WATER-QUALITY DATA FOR THE CLARK FORK AND SELECTED TRIBUTARIES FROM DEER LODGE TO MILLTOWN, MONTANA, MARCH 1985 THROUGH JUNE 1986

By John H. Lambing

U.S. GEOLOGICAL SURVEY

Open-File Report 87-110

Prepared in cooperation with

the STATE OF MONTANA

Helena, Montana
March 1987

DEPARTMENT OF THE INTERIOR

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CONVERSION FACTORS

The following factors can be used to convert inch-pound units in this report to the International System (SI) of units.

Multiply inch-pound unit	By	To obtain SI unit
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
mile	1.609	kilometer
part per million	1	microgram per gram
ton (short)	907.2	kilogram
ton per day (ton/d)	907.2	kilogram per day

Temperature can be converted from degrees Celsius (°C) to degrees Fahrenheit (°F) by the equation:

$$°F = 9/5\ (°C) + 32$$

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ABSTRACT

A water-quality sampling program was conducted at six sites on the Clark Fork and selected tributaries from Deer Lodge to Milltown, Montana. The purpose of the study was to collect baseline data on concentrations of suspended sediment and selected trace metals in streamflow. Included in this report are tables of daily data for mean streamflow, suspended-sediment concentration, and suspended-sediment discharge at two streamflow-gaging stations on the Clark Fork; periodic data for instantaneous streamflow, onsite water quality, and trace-metal and suspended-sediment concentrations in the Clark Fork and tributaries; and summary statistics for all the water-quality data. Also included are graphs for each site showing median concentrations of trace metals, relationship of concentrations of trace metals to suspended sediment, and median concentrations of trace metals in suspended sediments. Hydrographs for two sites on the mainstem show daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the period of study.

INTRODUCTION

The Clark Fork originates south of Deer Lodge in west-central Montana at the confluence of Silver Bow Creek and Warm Springs Creek (fig. 1). From its origin to Milltown Dam at Milltown, about 100 river miles downstream, four major tributaries enter the Clark Fork: Little Blackfoot River, Flint Creek, Rock Creek, and Blackfoot River. Surface-water uses in the upper Clark Fork basin include habitat for trout fisheries, irrigation, stock watering, light industry, and hydroelectric power generation. Land uses include agriculture, timber harvesting, mining, and recreation.

During the past century, extensive metal-ore mining and associated milling and smelting have occurred in the headwater areas of Silver Bow Creek near Butte. Moderate to small-scale mining also has occurred to a variable extent in the basins of the major tributaries. Past runoff conditions and floods have transported tailings and sediments containing large concentrations of trace metals down the Clark Fork and deposited them along the flood plains and in Milltown Reservoir.

As a result of potential toxicity associated with trace metals in sediments derived from mining and mineral-processing sites, the U.S. Environmental Protection Agency has designated three hazardous waste "Superfund" sites in the upper Clark Fork basin (fig. 1): Silver Bow Creek, Anaconda Smelter, and Milltown Reservoir (Montana Academy of Sciences, 1985). Concerns about water quality, especially the magnitude of trace-metals concentrations, have stimulated widespread public interest

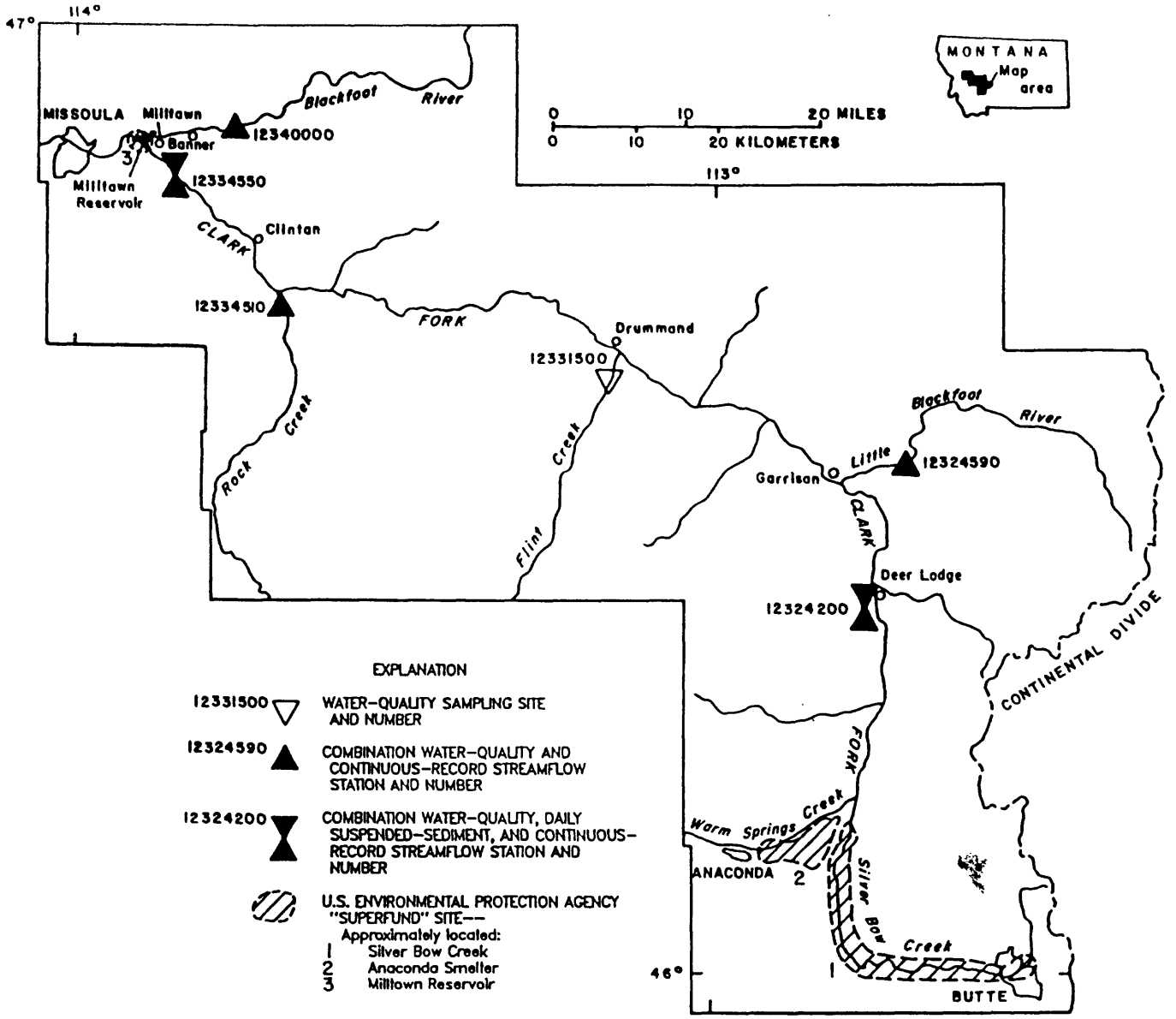


Figure 1.--Location of study area.

in the Clark Fork. Several studies either are underway or have been completed in the upper basin by government agencies and private consulting firms. This study is part of a comprehensive effort to determine various aspects of water quality in the Clark Fork basin.

The purpose of this study was to collect baseline data on concentrations of suspended sediment and selected trace metals in the Clark Fork and its major tributaries from Deer Lodge to Milltown. Sampling began in March 1985 and continued through June 1986 at six sites in the upper Clark Fork basin (fig. 1). The study was conducted by the U.S. Geological Survey, in cooperation with the Governor's Office of the State of Montana.

The collected data describe the geographic and seasonal variability of concentrations. Daily suspended-sediment discharge at two sites on the mainstem was determined to indicate the cumulative change within the study reach. Statistical relationships between suspended-sediment and metals concentrations were examined for simulation of metals transport at the daily sediment stations. Results of the study will provide data to resource-management agencies responsible for maintaining environmental quality or developing water-resource plans for the river.

DATA COLLECTION

Periodic suspended-sediment and trace-metal samples were collected from March 1985 through May 1986. Daily mean streamflow and suspended-sediment concentrations were available from March 1985 through June 1986 at the two Clark Fork mainstem streamflow-gaging stations (12324200 and 12334550). Information about the type of data collected at each of the sampling sites is listed in table 1.

Cross-sectional depth-integrated samples for suspended sediment and trace metals were collected according to standard U.S. Geological Survey procedures described by Guy and Norman (1970), U.S. Geological Survey (1977), and Knapton (1985). In addition, measurements were made onsite for water temperature, pH, specific conductance, bicarbonate, carbonate, and alkalinity.

Sampling frequency for cross-sectional samples was designed to identify concentrations throughout the complete range of hydrologic conditions. Because of the short duration of most runoff events, efforts were made to sample during runoff conditions rather than on a fixed time schedule to document maximum concentrations. However, few samples were collected in the mid- to upper ranges of streamflow because of low streamflows during 1985 resulting from less-than-normal precipitation throughout the basin.

Streamflow

Instantaneous streamflow at the time of sampling was determined at all sites, either by measurement at ungaged sites or from stage-discharge rating tables at streamflow-gaging stations. Daily mean streamflow values were available at the stations listed in table 1, except for Flint Creek. A continuous-recording streamflow-gaging station was established at Clark Fork at Turah Bridge, near Bonner on May 9, 1986. Daily mean streamflows for this site prior to gage installation were computed based on once-daily stage readings and a stage-discharge rating table developed from streamflow measurements.

Trace Metals

Cross-sectional samples for trace metals were analyzed for dissolved arsenic, cadmium, copper, iron, lead, manganese, and zinc; total arsenic; and total recoverable cadmium, copper, iron, lead, and manganese. Samples were analyzed at the U.S. Geological Survey water-quality laboratory in Denver, Colorado. Analytical methods used in the analyses are described by Fishman and Friedman (1985).

Table 1.--*Types of data collected at sampling sites in the upper Clark Fork basin*

Station number	Station name	Type of data collection: Continuous-record streamflow	Type of data collection: Periodic cross-sectional water quality[1]	Type of data collection: Daily fixed-point suspended sediment
12324200	Clark Fork at Deer Lodge, Mont.	X	X	X
12324590	Little Blackfoot River near Garrison, Mont.	X	X	--
12331500	Flint Creek near Drummond, Mont.	--	X	--
12334510	Rock Creek near Clinton, Mont.	X	X	--
12334550	Clark Fork at Turah Bridge, near Bonner, Mont.	[2]X	X	X
12340000	Blackfoot River near Bonner, Mont.	X	X	--

[1]Trace metals and suspended sediment.
[2]Gage installed May 9, 1986.

Suspended Sediment

Cross-sectional samples of suspended sediment were analyzed for concentration and particle size. Samples from March to June 1985 were analyzed at the U.S. Geological Survey sedimentation laboratory in Iowa City, Iowa. Samples from June 1985 through June 1986 were analyzed at the U.S. Geological Survey sediment laboratory in Helena, Montana.

