in the TMDL did not assure that the NPDES permit limitations would comply with the state's water quality standards, EPA has an independent obligation under section 301(b)(1)(C) of the Clean Water Act to do so. The effluent limitation in NPDES permits must be sufficiently stringent so as to comply with state water quality standards if a discharge would be likely to cause or contribute to an exceedence of the state's WQS.

Finally, although this TMDL is being issued by the State of Idaho as to state waters, should it be determined that the state of Idaho cannot ,under section 39-3611, issue a TMDL as to those waters that complies with the CWA, then EPA will, in the alternative, immediately issue the TMDL for the entire Coeur d'Alene river basin under its authority in section 303(d) of the CWA.

Comment #5 Letter(s) 266

The proposed TMDL is a "joint" EPA/DEQ action and therefore Idaho law cannot be ignored. Idaho law at IC 39-3611 clearly spells out statutory limitations on DEQ actions and authorities pursuant to TMDL development. Pertinent sections of IC 39-3611 have not been met.

Response: Idaho Code section 39-3611 provides that TMDLs must be developed in accordance with the CWA and must include certain elements. EPA and DEQ believe the TMDL meets the requirements of the CWA and includes each of the elements identified in 39-3611. The TMDL identifies the pollutants, provides an inventory of sources of pollutants, a discussion of the implementation of the TMDL, including control strategies, and a future evaluation process. In addition, as provided in the TMDL Schedule for the state of Idaho, Idaho is preparing an implementation plan that addresses some of these elements in more detail following the approval of this TMDL.

Comment #6 Letter(s) 266, 272, 274

Adits, waste rock piles, and other potential sources of metals are not "point sources" if there is no discernible discharge to surface waters.

Response: The commenter's assertion would be correct if there was proof that no pathway existed between adit discharges and adjacent receiving waters. This is not the case. EPA's statement in the Draft TMDL TSD should not be construed as a statement that discharge pathways from all adit portals to adjacent receiving waters are non-existent. In fact, numerous adits are known to discharge directly to an adjacent stream.

Some adits, however, are located in remote areas. They have been sampled at the adit portal but have not been surveyed in detail to chart the pathway to the adjacent stream. Potential pathways could include direct piped-discharge to the stream, overland flow to the stream, and seepage into the groundwater. Since groundwater is known to deliver metals to the adjacent stream, it is reasonable to assume that there is a hydraulic connection between the visible expressions of flow from an adit and the adjacent, downgradient stream. While some attenuation could occur between the adit and the receiving water, it is reasonable to assume that some fraction of the dissolved metals in any adit discharge will reach the adjacent stream. Thus, in the absence of evidence to the contrary, adits are assumed to be sources of dissolved cadmium, lead, and zinc to the receiving water. Since they are point sources (via a direct discharge or indirect hydraulic connection to the receiving water), it is reasonable and appropriate to assign them wasteload allocations in the TMDL.

The commenter has not provided any additional information about particular adits, nor has the commenter demonstrated that there is no hydraulic connection between a particular adit and the receiving water. Therefore, EPA and DEQ have no basis to eliminate adits that were assigned wasteload allocations in the draft TMDL.

Comment #7 Letter(s) 266, 274

Waste piles are not point sources. Runoff, if any, from such piles should be considered nonpoint source discharges.

Response: The treatment of discrete waste piles as point sources has been upheld in a number of mining cases. These cases have found that the definition of point source is broad and encompasses runoff from mining waste rock piles including runoff which enters surface waters , directly or indirectly through a ground water connection. The court in Earth Sciences found that "Even though runoff may be caused by rainfall or snowmelt, percolating through a pond or refuse pile, the discharge is from a point source because the pond or pile acts to collect and channel contaminated water" . U.S. v. Earth Sciences, Inc. 599F2d 368, 374 (10th Cir. 1979). See also Trustees for Alaska 749 F2d 549(9th Cir. 1984); Sierra Club v. Abston Construction Co. , 620 F2d 41 (5th Cir. 1980), Consolidated Coal Co. v. Costle, 604 F.2d 239, 249 (4th Cir. 1979) (point sources include slurry ponds, drainage ponds, and coal refuse piles), Washington Wilderness Coalition v. Hecla Mining co., 870 F. Supp. 983 (E.D. Wash.1994).

Comment #8 Letter(s) 266

The section 303(d) list applies only to waters impaired by point source discharges operating under the technology-based effluent limitations of CWA section 301. It does not apply to waters impaired by nonpoint sources.

Response: For a discussion of the applicability of section 303(d)(1)(A) to waters impaired by nonpoint sources, see Response to Comment A (ASARCO II.B.1). With respect to the commenter's assertion that the § 303(d) list applies only to point sources operating under technology-based effluent limitations of CWA section 301, see Dioxin/Organochlorine Center v. Clarke, 57 F.3d 1517 (9th Cir. 1995). In that case, the Ninth Circuit held that EPA has the authority to develop TMDLs for pollutants (toxics, in that case) even before technology-based effluent limitations for those pollutants or sources have been developed and implemented. Id. at 1527. The court found that EPA's interpretation was reasonable and was supported by legislative history for the Clean Water Act, as well as its overarching purposes.

The commenter also relies on the term "effluent limitations" and the scope of nonpoint source programs under CWA section 319 to support its position. EPA believes this view is not supported by the statute or the legislative history. (The commenter's view was also rejected by the court in the Pronsolino case.) First, the commenter's reliance on Section 319 to interpret the scope of Section 303(d) is misplaced. The commenter argues that EPA should ascertain Congress' intent in passing Section 303(d) by looking to Section 319, a section of the Act that was passed 15 years later. As the Supreme Court has emphasized, however, it is a peculiar form of statutory interpretation that looks to the views of a subsequent Congress to determine what the earlier one intended: "The will of a later Congress that a law enacted by an earlier Congress should bear a particular meaning is of no effect whatever. The Constitution puts Congress in the business of writing new laws, not interpreting old ones. '[L]ater-enacted laws . . . do not declare the meaning of earlier law.'" United States v. Estate of Romani, 523 U.S. 517, 536 (Scalia, J. concurring in part and concurring in the judgment) (quoting Almendarez-Torres v. United States, 523 U.S. 224, 237 (1998)); see also O'Gilvie v. United States, 519 U.S. 79, 90 (1996), citing United States v. Price, 361 U.S. 304, 313 (1960); Higgins v. Smith, 308 U.S. 473, 479-80 (1940)("[T]he view of a later Congress cannot control the interpretation of an earlier enacted statute.").(23) Therefore, to determine Congress' intent in passing Section 303(d), the Court should look to the intent of the 92nd Congress that passed Section 303(d)(1)-(3), and not to the intent of the 100th Congress that passed Section 319.

The commenter also contends that Congress' use of the terms "effluent limitations," and "daily load" in "total maximum daily load," plainly limit the application of Section 303(d) to point sources. Not only does the commenter misconstrue the Act, its "plain language" argument is undermined by the fact that numerous courts, including the Ninth Circuit, have read the terms "effluent limitations" and "daily load" in Section 303(d) and consistently reached a conclusion exactly opposite to the one the commenter urges EPA to accept. Under such circumstances, it is hard to imagine that the Act in fact has the plain and obvious meaning on its face that the commenter advances. Specifically, the commenter argues that the appearance of the term "effluent limitations" in Section 303(d)(1)(A), which addresses the 303(d) List, and in Section 303(d)(1)(C), which addresses TMDL establishment, demonstrates that Section 303(d) applies only to point sources. This view is in error because it fails to take into account the purpose of Section 303, and makes the applicability or proven failure of the technology-based limitations identified in Section 303(d) to point sources a condition precedent to 303(d) listing -- neither of which Congress intended.

As explained above, Congress' decision to include on the 303(d) List waterbodies where effluent limitations are not stringent enough to implement water quality standards reflects the approach adopted in the 1972 Amendments that effluent limitations occupy the first line of attack in cleaning up the Nation's waters, and when that effort is inadequate the State must turn to the safety net of a water quality-based approach. Given that it is the insufficiency of technology-based effluent limitations that triggers the need for a TMDL, it is hardly surprising to find a reference to "effluent limitations"in the listing provision in Section 303(d). Moreover, as explained supra, the Ninth Circuit has held that the applicability or proven failure of the technology-based limitations identified in Section 303(d) is not a condition precedent to 303(d) listing. See Dioxin, 57 F.3d at 1527-28. Contrary to the commenter's contention that the effluent limitations identified in Section 303(d)(1)(A) limit listing under Section 303(d) to waters where controls are subject to those effluent limitations, by its plain terms, all that Section 303(d)(1)(A) requires for listing is that the technology-based limitations identified in Section 303(d) be inadequate to achieve water quality standards. Id; see discussion supra.

Comment #9 Letter(s) 266

The TMDL is unlawful because it does not based on "applicable" water quality standards, but rather on water quality standards unlawfully approved by EPA in 1997.

Response: The CDA TMDL is based on the water quality standards applicable under the CWA. EPA's promulgation of the cold water biota use for specific waterbodies in the Coeur d'Alene basin was upheld by the court in Idaho Mining Association v. Browner 90 F. Supp.2d.1078, (D.Idaho, 2000). This promulgation included the South Fork of the Coeur d'Alene River and Canyon Creek. The court vacated the rule only as to Shields Gulch and remanded that portion of the rule to EPA for further consideration. The status of Shields Gulch has no impact on the calculations and allocations in the TMDL (see also discussion above regarding sources located upgradient from a target site).

Comment #10 Letter(s) 266

EPA has failed to comply with the requirements of CWA section 304(a)(2)(D) to identify pollutants suitable for TMDL calculation.

Response: The commenter disagrees with EPA's decision in 1978 that all pollutants are suitable for TMDL development. The issue is outside the scope of this TMDL, and the commenter does not explain how it has any bearing on a TMDL developed for metals.

Comment#11 Letter(s) 266

EPA lacks the authority to prohibit development in a watershed, accomplished by developing a TMDL that does not allow any new permits in the watershed in question (where the allocation is "used up"). This contravenes section 101(b), which accords to States the sole authority to plan the development and use of land and water resources.

Response: This TMDL contains no blanket prohibition on new permits as implied in the comment. In response to comments, the final TMDL has been revised to include a process for allowing new or expanded discharges cadmium, lead, and zinc.

The State of Idaho is issuing this TMDL. Therefore, the comment that EPA is contravening the State's authorities under section 101(b) is not pertinent to this TMDL.

As required by section 303(d) and EPA's implementing regulations, TMDLs develop allocations sufficient to meet applicable water quality standards. The water quality-based effluent limits in NPDES permits, in turn, must be consistent with any wasteload allocation in an applicable TMDL. See 40 C.F.R. § 122.44(d)(1)(vii)(B). Section 301(a) of the CWA prohibits the discharge of any pollutant to a water of the United States except in compliance with an NDPES permit or similar permit or license. Section 301(b) then requires point source discharges to achieve water quality-based effluent limitations. Depending on the circumstances in the watershed, TMDL and NPDES requirements can have an effect on development patterns in a community.

Comment # 12 Letter(s) 266

The commenter asserts that the proposed TMDL is incomplete because it does not account for all point and nonpoint sources and does not allocate a load to each source.

Response: EPA has the legal authority to assign allocations in a reasonable manner, so long as the sum of the allocations is equal to or less than the loading capacity of the receiving water (and allows for a margin of safety). In addition, with respect to nonpoint sources, EPA's regulations provide that load allocations "are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading." 40 C.F.R. § 130.2(g).

The TMDL identifies all the source categories in the basin and allocated gross loadings to these categories. Then the TMDL assigns individual wasteload allocations to those point sources for which the EPA and DEQ have sufficient information in order to develop an equitable allocation scheme. Allocation among the large number of non-discrete source areas will require additional data and technical analysis.EPA and the state will be able to establish additional individual source allocations, if necessary, as the Superfund RI/FS process is completed.

Comment # 13 Letter(s) 266

The proposed TMDL alludes to some uncited statutory authority that requires a TMDL to meet downstream standards including those in other states. We cannot find any statutory authority to support this position. Please specifically cite the authority under the CWA for this position.

Response: It is unnecessary to reach the question whether the Coeur d'Alene TMDL is "required" to meet downstream water quality standards, including those in other states. As a factual matter, the Coeur d'Alene TMDL is calculated at levels to meet applicable water quality standards for Idaho for the metals at issue. The TMDL was not adjusted to reflect any other jurisdiction's water quality standards. As it happens, however, the TMDL as calculated will also assure that Washington's water quality standards are met at the border, because (1) Coeur d'Alene River and tributary allocations will achieve Idaho standards in Lake Coeur d'Alene and its outlet (Spokane River origin) with a margin of safety, (2) allocations for municipal sources on the Idaho portion of the Spokane River are set at protective levels, and (3) Washington's water quality standards for the three metals are identical to Idaho's standards (except for minor differences in hardness assumptions). While EPA and DEQ have referred to the Washington standards for the Spokane River in the TMDL TSD, these references are provided for informational purposes only and do not affect the calculated TMDL

Comment # 14 Letter (s) 266

The commenter asserts that EPA acted improperly in indicating to Idaho that it would not approve a TMDL based on site-specific criteria as the applicable water quality standards while Idaho was subject to the National Toxics Rule.

Response: The State of Idaho has adopted the EPA "Gold Book" criteria as part of its standards, and it is these criteria that were used as the basis for the final TMDL. Idaho was removed from the National Toxics Rule in April, 2000, and issues regarding the Rule and its application are no longer relevant to the final TMDL. The status of SSC and the potential impact of SSC on the TMDL are discussed in the Regulatory Option section of the Response to Comments .

Comment # 15 Letter(s) 266

The commenter disputes the assertion in the proposed TMDL that water quality standards are adopted by states to maintain and restore the nation's waters for beneficial uses, such as drinking, swimming and fishing. The commenter asserts that this goal of the act applies only where attainable.

Response: EPA's water quality standards regulations authorize states to adopt water quality standards that do not protect the "fishable/swimmable" goals of the Clean Water Act when the state demonstrates that those uses are not attainable. See 40 C.F.R. § 131.10(g). By allowing states to develop such use attainability analyses to justify not protecting "fishable/swimmable" uses, EPA acts consistently with section 101(a)(2), which established such uses as the national goal "wherever attainable.". See Idaho Mining Association v.Browner, 90 F. Supp. 2d 1078 (D. Idaho, 2000).

Comment # 16 Letter(s) 266

The commenter asserts that the proposed TMDL incorrectly characterizes water quality standards as including an "anti-degradation requirement" and asserts that EPA's regulations at 40 C.F.R. § 131.3(i) do not include antidegradation policies as a component of water quality standards. Finally, the commenter describes antidegradation policies as "nothing more than guidance on the implementation of water quality standards and cannot be portrayed as an enforceable component of a 'water quality standard.'"

Response: EPA disagrees. Under CWA sections 303 and 304(d)(4)(B), EPA's regulations, and as recognized by the Supreme Court and many other courts, water quality standards contain three components: (1) use designations consistent with sections 101(a)(2), (2) 303(c)(2) of the Act, water quality criteria to support those uses, and (3) an antidegradation policy consistent with 40 CFR § 131.12. See 40 CFR § 131.6 (Minimum requirements for water quality standards submission.); PUD No. 1 of Jefferson County v. Washington Department of Ecology, 511 U.S.

700, 704 (1994); See also, National Wildlife Federation v. Browner, 127 F.3d 1126, 1127 (D.C. Cir. 1997); Natural Resources Defense Council, Inc. v. U.S. EPA, 16 F.3d 1395, 1400 (4th Cir. 1993); Manasota-88, Inc. v. Tidwell, 896 F.2d 1318 1320 (11th Cir. 1090); American Paper Institute, Inc. v. U.S. EPA, 890 F.2d 869, 871 (7th Cir 1989).

Comment # 17 Letter(s) 266

The commenter argues that the TMDL's consideration of historic impacts amounts to improper retroactive application of the Clean Water Act. The commenter says that there is nothing in the law or legislative history indicating Congressional intent to punish current point source discharges for historic activities.

Response: Section 303(d) of the Clean Water Act requires the establishment of TMDLs at levels necessary to achieve applicable water quality standards. EPA's regulations at 40 C.F.R. § 131.10(g) establish procedures whereby states can elect not to designate a receiving water for fishable/swimmable uses if it can show that those uses are not attainable. Listed among the reasons that attaining a use might not be feasible is the presence of naturally occurring pollutant concentrations that prevent the attainment of the use. See 40 C.F.R. § 131.10(g)(1). Also included are human-caused conditions or sources of pollution that cannot be remedied or would cause more environmental damage to correct than to leave in place. See 40 C.F.R. § 131.10(g)(3). With proper showings, a state may be able to change the designated uses for a water body based on one or more of these conditions. If it does so, the water quality standard -- and the target for the TMDL -- would change accordingly. In any case, as noted above, the TMDL works toward achievement of the applicable water quality standard. First, the TMDL must ascertain the water's loading capacity, which is the greatest amount of loading that a water can receive without violating water quality standards. See 40 C.F.R. § 130.2(f). Next, the TMDL allocates that load among point and nonpoint sources. Nonpoint sources may include sources of pollution (such as contaminated sediments) that resulted from past human activity. If the nonpoint sources consume the loading capacity, there is proportionally less loading capacity left over for point source wasteload allocations. See 40 C.F.R. § 130.2(h). In this sense, the TMDL takes the receiving water as it finds it, which may include historical and ongoing pollutant releases. This may mean that there is limited loading available for point sources that come later in time, but this is simply a result of the statutory requirement that the TMDL must be established at levels necessary to achieve applicable water quality standards.

Comment # 18 Letter(s) 266

The commenter asserts that the Clean Water Act does not authorize States or EPA to list waters "believed to be impaired."

Response: This comment is outside the scope of this TMDL. The commenter appears to argue that certain waters should not be included in Idaho's section 303(d) list. Any such argument should be raised in the context of a challenge to that list, not to the development of a TMDL. As one court has noted, EPA must approve or disapprove TMDLs submitted for waters identified on a state's § 303(d) list without inquiring whether different listed waters deserve different treatment. See NRDC v. Fox, slip op. at 55, 94 Civ. 8424 (PKL) (S.D. N.Y. May 2, 2000). In any case, there is ample data in the record for the listing decisions that the contested waters are indeed impaired.

Comment # 19 Letter(s) 266

The TMDL states that [EPA] has "not issued final guidance or regulations on acceptable trading mechanisms" for "effluent trading." There is no authority under the CWA for this activity because Congress did not intend for CWA Sec. 303(d) to result in such an outcome.

Response: EPA disagrees that it lacks authority under the CWA to promote trading through TMDLs. For example, EPA noted as long ago as 1985 in one of its earliest versions of the TMDL regulations that the TMDL process can provide for point/nonpoint source tradeoffs, e.g., in situations where controls on nonpoint sources might allow for less stringent wasteload allocations than might otherwise be established. See 40 C.F.R.§ 130.2(i); 50 Fed. Reg. 1774, 1780 (Jan. 11, 1985).

3.0 Implementation Issues

3.1 Feasibility of Allocations

Comment #1 Letter(s) 266

It is clear that a particular treatment technology, similar to that utilized by Red Dog, is being prescribed in the TMDL. Will permits be issued that require monitoring and reporting only if the specified technology is installed?

Also, the TMDL states that "operating mines have options for implementing tailings decant recycling and other water management measures to reduce effluent flow and thereby increase allowable effluent concentrations." The CWA does not provide options for EPA to dictate technology.

EPA's own treatability manuals describe a range of effluent quality for a given pollutant under certain treatment technologies and further that a well-maintained and operated wastewater treatment facility could be expected to operate within these ranges 95% of the time. The resultant permit limits would require 100% compliance, thus subjecting the facility to fines and penalties under the CWA. Do the agencies expect the mining industry to install a treatment technology that cannot guarantee 100% compliance with permit limitations, thus exposing the permittee to potential fines and penalties?

Response: EPA and DEQ are not dictating the use of a particular treatment technology or water management system in the TMDL. For the South Fork Coeur d'Alene River and tributaries, the TMDL establishes wasteload allocations in terms of lbs/day of metal discharged.

Anticipating concerns over the feasiblity of the allocations, EPA cited an example of technology available to mining facilities to achieve metals concentrations in the range of those required in the TMDL. EPA also noted the potential for reducing effluent flows by recycling or other water management measures. These examples should not be construed as regulatory requirements to employ a particular technology. The specific measures and technologies employed by a facility are under the responsibility and control of the facility.

In accordance with the NPDES regulations, EPA must establish permit limitations necessary to achieve technology-based requirements and Idaho state water quality standards. NPDES permits establish the limits on a discharge. Like the TMDL, they do not dictate the technology to be employed at the facility. It is the permittee's responsibility to take the necessary steps to comply with its permit (including selection and installation of pollution control technologies). The commenter is correct that violation of permit conditions can result in monetary penalties. EPA treatability evaluations are one of many sources of information available to permit applicants regarding performance of treatment technologies.

Comment #2 Letter(s) 266, 270, O23

Discharge values reported by "the Red Dog facility are average discharge concentrations . . . . To avoid permit non-compliance, water treatment goals would need to be based on the 98th or 99th percentile concentration, NOT the 50th percentile . . . . [Therefore,] the Red Dog treatment levels are [not] "similar" to those levels proposed in the TMDL and . . . it is [in]appropriate to compare "average" water treatment concentrations to proposed TMDL concentrations and subsequent NPDES permit limits. A more appropriate approach would be to compare Red Dog's 99th percentile water treatment performance to TMDL and NPDES permit concentrations . . . ."

Response: A detailed comparison between performance at Red Dog and requirements of the TMDL for the Coeur d'Alene mines is not possible, because EPA and DEQ do not have adequate information about the flow reduction opportunities at operating mines in the Coeur d'Alene basin to calculate the necessary end-of-pipe concentrations for these facilities with certainty. In this context, EPA and DEQ believe it is reasonable to use average performance at the Red Dog facility for the purpose of making a general comparison to the TMDL requirements.

Comment #3 Letter(s) 52, 67, 266, W21

The largest discharge in the South Fork is from the Bunker Hill treatment plant. A study concluded by CH2M Hill on 1/99 for the EPA Region 10 Bunker Hill Mine Water Presumptive Remedy revealed if a zero discharge treatment plant was constructed, it would cost taxpayers over $70,000,000 to build and $7,000,000 per year to operate.

If CH2M Hill is correct in its opinion that evaporation may be the only means of meeting the proposed TMDL limits, then the allocations are infeasible.

If the EPA cannot meet the TMDLs at the Bunker Hill facility, then why should the mines in the Silver Valley be held to a standard that is unattainable?

Response: As noted in the discussion of the latest information from the Bunker Hill project (see TMDL TSD and Appendices), EPA and DEQ believe an upgraded Bunker Hill Central Treatment Plant will achieve the TMDL allocations.

The cited report was a preliminary study containing a full range of alternatives for improving the wastewater treatment performance at the Central Treatment Plant (which treats the Kellogg Tunnel drainage). The report was prepared prior to treatability testing of any of the alternatives. The cited cost figures were associated with the worst-case scenario of building a plant that evaporates the water and discharges only distilled water (zero discharge of metals). EPA does not believe this type of facility is necessary to meet the TMDL wasteload allocations. For this reason, no further evaluation of the evaporation alternative was undertaken. Rather, further evaluation has focused on commonly used metals precipitation technologies and upgrading the existing Central Treatment Plant.

Comment #4 Letter(s) 274

The agencies should require no more than "reasonable reductions" from the existing sources, and not the extreme reductions the TMDL now proposes. On this point, the federal advisory committee wrote, "The Committee recommends that reasonable reductions be required of existing sources in light of the relative contribution of special challenge sources. During the time a TMDL is being developed for a water impaired by these sources, States may need to make permitting decisions for existing point sources of the pollutant whose contributions of the problem pollutant may be minor in relation to the special challenge source. In deciding on control actions for existing point sources during that time, States should apply a principle of requiring reasonable reductions, but should not impose extensive burdens on these sources where the reductions accomplished will not significantly contribute to attainment of the water quality standard." *Report* at 47.

The last part of this recommendation is especially important and relevant for the Coeur d'Alene Basin. The TMDL should not impose excessive burdens where the reductions "will not significantly contribute to attainment of the water quality standard." While Asarco concurs with the principle of this recommendation, Asarco supports even more strongly the position of the Minority Report: Pollutant allocations for current dischargers should not be affected by the perceived need to address "special challenge sources" unless reasonable reductions by the current dischargers would be expected to significantly improve water quality for the pollutant of concern within the next five-year NPDES permit cycle.

Response: EPA and DEQ must develop a TMDL that achieves the water quality standard. Despite the stringency of the criteria and the large number of sources, the available information from the Bunker Hill facility indicates that the TMDL allocations are achievable. Regulatory relief mechanisms can be pursued by those facilities that cannot achieve the allocations (see discussion in introductory section).

It stands to reason that, in general, significant reductions in current metals releases from both discrete and non-discrete sources will significantly improve water quality. EPA and DEQ will prioritize permitting and cleanup actions to address higher loading sources in the early phases of implementation.

Comment #5 Letter(s) 266

A closer look at the above Red Dog/Lucky Friday information concerning cadmium indicates that, for a 30-day month, sulfide reagents costs alone for cadmium removal result in a cost per pound of cadmium removed of approximately $1.25 at the Red Dog mine. Using the same sulfide concentration, and assuming (an impossible) 100% cadmium removal from Lucky Friday effluent results in an approximate cost of $2,196.00 per pound of cadmium removed. As stated above, the only reason Red Dog added the sodium sulfide treatment was for cadmium removal. Another way of looking at the comparison of Red Dog versus Lucky Friday is that Red Dog removes approximately 12,600 pounds of cadmium in a month whereas at the Lucky Friday current discharge rate of cadmium, it takes approximately one month to discharge one pound of cadmium. Thus, Red Dog removes in one month what it would take Lucky Friday over 1,000 years to discharge! To mandate, or even imply, that sulfide precipitation is the appropriate technology to be utilized is economically and technologically inappropriate.

Response: See Comment #15 below.

Comment #6 Letter(s) 266

Even if an operating mine such as Lucky Friday were to reduce discharge by one-half of the recent historic range, the resultant concentration required in the discharge would still be either submicron or a fraction of an instream Gold Book criteria for the three metals. It should be pointed out that while operating mines may have some water management options, a POTW must treat what it receives.

The practical effect of the proposed TMDL wasteload allocations for the mines is ZERO discharge. The concentrations corresponding to the allocated pounds/day of the three metals and existing discharge flow volumes result in concentrations that are both fractions of Gold Book values and sub-micron levels in concentration. This is also true for the POTWs discharging to the South Fork of the Coeur d'Alene River. Nowhere in either the law or legislative history did Congress intend such an approach under CWA Sec. 303(d). We need to consider the objective of the CWA and the goals (to achieve the objective) that must be both "consistent with the provisions of this Act" and "wherever attainable" as directed by Congress.

Response: The TMDL wasteload allocations are clearly not set at zero, nor is a "zero discharge" requirement the practical effect of the allocations. The comment focuses on concentrations associated with the assigned allocations. The TMDL, however, establishes wasteload allocations expressed not as concentrations but rather as loads (lbs/day). Two factors make up an effluent metals load: flow and metals concentration. A facility can reduce either flows or metals concentrations, or both, to reduce the load. If a facility reduces its flows, via recycling or other water management measures, the allowable discharge concentration can be proportionally higher to achieve the same loading level.

Lucky Friday has not submitted information on the degree of flow reduction it can achieve by the use of recycling and flow segregation. To adopt the example in the comment, if Lucky Friday reduced its discharge by one-half, its allowable discharge concentration (to meet it wasteload allocation loading) would double. However, the assertion that a one-half reduction in flowrate at Lucky Friday would still require the facility to keep discharges below the Gold Book criteria assumes that Lucky Friday currently discharges at its long term average flowrate during 7Q10 conditions. This assumption is not supported. It is more likely that Lucky Friday already discharges at a lower flowrate during these critical low flow periods. Recycling and other water management measures would reduce flowrates further, resulting in proportionally higher allowable discharge concentrations.

EPA and DEQ agree that water management options are more limited for municipal treatment plants. This is one reason the agencies believe variances may be appropriate for the municipalities in the Silver Valley. The agencies note, however, that inflow and infiltration into a sewage collection system directly affects efficiency of the system and effluent flowrates, and treatment facilities commonly modernize their collection systems to minimize inflow and infiltration.

Comment #7 Letter(s) 266

The TMDL states that "Cost-effective technologies to remove metals from mining wastewaters are in widespread use in the industry," but the Red Dog mine is the only example of a full-scale operation in the EPA contractor document. The TMDL preparers state that they have "used information about treatment options to evaluate the wasteload allocations in this TMDL." It appears instead that selected information was used to support a predetermined conclusion. If this were not so, why the significant differences in the SAIC and CH2M Hill reports discussed in our previous comments? Why isn't recognition given to the removal efficiency of the tailings ponds at the operating mines (over 99% removal of all metals)?

Response: While numerous facilities employ water management and technology to remove metals from mining wastewaters, permit limitations in the range of the TMDL allocations are less common. EPA discussed the Red Dog facility in some detail in the draft TMDL TSD, because its concentration-based permit limits are in the range of the TMDL requirements.

See above regarding the scope of the referenced CH2M Hill report on alternatives. Both the SAIC and CH2M Hill reports have been supplanted by a significant body of information from the Bunker Hill CTP review. This information generally confirms EPA's statements in the draft TMDL TSD regarding wastewater treatment.

EPA and DEQ affirm the importance of current waste management practices at operating mines, including the backfilling of coarse tailings and settling of tailings wastewater in ponds, in reducing metals loads to adjacent rivers and achieving technology-based permit limits. The TMDL establishes allocations necessary to meet water quality standards.

Comment #8 Letter(s) 272

Conventional water treatment cannot meet the proposed TMDL levels. Extensive analyses show that 99 percent removal efficiencies must be achieved to meet the proposed TMDL for one Coeur project. This is neither possible nor cost effective as an alternative to meet the proposed TMDLs. Montgomery Watson, under retainer from Coeur, estimated from the limited information available, that water treatment for Coeur's three operations in the CdA Basin would require a three-phased approach including chemical precipitation, reverse osmosis, and ion exchange polishing. Cursory costs for implementation range from $10 million to over $20 million, depending on the flow range to be treated. Such costs would result in mine closure and subsequent impacts to the local economy.

Phasing the TMDL may identify significant sources that could and are presently being mitigated and result in significant improvement in stream quality without imposing discharge concentrations a fraction of Gold Book Criteria, which are not attainable with conventional treatment methods.

Response: The concept of a phased TMDL is that a TMDL should be completed based on available data and information even when that information is limited, and the TMDL can be modified when further information is available. EPA and DEQ have noted that the Coeur d'Alene TMDL will be modified if warranted by new data and information. At the same time, NPDES permit limits must be based on wasteload allocations in a TMDL, whether or not it is a phased TMDL. When a TMDL is modified, NPDES permit limits based on the TMDL wasteload allocations can be modified as well.

As noted in comment #3 under Method of Allocation, the TMDL does not impose discharge concentrations at a fraction of the Gold Book criteria.

Coeur has not supplied information supporting its assertion that it will need to construct and operate relatively costly reverse-osmosis or ion-exchange treatment to meet the allocations. Available information indicates that the Bunker Hill facility can achieve the allocations with less-costly precipitation technology. Further, this comment does not discuss the effect of recycling and water management on the treatment goals.

Comment #9 Letter(s) 251, 255

The proposed allocations for municipalities along the Spokane River are not attainable under projected growth scenarios without major expenditures.

Response: The TMDL establishes wasteload allocations at the level of current performance for those facilities that discharge below their calculated wasteload allocation. The calculated allocation is expressed as a concentration for the Spokane River facilities. As noted in the TMDL TSD, it appears that the wasteload allocations for the Spokane River facilities will be based on current performance (estimates of current effluent concentrations). EPA and DEQ also assume that growth will be manifested in higher influent flows but not in higher influent metals concentrations, and the agencies received no information to dispute this assumption during the comment period. Higher effluent flows at a facility would not be a concern with respect to the TMDL provided the performance-based wasteload allocation (concentration) is maintained over time. Based on these considerations, EPA and DEQ do not agree that the wasteload allocations represent growth restrictions for these dischargers.

Comment #10 Letter(s) 272

To achieve the water quality criteria set, based on the maximum values shown in the table at Cataldo, approximately 87 percent of cadmium, 93 percent of lead, and 95 percent of zinc would have to be removed from the system. Standard technology doesn't exist to remove this level of metals consistently from a water system.

Response: EPA and DEQ confirms the calculated reductions needed based on maximum reported concentrations at Cataldo. EPA and DEQ acknowledge that achieving such reductions is a major challenge. The effectiveness of tailings removal actions is uncertain; however, some standard treatment technologies do achieve percent-removals in this range. EPA and DEQ note that target concentration, and not percent removal, is the limiting factor for treatment system design.

Comment #11 Letter(s) 272

Figure 7.2 in the Technical Support Document presents theoretical solubility of metal hydroxides and sulfides. Such theoretical data are of limited usefulness in assessing the practicality of treatment of actual discharges. Theoretical data ignore interactions that occur naturally between substances both chemically and physically. Figure 7.2 also indicates that the industry standard of hydroxide precipitation is not capable of achieving dissolved cadmium, lead, and zinc concentrations. The theoretical solubility for sulfide compounds is unstable, as current analytical methods cannot quantify concentrations of these compounds at such minute levels.

Response: EPA and DEQ agree that the theoretical solubility is a starting point for analysis of feasibility, and actual treatment efficiencies are dependent upon a number of factors (e.g., wastewater characteristics, treatment process, physical/chemical interferences, etc.).

EPA and DEQ agree that hydroxide precipitation alone may not be sufficient to achieve the wasteload allocations. It should be noted, however, that this type of treatment may be sufficient in combination with flow management measures for some sources.

Comment #12 Letter(s) 266

EPA/DEQ fail to address technological feasibility and economics in the TMDL. "[T]he TMDL presumes that under the CWA Sec. 303(d) economics may be ignored. [Section] 303(d) does not negate CWA sections that specifically address effluent limitations. This would not be "consistent with the provisions of this Act" as mandated by Congress. Therefore, it is curious that EPA would conduct an economic analysis (albeit an insufficient economic analysis) on its water quality standards rulemaking for Idaho (in 1997) and yet ignore economics under a 303(d) TMDL. The EPA's 1997 economic analysis & accompanying technical support document (*Economic Analysis for the Final Water Quality Standards for Idaho* -July 21, 1997) at least provided some form of cost effectiveness guidelines for a given technology, even though reality appeared to play a minor role in this exercise. For example, the economic analysis only included one Lucky Friday pond under an incorrect assumption that another pond already was permitted under the national toxic rule (NTR) requirements. The Lucky Friday permit already is water quality-based, but not under the NTR. Further, in the *Economic Analysis*, individual pollutants are given specific factors based upon obscure "toxic weights." The effect of this mathematical manipulation is a distortion of the true "cost-effectiveness" of a given treatment technology. This occurs because the "toxic weights" result in a much larger denominator of the formula (treatment cost - pounds of metal removed), with the actual estimated annualized treatment costs (annual O & M + annualized capital) as the numerator.