Daily suspended-sediment samples were collected at the two Clark Fork mainstem sites at Deer Lodge and at Turah Bridge, near Bonner. Daily samples were depth-integrated at a fixed point in the cross section. Actual sampling frequency depended on stream conditions; generally, samples were collected daily during medium and high flows, and approximately every other day during low flows. Twice-daily samples were collected during high streamflow peaks.

DATA RESULTS

Streamflow

Instantaneous streamflow at the time of cross-sectional sample collection is listed in table 2 and summary statistics are given in table 3 at the back of the report. Daily mean streamflows for the daily sediment stations (Clark Fork at Deer Lodge and at Turah Bridge, near Bonner) are presented in tables 4 and 5.

Streamflow values were used to calculate constituent discharge (load) according to the equation:

$$L = Q \times C \times K \quad (1)$$

where

L = constituent discharge, in tons per day;
Q = stream discharge, in cubic feet per second;
C = constituent concentration, in either milligrams per liter or micrograms per liter; and
K = conversion constant (0.0027 for concentrations reported in milligrams per liter and 0.0000027 for concentrations reported in micrograms per liter).

The above equation was used to calculate suspended-sediment discharges given in this report.

Trace Metals

Results of the trace-metals analyses are listed in table 2 and summary statistics are given in table 3. Values for the suspended concentrations of trace metals can be estimated by subtracting the dissolved from the total or total recoverable concentration.

Median concentrations of dissolved and total or total recoverable trace metals are graphically illustrated in figures 2 to 8. Median concentrations less than the detection limit of 1 microgram per liter were arbitrarily plotted midway between zero and the detection limit. The graphs can be used to compare data among the six sampling sites, and between the dissolved and suspended phases of the metals.

The relationships between total or total recoverable metals concentration and suspended-sediment concentration are shown in figures 9 to 15. Although regression statistics are not presented, least-squares lines of best fit are drawn as an indication of potential linear relationships based on the available data. However, because of the limited amount of data in the medium- and high-flow range, the regression lines may not be statistically valid and are not assumed to infer predictive capability.

Graphs comparing the median metals concentration within the suspended sediments among the sites are presented in figures 16-22. Presenting the metals data in this manner eliminates the diluting or concentrating effects of streamflow and indicates the metals content in the sediments derived from upstream areas. To calculate metals concentration in the suspended sediments, the value for suspended-metals concentration was determined by subtraction of the dissolved from the total or total recoverable concentration. The suspended-metals concentration then was divided by the suspended-sediment concentration and multiplied by 1,000 to give a mass-ratio concentration in micrograms per gram (parts per million). Where "less than" dissolved or total recoverable concentrations were reported, a value midway between zero and the detection limit was assumed for calculation of the suspended-metals concentration.

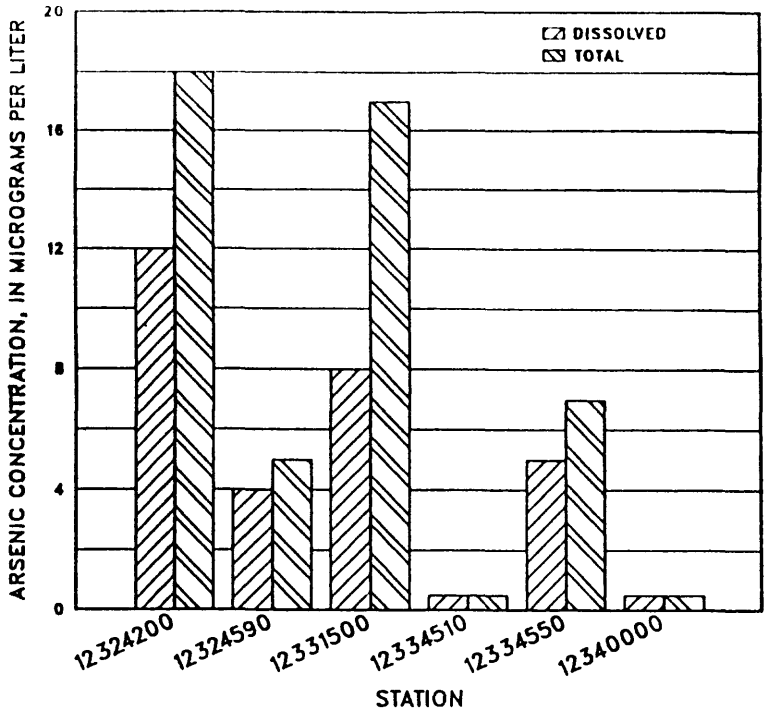


Figure 2.--Median concentrations of dissolved and total arsenic.

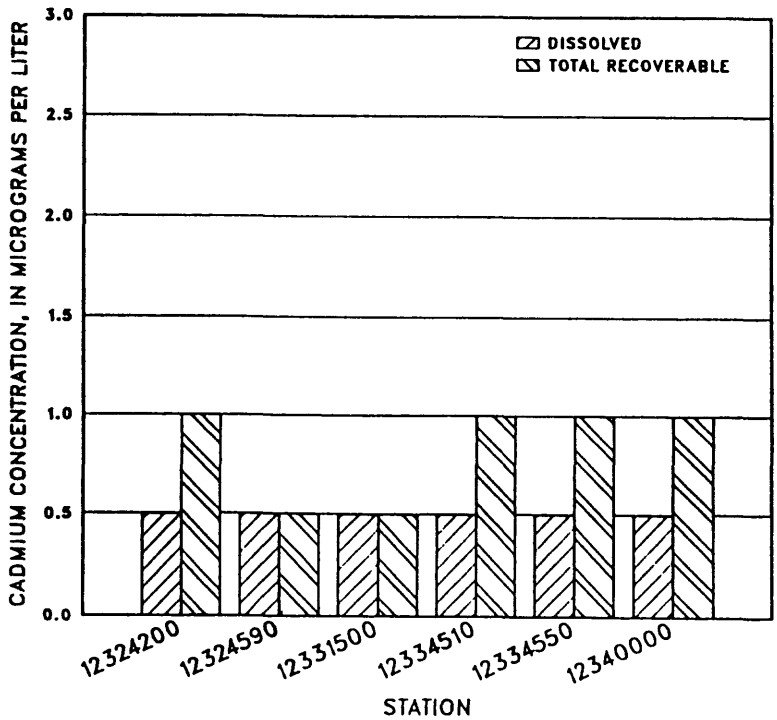


Figure 3.--Median concentrations of dissolved and total recoverable cadmium.

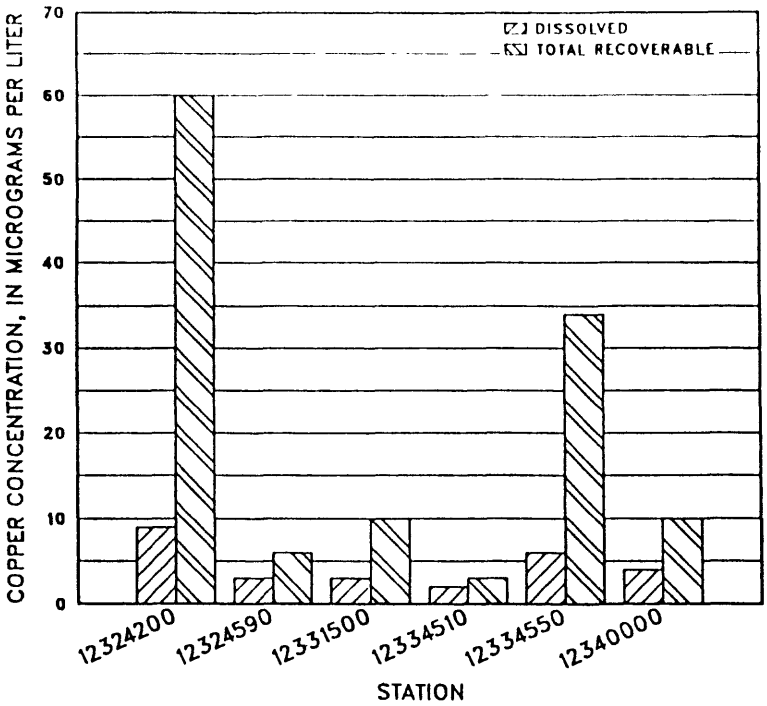


Figure 4.--Median concentrations of dissolved and total recoverable copper.

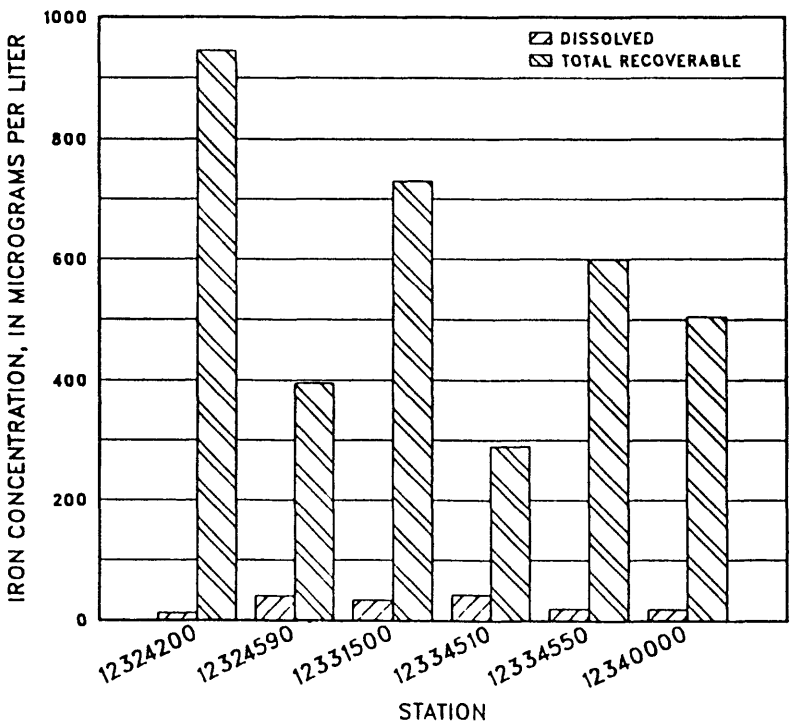


Figure 5.--Median concentrations of dissolved and total recoverable iron.

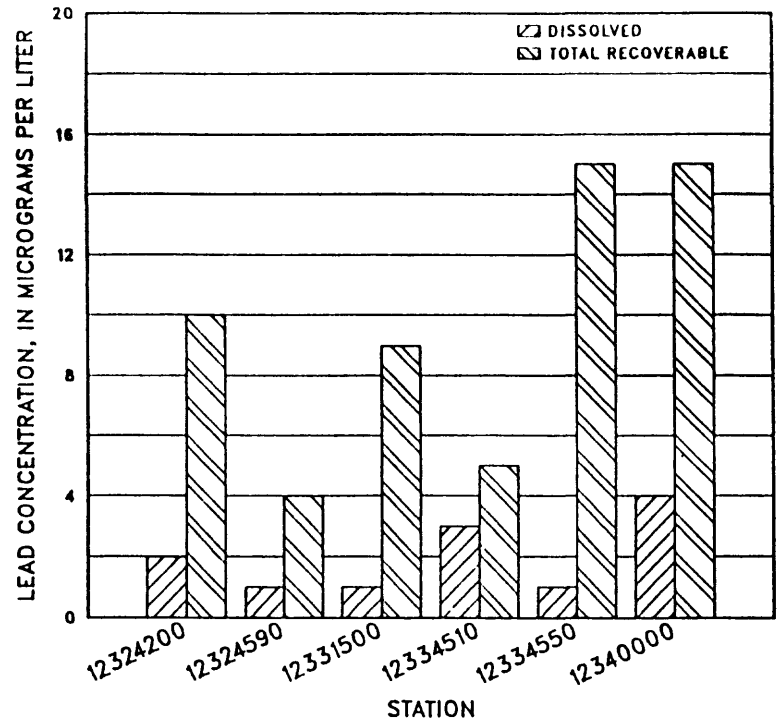


Figure 6.--Median concentrations of dissolved and total recoverable lead.

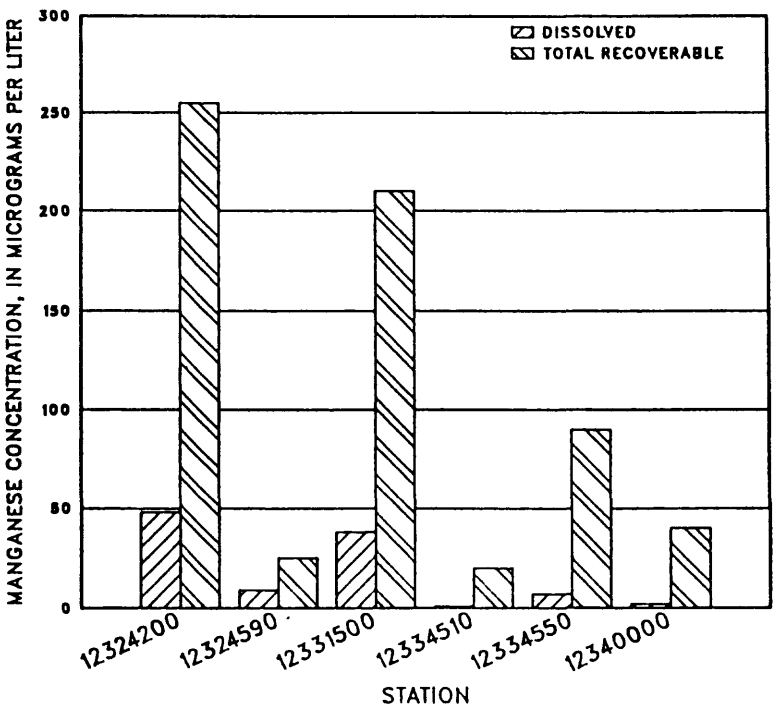


Figure 7.--Median concentrations of dissolved and total recoverable manganese.

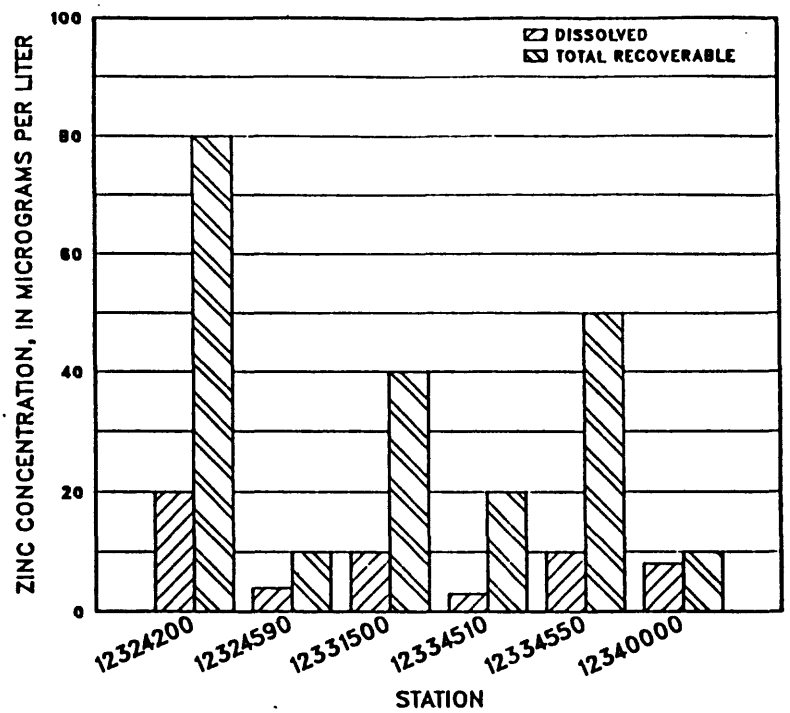


Figure 8.--Median concentrations of dissolved and total recoverable zinc.

Suspended Sediment

Suspended-sediment concentrations measured from cross-sectional samples are listed in table 2 and summary statistics are given in table 3. Graphs of suspended-sediment concentrations from cross-sectional samples illustrating the range and quartile values for each site are shown in figure 23.

Sampling frequency at the daily sediment stations enabled calculation of a daily mean suspended-sediment concentration. Daily mean suspended-sediment concentrations were computed according to procedures described in Porterfield (1972). Daily mean streamflow values then were used to compute daily suspended-sediment discharge. Daily values for suspended-sediment concentration and suspended-sediment discharge at the Clark Fork daily sediment stations are presented in tables 4 and 5.

Hydrographs of daily mean streamflow and suspended-sediment concentration for the Clark Fork at Deer Lodge and Clark Fork at Turah Bridge, near Bonner are shown in figures 24 and 25. Hydrographs of daily mean suspended-sediment discharge at the two stations (fig. 26) illustrates the cumulative increase in sediment transport between the upstream and downstream mainstem sites.

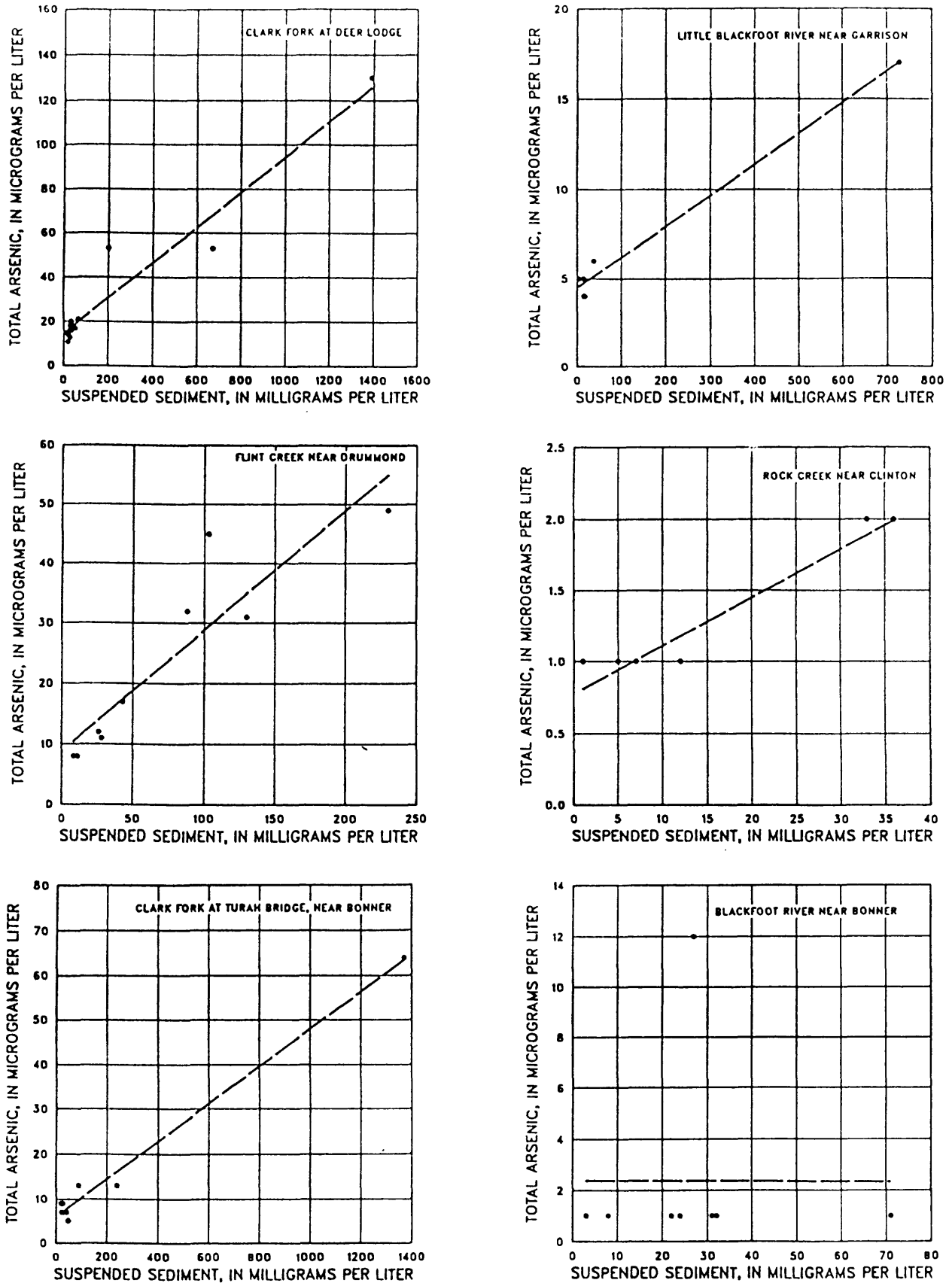


Figure 9.--Relationship of concentrations of total arsenic to suspended sediment.