To further the Lucky Friday example, the *Economic Analysis* used permit limits rather than actual discharge levels of metals, resulting in a distorted overestimate of "toxic weights," thus a lower "cost effectiveness." Using procedures from the ANALYSIS, the "cost effectiveness" was estimated as $64 for Lucky Friday. Using actual discharge levels of metals and the same procedure from the ECONOMIC ANALYSIS, actual "cost effectiveness" is $939. Using real numbers is important because EPA used a "$200 per toxic pounds-equivalent trigger" above which a facility "qualified" for "alternative regulatory approaches." These "alternative regulatory approaches" include procedures "such as phased total maximum daily loads (TMDLs), site-specific criteria, and water quality variances." As detailed in comments above, the proposed TMDL is not appropriate. Further, it is not necessary to request a "water quality variance" for a use/criteria not applicable to the receiving water (also as detailed in comments above). Therefore, it appears that the site-specific criteria currently is the best known approach available; this is the approach being taken under the 1993 agreement between EPA, DEQ and Hecla."

Response: In the Clean Water Act and implementing regulations, there is no requirement to conduct an economic analysis of wasteload allocations derived in a TMDL. Nevertheless, EPA and DEQ discussed the feasibility of meeting NPDES effluent limits based on the TMDL in the TMDL TSD, and the agencies solicited comment from the public on this topic to assist in developing implementation strategies.

The economic analysis referenced by the commenter was performed for EPA's 1997 rulemaking for water quality standards (including cold water biota use designations) in the South Fork Coeur d'Alene River and tributaries. This analysis is not relevant or applicable to this TMDL. EPA's 1997 rulemaking was challenged in Idaho District Court. See Idaho Mining Assoc. vs. Browner (D.Id., CV-98-0390-S-MHW). The court upheld EPA's rulemaking. Since the TMDL is based on applicable water quality standards for Idaho, the effect of the court's ruling is that the applicable standards have not changed at the target sites in the TMDL.

Comment #13 Letter(s) 272

Based on the concentrations suggested in the TMDL, there is only a limited amount of recycling and water management that can be completed to reduce metal loading. The concentrations are so low that a combination of water management and water treatment will have to be employed. Metal removal requirements for SVR must exceed 90 percent, well beyond the capacities of present conventional techniques. To ensure compliance on a continuous basis, removal efficiencies would need to exceed 95 percent. Water treatability analyses for the Kensington Gold Project in Southeast Alaska suggest 50 to 60 percent removal efficiencies could be expected continuously. This would be insufficient to meet the discharge criteria established by the proposed TMDL. Overall, point source dischargers would need to routinely treat discharges to achieve metals concentrations that are four to eight times lower than the concentrations listed in the TSD.

Response: While more detailed information from facilities about water management opportunities is warranted, EPA and DEQ acknowledge that achieving the TMDL reductions is a significant challenge. However, some standard treatment technologies do achieve percent removal in the range cited in the comments. Both the Red Dog and Bunker Hill facilities perform at a level surpassing 90% removal. However, EPA and DEQ also note that target concentration, and not percent removal, is the limiting factor for treatment system design. This may explain the lower percent removals at the Kensington facility, where the influent metals concentrations to the treatment system are relatively low.

The reference to the need to treat to levels 4-8 times lower than the concentrations appears to assume that facilities will discharge at their long term average flowrate during lower flow conditions (e.g., 7Q10 conditions). This assumption is not supported in the comments. It is more likely that facilities already discharge at a lower flowrate during these critical low flow periods. Recycling and other water management measures would reduce flowrates further, resulting in proportionally higher allowable discharge concentrations.

Comment #14 Letter(s) 266

The TMDL states that "Figure 7-2 shows theoretical lowest residual metal concentrations" and that the sulfide precipitation at Red Dog treats metals "to concentration ranges similar to levels specified in this TMDL." Since Figure 7-2 was undoubtedly based upon the operational definition of "dissolved" metals, it has very little scientific validity.

Response: Figure 7-2 depicts the relationship between pH and dissolved metals. It was developed for the TMDL by SAIC using standard, published solubility product data.

Comment #15 Letter(s) 266, 270, 272, 274

The sulfide and/or sulfide/hydroxide precipitation processes have not been demonstrated as being capable of achieving the cadmium and lead concentrations proposed by the TMDL. Theoretical solubilities of metal salts cannot be achieved in full scale systems because solubilities are affected by other physical and chemical factors, including temperature and the presence of other cations and anions. Moreover, filters are not 100% efficient and fine (colloidal size) particles will pass through filters and cause an exceedance of these extremely low metals concentrations. EPA's statement that these processes can achieve the target limits "with refinement" is speculative and not based on any technical analysis. We have reviewed the EPA's Risk Reduction Engineering Laboratory technology data base and it contains no treatability data that demonstrate the ability of any of the available treatment technologies to consistently achieve the target cadmium and lead concentrations.

EPA recently evaluated metals removal technologies and performance data for its proposed effluent limitations guidelines and standards for the centralized waste treatment industry. This study evaluated sulfide precipitation/filtration and reverse osmosis treatment for metals removal. The performance that was demonstrated in these studies resulted in effluent concentrations for cadmium, lead, and zinc that were orders of magnitude greater than the target effluent concentrations developed from the TMDL. Although these waste streams do not have identical characteristics to the wastewaters that are the target of the TMDL for the CdA basin, these EPA data do indicate that the performance of the most widely used technologies, when applied to actual wastes in field-scale operation, falls far short of that required by the proposed TMDL.

Based on our review of available, demonstrated treatment technologies for metals, we believe that the ability of point sources to achieve the proposed wasteload allocations is problematic. We did not find any field-scale data in the technical literature that document that the cadmium and lead concentrations required by the proposed wasteload allocations could be consistently achieved by any available chemical precipitation-filtration treatment. This is a serious limitation to successful implementation of the TMDL and must be investigated further before these wasteload allocations are used for setting NPDES permit limits.

The regulated community must operate in the real world, not a theoretical world. The Red Dog wastewater is not directly comparable to any mining wastewater in the Coeur d'Alene Basin, and the Red Dog results do not meet the levels associated with the proposed TMDL.

Response: The CWA requires the reduction of current discharges to achieve water quality standards. The CWA does not require that the TMDL evaluate or specify a particular technology to achieve this reduction. Nonetheless, in establishing the allocation scheme, EPA and DEQ can consider feasibility of achieving the necessary reductions. Anticipating concerns over the feasiblity of the allocations, EPA cited the performance of the Red Dog facility as an example to show that there are technologies available to mining facilities to achieve metals concentrations in the range of those required in the TMDL.

The TMDL, however, establishes wasteload allocations expressed not as concentrations but rather as loads (lbs/day) for the mining facilities. Two factors make up an effluent metals load: flow and metals concentration. A facility can reduce either flows or metals concentrations, or both, to reduce the load.

EPA and DEQ attempted to highlight both factors in the feasibility discussion. Regarding effluent flow management, as noted in the Technical Support Document, EPA and DEQ believe that water management measures to reduce effluent flows are an option for operating mines in the basin. Since the cost of treatment operations is proportional to the flowrate, the cost of treatment requirements could be significantly reduced through recycling and other water management actions. Regarding management of effluent metals concentrations, EPA endeavored in the TSD to assist facilities by highlighting technology that is currently in use in the industry.

The specific measures and technologies employed by a facility are under the responsibility and control of the facility. In order to evaluate the feasibility of the allocations at individual facilities, EPA and DEQ requested that facilities submit information during the comment period regarding their ability to meet the wasteload allocations, including information on both treatment and water management options.

The mining facilities did not supply sufficient information on the feasibility of the allocations to justify a change to the allocation scheme. None of the facilities addressed specific water management and treatment options at their facilities to reduce loads to the TMDL levels.

Comment #16 Letter(s) 274

EPA and DEQ should not impose a TMDL without knowing whether the source reductions will be technically or economically feasible. By their own admissions, the agencies do not know whether the wasteload allocations in the proposed TMDL will be achievable either technically or economically. To the question "Can Basin waters be cleaned-up to meet current water quality standards," the agencies answered "We do not know." While Asarco appreciates the candor of the agencies' response, the answer reinforces the absurdity of proceeding with the development and implementation of a TMDL when neither agency knows (1) whether there are technologies that can achieve the load reductions required, nor (2) whether, after reducing the loads of all point sources, the Coeur d'Alene Basin will achieve water quality standards.

Response: To the extent practicable, EPA and DEQ have considered feasibility in the development of the TMDL. The agencies recognize that the successful implementation of the TMDL throughout the basin is uncertain; however, the agencies firmly believe that the TMDL provides a needed framework for cleanup actions and NPDES permitting. To cite an example, the proposed TMDL set forth preliminary goals for the ongoing work to evaluate the long term design and operation of the Central Treatment Plant at the Bunker Hill site. Based on the analyses to date, the facility can meet the TMDL requirements with precipitation and filtration technology. Control of point source loading through implementation of the TMDL is a step in the direction of achieving standards protective of aquatic life.

Because of the extensive tailings deposits in the floodplain, the South Fork and mainstem Coeur d'Alene River are not expected to achieve water quality standards with point source controls alone.

Comment #17 Letter(s) 274

It is disturbing that EPA and DEQ specifically request comment on their assumption that the permitted point sources can achieve the proposed wasteload allocations with improved water management and/or conventional treatment technologies (*e.g.*, metals precipitation technology).

EPA and DEQ rely on this assumption yet at the same time -- including at the public meetings -- they acknowledge that EPA has not yet determined whether the largest point source of metals in the basin (the Central Treatment Plant) can achieve its allocation through these kinds of technologies and how much it would cost to do so. EPA's own consulting firm has concluded that sulfide precipitation is not likely to achieve the kinds of reductions required by the TMDL and that the only technology that can will require evaporation and crystallization. EPA nonetheless expects the regulated community and the public to disprove the assumption that point sources can meet their wasteload allocations when EPA is unable to provide information to show that these allocations can be met.

Response: EPA and DEQ believe that the regulated community, particularly the mining industry, is clearly in the best position to answer the question of whether the NPDES effluent limits based on the TMDL allocations can be achieved at their facilities. EPA and DEQ provided an extended comment period to afford the regulated community adequate time to supply additional information on the feasibility of the allocations. The agencies have evaluated and considered the information received during the comment period. In addition, the agencies have evaluated feasibility of TMDL allocations for the Bunker Hill CTP (See appendix in TMDL TSD).

Comment #18 Letter(s) 266, 270, 272

Other concerns for CdA basin operators related to similar treatment facilities include high lime consumption, sludge management issues, water storage facilities, and high operating costs.

Response: EPA and DEQ acknowledge that chemical consumption, sludge management, water storage, and operating costs are relevant concerns for mining facilities. However, EPA and DEQ have received no facility-specific information indicating that any of these particular concerns render the allocations infeasible.

Comment #19 Letter(s) 266, 270

It is inappropriate to compare Red Dog's achieved effluent concentrations to other facilities without a complete evaluation of each facility's influent characteristics. Chemical thermodynamic properties (such as adsorption) can differ significantly between high concentration influents (*e.g.*, Red Dog) and low concentration influents (*e.g.*, Silver Valley dischargers).

Response: See above regarding the purpose and basis of comparison to the Red Dog facility. EPA and DEQ recognize that wastewater properties can vary and that these differences can affect treatability. However, the mining facilities have not provided any sampling or treatability information specific to their discharge to support this concern. The only Silver Valley facility for which the agencies have treatability test data is the Central Treatment Plant (CTP) at Bunker Hill. These tests indicate that the sulfide precipitation technology and filtration similar to that used at Red Dog is effective at reducing metals in the CTP wastewater.

Comment #20 Letter(s) 255, W18

On the basis of initial treatability studies, the treatment EPA is proposing will not meet the necessary removal levels, such as 99.95% for lead. The processes would in fact include something much more stringent and much more costly to operate.

Response: The only Silver Valley facility for which the agencies have treatability test data is the Central Treatment Plant (CTP) at Bunker Hill. These tests indicate that the sulfide precipitation technology and filtration similar to that used at Red Dog is effective at reducing metals in the CTP wastewater. It is projected that the CTP can achieve the TMDL allocations.

Comment #21 Letter(s) 273

The implementation plan for the Idaho TMDL should set a goal of ensuring that Spokane River TMDL criteria are met at the border during transient events.

Response: EPA and DEQ agree that achieving Washington criteria at the border at all times is one of the goals of the TMDL and its implementation.

3.2 Timing of TMDL and Permitting Actions

Comment #1 Letter(s) 266

Since Congress did not intend for CWA Sec. 303(d) to negate all other provisions of the CWA, including technological and economic considerations, we believe the proposed TMDL is illegal and must be set aside pending resolution of issues raised in these comments.

Response: EPA and DEQ discuss provisions of the CWA that address technological and economic considerations in this document (See Regulatory Options). This TMDL has not "negated" any of these mechanisms. On the contrary, the TMDL has brought about a better understanding of these mechanisms under the CWA. The TMDL can be modified as necessary to reflect changes in the water quality standards (e.g., site-specific criteria or use attainability).

While EPA and DEQ recognize the complexity and controversy of the TMDL, the agencies disagree that it should be set aside because of the issues raised in the comments.

Comment #2 Letter(s) 272, 274

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 TMDL for these waters until the Basin-wide RI/FS and cleanup are complete. The reason for such a deferral is simple: DEQ cannot know how much load reduction from point sources will be necessary until DEQ and EPA understand the amount of load reduction that can be achieved through cleanup of non-point sources. It makes no sense to impose overly stringent load reductions on point sources when the possibility exists that the cleanup of non-point sources will obviate the need for such stringent point source load reductions.

Some attempt should be made to better understand the non-point sources and the feasibility of reducing loads from them, before embarking on restrictive water quality criteria for point sources. TMDLs should include expected loading reductions from point/non-point sources from Bunker Hill Superfund Site and other projects throughout the Basin.

Response: EPA and DEQ agree that a better understanding of non-point sources would benefit the cleanup actions. However, the nature and extent of the non-discrete sources in this basin will limit our ability to predict the effectiveness of cleanup actions with confidence. In this context, EPA and DEQ believe that reductions in discrete sources and non-discrete sources can and should proceed on a parallel path.

A listing of expected loading reductions is not required in a TMDL. Rather, TMDLs must allocate the loading capacity of the river to known sources and/or source categories. As described above, available information indicates that the CTP facility at Bunker Hill can achieve its allocation.

Comment #3 Letter(s) 272

The NPDES permit should also be tied to the TMDL program. At the present time, they appear to be operating on two different schedules and directions. There is no reason to issue new NPDES permits until EPA/IDEQ determine the criteria from the TMDL process.

Response: The timing of the NPDES permits and TMDL are coordinated, and the requirements of the permits will be consistent with the TMDL. NPDES permits for the South Fork dischargers will be issued after the TMDL is finalized, and the permit limits will be based on the wasteload allocations in the TMDL.

TMDLs do not determine the applicable water quality criteria; TMDLs are established to achieve the applicable water quality criteria. This TMDL is based on the applicable water quality standards (and criteria) for Idaho.

Comment #4 Letter(s) 259, 260

Active NPDES permits should be renewed immediately to include limits consistent with the TMDL.

Response: EPA is actively working on the NPDES permit renewals for the basin.

Comment #5 Letter(s) 3, 4, 5, 6, 8, 12, 13, 14, 17, 18, 19, 21, 22, 59, 304

Request a formal public hearing.

Response: EPA and DEQ responded to these requests by holding three public hearings on the proposed TMDL. Hearings were held in Wallace (May 18, 1999), Coeur d'Alene (May 19, 1999), and Osburne (May 25, 1999).

Comment #6 Letter(s) 284

What is the status of the NPDES permits for the 70 discrete point source discharges?

Response: Most of the 70 discrete sources identified in the TMDL are mining sources not currently discharging under an NPDES permit. The following table shows the permitted facilities in the basin and expiration date of each permit. Expired permits are still in effect, because they have been administratively extended pending permit reissuance.

Individual NPDES Permits in the South Fork CdA River Watershed				
Permit ID No.	**Facility Owner/Operator**	**Facility Name**	**Expiration Date of Permit**	**Facility Description**
ID-0000175	Hecla Mining Company	Lucky Friday Mine	12-31-80	operating lead/zinc mine & mill
ID-0000167	Hecla Mining Company	Star and Morning Mines	3-13-95	inactive tailings pond and adit
ID-0000027	Silver Valley Resources Corp. (Coeur d'Alene Mines Corp.)	Galena and Coeur Mines	1-10-94	operating copper/silver mine & mill
ID-0025429	Silver Valley Resources Corp. (Coeur d'Alene Mines Corp.)	Caladay Mine	3-30-95	inactive exploration adit
ID-0000060	Sunshine Mining Company	Sunshine Mine and Mill	9-9-96	operating antimony/ silver/copper mine, mill & refinery
ID-0000159	Sunshine Mining Company	Consolidated Silver Mine	9-28-93	inactive adit
ID-0021296	South Fork CdA River Sewer District	City of Mullan Wastewater Treatment Plant	10-9-90	wastewater treatment plant
ID-0021300	South Fork CdA River Sewer District	City of Page wastewater treatment plant	6-28-99	wastewater treatment plant
ID-0020117	City of Smelterville	City of Smelterville wastewater treatment plant	6-26-90	wastewater treatment plant
NA	EPA	Bunker Hill Central Treatment Plant	NA	mine drainage treated/discharged under CERCLA authority

The three NPDES permits for municipalities along the Spokane River were reissued last year, as indicated in the table below:

Individual NPDES Permits in the Spokane River Watershed			
Permit ID No.	**Facility Owner/Operator**	**Expiration Date of Permit**	**Facility Description**
ID-002585-2	City of Post Falls	Nov. 2, 2004	wastewater treatment plant
ID-002285-3	City of Coeur d'Alene	Nov. 2, 2004	wastewater treatment plant
ID-002659-0	Hayden Area	Nov. 2, 2004	wastewater treatment plant

Comment #7 Letter(s) 255, 266

Given the numerous legal and technical deficiencies in the proposed TMDL, it is difficult to understand the "fast-track" procedure EPA and DEQ appear to be on to complete this TMDL. Judge Dwyer's directions clearly authorize modifications to the timing of Idaho's TMDL development process. In fact, DEQ requested more time for the development of the state TMDL. This additional time was necessary to collect all information requisite for scientifically defensible TMDL. Idaho's request was rejected by EPA Region X (letter dated November 9, 1998). It appears the deciding factor to rush into the subject inadequate TMDL is stated in EPA's letter in that "EPA has decided to move forward expeditiously to develop TMDLs for the Coeur d'Alene basin in order to ensure that it has the information and analyses necessary to implement its responsibilities under the NPDES permit program and the CERCLA program." These are not valid reasons for developing an indefensible TMDL. A responsible and scientifically sound TMDL must precede both NPDES permits and the RI/FS process. It is sad to note that the "substantive concerns" EPA identified with the state draft TMDL in EPA's letter (Non-NTR Issues with IDEQ Draft TMDLs) are repeated and even exaggerated in the joint EPA/DEQ TMDL. EPA and DEQ must take advantage of the flexibility allowed in Judge Dwyer's ruling in order to develop a scientifically sound and legally defensible TMDL.