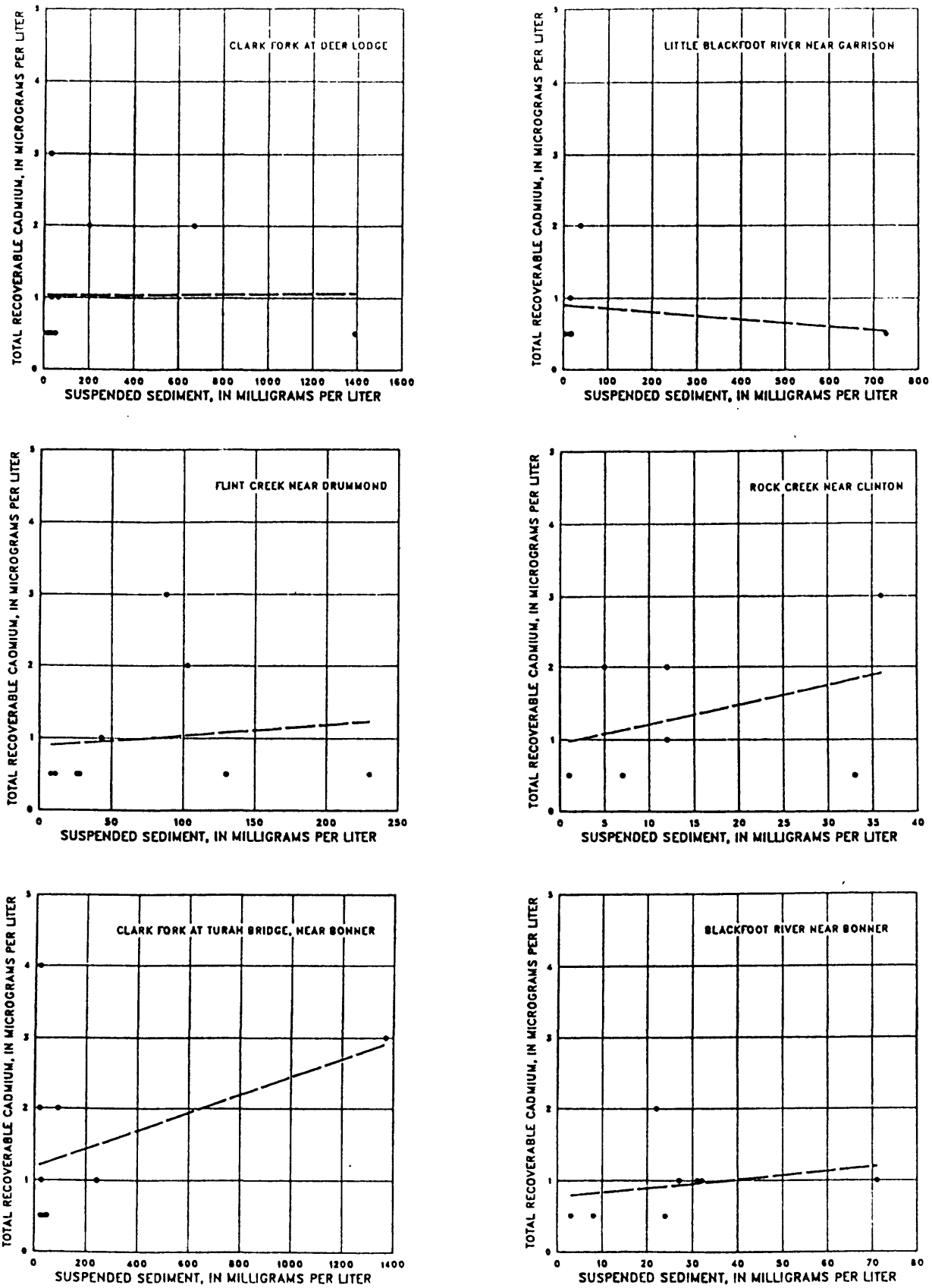
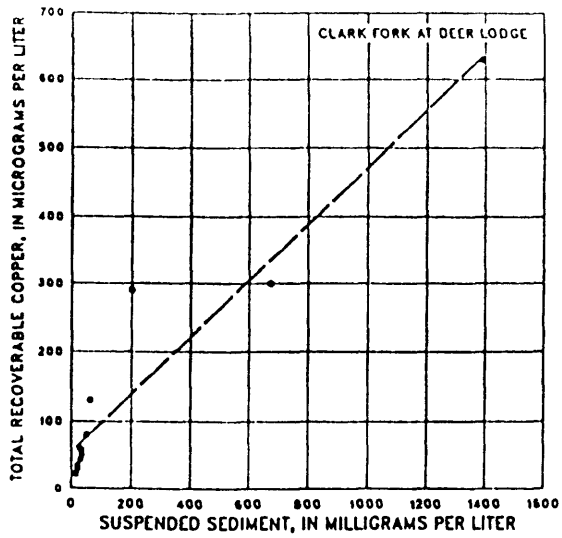
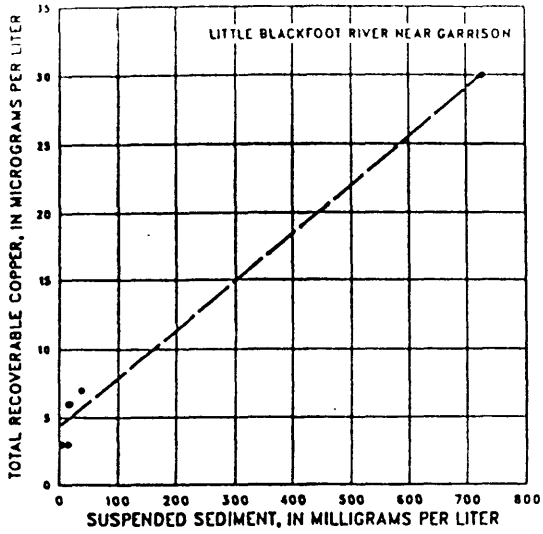
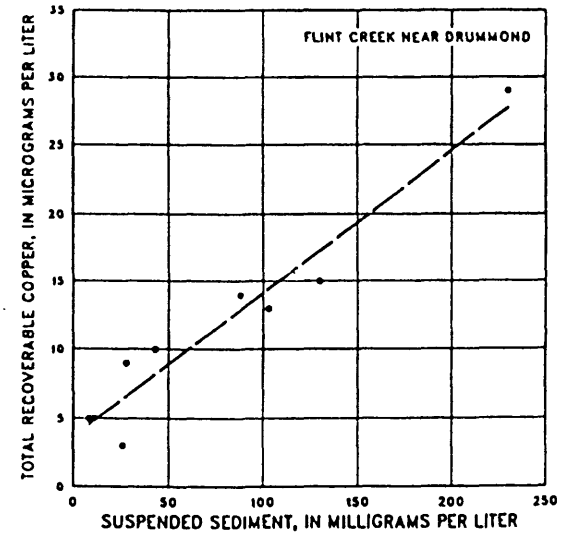
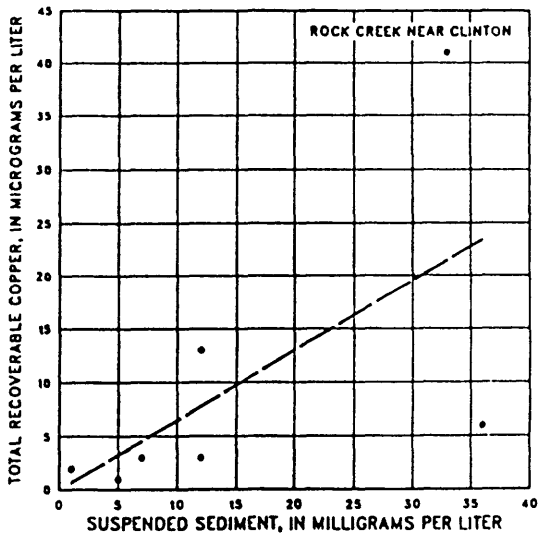


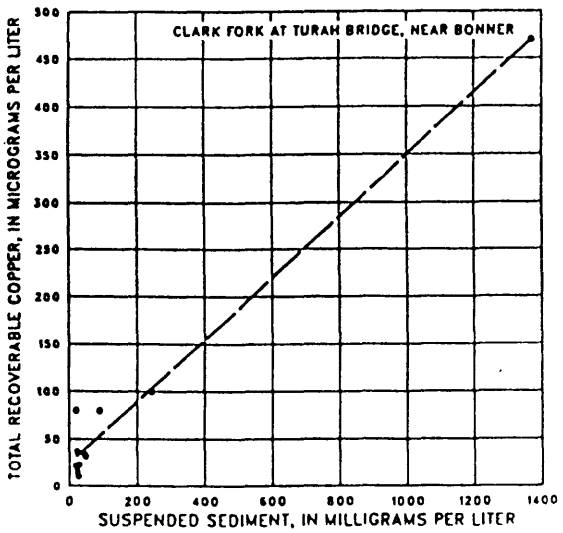
Figure 10.--Relationship of concentrations of total recoverable cadmium to suspended sediment.











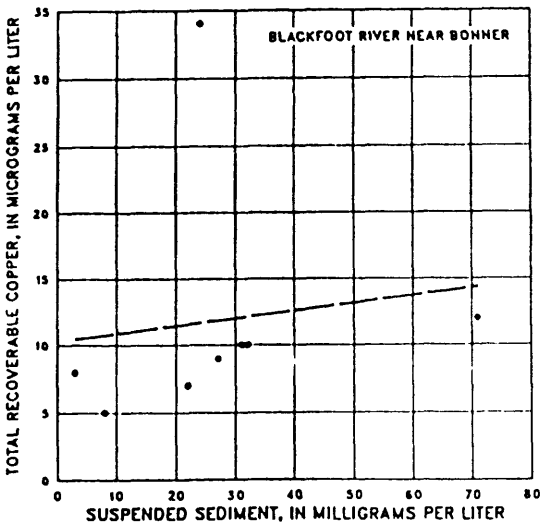


Figure 11.--Relationship of concentrations of total recoverable copper to suspended sediment.

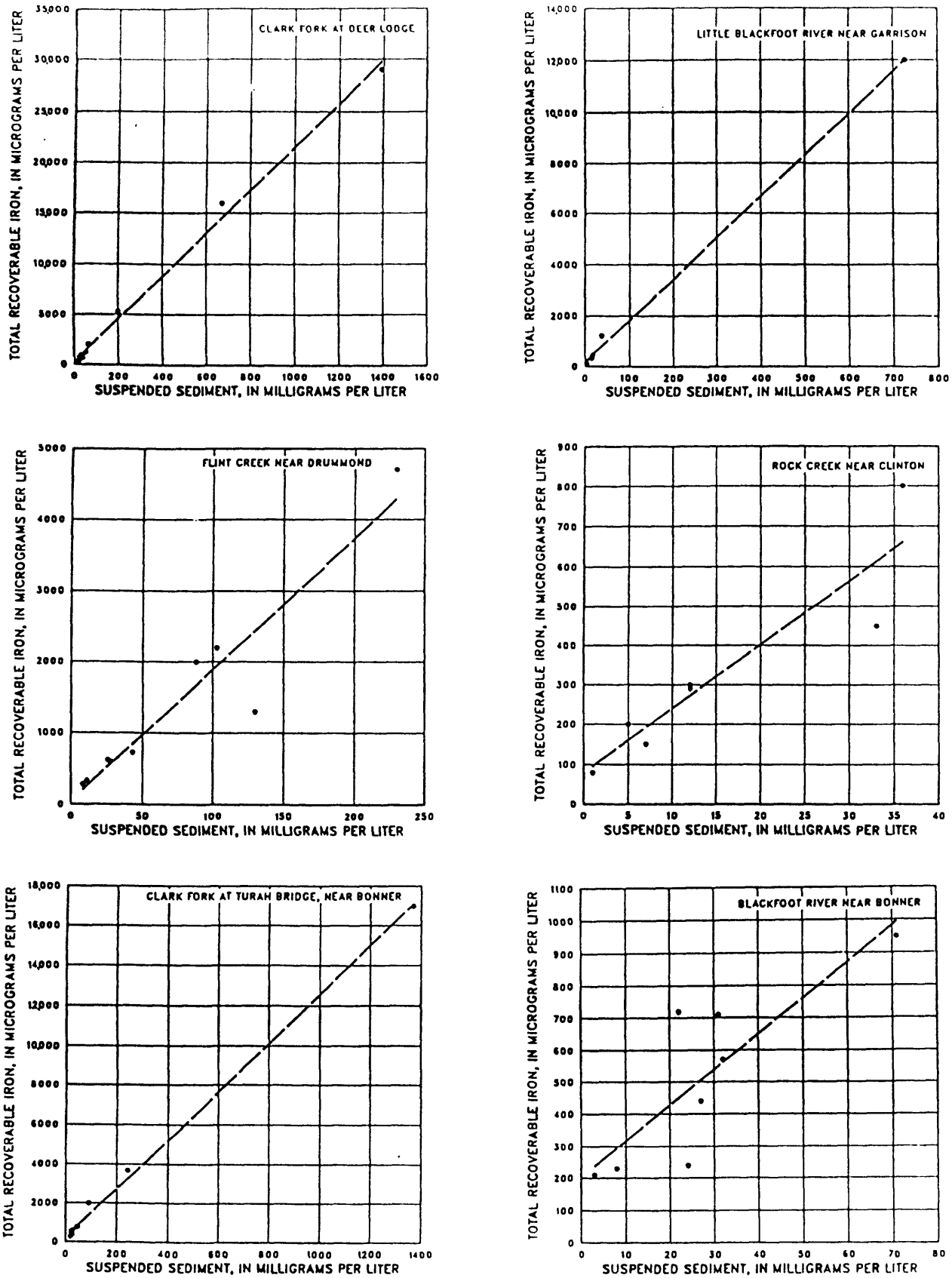


Figure 12.--Relationship of concentrations of total recoverable iron to suspended sediment.