Response: Given the 120-day comment period and several months expended on responding to comments, EPA and DEQ do not view this as a "fast-tracked" TMDL. There are several reasons for issuing a TMDL at this time. The two primary reasons are captured in the comment. The November 9, 1998, letter referenced in the comment accurately reflects the agencies' need to establish long-term cleanup goals and NPDES wasteload allocations. The Idaho TMDL schedule lodged with the federal court is also a major consideration affecting TMDL scheduling throughout the state.

EPA and DEQ disagree that the TMDL is unsound. The assertion that substantive problems in a previous draft TMDL were repeated and exaggerated is not supported by any specific examples. EPA and DEQ have carefully considered public comments and made improvements to the draft TMDL products based on this input. The result is a legally and scientifically sound TMDL with a supportive administrative record.

Comment #8 Letter(s) 255, 272

Concurrently implementing TMDLs while revising criteria, pending evaluations, and untested regulatory arenas to fully understand and develop meaningful TMDLs to protect water resources is not prudent or effective. Effort should be taken to use every regulatory avenue available, allow on-going remediation to show improvements, and develop a better scientific knowledge base for implementing the TMDL program. The evaluation of realistic water quality criteria (site-specific, etc.) while still fully protecting the water resource should be the highest priority. In this way, EPA/IDEQ are meeting the objective of setting TMDLs and improving water quality as required.

However, this means a more detailed and open process will be required with industry, municipalities, the public and agencies exploring all available alternatives to assist Idaho in meeting the challenges faced.

Response: EPA and DEQ see no barriers to collaborative implementation of the TMDL and the cited regulatory relief avenues (See Regulatory Options). EPA and DEQ disagree with the suggestion that the TMDL process has not been open, particularly after holding 3 public meetings and a 120-day comment period when the agencies were available for consultation. The agencies will continue to welcome constructive participation from the affected parties in the basin as TMDL implementation progresses.

Comment #9 Letter(s) 84

EPA proposes to issue NPDES permits to existing NPDES facilities in the CdA river basin. Does this mean no new permits will be issued and only renewals will be addressed?

Response: EPA is beginning to develop draft NPDES permits for the operating mines and municipalities along the South Fork. The schedule for issuing the South Fork municipal permits will be coordinated with any variance actions. The appropriate approach to address all inactive mine adits will be evaluated in the RI/FS process. Decisions on next steps to implement the TMDL for these adits will be made in the Superfund Record of Decision.

Comment #10 Letter(s) 272

EPA plans to refine gross allocations for waste piles and non-point sources. A phased approach to setting TMDLs would allow this to be completed in a concurrent, cost effective manner.

Response: EPA and DEQ do not expect to complete the refinements to the gross allocations in the short term. Given the agencies' goal of reducing metals loads to the river system, the agencies do not believe it is appropriate to delay the TMDL and NPDES permitting for discrete sources until completion of these refinements.

Comment #11 Letter(s) 259

Issuance of the TMDL should not be delayed to allow for the development of site-specific criteria.

Response: EPA and DEQ agree. The TMDL can be modified, as needed, based on approved site-specific criteria.

Comment #12 Letter(s) 272

Revision [of the TMDL] at a later date seems unnecessary and costly to the agencies, regulated communities, and the general public. An extensive process will be necessary to make such a revision. Additional information could be developed to augment data being collected for the RI/FS as it is focused on certain objectives not consistent with setting TMDLs. Developing a phased TMDL, as allowed by regulations, that establishes an integrated, well planned data collection and evaluation program to assess stream conditions and contributing loading sources.

Response: Future revision of a TMDL is a possibility based on new information and changes to water quality standards. At this time, EPA and DEQ believe it is appropriate and reasonable to issue a TMDL based on current regulations and the best available information. The agencies note that the concept of phased TMDLs is discussed in EPA guidance and not regulation. For further discussion of phased TMDLs, see comment #8 under Feasibility of Allocations.

Comment #13 Letter(s) 272

EPA recognizes that changes can be made to the water quality criteria based on site-specific conditions and is willing to change the TMDL at a later date. However, this seems redundant and less efficient than using site-specific conditions at this time to set reasonable and attainable TMDLs. It is expected that initiating this effort now could span a 24-36 month period to collect acceptable data. Recognizing that EPA is willing to consider site-specific information later, why not develop a phased approach to establishing TMDLs. This phased approach would evaluate site-specific conditions to set TMDL levels. In this way, State, Federal, local and industry efforts can be maximized on one common approach and method. Setting intermediate targets, milestones and goals would help to assess stream conditions/improvements working towards protecting the uses instead of an arbitrary number. This would also allow all parties to participate equally in the review program. It is expected, even under the EPA proposal, to take many years to achieve these goals and objectives. It seems reasonable to do both concurrently while assessing stream system improvements.

Response: The commenter's concept of a phased approach would not comply with the Clean Water Act requirement that TMDLs achieve applicable water quality standards. A TMDL must be based on the applicable water quality standard; therefore, EPA and DEQ cannot establish intermediate targets in the TMDL or subsequent permits. However, EPA and DEQ can establish a reasonable schedule for discharge improvements in a permit compliance schedule. See also previous comment.

Comment #14 Letter(s) 272

Issuance of TMDLs at this point seems counter-productive and premature. More information is needed, as evidenced in the document. Given that so many studies are being completed, it seems prudent to collect as much data as possible to ensure TMDLs are appropriate and attainable. A phased approach could use data collected under all the programs, analyses and studies being completed at this time. An integrated evaluation would significantly improve data needed to help set appropriate TMDLs.

Response: EPA and DEQ do not believe more data is necessary to develop an appropriate TMDL and note that this basin will continue to be studied for years to come. However, EPA and DEQ do agree with the goal of integrating the best available information to improve the TMDL. The agencies believe the integrated process outlined herein best serves this purpose while moving forward on a reasonable timeframe toward protective NPDES permits and reduced discharges.

Comment #15 Letter(s) 272

"Technical data used for developing the TMDL, by EPA's own admission is limited and provides insufficient data to setting TMDLs. EPA has determined to take a very conservative approach to allocating metal loading. Instead, a thorough investigation of flows, hardness, natural metal levels, uses and other critical issues should be adequately evaluated prior to setting TMDLs. For this reason, a phased approach to setting the TMDLs could incorporate supplemental and missing data which provides further scientific information. Data collection could be coordinated with NPDES permit monitoring and compiled into one database. Many stretches of the S. Fork of the Coeur d'Alene River are presently monitored and would provide important data. Many of the assumptions used in the document are dependent upon accurate characterization of the stream system and discharges (point and non-point sources). Flows are critical to develop loading capacities. It also eliminates the need to develop multiple layers of safety factors in the estimations."

Response: While acknowledging and describing the limitations of the available data, EPA and DEQ have not claimed that the data is insufficient for setting TMDLs. In fact, a substantial amount of river and source data is available for the Coeur d'Alene basin. The TMDL TSD states the following about data sources and data limitations:

> "These issues are not unusual in water quality analysis and regulation because water quality and flow data are often collected using a variety of methods and for different purposes. Collectively, the above sources provide for the development of a sound and reasonable TMDL."

Regarding an integrated database for the TMDL and permits, EPA continues to build a large database system that holds metals sampling information for the Coeur d'Alene basin from a variety of sources, including data collected by Idaho DEQ, USGS, NPDES permittees, Superfund program, and mining companies. EPA posted a portion of this database that was used in the development of the TMDL on the Internet during the public comment period.

EPA and DEQ agree with the general supposition that a lack of data necessitates a higher margin of safety in a TMDL.

Comment #16 Letter(s) 274

The Idaho Mining Association ("IMA") has challenged EPA's cold water biota designated use for the South Fork of the Coeur d'Alene River, Canyon Creek, and Shields Gulch. This litigation is pending in the United States District Court in Idaho, and motions for summary judgment have been filed. The TMDL that EPA and DEQ have proposed is based on the challenged designated uses (and accompanying water quality criteria) for those water bodies. If IMA prevails in the litigation, EPA will have to revisit the appropriate designated use for those water bodies, and EPA and DEQ will in turn have to revise the TMDL. In light of the ongoing litigation concerning the appropriate designated use for the three water bodies in the Coeur d'Alene Basin, the State should devote its limited resources to the development of TMDLs for those water bodies which are not covered by the IMA lawsuit.

Response: The U.S. District Court recently issued a ruling in the IMA case upholding the cold water biota use designation for the South Fork Coeur d'Alene River and Canyon Creek. The Shields Gulch designation was remanded to EPA for re-evaluation. Therefore, it is appropriate to issue a TMDL for the South Fork and tributaries.

Comment #17 Letter(s) 274

EPA and DEQ should not develop a TMDL before EPA revises its TMDL regulations. The timing of the TMDL is especially inappropriate because the comment period will close at about the time that EPA intends to publish revisions to the TMDL regulations themselves. See 64 Fed. Reg. 22033 (Apr. 26, 1999)(proposed revisions to the TMDL regulations anticipated in July 1999). At a minimum, EPA and DEQ should defer further work on the TMDL until after EPA's amended regulations are final. At that point, the TMDL should be modified in accordance with the revised regulations and the public should be given an opportunity to review and comment on the revised TMDL.

Response: As anticipated in this comment, EPA issued proposed changes to the TMDL regulations (40 CFR 130) on August 23, 1999 and finalized the regulations on July 13, 2000 (65 FR 43585). On June 30, 2000, the U.S. Congress passed legislative restrictions on the use of appropriated funds for the New TMDL Regulations. The restrictions are contained in "the TMDL Rider," which was included in the FY 2000 Supplemental Appropriations provisions attached to the FY 2001 Military Construction, Family Housing, and Base Realignment and Closure for the Department of Defense (MilCon) Appropriations Bill. The President of the United States signed this bill, including the TMDL Rider, into law on July 13, 2000. Because of the TMDL Rider, the New TMDL Regulations do not take effect until 30 days after the date that Congress allows EPA to implement this regulation. See 65 FR at 43586. Under current law, therefore, the regulations would not take effect before October 30, 2001. Id. However, neither the TMDL Rider nor the delayed effective date of the New TMDL Regulations affects a state's authority to develop implementation plans if they choose to do so. Numerous implementation considerations are already introduced in the TMDL support documents and this responsiveness document in order to provide information to the entities that will implement control actions. The state anticipates that implementation planning will be iterative, with more detailed plans being developed as permitting and cleanup assessments proceed.

Comment #18 Letter(s) 274

The development of site-specific criteria, which is underway by DEQ, is an essential component of the TMDL for cadmium, lead and zinc. These criteria should account for site-specific chemistry and aquatic ecosystem sensitivity and will be a major improvement in the TMDL. The concern is that the development of site-specific criteria may take a long time and that the regulated dischargers will be required to implement controls in the meantime based on an inaccurate and overly conservative TMDL study. EPA and DEQ have pressed ahead to develop a TMDL based upon criteria that both expect will be increased in the future. EPA and DEQ should defer the TMDL until after completion and approval of the site-specific water quality criteria.

In addition, DEQ and EPA should expeditiously complete the site-specific criteria studies and propose and adopt such criteria where they are scientifically supported. Furthermore, all dischargers should be provided with compliance schedules of sufficient duration to allow these site-specific criteria to be adopted and incorporated into the calculation of their permit limits.

Response: As noted in the discussion under Regulatory Options, the site-specific criteria development is only proceeding for an 8 mile stretch of the South Fork above Wallace. To date, the mining companies have elected not to fund work on a larger scale (e.g., site-specific criteria for the entire South Fork) that might affect TMDL allocations. In addition, current information suggests that a site-specific cadmium criterion may not be significantly higher than the Gold Book criterion. As a result, DEQ does not expect to propose a site-specific criterion for cadmium.

Compliance schedules in permits can only address the time needed to meet water quality-based permit limits, not the time needed to develop and promulgate changes to underlying water quality standards. If standards are changed during the term of the permit, the associated permit limits can be modified.

Comment #19 Letter(s) 274

Implementation of the TMDL may result in degradation of water quality. Adopting a TMDL prior to the development and implementation of a plan for addressing non-point source pollution may actually cause degradation of the water quality in parts of the Coeur d'Alene Basin. This could occur if current discharges to the Coeur d'Alene Basin are substantially reduced or completely eliminated. For example, consider a point source currently discharging metals in concentrations higher than its assigned loading but below the concentrations in the receiving waters. If the only means of achieving its assigned load allocation is to stop the discharge altogether through evaporation, plugging an adit, or shutting down operations, the receiving water's metals concentration below the discharge will actually increase. In other words, elimination of a "cleaner" discharge will result in "dirtier" flow once the "cleaner" discharge is removed from the total flow. Accordingly, it makes no sense to ratchet down on point source discharges prior to addressing the overall non-point source metals contributions throughout the Coeur d'Alene Basin.

Response: EPA and DEQ acknowledge the concern that, in the short term, some control actions to reduce flowrates of less-contaminated discharges could in theory result in worse water quality. However, in most cases, the agencies expect both flow and concentration reductions from discrete sources. This comment also reinforces the need to proceed with cleanup actions on large non-discrete sources in parallel with discrete source reductions.

Comment #20 Letter(s) 255, 274

EPA and DEQ should defer establishing a TMDL until completion of the Basin RI/FS and cleanup.

Response: EPA and DEQ have coordinated the TMDL with ongoing data collection and analysis under the Basinwide RI/FS. While the cleanup activities may impact the TMDL in the future, the agencies do not believe it is reasonable or appropriate delay the TMDL until completion of the cleanup. In fact, the TMDL allocations will serve as one of the goals in the RI/FS evaulation of feasibility.

Comment #21 Letter(s) 255, 272

State law establishes the criteria by which water quality regulations can be imposed upon those permitted sources that contribute less than 25 percent of the load to a stream system. The intent was to ensure excess pressure and burden wasn't exerted on point sources when impacts were from non-point sources. For this reason, based on state law, EPA/IDEQ should adequately address non-point source issues and mitigation efforts prior to implementing any plans or water quality criteria revisions which cause significant financial burden on sources which do not contribute significantly to the overall degradation of the system.

Response: EPA and DEQ do not believe the referenced state law should be used as a basis to delay water quality improvements from a particular category of sources. The TMDL and water quality-based permits for this basin are long overdue. At the same time, regulatory relief may be available to some sources (see discussion of Regulatory Options). The agencies plan to move forward with both point and nonpoint controls to reduce metals contamination in basin waters.

3.3 Relative Contribution of Discrete Sources

Comment #1 Letter(s) 266

An example of how the non-point source aspect of the system functions can be shown by reviewing the McCulley, Frick, and Gillman (MFG) high and low flow reports referenced in the TMDL Technical Support Document (TSD). The MFG monitoring data for station SF-125 (South Fork above Wallace) and the monitoring data for the Morning discharge (inactive mine since Nov. 1990 - daylighting of infiltrated groundwater seepage only) during both high and low flow sampling events highlight the non-point source nature of the system. The high flow event at SF-125 showed the following increases over the low flow event at the same station: flow increased by a factor of 15.5; zinc load increased by a factor of 83.9; lead load increased by a factor of 46.6; and cadmium increased by a factor of 7.8. However, monitoring results for the high and low flow sampling events for the Morning mine (an example of the majority of "discrete sources" identified in the draft TMDL) showed that flow actually was higher during the low flow event. Both zinc and lead were below detection limits for both sampling events. Cadmium loading was marginally higher during the high flow event by a factor of 1.14. The point of this example is that the high flow event monitoring results instream clearly responded to non-point source additions whereas the "discrete source" did not respond in a similar fashion.

Another example of the point vs. non-point source contributions can be found based upon actual DEQ instream sampling events. For example, DEQ monitoring for the South Fork above Wallace on April 15, 1994 (271 cfs) results in actual metal loads in the South Fork above Wallace of approximately 237 pounds/day zinc, 76 pounds/day lead, and 1.75 pounds/day cadmium. The same load allocations for this flow tier in the TMDL (all point sources above Wallace combined), as a percent of the actual instream load during the DEQ monitoring event, are only 0.54% for zinc, 0.05% for lead, and 1.07% for cadmium - all the rest of the loading is non-point. It is clear that the total elimination of the "point sources" would not result in any appreciable reduction in system load.

Response: As noted in the responses to comments about effluent flow, the relationship between effluent and river flow varies among discrete sources in the basin. Based on the comment, it appears that the Morning mine discharge does not "mimick" the adjacent river flow hydrograph or loading profile. While it is important for the mine owner to recognize these characteristics of the discharge in planning controls, these characteristics have no bearing on the calculated TMDL allocations, which derive solely from the loading capacity of the river and the average effluent flowrate compared to other sources in the area.

The discussion of the relative loading of discrete and non-discrete loadings above Wallace is technically flawed. The commenter is comparing current instream loads with the TMDL allocations for discrete sources in order to argue that point sources are insignificant. The key missing information to make this case is the current discrete source loading (the loading that occurred on April 15, 1994). As noted in the TMDL TSD, EPA used a dataset that included adit sampling to estimate relative loadings and found that the zinc loading above Wallace is primarily released from discrete sources. If the existing discrete loadings are a significant percentage of the instream load, then it stands to reason that point source controls will reduce the instream load.

3.4 TMDL Implementation Issues Regarding Superfund Cleanup

Comment #1 Letter(s) 87, 245

Actions surrounding the TMDL should include the cleanup of the metals in sediments of riverbed and banks.

Are there any plans to remediate the entire watershed downwind of the lead smelters and zinc plant stacks to prevent silt-laden spring run-off?

Response: Through the Coeur d'Alene Basin-wide Remedial Investigation/Feasibility Study ("Basin-wide RI/FS"), EPA, the State of Idaho, the Coeur d'Alene Tribe, and other governmental partners are working to determine the impact from metals in sediments of riverbeds and banks on water quality and ecological receptors. This work may confirm a need for cleanup of metals in sediments, and identify alternatives for conducting such cleanup activities.

Comment #2 Letter(s) 277, W13

To clean up the Coeur d'Alene River, why not go after the main source of contamination, the Bunker Hill site and the central impoundment area tailings and mine dumps?

Response: The TMDL establishes allocations for all sources of contamination, including sources within the Bunker Hill Complex. TMDL implementation for discrete and non-discrete sources within the Bunker Hill complex will be addressed through the Superfund cleanup.

Comment #3 Letter(s) 284

How does EPA plan to eliminate the non-point metal load?

Response: EPA is evaluating potential cleanup alternatives for non-point sources in the Basinwide RI/FS.

Comment #4 Letter(s) 1, 2, 9, 65, 277

The accumulation of tons of tailings along the riverbanks will continue to pollute the river for years to come.

Response: EPA and DEQ agree that the cleanup effort will take many years.

Comment #5 Letter(s) 258

The cleanup effort should focus on both cleaning up existing pollution and preventing recontamination from other potential sources of pollution.

Response: EPA and DEQ agree that the potential for recontamination should be considered as cleanup proceeds.

Comment #6 Letter(s) 2, 39

Has the EPA estimated the cost to treat the seeps from the Central Impoundment Area (CIA) at the Bunker Hill Superfund site?

Response: Installation of a low permeability cap on the CIA is expected to drastically reduce infiltration of water through the waste impoundment, from an estimated 177,000 to 1,560 cubic feet per acre on an annual average basis. EPA has evaluated the potential effectiveness and costs of collecting the remaining seepage after cap installation. Because of the proximity of the CIA to the river, collection of seepage would be difficult. It is estimated that river water would comprise approximately 98% of the water collected in trenches, while seepage would only constitute 2% of the collected water on average. A screening-level study estimates the costs for a collection trench and pumping system (i.e., not including treatment) of approximately $2 million. Given that the estimated volume of water collected is in excess of 2 cfs, costs for a treatment plant would be significant. EPA plans to further evaluate the CIA seepage issue after the cap has been in place for sufficient time to reduce the infiltration through the impoundment.

Comment #30 Letter(s) 298

Under the Clean Water Act, the EPA can issue 106 orders to companies mandating cleanup work. Does EPA plan to issue any 106 orders in the CdA Basin?

Response: EPA has authority to issue cleanup orders under Section 106 of CERCLA, not the Clean Water Act. Exercise of EPA's authority under CERCLA Section 106 is a matter of EPA's enforcement discretion. Before exercising this authority, EPA routinely seeks to achieve cleanup work through agreements on consent. Such agreements may be entered in the form of Administrative Orders on Consent (AOCs) and judicially approved consent decrees (CDs). Both forms of agreement have been entered to provide for limited cleanup activities in the Coeur d'Alene Basin, and EPA remains engauged in seeking further such agreements.

3.5 Monitoring

Comment #1 Letter(s) 267

Recently developed ultra-clean sampling and testing methods were not used throughout the data collection history, which may prove to be problematic in assessing a source's 'reasonable potential to exceed' a given allocation. A rationale and protocol should be developed to further data collection using only ultra-clean methods.

Response: Because the TMDL does not allow increases in current metals discharges, a "reasonable potential" evaluation to determine whether a facility needs a permit limit for these metals is neither necessary nor appropriate. EPA anticipates that all NPDES permits for sources identified in the TMDL will contain effluent limits for cadmium, lead, and zinc consistent with the TMDL wasteload allocations.

For the vast majority of surface water stations and sources in the upper basin, metals concentrations are relatively high and ultra-clean sampling techniques have not been necessary. However, EPA and DEQ agree that sources discharging at the lower concentrations associated with the wasteload allocations may need to employ ultra-clean techniques to minimize the potential for false-positive results from sample contamination. EPA and DEQ believe they should be used on a case-by-case basis. EPA and DEQ can work with individual sources to evaluate the need for ultra-clean sampling.

Comment #2 Letter(s) 273

Areas that are identified as not requiring clean-up should be monitored to determine whether their status changes.

Response: EPA and DEQ would support follow-up monitoring in cases where new activities in the watershed could alter water quality.

Comment #3 Letter(s) 284

There should be a re-evaluation of the TMDL after several years to address the results of identifying additional point and non-point sources and monitor the effectiveness of the established control actions.

Response: EPA and DEQ acknowledge that re-evaluation and/or modification of the TMDL may be necessary for any number of reasons.

3.6 TMDL Implementation Issues Regarding NPDES Permitting

Comment #1 Letter(s) 266, 274

EPA asserts that 40 CFR 122.45 mandates that permit limits be based upon "total recoverable metal," thus requiring the translator. This is not true, as evidenced by the intent of the regulation as explained in the Federal Register notice accompanying the rulemaking (49 FR 37998). The proposed rule was promulgated "unchanged," identifying the procedure for "using total recoverable metals as the general standard, unless otherwise specified in a guideline or the permit writer determines other measures are appropriate." Although using "dissolved metals limits is being strongly discouraged" by EPA in the rulemaking, "highly unusual cases to implement the Clean Water Act" can allow limits to be expressed as "dissolved" metals, but "metals limits in permits should be stated as total recoverable." EPA's reinterpretation of "should" to "shall" has the effect of a new regulation and thus this action violates federal APA requirements.

Response: Consistent with the letter of the applicable NPDES regulation, permit limits <u>must</u> be expressed as total recoverable metals (40 CFR 122.45).

Comment #2 Letter(s) 266

EPA's use of the translator represents an inappropriate manipulation of data, science, and regulatory intent.

Response: The Idaho water quality standards for metals are expressed as dissolved metal concentrations. Consistent with the letter of the applicable NPDES regulation, permit limits <u>must</u> be expressed as total recoverable metals (40 CFR 122.45). Therefore, it is appropriate to translate a wasteload allocation from dissolved metal to total recoverable metal. EPA has published national guidance on translators, and the method used in this TMDL is consistent with that guidance (see TMDL TSD).

Comment #3 Letter(s) 255

NPDES permits should be based on concentration-based limits rather than load-based limits due to the difficulty for treatment plant operators to respond to rapidly changing flows.

Response: Loading and concentration limits are a common requirement in NPDES permits, and the allocation method for the South Fork and tributaries results in load-based allocations. EPA and DEQ believe the use of flow-based allocations for the South Fork and tributaries (based on river flow) provides ample flexibility for facility operators to address variability in both flow and metal concentration. This flexibility has been a significant factor in the evaluation of alternatives for upgrade of the CTP at Bunker Hill (See discussion of the CTP in an appendix to the TMDL TSD).

Comment #4 Letter(s) 245

The identified point sources should be required to use best available control technologies.

Response: NPDES permittees must achieve both technology-based and water quality-based limits. EPA established a technology "level playing field" for mining sources in the 1982 effluent guidelines (40 CFR 440.103). While EPA cannot prescribe the use of a particular technology, water quality-based NPDES permitting in the Pacific Northwest has resulted in mines installing and operating technology more advanced than that required by the 1982 guidelines. The use of sulfide precipitation at the Red Dog mine is one example of the level of technology needed to achieve water quality standards. The Coeur d'Alene TMDL, consistent with this trend, will likely require more advance technology than that needed to meet the 1982 national effluent guidelines for this industry.

EPA has no technology-based requirements for metals in municipal discharges. Additional analysis of the South Fork municipal discharges will be conducted as part of the permitting process.

Comment #5 Letter(s) 255

EPA expects dischargers to evaluate different treatment scenarios and let EPA determine what levels are reasonable. These costs could be excessive, particularly for municipal dischargers. EPA should assist with the funding of these studies.

Response: EPA and DEQ recognize the costs of technical evaluations and agrees that it is appropriate that EPA assist the State of Idaho with identification of grants or other technical assistance funding for feasibility studies for the municipalities that are located within the Bunker Hill NPL site.

Comment #6 Letter(s) 267

The TMDL states that the Conversion Factor (translator) for determining chronic dissolved criteria is 0.986. This is confusing when viewing Table 6-12. The TMDL should present a table of translators for the various reaches and/or point source dischargers where applicable. A data set showing any and all relationships between total recoverable and dissolved should be included as an appendix.

Response: EPA and DEQ could not locate the statement regarding a conversion factor of 0.986 in the draft TMDL documents. The difference between "conversion factors" and "translators" can be confusing. A conversion factor converts a total recoverable water quality criterion to a dissolved criterion (i.e., they are built into the dissolved water quality criteria equations). A translator converts a dissolved wasteload allocation into a total recoverable wasteload allocation. Translators are based on site-specific data, where available.

For the Coeur d'Alene River and tributaries, dissolved wasteload allocations are translated into total recoverable wasteload allocations based on actual river monitoring. The TMDL TSD presents a table of the translators by reach. In response to the above comment, EPA and DEQ have included the translator dataset in an appendix to the final TMDL TSD.

For the Spokane River, to implement the effluent criterion approach for lead, EPA and DEQ have used the default conversion factor to convert the dissolved water quality criterion equation to a total recoverable equation.

Comment #7 Letter(s) 267

The TMDL should consider a number of recommendations to address concerns by Publicly Owned Treatment Works (POTW) operators along the Spokane River including:

1. A seasonal TMDL for the Spokane River
2. Recognizing the benefit to the river of the dischargers' effluent;
3. Establishing a clear and detailed sampling regime for NPDES permit writers;
4. Recognizing the inability of POTWs to implement source-control over domestic customers;

5. Adding language for use by permit writers to provide additional flexibility such as "There could be reasons why either a discharger or the state agency may want to have a [reasonable-potential-to-exceed (RPTE)] determination and possibly even a permit limit that was more directly tied to the hardness based formula that is the standard. Such an approach would require that the discharger concurrently monitor both the metals concentrations and the hardness and interpret the results in terms of the hardness standard. Therefore a discharger may propose and demonstrate a method for a hardness-based RPTE and limit derivation to the agency for consideration. Another important consideration is when a discharger actually uses some of the river water, in which case, it should be allowed intake credits.

Response: 1) The type of seasonal limits envisioned is not supplied in the comment. The effluent-criterion and performance-based allocations are valid regardless of seasonal conditions in the river and result in concentration-based allocations for the Spokane River facilities.

2) The Spokane River dischargers are a benefit only in the context of (1) high metals levels in the river from upstream sources and (2) providing additional loading capacity for other sources. It should be noted that if the Spokane River contained zero metals, the metals in these municipal discharges would be degrading water quality (albeit not to a level exceeding standards).

3) EPA and DEQ do not believe a detailed monitoring plan for the NPDES permits is necessary in the TMDL, though the agencies agree that the anticipated translation of TMDL wasteload allocations to the permits should be considered in the TMDL development. These concerns have been addressed in numerous elements of the TMDL, such as the NPDES translators and language pertaining to the required averaging period for the wasteload allocations (monthly average).

4) EPA and DEQ acknowledge that the alternatives for reducing metals inputs from domestic users may be limited to education programs.

5) The "reasonable potential" concept in NPDES permitting does not apply under the TMDL allocation approach for the Spokane River, which will result in each facility receiving permit limits. If a facility's metals discharge is below the effluent-based criterion, a performance-based allocation must be established. If it is not, the effluent-based criterion is established as the allocation. EPA and DEQ believe it is appropriate and necessary to include limits in all permits for facilities discharging metals in the Coeur d'Alene basin.

Comment #8 Letter(s) 267

The TMDL incorrectly states that EPA will begin developing and reissuing expired NPDES permits after the TMDL has been adopted. Pre-certification draft permits were issued on April 19, 1999 and included mass loading limits for metals that did not always include the 3 metals of concern. Public comment draft NPDES permits were issued on June 18, 1999 with the comment period closing on July 23, 1999. There should be greater coordination/communication within the Region's Office of Water.

Response: EPA's Office of Water has coordinated NPDES permitting and TMDL development in the basin, but the commenter is correct that the TMDL TSD did not note that the Spokane River permits were under development at the time of the TMDL proposal. The NPDES permits for these facilities, issued in October 1999, will be revised to incorporate the wasteload allocations in this TMDL.

Comment #9 Letter(s) 284

Renewal or initiation of NPDES permits for all point source discharges need to include appropriate monitoring and compliance schedules.

Response: EPA and DEQ agree.

Comment #10 Letter(s) 272

Toxicity of metals is based on bioavailability. Using Total Recoverable analyses to ensure compliance assumes physical changes in the water column will occur adversely to stream water quality. Given the conservative hardness used to set TMDLs, it is not reasonable to expect toxicity to increase because hardness numbers are much higher than set in the TMDLs. This ultra-conservative method continues to drive the discharge concentration to levels a fraction of the Gold Book Criteria. This is neither necessary, reasonable nor attainable.

Response: EPA and DEQ have promulgated dissolved metals criteria based on analysis of metals bioavailability. However, EPA must express metals limits as total recoverable in NPDES permits pursuant to a long-standing regulation (40 CFR 122.45). For this reason, metals translators were calculated to translate dissolved wasteload allocations into total recoverable wasteload allocations.

EPA has révised the hardness values in the TMDL (see comments/responses under Hardness Assumptions).

Comment #11 Letter(s) 270

"Page 46 of the TSD indicates that the TMDL could be modified in the future pending adoption of site-specific water quality criteria for the CdA River. If NPDES discharge permits are issued based on this TMDL and this TMDL is later modified to better reflect the naturally mineralized conditions present in the CdA basin, how will NPDES permits be adjusted accordingly? The anti-backsliding provisions outlined in Section 402 (o) of the Clean Water Act seem to prohibit the issuance of NPDES permit limits with less stringent effluent limitations than those contained in previous permits. EPA has not adequately addressed how effluent limits in NPDES permits issued under this TMDL could change if the TMDL is later modified as specified in the TSD."

Response: Section 402(o) addresses anti-backsliding with respect to technology-based limitation. Section 303(d)(4)(A) of the Clean Water Act addresses the commenter's concern about modification of effluent limits based on revised water quality standards. This section provides that, when there is a TMDL in place, an effluent limitation may be relaxed if the TMDL itself is revised to (1) reflect the changed wasteload allocation and (2) demonstrate that the new allocations will meet water quality standards.

Comment #12 Letter(s) 284

Will each discharger be permitted to exceed the water quality criteria in the mixing zone? If so, this may not be protective of the bull trout.

Response: Mixing zones cannot be authorized when the receiving water exceeds the criteria. It would not be appropriate for dischargers in the Coeur d'Alene basin to receive mixing zone authorizations for cadmium, lead, and zinc.

Comment #13 Letter(s) 274

When there is one discharger of a specific pollutant, the probability that it will simultaneously discharge at its maximum monthly average flow and maximum monthly average effluent concentration is low. For example, if both the maximum flow and maximum effluent concentration are assumed to occur at a 5% frequency (which is EPA's assumption for the effluent limitations guidelines) and they are not correlated with one another, the probability of both maximums occurring simultaneously is 0.25% (expressed as probability = 0.05^2).

However, for many pollutants, flows and concentrations are negatively correlated because of the dilution effect. Thus, the probability of the maximum monthly average effluent flow and the maximum monthly average effluent concentration occurring simultaneously may be even less than 0.25%. Region 10, by using the maximum monthly average flow and concentration to calculate a discharger's pollutant loading, has included a margin of safety that is potentially as great as 20 (5% divided by 0.25%) in the WLA analysis for every individual discharger. This margin of safety is caused by the overestimated frequency of occurrence of a maximum discharge loading of a target pollutant that is inherent in Region 10's assumption.

It is intuitive that if the probability of the maximum effluent flow and maximum effluent concentration occurring simultaneously in the discharge from a single point source is low, the probability of these conditions occurring at the same time for two or more point sources is even lower. In fact, if the discharges are independent, the probabilities of occurrence are again multiplicative. Thus, if a single discharger has a 0.25% probability of discharging at its maximum flow and maximum concentration of a pollutant simultaneously, the probability of this happening at the same time for two dischargers is 6.25×10^{-6} (0.0625%). For 3 dischargers, the probability is 1.5×10^{-8}. The methodology used for development of the WLAs for this TMDL incorporates this overly conservative approach and thus results in permit limits for point sources that may be technically unachievable.

We recommend that instead of equating the calculated WLA values to maximum monthly averages, the TMDL should consider these values as long-term averages. Permit limits should then be calculated by applying statistically-based variability factors, based on the capabilities of metals removal technologies, to the long-term average concentrations developed from the WLAs. Because it is virtually impossible for all point sources to be discharging at their maximum monthly average loadings at the same time, this approach will be protective of water quality.

Response: The establishment of wasteload allocations not to be exceeded on a monthly average basis has nothing to do with the probability that the maximum effluent flow and concentration will occur on the same day at an individual facility. The pertinent question is whether a daily discharge loading from one facility in excess of its monthly average allocation is likely to be equally balanced by another facility discharging a loading below the allocation. This question is then expanded to address the problem of numerous facilities discharging simultaneously in the Coeur d'Alene basin.

The commenter provides no objective basis to conclude that meeting allocations on a long-term average basis is more appropriate than the proposed approach of applying the allocations on a monthly average basis. Therefore, the monthly average approach remains unchanged.

Comment #14 Letter(s) 274

The TMDL proposes to use a translator procedure to calculate NPDES permit limits for total recoverable metals from the wasteload allocations for dissolved metals. According to the TMDL TSD, Region 10 has estimated the ratios of total recoverable metals to dissolved metals using surface water samples collected at or near the target sites, and has used the 5th percentile ratio as the translator. The resulting translators are shown in Table 6-12. The proposed cadmium and zinc translator ratios have a value of 1.0, meaning that the permit limits for total recoverable metals are set equal to the dissolved metals wasteload allocations. The lead translator ratios vary by target site from 1.0 to 3.2.