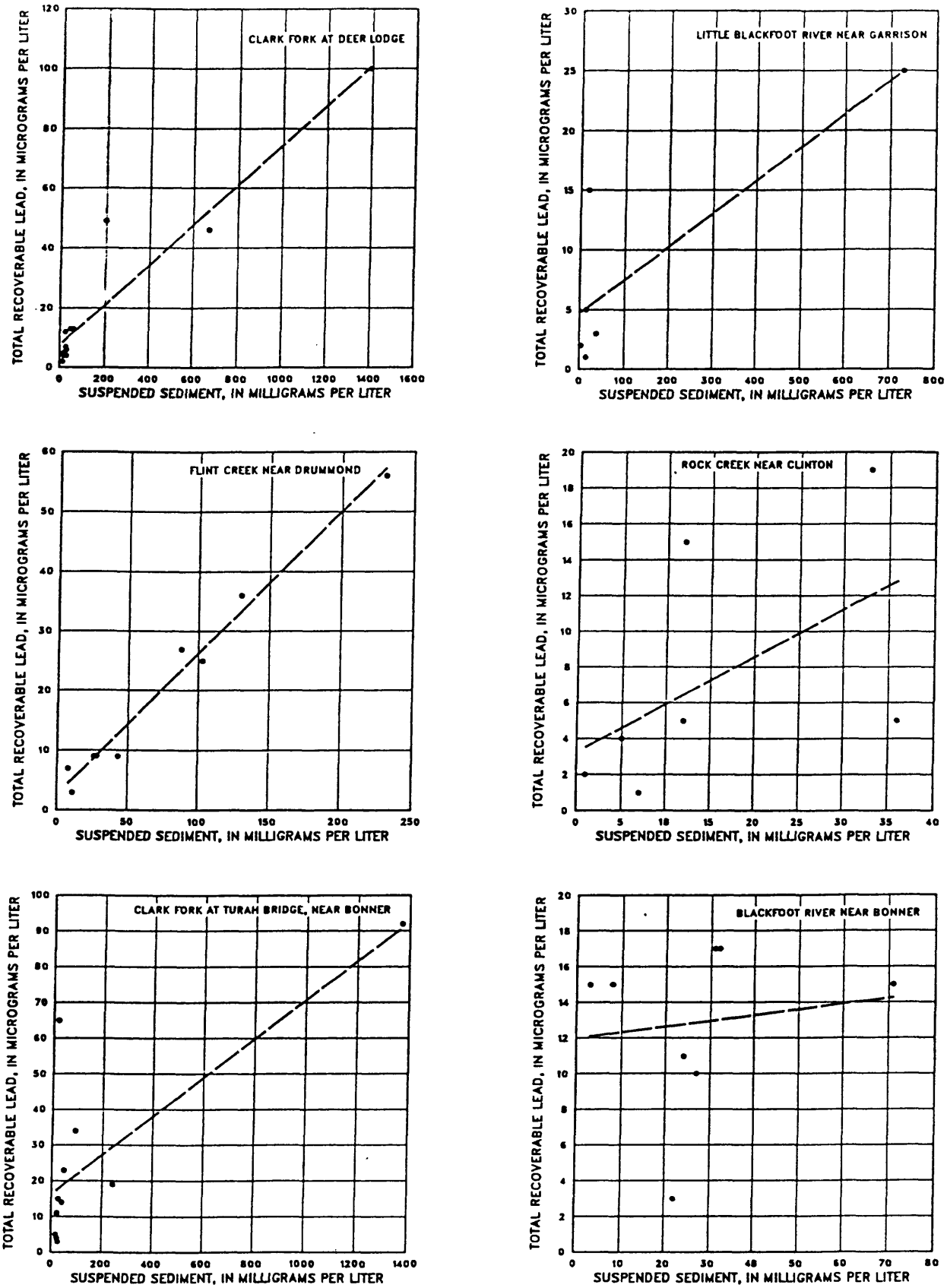
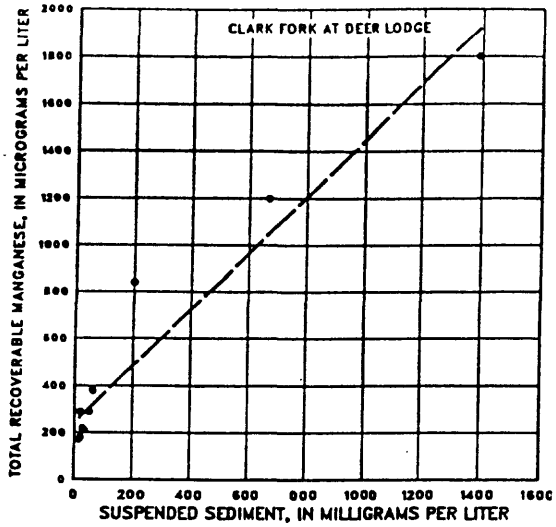
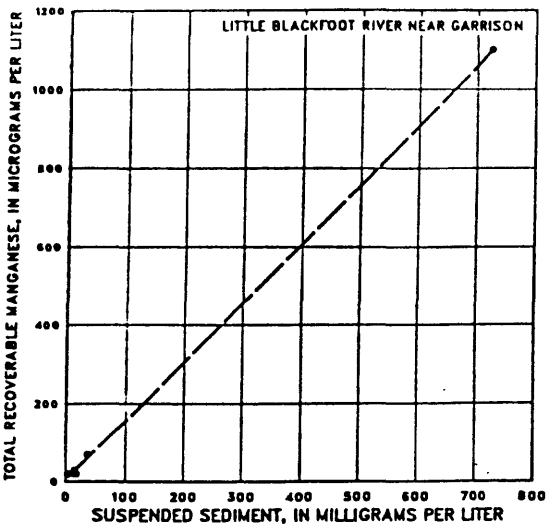
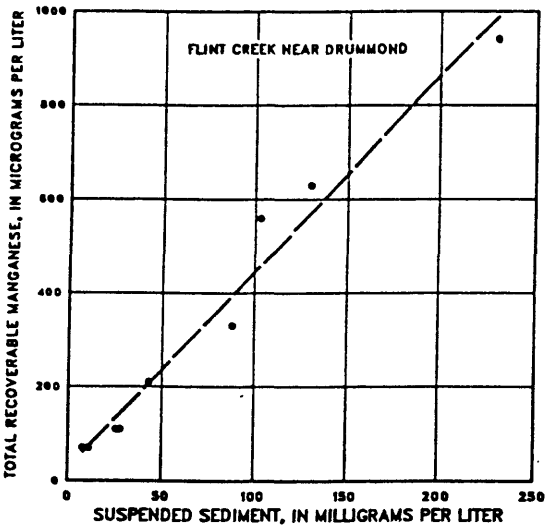
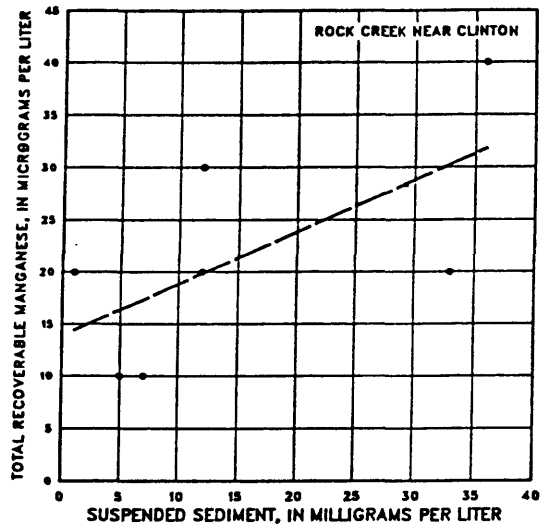


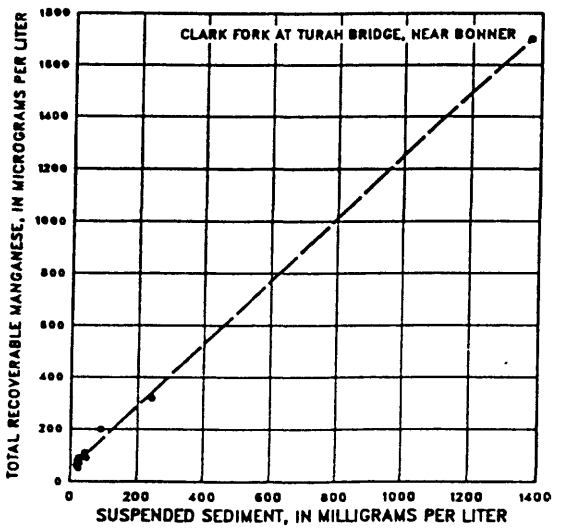
Figure 13.--Relationship of concentrations of total recoverable lead to suspended sediment.











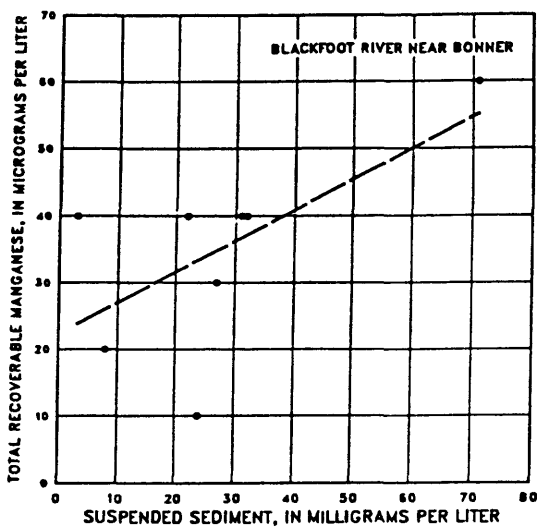


Figure 14.--Relationship of concentrations of total recoverable manganese to suspended sediment.