EPA's translators are not technically supported because the relationship between the translator and stream flows was not examined, and the proposed TMDL is based on stream flow. The TSD does not present the actual data used in the calculations and, more importantly, the total suspended solids concentrations that were associated with each total recoverable: dissolved metals sample pair are not provided. Because the TMDL loading allocations vary as a function of stream flow, it is probable that the dissolved total recoverable metals ratio will vary because suspended solids concentrations will correlate with stream flows. At high stream flow rates, more suspended concentrations can be achieved by the treatment process. For example, the monthly variability factor that EPA estimated for the metals subcategory in the proposed centralized waste treatment facility effluent guidelines and standards was 1.57 times the long-term average achievable metals concentrations (as a group), based on analysis of 20 samples per month. In this example, the target metals concentrations were about two to three orders of magnitude greater than the target effluent concentrations for the TMDL. It is typical for the variability factors to increase as the long-term average concentration decreases because even acceptable analytical precision can account for concentration variations of a factor of 2 to 3 times the true concentrations at these trace metals levels. Consequently, treatment systems would have to achieve long term average concentrations on the order of 0.05 $\mu g/l$ for cadmium, 0.075-0.125 $\mu g/l$ for lead, and 3.5-5 $\mu g/l$ for zinc.

Response: EPA and DEQ disagree that the translators are not technically supported. The method used to calculated the translators is consistent with EPA's national guidance. The available data are provided in an appendix to the final TMDL TSD.

EPA and DEQ recognize that effluent variability is an important factor in designing treatment and control systems to meet permit limits. However, the generalization that specific concentrations must be met by each of the facilities in the basin is not appropriate, because flow management and recycling would directly affect the concentration requirements at a given facility.

Comment #15 Letter(s) 274

EPA and DEQ have specifically requested comment on the proposal to set NPDES permit limits as monthly average loads. While Asarco believes it is premature and ill-advised to develop a TMDL now for use in setting NPDES permit limits, Asarco agrees in principle that any NPDES permit limits should be expressed as monthly average limits. It would be impractical, if not impossible, for a permitted point source to ensure compliance with daily maximum permit limits because those limits depend on the flow rate which can vary significantly from day-to-day, depending on numerous uncontrollable factors, such as rainstorms, snowpack, and temperature. Often, there can be a lag period between change in a stream's flow rate and an increase in metals loading to the stream. Accordingly, any limits that result from a TMDL should be set based on monthly average loadings.

Response: The proposal to apply the wasteload allocations to monthly average discharges is not based on the difficulties faced by an individual facility in meeting a daily maximum limit. The pertinent question is whether a daily discharge loading from one facility in excess of its limit is likely to be equally balanced by another facility discharging a loading below the limit, when both are achieving monthly average limitations. This question is then extrapolated to the numerous facilities discharging simulaneously in the Coeur d'Alene basin.

EPA and DEQ believe that it is reasonable to apply the allocations on a monthly average basis, given the number of facilities and the expected timeframe for recovery in this basin. If a more stringent approach is needed in the future, the TMDL can be revised accordingly.

3.7 TMDL Implementation Issues Regarding Effluent Trading

Comment #1 Letter(s) 266

The TMDL states EPA has "not issued final guidance or regulations on acceptable trading mechanisms" for "effluent trading." There is no authority under the CWA for this activity because Congress did not intend for CWA Sec. 303(d) to result in such an outcome.

Response: EPA and DEQ agree that the Clean Water Act does not explicitly authorize effluent trading mechanisms. At the same time, the Act does not preclude an effluent trading mechanism. In general, EPA and DEQ believe that the potential benefits and pitfalls of a trading mechanism should be considered on a case-by-case basis in developing TMDL allocations or NPDES permit limits.

Comment #2 Letter(s) 262, 274

The published information and the verbal discussions were silent on the exchanging of individual point source loadings. What are the EPA's thoughts on this?

If EPA and DEQ proceed with promulgation of a TMDL for the Coeur d'Alene Basin, they should allow sources to trade allocations in order to achieve compliance. This would be consistent with EPA's recognition in the context of watershed planning that effluent trading is an effective and useful approach to achieving water quality objectives.

The allocation method should provide for trading of load allocations among point sources and non-point sources, which would be limited to the TMDL for each stream segment to assure that water quality criteria will be met. Trading will improve the economic efficiency of the TMDL implementation and is consistent with EPA's national policy.

Response: EPA briefly discussed effluent trading in the TMDL TSD (see appendix to TMDL TSD on allocation alternatives). EPA and DEQ have not received specific proposals for either a basinwide trading mechanism or specific trades between sources. Therefore, the allocation method remains unchanged in this respect. The agencies believe certain aspects of the pollution problem in the Coeur d'Alene basin will represent major obstacles to effluent trading, including:

1) difficulty quantifying current loadings & expected reductions from specific nonpoint source areas
2) multiple responsibilities of parties under CERCLA and CWA
3) magnitude of impairment and prospects for attaining standards in long term
4) need for a standard set of trading rules rather than case-by-case trades (and TMDL modifications)

During implementation of the TMDL, EPA and DEQ will consider trading proposals that address these concerns and demonstrate that the trading mechanism will make significant progress toward achievement of water quality standards.

3.8 TMDL Implementation Issues Regarding Economic Considerations

Comment #1 Letter(s) 56, 255, 302, W6

According to reports in our newspapers, the cost of just bringing the South Fork Sewer District Treatment Plant up to the point where the discharge would meet the Gold Book requirements would cost every patron $6400 plus $700 additional annual fees. Upgrading the Page plant to treat metals would cost $10-$20 million.

Response: EPA believes the cost figures cited in this comment are probably based on an assumption that the most costly treatment alternative considered for the Bunker Hill CTP (evaporation technology) would be necessary for the municipality to meet the TMDL allocations. EPA and DEQ have less information about the options for reducing metals levels in the municipal treatment plant discharges than it does for mining sources such as the CTP. While EPA and DEQ cannot substantiate the cost estimates cited in the comment, the agencies remain particularly concerned about the potential costs of the TMDL to local communities. For this reason, EPA and DEQ have outlined the process for obtaining a variance from the TMDL requirements.

Comment #2 Letter(s) 301, C2, C11, C21, C22, W13

Request that EPA conduct an economic impact analysis regarding the proposed TMDL standards.

Response: An economic impact analysis is not required under the Clean Water Act or implementing regulations for TMDLs. However, EPA and DEQ will review individual requests for variances from the TMDL requirements during the NPDES permitting process. In its variance application, a facility may supply information to the agencies about the economic impact of meeting the effluent limitations based on the wasteload allocations. If achieving the effluent limits would result in substantial and widespread economic and social impact, a variance can provide regulatory relief provided the facility makes "reasonable further progress" toward achievement of the effluent limits (see discussion under Regulatory Options and the variance provisions in the Idaho water quality standards).

Comment #3 Letter(s) 258

The health and safety of residents and visitors to the Coeur d'Alene basin is a more important consideration than economic well being.

Response: EPA and DEQ acknowledge the comment.

Comment #4 Letter(s) 255, 259

EPA and DEQ should work with dischargers to identify and obtain funding to upgrade existing treatment operations. Further, variances and/or shifting the reduction requirements to other sources or source sectors would be acceptable as long as reductions in overall loadings are achieved.

Response: EPA and DEQ will work with municipalities to identify funding sources for facility improvements. As discussed in other responses, the agencies will consider requests from dischargers for regulatory flexibility. EPA and DEQ have not received specific requests for variances or effluent trades to date.

Comment #5 Letter(s) 258

A "sinking fund" should be established to fund both the cleanup of the basin and the ongoing maintenance that will be required for the foreseeable future. Funding could be obtained from the parties responsible for the pollution over time as well as federal, state and local sources.

Response: EPA and DEQ agree that a single cleanup fund would have advantages. Until a basinwide agreement among all public and private entities is in place, the agencies will continue to direct cleanup actions using a variety of funding sources.

Comment #6 Letter(s) 106, O18

A fund should be started to clean up the river.

Response: EPA and DEQ cleanup programs continue to pursue funding for the cleanup of the metals contamination in the CdA Basin.

Comment #7 Letter(s) 254

Failure to improve water quality will actually discourage new businesses from moving into the area.

Response: While the agencies cannot speculate on the affect of not cleaning up the basin on business development, EPA and DEQ believe that the TMDL and RI/FS will serve to reduce current uncertainty about regulatory requirements for new businesses in the basin.

Comment #8 Letter(s) 250

Local, state, and congressional leadership should be seeking funding to offset the costs of implementing the TMDL.

Response: EPA and DEQ acknowledge the comment.

3.9 TMDL Implementation Issues Regarding Removal Technologies

Comment #1 Letter(s) 87

How do you recover the metals from the CdA River and lake, and is the yield then recycled through a smelter?

Response: EPA and DEQ do not anticipate the re-milling of tailings wastes to recover metals. Metals loadings to the water column in the river can be reduced through a variety of actions including physical removal to capped waste repositories (such as the Central Impoundment Area in Kellogg) and wastewater treatment of mining and municipal wastewaters.

Comment #2 Letter(s) 132, 138

EPA should physically remove contaminated sediments from the lakes and rivers.

Response: Removal of contaminated sediments from the floodplain is ongoing. EPA and DEQ continue to analyze the feasibility of sediment removal from the lateral lakes.

Comment #3 Letter(s) 143

New mining methods should be developed to reduce the amount of pollutants and environmental impacts.

Response: EPA and DEQ have noted that water management and wastewater treatment measures appear to be options for achieving reductions in metals loadings. EPA and DEQ also encourage the mining industry to consider different mining and milling methods where feasible. The mines in the CdA basin have not provided any information to the agencies about the potential for adjusting mining and milling methods to reduce loadings.

Comment #4 Letter(s) 145

Plugging the discharges from existing mines and covering contaminated soils with impermeable material would reduce pollutant loadings.

Response: EPA and DEQ agree that these actions would reduce metals loadings.

Comment #5 Letter(s) 205

The TMDL Technical Support Document does not indicate any analysis or consideration given to the effects of ongoing remediation activities or natural attenuation.

Response: EPA and DEQ solicited public comment on attenuation, and the subject is discussed in an appendix to the TMDL TSD. The effects of specific remediation actions on water quality are difficult to quantify with confidence, but it stands to reason that actions such as removing tailings wastes from the floodplain will improve water quality over time.

Comment #6 Letter(s) 132

EPA should reroute the stream channel to get the stream away from the contaminated sediments already in the streambeds.

Response: EPA and DEQ have directed some channel construction work around the Bunker Hill site and will continue to consider stream channel actions to reduce metals loadings.

Comment #7 Letter(s) 97, 130, 156, 162

Build temporary dams or dikes between the tailings and the river to keep the contaminated sediment out of the river.

Response: In some cases, tailings are "cribbed" in waste piles above the rivers; in others, the tailings are incorporated into the river sediments themselves. Replacing failing cribs with walls or retaining structures is an option for reducing pollutant loads, as is removal of waste pile material to a more permanent and capped waste repository.

Comment #8 Letter(s) 118, 121, 123, 131, 136, 141, 149, 158, 179, 200

Develop a filter that could remove pollutants from the river.

Response: Filtration is a relatively common method of wastewater treatment at mining facilities, because filters can remove metals absorbed to small particles in the wastewater. EPA and DEQ are not aware of any application of filtration technology to an entire river or creek. Even if this was economically feasible, filtration would not remove metals that are predominantly in the dissolved phase (notably zinc and cadmium in CdA basin waters).

Comment #9 Letter(s) 262, W14

The proposed regulations are not realistic and certainly not affordable. We are already suffering from 18 years of economic depression. The proposed regulations will wipe out our people's savings by reducing the value of their homes.

Response: EPA and DEQ recognize the concerns about the potential economic impact on municipalities and their residents. See discussion under Regulatory Options. The agencies note that the TMDL is not a regulation or a rulemaking.

Comment #10 Letter(s) 78, 79, 80, 81, 82, 83, 84, 85, 86, 88, 89, 90, 91, 92, 95, 96, 98, 99, 100, 101, 103, 104, 105, 108, 116, 117, 118, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201

Planting of hybrid poplar trees along the river would be a good method for bioremediation of metals in the river water and soils. In addition, these trees will help keep soils in place during floods.

Response: As part of the Basin-wide RI/FS, EPA and others are evaluating various treatment options. Bioengineered solutions are one category of options being considered. Although these trees may take up and fix some trace metals, it is not expected that sufficient root mass would be developed to significantly lower metals concentrations in-stream. Additionally, capping or soil removal may need to accompany the planting of any vegetation so that the plants do not attract wildlife to contaminated soils and so that the plants do not become an additional contaminant vector.

Comment #11 Letter(s) 118, 155, 170

Find a chemical to counteract the pollutants and reduce them to an acceptable level.

Response: Chemical addition (e.g., using lime and sulfide to precipitate metals) is a proven method to remove metals from mining wastewaters.

4.0 Other Issues

Comment #1 Letter(s) 266

The TMDL states that "Flow-based allocations can be incorporated into daily maximum and monthly average effluent limitations." We are under the impression that the wasteload allocations are based upon the chronic instream value. Will there be an additional upward adjustment to reflect an acute value?

Response: NPDES permit limits must implement both acute and chronic criteria in the Idaho water quality standards. The TMDL allocations, when incorporated into an NPDES permit, will implement the chronic criteria. EPA will evaluate the need for additional limits to implement the acute criteria on a case-by-case basis in the NPDES permitting process for individual facilities.

Comment #2 Letter(s) 241

The Little North Fork of the Coeur d'Alene River was not specifically mentioned and included as part of the CdA basin. The Little North Fork should be specifically identified under the Designated Uses section for the North Fork of the Coeur d'Alene River and identified as being "protected for one or more of the following designated uses." Further, the document should clarify whether the Little North Fork is included in the designation as a "Special Resource Waters."

Response: EPA and DEQ do not believe the suggested level-of-detail regarding the Little North Fork is warranted, because this TMDL does not address water quality issues in tributaries of the North Fork Coeur d'Alene River. The current metals loadings from the North Fork are factored into the loading capacity and allocations for the mainstem Coeur d'Alene River.

Comment #3 Letter(s) 266

The TMDL states that "Tables F-1 through F-5 indicate approximate concentrations that would have to be achieved to meet the assigned loadings . . . ." These tables do not have either concentrations or information allowing the calculation of concentrations in a discharge.

Response: Tables F-1 through F-5 in the draft TMDL TSD contained columns with loadings, concentrations, and discharge flowrates. Revised tables are included in the final TMDL TSD that include loads and flowrates. Concentrations can be calculated by dividing the load by the associated flowrate.

Comment #4 Letter(s) 266

The proposed TMDL states that "EPA and the State of Idaho continue to fund and implement clean-up activities in the 21- square mile study area." It also must be mentioned here the millions of dollars being spent by industry. We also would suggest that the above statement be modified to reflect that "Federal and state tax dollars continue to fund . . ."

Response: EPA and DEQ agree that cleanup funding by industry should be noted in addition to agency funding from tax revenue.

Comment #5 Letter(s) 266

On Table 6-6 the "total loading capacity" for dissolved cadmium on the "South Fork Above Wallace," at a 14 cfs flow, is given as 0.0277 pounds/day. It appears that the value should be 0.02869 pounds/day. Is this simply an error or is there an additional "margin of safety" being imposed? All of the calculations should be verified.

Response: The values cited in this comment are no longer relevant, because the TMDL has been revised. All of the steps in the calculation of allocations are clearly set forth in the TMDL TSD. The explicit portion of the margin of safety is 10% of the loading capacity; there are no additional subtractions. EPA has endeavored to run checks on the calculations in the final TMDL.

Comment #6 Letter(s) 266

The TMDL [erroneously] states that "Outfall 002 into the South Fork (from a waste rock pile)" comes from the Star/Morning mine. This is a NPDES permit point source discharge that (presumably) is understood by the EPA. The source of the water is groundwater seepage from the adit and surface water runoff.

Response: The Star/Morning 002 discrete discharge emanates from the bottom of a waste rock pile prior to discharge into the South Fork. As indicated in the comment, this discharge consists of a combination of adit drainage and surface water runoff.

Comment #7 Letter(s) 266

The reference list of documents in the TSD was only available in EPA Region X offices in Seattle. But all references were not available for review, even in the Seattle location. We do appreciate the assistance of EPA Region X personnel in our review of those documents that were available, but we believe that the basis of the TMDL must be available locally for review.

Response: This comment appears to be in reference to an informal request for information during the comment period. EPA responded appropriately to this request by voluntarily making the requested references available for review by the commenter. For the final TMDL, EPA and DEQ plan to make a copy of the administrative record available for review at DEQ's Coeur d'Alene field office.

Comment #8 Letter(s) 266

It is not clear whether all sample events in Table 5-1 were included in the "n" value of Table 5-2. If they were not, there needs to be an explanation; or if they were, it should be so stated. It is also not clear whether all the flow tiers (7Q10, 10/50/90th %) are represented in the data set. If not, it is unclear how the "seasonal variations" can be determined. The CWA, at Sec. 303(d)(1)(C), is quite clear that seasonal variations "shall" be accounted for. Thus, it is confusing how a single sample event can meet the statutory mandate. The TMDL should be clarified.

Response: Table 5-2 contains data from sources cited in the detailed footnotes to the table. This information was the best available information during TMDL development. At some sites (including the target sites along the South Fork Coeur d'Alene River), a significant amount of data has been collected over a wide variety of flow conditions, while at others there is a relatively small amount of surface water quality data. The commenter has not noted any specific problems with this reported data or the footnotes to the table.