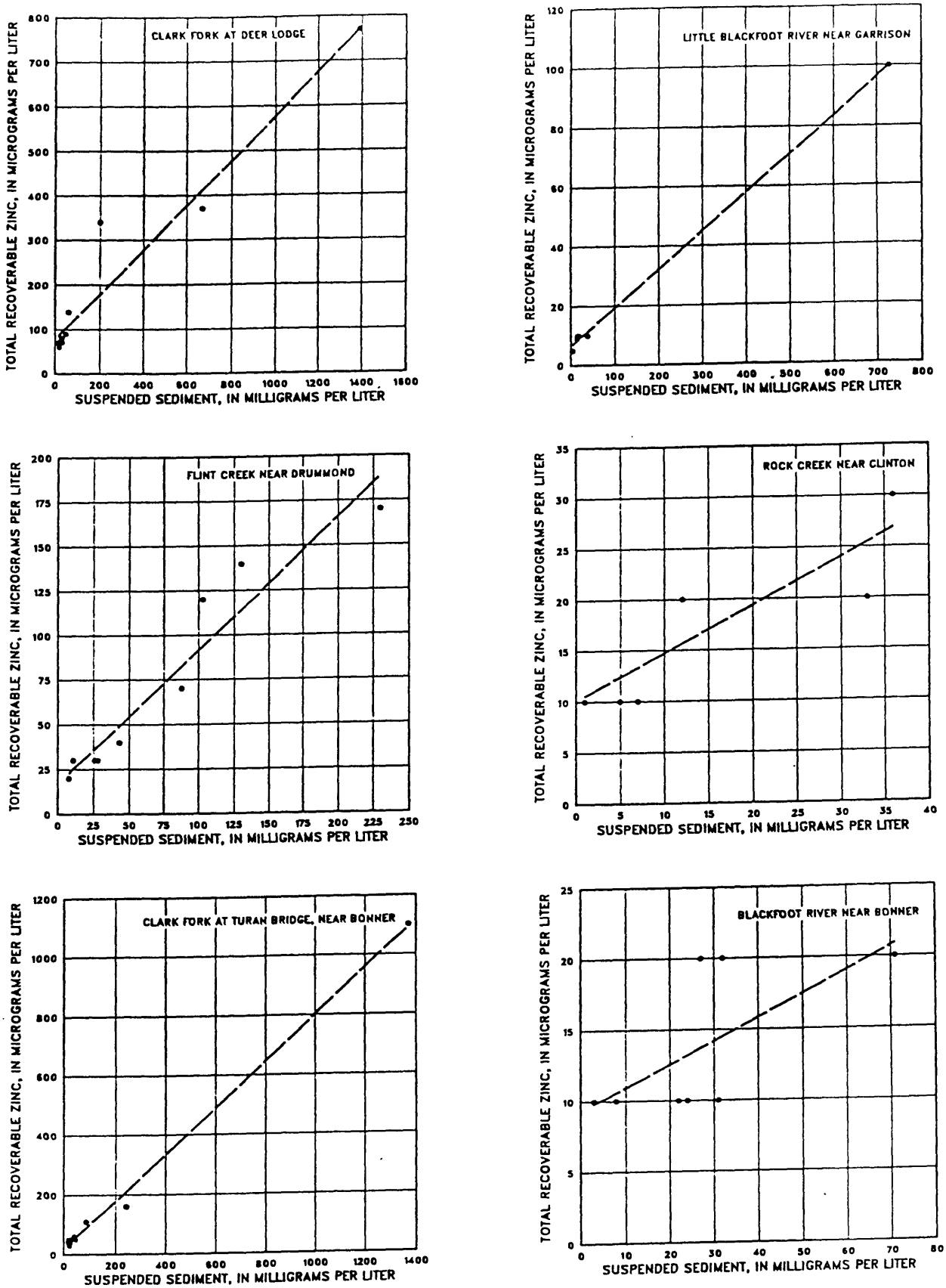


Figure 15.--Relationship of concentrations of total recoverable zinc to suspended sediment.

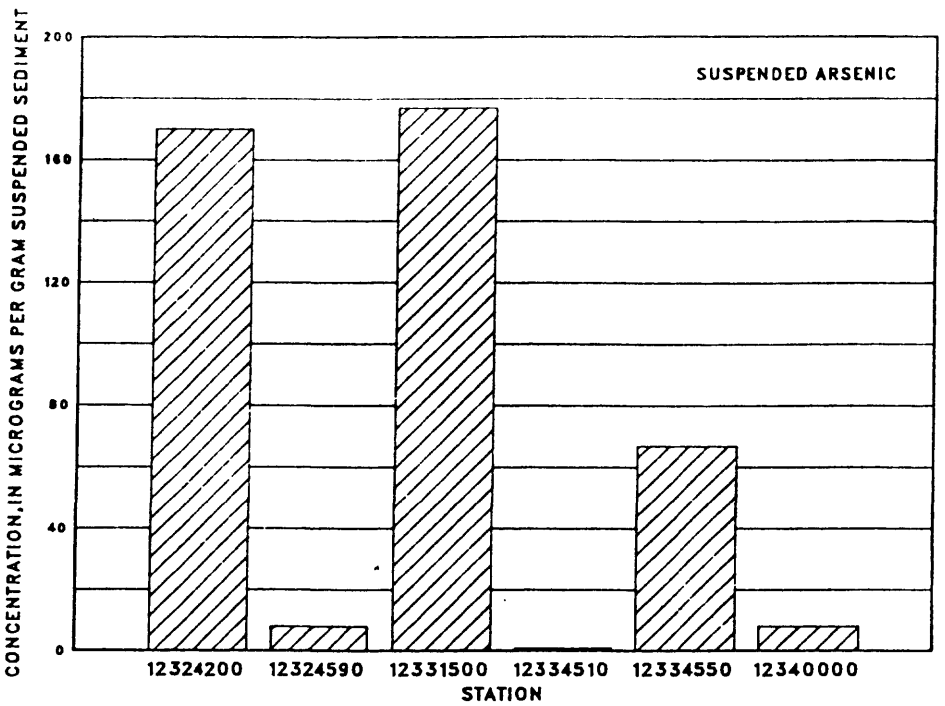


Figure 16.--Median concentrations of suspended arsenic in suspended sediments.

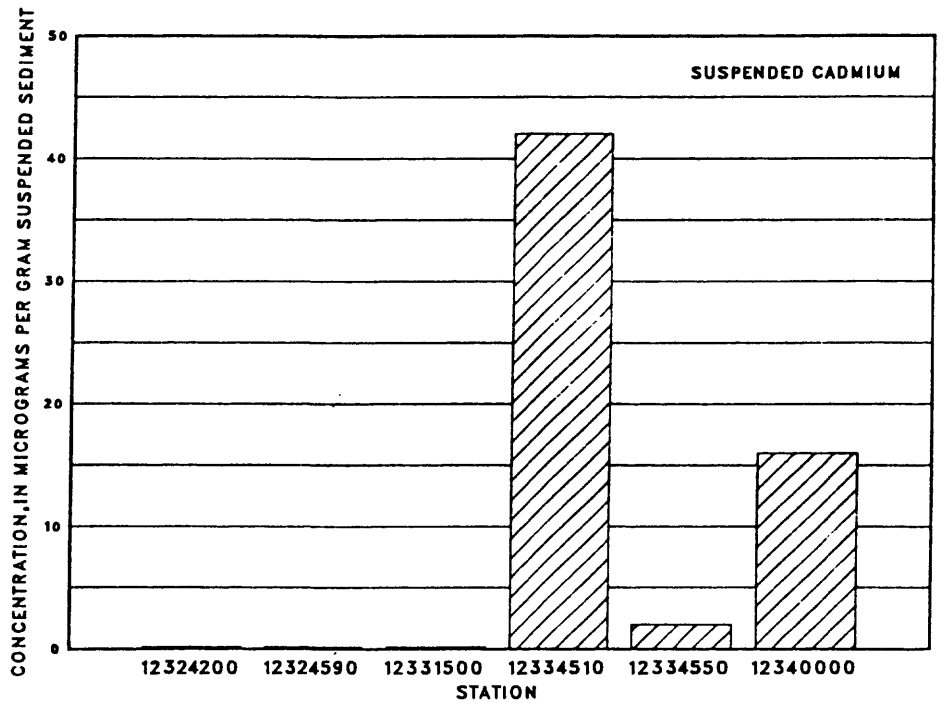


Figure 17.--Median concentrations of suspended cadmium in suspended sediments.

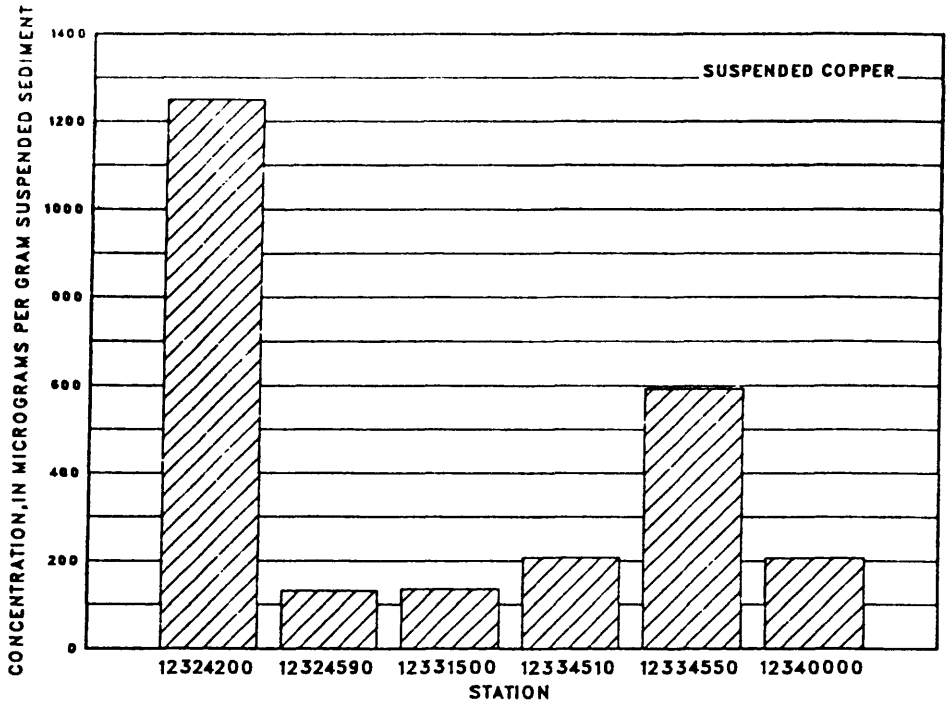


Figure 18.--Median concentrations of suspended copper in suspended sediments.