Seasonal variation is addressed through the application of a variable loading capacity approach using flow tiers. The data portrayed in Table 5-2 were not used in the development of TMDL elements addressing seasonal variation (note that the TMDL itself does not contain or reference this data). Rather, the Table 5-2 data were provided as information about the measured metals levels in surface waters in this area.

Comment #9 Letter(s) 266

The proposed TMDL mentions that both Granite Creek and the North Fork of the Coeur d'Alene River "are designated as Special Resource Waters in Idaho." The statement does not appear to be relevant to the TMDL. There are several reasons why a water may have such a designation, as clearly outlined in Idaho regulations at IDAPA 01.02.056. If the specific reason why a water has such a designation in Idaho would be "outstanding high quality," then perhaps the designation was in error in the first place if current conditions warrant a TMDL. It is a fact that water quality has steadily improved in the basin since the 1960's and that there is a finite amount of historic material in the system. Common sense dictates a continuation of water quality improvements given the finite amount of leachable materials.

Response: The TMDL statement about the designation of these particular waters was provided as background information.

Comment #10 Letter(s) 269, 270

Paragraph 2, page 44 of the TSD states "hydroxide precipitation is currently employed at the Bunker Hill Central Treatment Plant, which is the only facility in the basin that employs metals removal technology (other than settling ponds)." This statement is not true and demands correction. Every operating mine in the valley currently utilizes some form of metal removal technology other than settling.

Response: EPA and DEQ acknowledge that some facilities add chemicals to waste streams and optimize the metals-removal performance of their settling ponds. The Bunker Hill facility is the only mining facility currently using a mechanical wastewater treatment plant designed for removal of metals.

Comment #11 Letter(s) 273

Request that digital maps and data sets be made available on the Internet to the public, universities, schools, and corporations.

Response: EPA made data and maps supporting the TMDL available in both hard copy and on the Internet during the comment period. EPA will continue to share data collected as part of the RI/FS with the public through a variety of media, including local information repositories (e.g., libraries).

Comment #12 Letter(s) 274

There are a few minor errors in the description of water quality criteria from the National Toxics Rule. The proposed TMDL gives the same general equation for all three metals as:

Criteria = 0.986(exp[a(ln(hardness))-b])

Table 4-1 in the TMDL gives the values of "a" and "b" in the above equation, which are different for each metal. The value of "b" for zinc in Table 4-1 should have a minus sign in front of it. The "0.986" value in the above equation, which is a dissolved correction factor (CF), is correct for zinc, but not for lead or cadmium. The CF for lead and cadmium is hardness based and is given in the National Toxics Rule as:

Cadmium: CF = 1.101672 - [0.041838 ln(hardness)]
Lead: CF = 1.46203 - [0.145712 ln(hardness)]

If the above equations are used with the exponential part of the criteria equation above, the calculated criteria values for lead and cadmium are slightly different than those given in the TMDL. Our calculations result in criteria for cadmium of 0.37 micrograms per liter (μg/l) and 0.31 μg/l for a hardness of 25 milligrams per liter (mg/l) and 20 mg/l, respectively (Table 4.1 values are 0.38 μg/l and 0.32 μg/l), and values for lead of 0.54 μg/l and 0.42 μg/l (Table 4.1 values are 0.54 μg/l and 0.41 μg/l).

Response: EPA and DEQ agree that the TMDL TSD did not list the equations correctly. The revised TMDL TSD has been corrected. While the notation in the TMDL TSD was problematic, the calculated criteria values listed in the TMDL TSD and used in allocation calculations were correct, as indicated by the nearly identical values calculated by commenter.

Comment #13 Letter(s) 22, 60, 72, 204, 215, 277

Disagree with EPA's involvement in implementing the proposed TMDLs and suggest that no action be taken.

Response: The Technical Support Document outlines the basis for issuance of this TMDL by both EPA and the State of Idaho. EPA is also obligated under federal law to be involved in the implementation of the TMDL (e.g., EPA is the NPDES permitting authority in the State of Idaho).

Comment #14 Letter(s) 203

Section 5.2 of the April 1999 Technical Support Document identifies several important data limitations that increase the uncertainty of decisions related to establishing TMDL values. Are the available data appropriate to support establishing TMDL values? Also, what is the EPA's identified level of acceptable uncertainty that is appropriate for proposed TMDL decisions?

Response: As stated in the Technical Support Document, EPA and DEQ believe the available data provide for development of a sound and reasonable TMDL. EPA does not have an identified level of acceptable uncertainty for TMDL decisions. The Clean Water Act recognizes the inherent uncertainties in TMDL development in the requirement for a margin of safety.

Comment #15 Letter(s) 205

Under the Federal Water Pollution Control Act, EPA was required to conduct a 'careful investigation' and to cooperate with state water pollution control agencies, interstate agencies, and 'the municipalities and industries involved' (Water Pollution Control Act Section 102(a)). What consultation occurred before the public meetings?"

Response: This TMDL is issued under the authorities of Section 303(d) of the Clean Water Act. EPA and DEQ met with numerous affected parties prior to the release of the draft TMDL. It should also be noted that there is no obligation to do so under Section 303(d).

Comment #16 Letter(s) 203,208, 295

Based on information available to the public, it is not clear that the planning and assessment steps supporting the proposed TMDL are documented.

Response: The final administrative record for the TMDL documents all of the information used to support this action.

Comment #17 Letter(s) 284

The Coeur d'Alene Tribe feels that the water quality within the Coeur d'Alene basin has been greatly mismanaged by federal and state water quality managers by not considering the basin's water as a whole, but rather as parts which fit into different jurisdictions.

Response: EPA and DEQ agree that jurisdicational lines can impede progress in the waterbody as a whole. This TMDL has been developed with the intent of analyzing and managing the water quality problems holistically, across jurisdictional lines.

Comment #18 Letter(s) 115

Mining companies have been cleaning up the area and revegetating the disturbed areas, and lead levels in blood are dropping. These things should be acknowledged.

Response: EPA and DEQ acknowledge that the mining companies have funded a number of cleanup projects in the basin to date. Again, this TMDL is focused on aquatic life rather than human health, but EPA and DEQ do acknowledge that blood lead levels in humans have dropped over time as cleanup and public education projects have proceeded.

Comment #19 Letter(s) 207

To be consistent with other listings of water bodies with contaminated sediments in the state and nation, the Coeur d'Alene Basin/Spokane River sediment issue will need to be addressed under Section 303 of the Clean Water Act. Washington's proposed metals TMDL purposely did not address the particulate fraction since it was assumed that the Idaho metals TMDL would provide specific goals for controlling the sources of stream bed sediment loads in the Coeur d'Alene Basin as was originally proposed before the EPA took over the TMDL development.

Response: As stated in the TMDL and supporting documents, this TMDL addresses dissolved metals contamination of the water column. Therefore, contaminated sediments in the floodplain are treated as a source of metals to the water column in this TMDL. A TMDL focused on floodplain sediments themselves is a distinctly different endeavor. Contrary to the suggestion in this comment, neither EPA nor DEQ have begun such a TMDL. Rather, DEQ is working on a "clean sediment" TMDL, focused on physical impairments to habitat from excess sediment delivery (and not on chemical quality of sediments).

There are a number of unresolved issues pertaining to any future TMDLs for contaminated sediments in Idaho. The state of Idaho does not have sediment quality standards for metals and other contaminants. Therefore, these waters are not currently 303(d)-listed for sediment contamination. Even if the waters are listed as impaired in the future, characterization and quantification of the allowable particulate load to protect downstream sediments will be a major technical challenge, requiring significant time and resources to complete. EPA and DEQ believe this TMDL is appropriately focused on the water column first, and this focus does not preclude further work in the future (including ongoing Superfund evaluations) on other aspects of the pollution problems in this river system.

Comment #20 Letter(s) 273

The TMDL only addresses dissolved cadmium, lead and zinc. No standards are proposed for the loading of suspended solids. Only addressing the dissolved fraction (as opposed to the total metals level) will not adequately reflect the true water quality parameters needed to support a healthy ecosystem. TMDL criteria are needed for total suspended solids.

Response: EPA and DEQ have determined that the dissolved fraction of these metals in the water column is the greatest concern from a toxicity standpoint, and the focus on dissolved metals is consistent with the requirements of the Idaho water quality standards. EPA and DEQ agree that this TMDL does not address either "clean" or contaminated suspended solids. However, DEQ has proposed a TMDL for sediment to address habitat concerns in the Coeur d'Alene Basin. This TMDL will likely be revised and expanded in the coming year. In addition, contaminated sediments may be addressed in this TMDL.

Comment #21 Letter(s) 216, 218

What is the EPA doing to protect the Silver Valley Aquifer?

Response: EPA is analyzing groundwater contamination and remediation alternatives as part of the RI/FS for the basin.

Comment #22 Letter(s) 155

Flood prevention within the basin needs to be addressed.

Response: EPA and DEQ recognize that water and runoff management are important elements in the cleanup project.

Comment #23 Letter(s) 167

Is it possible to give schools a chance to participate in adopting a part of the stream and plant hybrid poplar trees?

Response: If planting of trees along a segment of stream channel is selected as a remedy in the RI/FS process, EPA and DEQ would welcome school participation in planting and maintenance. These decisions will be made after completion of the RI/FS.

Comment #24 Letter(s) 267,255, 203

The derivation of proposed TMDLs for the Coeur d'Alene Basin surface waters was apparently not performed using guidance issued by EPA's Quality Assurance Division. That guidance was prepared in response to EPA Order 5360.1 entitled *Policy and Program Requirements to Implement the Quality Assurance Program*. One objective of that guidance is to support defensible decision-making.

The EPA should use all seven steps of the DQO process to identify all decisions that support the proposed TMDL and make this documentation available to the public.

Response: There is no legal requirement to use DQO process steps in a TMDL, nor is it clear how the DQO process would improve this TMDL. EPA and DEQ have identified all data sources and technical decisions supporting the TMDL in the Technical Support Document.

Comment #25 Letter(s) 118

Educate local businesses to encourage them to be more proactive in addressing pollution issues.

Response: EPA and DEQ will continue to meet with municipalities and industry to discuss the best ways to reduce metals loadings.

Comment #26 Letter(s) 154

The TMDL would just be a policy to ease people's minds, but would accomplish nothing.

Response: EPA and DEQ disagree. This TMDL is one of the first attempts to holistically analyze metals impairment in the CdA Basin (the RI/FS is another), and it is the first action to assign responsibility for source cleanup in the context of a basinwide framework. The TMDL allocations will be incorporated into NPDES permits and will therefore directly affect the amount of pollution entering the stream from discrete sources. It also serves an important purpose of clarifying applicable water quality standards across jurisdictions of the State of Idaho, Coeur d'Alene Tribe, and State of Washington, and it translates these standards into loading goals for the Superfund cleanup.

Comment #28 Letter(s) 64, 66, 147, O4, W1

With respect to lead, the EPA should report its assay numbers regarding oxide lead separately from an assay for total lead and an assay for sulfide lead. Oxide lead, as PbO, is the part that is harmful to animals and humans, not the total lead as reported by the EPA.

Response: The TMDL goal is to identify controls necessary to meet Idaho water quality standards for metals. Idaho standards for protection of aquatic life from metals, including lead, are expressed as dissolved metal. The total recoverable measure is also used in the TMDL, because NPDES permit limits for metals must be expressed as total recoverable by regulation. Neither the water quality standards nor NPDES regulations include oxide lead as a regulatory measure for aquatic life protection.

Comment #29 Letter(s) 252, O2

Don't penalize the existing mining operations for problems related to mining in the past (supporting 2 major wars).

Response: The TMDL must be designed to achieve water quality standards. With respect to operating mines, the discrete wasteload allocations for their discharges of metals, combined with reductions from other sources, are necessary to achieve the standards. EPA and DEQ believe the mines can achieve these allocations at costs that are consistent with pollution abatement practices in use at mining facilities in other regions of the country.

Comment #30 Letter(s) 24, 25, 47, 54, 55, 215, 263, O17, O24, O26

If the EPA considers the Coeur d'Alene River water so dangerous, and in need of such restrictive regulation, why are long-time residents not suffering any significant adverse health effects from living in the valley?

Response: This TMDL action is focused on aquatic life protection, not human health concerns. EPA and DEQ have not portrayed metals in basin waters as "dangerous" to residents, but rather as harmful to fish and other aquatic life.

Appendix A: Comments Log

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
1	John/Irma Pickard	4/26/99			
2	Mary Wieman	5/5/99	20	Robin Stanley Superintendent Mullan School District #392	5/17/99
3	Shirley Hindley	5/11/99	21	South Fork Coeur d'Alene River Sewer District	5/17/99
4	Shoshone County Commissioners	5/12/99	22	Michael Stevenson Silver Valley People's Action Coalition	5/17/99
5	Doug Stiles Lucky Friday Mine	5/13/99	23	Robert Stovern Stovern Supply Co	5/17/99
6	Michele Nanni The Lands Council	5/13/99	24	Dee Sverdsten	5/17/99
7	Sharon Waldo Kellogg Chamber of Commerce	5/13/99	25	Jeanne Batson	5/18/99
8	Rose Zieja	5/13/99	26	Greg Godwin, Superintendent Joint School District #391	5/18/99
9	Vanner Hegbloom Local 5114 USWA	5/13/99	27	South Fork Coeur d'Alene River Sewer District	5/19/99
10	Kenneth/Joann Branstetter	5/13/99	28	Sherry Krulitz Shoshone County Commissioner	5/19/99
11	Roger Mangum, Mayor City of Kellogg	5/13/99	29	Walter Hadley Kellogg Planning & Zoning Commission	5/19/99
12	Robert (Rick) Richins Coeur d'Alene Mines Corp	5/14/99	30	Larry Watson Idaho House of Representatives	5/20/99
13	Bill Dire, Jr. Wallace City Council	5/14/99	31	Roy/Nancie Burkhart	5/20/99
14	Larry Watson Idaho House of Representatives	5/14/99	32	Roy/Nancie Burkhart	5/20/99
15	Tamra Schlittenhart	5/14/99	33	Clyde Peppin	5/20/99
16	Joe Peak Enaville Resort	5/14/99	34	John Amonson	5/20/99
17	Tom Fudge Hecla Mining Co. Lucky Friday Mine	5/14/99	35	Shirley Hindley Coeur d'Alene Assn of Realtors	5/20/99
18	Buell Hollister Kootenai Environmental Alliance	5/17/99	36	Doug Stiles Hecla Mining Co. Lucky Friday Mine	5/20/99
19	Nancy Vandeventer Wallace Schools Superintendent	5/17/99 Melinda			

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
37	Randall Anderson Hecla Mining Co.	5/20/99	W13	Roger Mangum Mayor of Kellogg	5/18/99
38	Roger Mangum Mayor of Kellogg	5/20/99	W14	Duane E. Little Shoshone County Assessor	5/18/99
39	Duane E. Little Shoshone County Assessor	5/20/99	W15	Mike Carlson Silver Valley Resources	5/18/99
40	Jack King Shoshone County Commissioner	5/20/99	W16	Bill Dire Wallace City Council	5/18/99
			W17	Bret Bowers Community Leaders for EPA Accountability Now! (CLEAN)	5/18/99
W1	W.M. (Bill) Calhoun W. M. Calhoun, Inc.	5/18/99	W18	Rick Richins Coeur d'Alene Mines Corporation	5/18/99
W2	Tom Fudge Hecla Mining Co. Lucky Friday Mine	5/18/99	W19	Joe Peak Enaville Resort	5/18/99
W3	Ross Stout South Fork Coeur d'Alene River Sewer District	5/18/99	W20	Jack King Shoshone County Commissioner	5/18/99
W4	Harry Cougher Sunshine Mining Co.	5/18/99	W21	Sherry Krulitz Shoshone County Commissioner	5/18/99
W5	Lee Haynes City of Smelterville	5/18/99	W22	Jim Vergobbi Shoshone County Commissioner	5/18/99
W6	Bill Keller Mayor of Smelterville	5/18/99	W23	Jack Riggs Idaho State Senator	5/18/99
W7	Shirley Hindley Coeur d'Alene Assn. of Realtors	5/18/99			
W8	Doug Stiles Hecla Mining Co. Lucky Friday Mine	5/18/99	C1	H. Sid Frederickson City of Coeur d'Alene Wastewater Utility Division	5/19/99
W9	Arthur Iverson	5/18/99	C2	Marti Callabreta Coeur d'Alene River Basin Commission	5/19/99
W10	Pat Kinsey	5/18/99	C3	Steve Judy Mayor of City of Coeur d'Alene	5/19/99
W11	Randy Anderson Hecla Mining Co.	5/18/99	C4	Anne Walsh Coeur d'Alene Mines Corp.	5/19/99
W12	Eric Klepfer Coeur d'Alene Mines Corporation	5/18/99	C5	Joe Guardipee	5/19/99

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
C6	Greg Godwin Superintendent Joint School District #391	5/19/99	O1	John Hull Wallace School District	5/25/99
C7	Ed Kerwin Coeur d'Alene Mines Corp.	5/19/99	O2	Robin Stanley Superintendent Mullan School District #392	5/25/99
C8	Merv Cricky Save Our River Environment	5/19/99	O3	Connie Fudge	5/25/99
C9	John Amonson	5/19/99	O4	W. M. (Bill) Calhoun W. M. Calhoun, Inc.	5/25/99
C10	Michele Nanni The Lands Council	5/19/99	O5	Tom Fudge Hecla Lucky Friday Mine	5/25/99
C11	Ron Krusemark	5/19/99	O6	Randy Anderson Hecla Mining Co.	5/25/99
C12	Sue Hollister	5/19/99	O7	Mary Wieman Silver Valley People's Action Coalition	5/25/99
C13	Dean Jamison Coeur d'Alene Area Chamber of Commerce	5/19/99	O8	Barbara Miller Silver Valley People's Action Coalition	5/25/99
C14	Larry Watson Idaho House of Representatives	5/19/99	O9	Greg Godwin Superintendent Joint School District #391	5/25/99
C15	Mike Lee Silver Valley Resources	5/19/99	O10	Fred W. Brackebusch Mine Systems Design, Inc.	5/25/99
C16	Jim Duff	5/19/99	O11	Doug Stiles Lucky Friday Mine	5/25/99
C17	Bill Madigan Post Falls WWTP	5/19/99	O12	John Lang	5/25/99
C18	Jerry Boyd	5/19/99	O13	Michele Nanni The Lands Council	5/25/99
C19	Robert Hopper Bunker Hill Mining Co.	5/19/99	O14	Bill Hollister	5/25/99
C20	Jack Riggs Idaho State Senator	5/19/99	O15	Joe Peak Enaville Resort	5/25/99
C21	Shirley Hindley Coeur d'Alene Assn. of Realtors	5/19/99	O16	Larry Watson Idaho House of Representatives	5/25/99
C22	Larry Drew Hecla Mining Co.	5/19/99	O17	Jean Vasberg	5/25/99
C23	Ross Stout	5/19/99	O18	Frank Seats	5/25/99
C24	Tom Fudge Hecla Lucky Friday Mine	5/19/99	O19	Dale Leaf	5/25/99
C25	Bret Bowers Community Leaders for EPA Accountability Now! (CLEAN)	5/19/99	O20	Cathy Zinetti	5/25/99