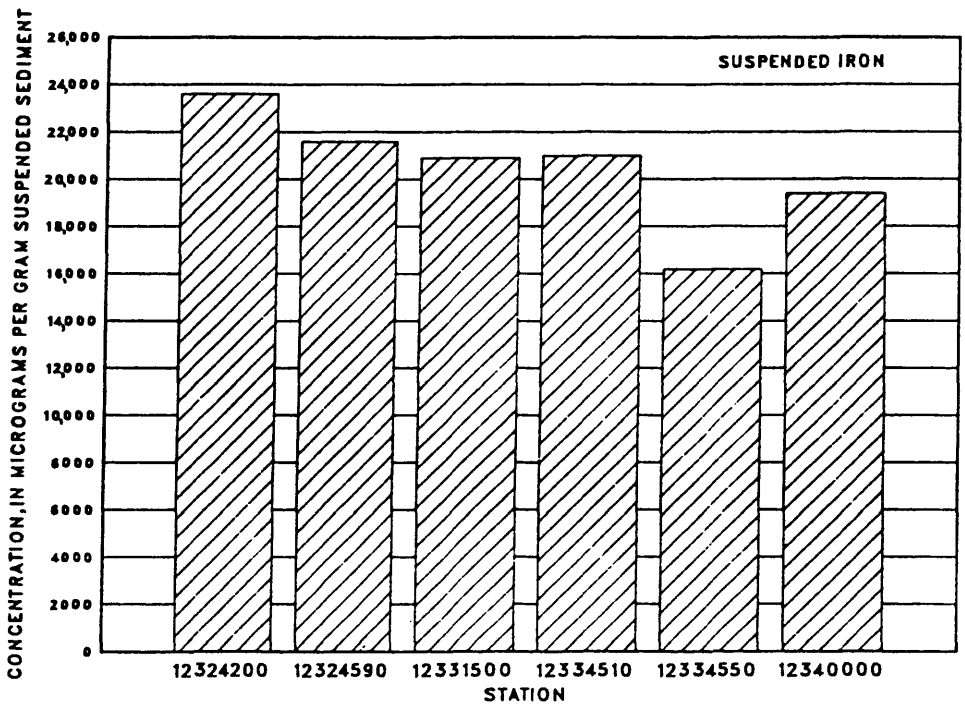


Figure 19.--Median concentrations of suspended iron in suspended sediments.

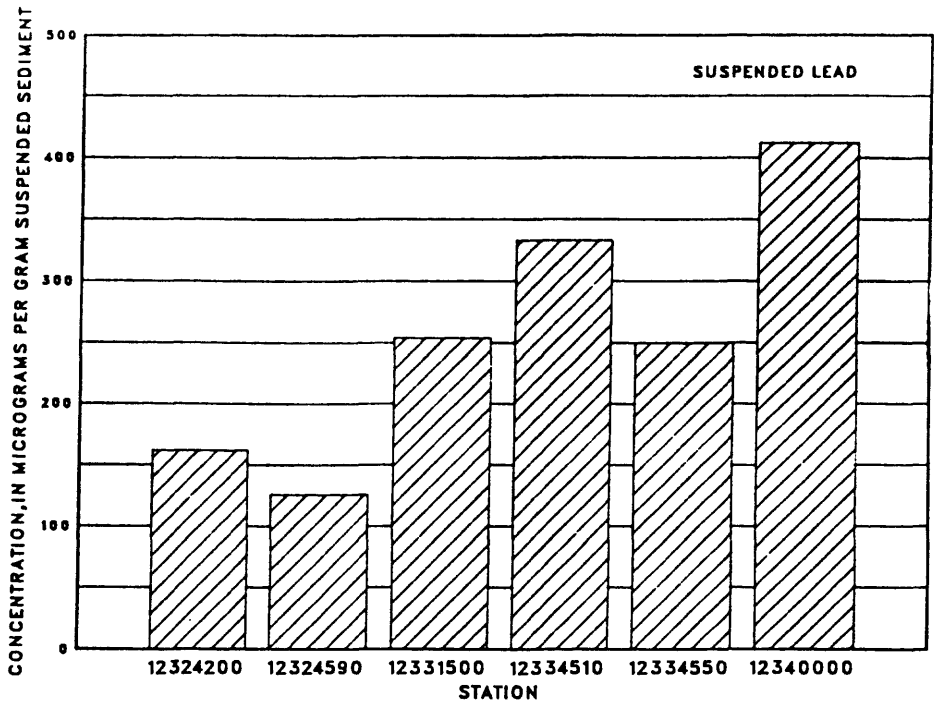


Figure 20.--Median concentrations of suspended lead in suspended sediments.

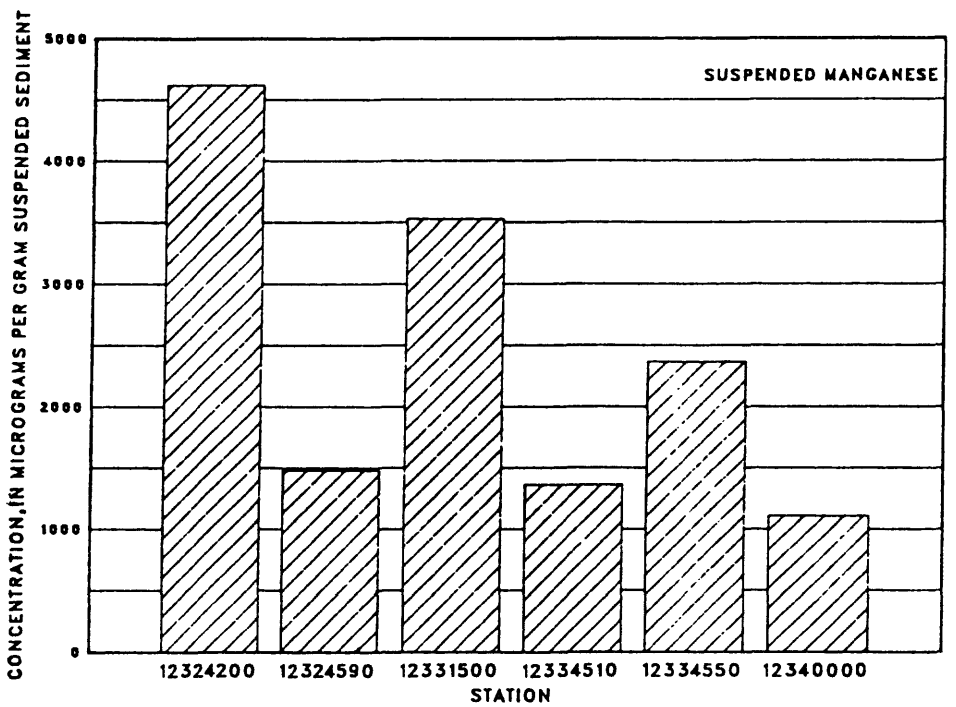


Figure 21.--Median concentrations of suspended manganese in suspended sediments.

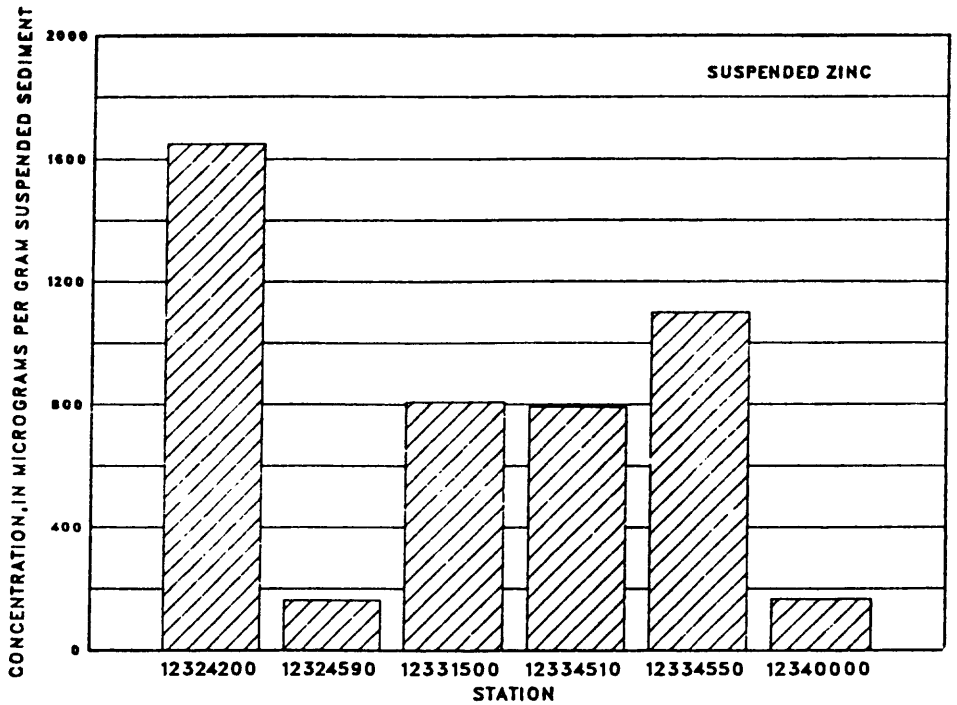


Figure 22.--Median concentrations of suspended zinc in suspended sediments.

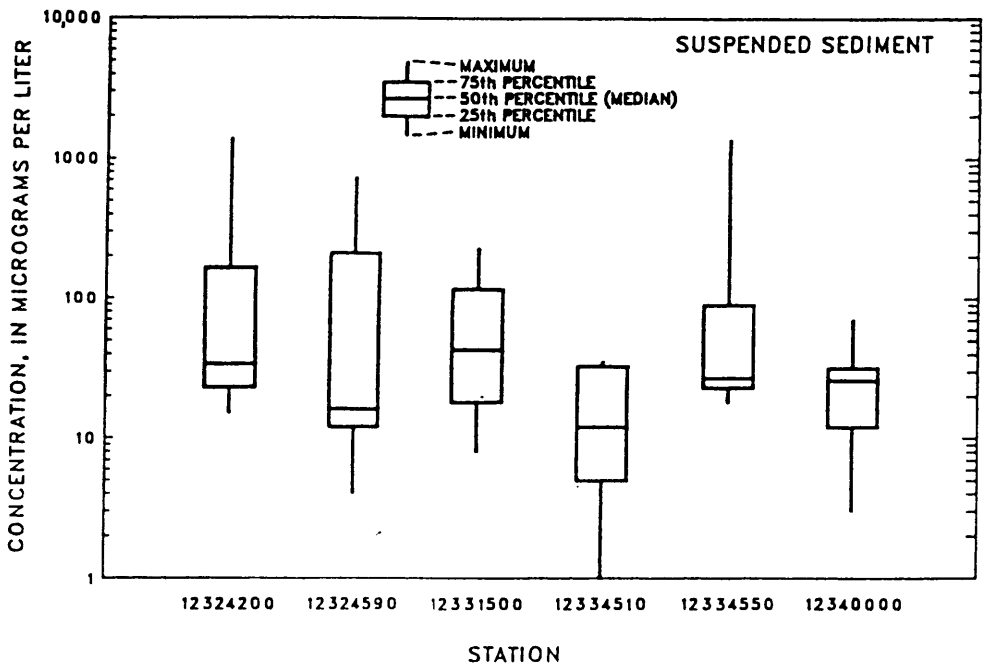


Figure 23.--Statistical distribution of concentrations of suspended sediment from cross-sectional samples.