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
O21	Bill Keller Mayor of Smelterville	5/25/99	55	Larry Watson Idaho House of Representatives	Duplicate of #30 5/20/99
O22	Mike Lee Silver Valley Resources	5/25/99	56	D.F. Zabel Phoenix Home Life Mutual Ins.	5/21/99
O23	Anne Walsh Coeur d'Alene Mines Corp.	5/25/99	57	Joint School District 391	5/24/99
O24	Gene Duffy	5/25/99	58	Dwight Morgan	5/24/99
O25	Robert Hopper Bunker Hill Mining Co.	5/25/99	59	Michael Crapo, US Senator	5/26/99
O26	Jack King Shoshone County Commissioner	5/25/99	60	Art Barrett	5/26/99
O27	Art Barrett	5/25/99	61	Larry Yergler	5/26/99
O28	Larry Yergler	5/25/99	62	Jack King Shoshone County Commissioner	5/26/99
	VOLUME 2 BEGINS HERE		63	Fred W. Brackebusch Mine Systems Design, Inc.	5/26/99
41	Lee Haynes City of Smelterville	5/20/99	64	W. M. Calhoun W. M. Calhoun, Inc.	5/26/99
42	Ron Krusemark	5/20/99	65	John Hull Wallace School District	5/26/99
43	Mike Carlson	5/20/99	66	W. M. Calhoun W. M. Calhoun, Inc.	5/26/99.
44	Darrick/Connie Holmquist	5/20/99	67	Michael J. Murray	5/26/99
45	Marilyn Hinsz	5/20/99	68	Keith Dahlberg, MD	5/26/99
46	Terri Wild	5/20/99	69	Steve Pritchett	5/27/99
47	W.M.Calhoun W. M. Calhoun, Inc.	5/20/99	70	Clyde Peppin	5/27/99
48	Joe Guardipee	5/20/99	71	Shauna Hillman Indelible Tidbits	5/28/99
49	Larry Watson, Idaho House of Repsentatives	5/20/99	72	Dorothy Thielman	5/28/99
50	(No Name)	5/20/99	73	Edith Smith	5/28/99
51	John Amonson	5/20/99	74	Steve Pritchett	6/1/99
52	Roger Mangum Mayor of Kellogg	5/20/99	75	Dee Ann Sverdsten	6/1/99
53	Coeur d'Alene Chamber of Commerce	5/20/99	76	Darrell Jerome	6/1/99
54	Larry Watson Idaho House of Representatives	5/21/99	77	Randall Anderson Hecla Mining Co.	6/1/99

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
78	Andy Warren Horizon Jr. High School Student	6/2/99	98	Bryan Blackburn Horizon Jr. High School Student	6/4/99
79	Justin Rose Horizon Jr. High School Student	6/23/99	99	Tyler Jeffries Horizon Jr. High School Student	6/4/99
80	Jessica Tenney Horizon Jr. High School Student	6/2/99	100	David Daines Horizon Jr. High School Student	6/4/99
80a	Katie Stone Horizon Jr. High School Student	6/2/99		**Beginning Vol 4**	
81	Ashley Guimond Horizon Jr. High School Student	6/2/99	101	Kendra Black Horizon Jr. High School Student	6/4/99
82	Robin Ann Silvey	6/2/99	102	Janet Voltolini	6/4/99
83	Amanda Golden	6/2/99	103	Janel Davisson Horizon Jr. High School Student	6/4/99
84	Nicholas Woolf Horizon Jr. High School Student	6/2/99	104	Mark Tarbutton Horizon Jr. High School Student	6/4/99
85	Jenny Giesen Horizon Jr. High School Student	6/2/99	105	Elijah Doyle Horizon Jr. High School Student	6/4/99
86	Gina Pfau Horizon Jr. High School Student	6/2/99	106	Rachelle Langdon Horizon Jr. High School Student	6/4/99
87	Keith Dahlberg, MD	6/2/99	107	Harry Voltolini	6/4/99
88	Cory Degenstein	6/2/99	108	Brian McGaugh Horizon Jr. High School Student	6/4/99
89	Kalen Hollinberger Horizon Jr. High School Student	6/2/99	109	Clarence Christman	6/8/99
90	Bryce Anderson Horizon Jr. High School Student	6/2/99	110	Richard Shaffer Best Western Wallace Inn	6/8/99
91	Jeremy Redding Horizon Jr. High School Student	6/2/99	111	Arthur Iverson	6/9/99
92	Katie Lallier Horizon Jr. High School Student	6/4/99	112	Edward Peterson	6/10/99
93	Arthur Iverson	6/4/99	113	Dante Bisaro	6/10/99
94	Connie Sue Fudge	6/4/99	114	James Berry	6/10/99
95	Whitney Rollins Horizon Jr. High School Student	6/4/99	115	Terry/Catherine Lininger	6/11/99
96	Lexie Gulden Horizon Jr. High School Student	6/4/99	116	Lacy O'Connell Horizon Jr. High School Student	6/14/99
97	Tony Honorof	6/4/99	117	Patrick Kaczmarek Horizon Jr. High School Student	6/14/99

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
118	Christina Gulden Horizon Jr. High School Student	6/14/99	135	Lisa Munts Horizon Jr. High School Student	6/14/99
119	Craig/Dianna Mast (illegible) Tim Killebrew Joanne White Dick Clark Steve Anderson Jan Turbak Fred Fossberg(?)	6/14/99	136	Courtney Massey Horizon Jr. High School Student	6/14/99
120	Heather Douglas Horizon Jr. High School Student	6/14/99	137	Michael Pentico Horizon Jr. High School Student	6/14/99
121	Ranae Nelson Horizon Jr. High School Student	6/14/99	138	Lisa Schuldt Horizon Jr. High School Student	6/14/99
122	John D'Addabbo Horizon Jr. High School Student	6/14/99	139	Colin Fulton Horizon Jr. High School Student	6/14/99
123	Ashley Dill Horizon Jr. High School Student	6/14/99	140	Brittney Pence Horizon Jr. High School Student	6/14/99
124	Joshua Wilson Horizon Jr. High School Student	6/14/99	141	Larry Brick Horizon Jr. High School Student	6/14/99
125	Jennifer Numata Horizon Jr. High School Student	6/14/99	142	Paula Silinger Horizon Jr. High School Student	6/14/99
126	Mike Livingbston Horizon Jr. High School Student	6/14/99	143	Leann Muller Horizon Jr. High School Student	6/14/99
127	Morgan Paupst Horizon Jr. High School Student	6/14/99	144	Kenneth Clark	6/14/99
128	Kyle Jones Horizon Jr. High School Student	6/14/99	145	John Harris Horizon Jr. High School Student	6/14/99
129	Aaron Bertoni Horizon Jr. High School Student	6/14/99	146	Mitch Lykins Horizon Jr. High School Student	6/14/99
130	Justin Gottlob Horizon Jr. High School Student	6/14/99	147	Nicole Lovinger Horizon Jr. High School Student	6/14/99
	Beginning Vol 5		148	Matt Unger Horizon Jr. High School Student	6/14/99
131	Kellie Spurgeon Horizon Jr. High School Student	6/14/99	149	Teagan MacDonald Horizon Jr. High School Student	6/14/99
132	Meegan Buege Horizon Jr. High School Student	6/14/99	150	Blair Holbrook Horizon Jr. High School Student	6/14/99
133	Chad Flaherty Horizon Jr. High School Student	6/14/99	151	Taylor Hall Horizon Jr. High School Student	6/14/99
134	Jo Ellen Schmidt Horizon Jr. High School Student	6/14/99			

#	Name/Org	Date Comments Received
152	Heidi Odeen Horizon Jr. High School Student	6/14/99
153	Kyle Lynden Horizon Jr. High School Student	6/14/99
154	Carl Niggemyer Horizon Jr. High School Student	6/14/99
155	Tiffany Nichols Horizon Jr. High School Student	6/14/99
156	Lauralee McMillan Horizon Jr. High School Student	6/14/99
157	Rachel Cortez Horizon Jr. High School Student	6/14/99
	Beginning Vol 6	
158	Tyler Winningham Horizon Jr. High School Student	6/14/99
159	Ben Sanders Horizon Jr. High School Student	6/14/99
160	Jessica Herman Horizon Jr. High School Student.	6/14/99
161	Ryan Hite Horizon Jr. High School Student	6/14/99
162	Amanda Sparr Horizon Jr. High School Student	6/14/99
163	Lauren Leavitt Horizon Jr. High School Student	6/14/99
164	Luke Jensen Horizon Jr. High School Student	6/14/99
165	Jessica DeRouen Horizon Jr. High School Student	6/14/99
166	Uyen Bui-Nguyen Horizon Jr. High School Student	6/14/99
167	Tessa Mahoney Horizon Jr. High School Student	6/14/99
168	Jacob Radke Horizon Jr. High School Student	6/14/99
169	Alexa Smith Horizon Jr. High School Student	6/14/99
170	Chris Ralston Horizon Jr. High School Student	6/14/99
171	Tyler Ormsby Horizon Jr. High School Student	6/14/99
172	Billy Belknap Horizon Jr. High School Student	6/14/99
173	Kara Christen Horizon Jr. High School Student	6/14/99
174	April Kawamoto Horizon Jr. High School Student	6/14/99
175	Teasha Barfuss Horizon Jr. High School Student	6/14/99
176	Jonathan Solberg Horizon Jr. High School Student	6/14/99
177	Marci Kindsvogel Horizon Jr. High School Student	6/14/99
178	Sean Nowling Horizon Jr. High School Student	6/14/99
179	Shelby Nord Horizon Jr. High School Student	6/14/99
180	Tyler Guilbault Horizon Jr. High School Student	6/14/99
181	Timber Roden Horizon Jr. High School Student	6/14/99
182	Megan Barney Horizon Jr. High School Student	6/14/99
183	Jenniephier Rise Horizon Jr. High School Student	6/14/99
184	Ashley Steward Horizon Jr. High School Student	6/14/99
185	Megan Dormaier Horizon Jr. High School Student	6/14/99
	Beginning Vol 7	
186	Kris Fischer Horizon Jr. High School Student	6/14/99
187	Allen Greaves Horizon Jr. High School Student	6/14/99

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
188	Lindsey Poole Horizon Jr. High School Student	6/14/99	208	R. Merril Coomes Coomes Associates	6/25/99
189	Brent Cabot Horizon Jr. High School Student	6/14/99	209	A petition with 484 signatures on it, 64 pages long	6/21/99
190	Jennifer Jewett Horizon Jr. High School Student	6/14/99		**Beginning Vol 8**	
191	Sean Ness Horizon Jr. High School Student	6/14/99	210	Robert Werner	6/23/99
192	Bailen Brown Horizon Jr. High School Student	6/14/99	211	Bill Osebold	6/29/99
193	Skip Jewett Horizon Jr. High School Student	6/14/99	212	Cecelia/Frank Walls	6/30/99
194	Brian Eik Horizon Jr. High School Student	6/14/99	213	Susan Crampton, MD	7/1/99
195	Jessica Pillsbury Horizon Jr. High School Student	6/14/99	214	Mary Souchik	7/2/99
196	Kelsey Nord Horizon Jr. High School Student	6/14/99	215	Kenneth/Joann Branstetter	7/2/99
197	Tyson Shelly Horizon Jr. High School Student	6/14/99	216	Sy Thompson	7/6/99
198	Christina Ralston Horizon Jr. High School Student	6/14/99	217	C Shulz	7/7/99
199	Lucas Chane Horizon Jr. High School Student	6/14/99	218	Sy Thompson	7/7/99
200	Rose Mattana Horizon Jr. High School Student	6/14/99	219	Jean Stout	7/8/99
201	Alex Cross Horizon Jr. High School Student	6/15/99	220	Larry/Gina Schrock	7/12/99
202	Art Barrett	5/26/99	221	Michael Boyd	7/12/99
203	R. Merril Coomes Coomes Associates	6/15/99	222	Warren/Ruth Peterson	7/12/99
204	Kenneth Clark	6/15/99	223	Don/Thea Tager	7/13/99
205	Jerry Boyd	6/16/99	224	Robert McFarland	7/13/99
206	Mary Wieman	6/18/99	225	Gregory Nickel	7/19/99
207	Megan White Washington Dept of Ecology	6/21/99	226	Jim Cronin Megan Schmall	7/19/99
			227	Carol Bieschke Small	7/22/99
			228	Gregory Nickel	7/22/99
			229	Harve/Tina Paddock	7/22/99

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
230	Harry Cougher Sunshine Mining Co.	7/27/99	250	Mary Lou Reed	8/11/99
231	Scott Brown Idaho Conservation League	7/29/99	251	Jack Domit Spokane R. Prop. Owner's Assn.	8/11/99
232	C. S. Anderson	8/2/99	252	Gordon Canterbury	8/11/99
233	W. C. Rust	8/3/99	253	Lupé Eckenrode	8/11/99
234	Jerry Jayne	8/4/99	254	David Brown	8/11/99
235	Paul De Palma	8/4/99	255	Ross Stout SF Coeur d'Alene R. Sewer Dist.	8/12/99
236	Eunice Cunningham	8/4/99	256	Steve Doyle	8/12/99
237	Margaret Hafey	8/4/99	257	Lola Palmer Marlin Palmer Candice Cameron Bob Cameron Karen DuPuis Bill DuPuis Kathy Cameron Gail Haynes John Nearing	8/12/99
238	Eileen Stanley	8/5/99	258	George Brabb	8/13/99
239	James Thomas	8/5/99	259	Michele Nanni The Lands Council	8/13/99
240	Jack Roylance	8/5/99	260	Guadalupe Flores	8/13/99
241	Mike Mihelich Kootenai Environmental Alliance	8/6/99	261	Marcelle/Art Barrett	8/13/99
242	Anne Solomon	8/9/99	262	John Siddle Sunshine Mining Co.	8/13/99
243	Michael Clary	8/9/99	263	Anne Hite	8/13/99
244	Lisa Carney	8/10/99	264	Gina Brooks	8/13/99
245	Guy Bailey American Wildlands	8/10/99	265	Clyde Peppin	8/13/99
246	Marion Grosvenor	8/10/99	266	William Booth Hecla Mining Co.	8/13/99
247	Mitchell Grant	8/11/99	267	H. Sid Frederickson City of Coeur d'Alene	8/13/99
248	Cheryl Grant	8/11/99	268	(27 Geologists/ Engineers) (Petition Style letter)	8/13/99
249	Valerie Palmer	8/11/99	269	Shoshone Natural Resources Coalition	8/13/99

#	Name/Org	Date Comments Received	#	Name/Org	Date Comments Received
270	Tom Fudge Hecla Mining Co. Lucky Friday Mine	8/13/99	292	James Geyer	8/17/99
271	(544 petition type forms)	8/13/99	293	Eileen Stanley	8/17/99
272	Robert (Rick) Richins Coeur d'Alene Mines Corp.	8/13/99	294	James Thomas	8/16/99
273	Esther Larsen WA Citizens Advisory Committee	8/13/99	295	Lisa Carney	8/13/99
274	Douglas Parker Asarco	8/16/99	296	Jack Roylance	8/18/99
275	Judy Johnson	8/16/99	297	2 packets of form letters/ petitions.	Sent July 9, 1999
276	Sharon Broadhead	8/16/99	298	Bret Bowers Communty Leaders for EPA Accountability Now! (CLEAN)	5/13/99 (approx.)
277	Norman Graham	8/16/99	299	John Woodworth WA State Public Works Board	5/14/99
278	Michele Nanni Lands Council	8/16/99	300	Joe Peak Enaville Resort	5/17/99
279	Ken Bright	8/16/99	301	Shirley Hindley Coeur d'Alene Assoc.of Realtors	5/20/99
280	Michael Lee Silver Valley Resources	8/16/99	302	SF Coeur d'Alene R. Sewer Dist.	5/20/99
281	Esther Larsen WA Citizens Advisory Committee	8/16/99	303	SF Coeur d'Alene R. Sewer Dist.	5/20/99
282	Jack Roylance	8/16/99	304	Michael Crapo U. S. Senator	5/25/99
283	(petition type with 66 signatures)	8/16/99	305	Nancy Vandeventer	5/26/99
284	Phillip Cernera Coeur d'Alene Tribe	8/16/99	306	Silver Valley People's Action Coalition	7/7/99
285	Robert Hallock US Fish & Wildlife Service	8/16/99	307	Bill Osebold	7/26/99
286	Lola Frederick	8/16/99	308	Gary Stanley	8/16/99
287	Jami Fernette	8/16/99	309	Arline Stanley	8/16/99
288	Eric Williams	8/16/99	310	John "Jack" Roylance, Jr.	8/16/99
289	Burton Gosling	8/16/99			
290	Jennifer Leinart	8/16/99			
291	Mike Poulson, WA State Farm Bureau Natural Resources Committee	8/16/99			