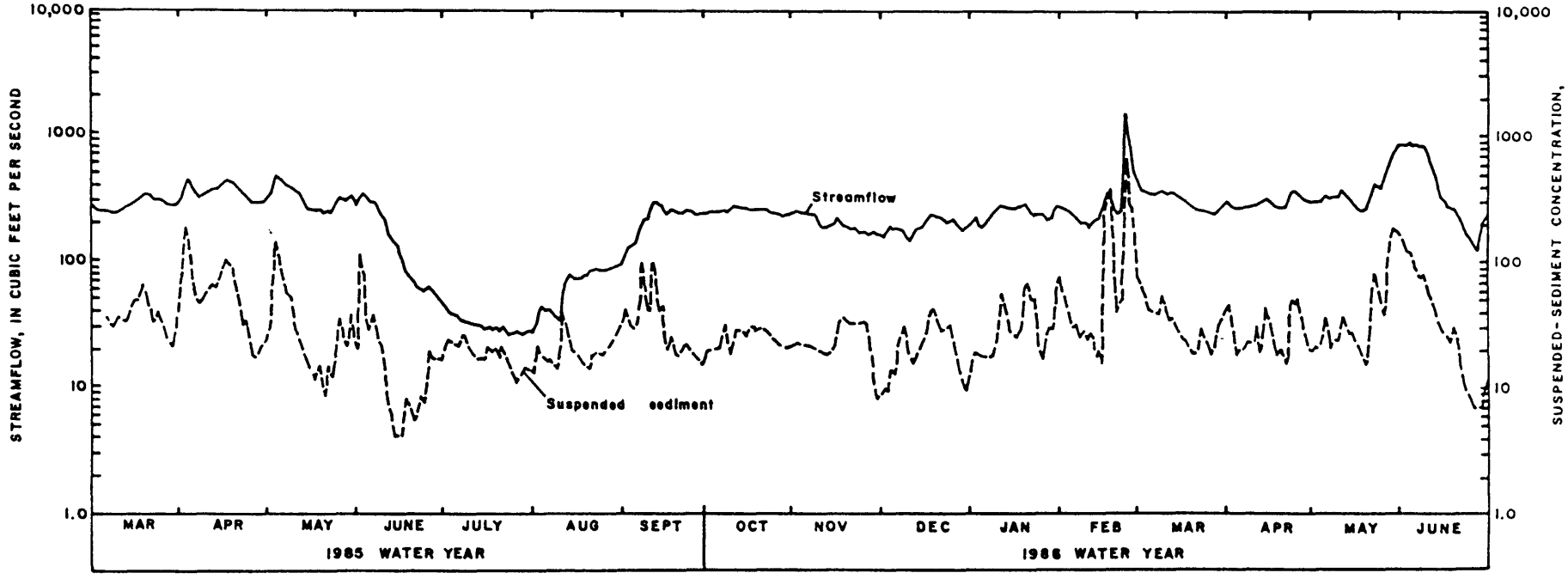


Figure 24.--Daily mean streamflow and suspended-sediment concentration for the Clark Fork at Deer Lodge, March 1985 through June 1986.

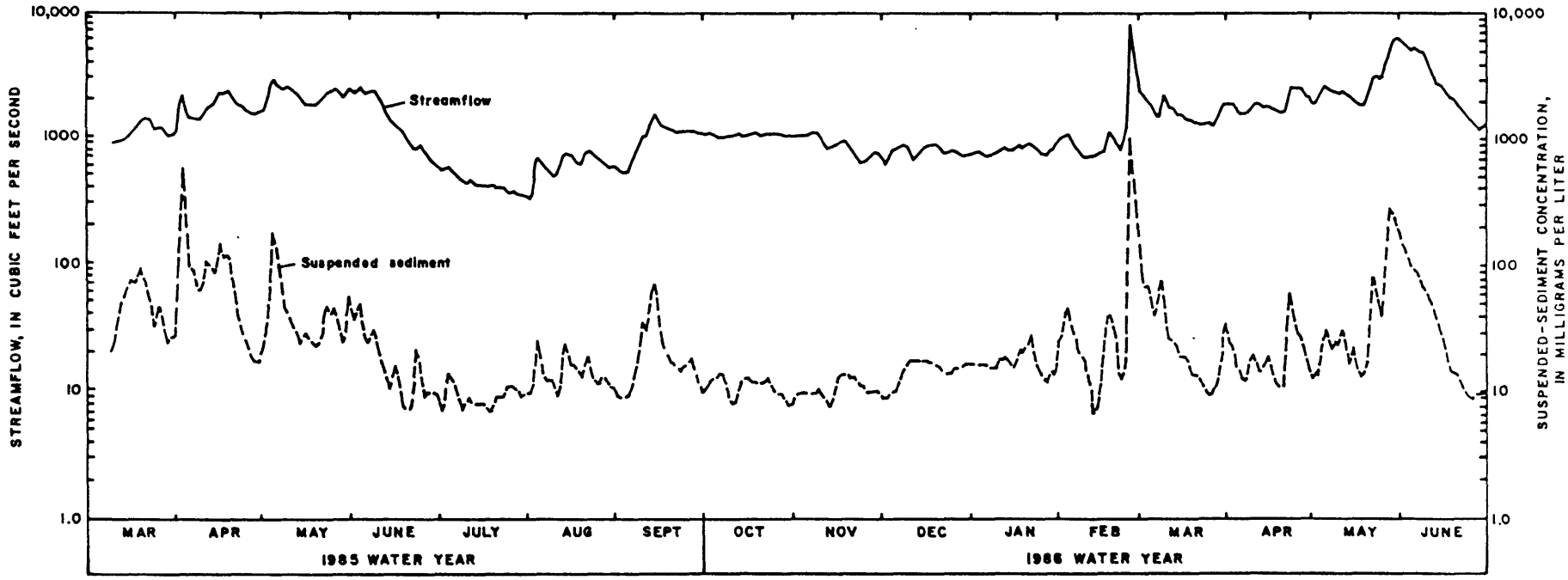


Figure 25.--Daily mean streamflow and suspended-sediment concentration for the Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986.

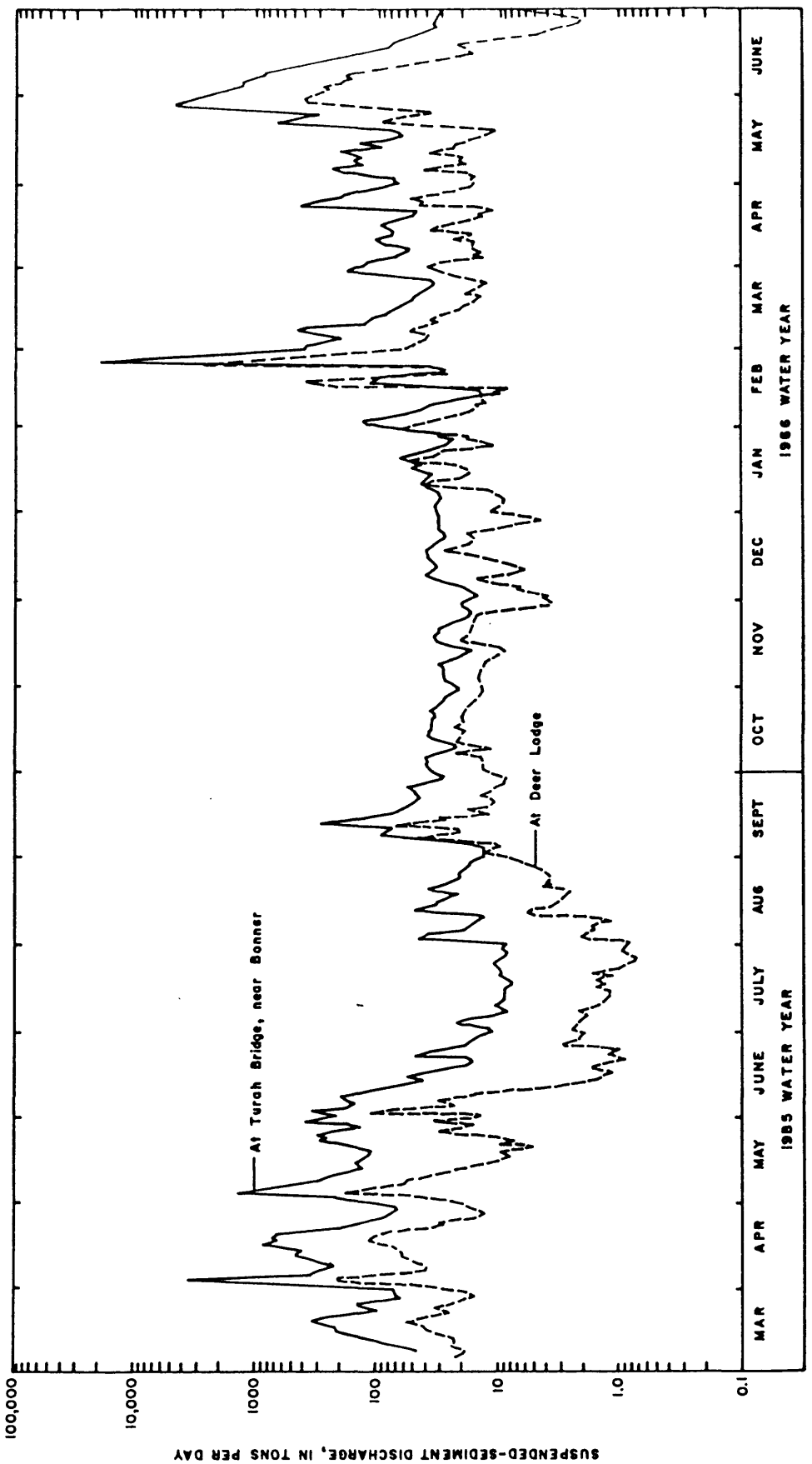


Figure 26.--Daily mean suspended-sediment discharge for the Clark Fork at Deer Lodge and Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986.

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Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*

[Analyses by U.S. Geological Survey. Abbreviations: ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; ton/d, tons per day; mm, millimeters; --, no data; <, less than detection limit of the analysis]

12324200--CLARK FORK AT DEER LODGE, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Spe-cific con-duct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, air (°C)	Temper-ature, water (°C)	Bicar-bonate, onsite (mg/L as HCO_3)	Car-bonate, onsite (mg/L as CO_3)	Alka-linity, onsite (mg/L as $CaCO_3$)
Mar 1985									
29...	1430	267	550	8.1	5.5	4.5	--	--	--
Apr									
11...	1230	358	505	8.0	8.5	9.0	--	--	--
22...	1200	351	500	8.0	4.0	4.5	--	--	128
May									
07...	1100	399	420	8.2	12.0	10.5	--	--	113
30...	1330	345	455	8.2	7.0	8.5	--	--	115
Aug									
03...	0900	41	600	8.1	11.0	11.5	--	--	196
13...	1115	76	610	8.2	12.0	11.0	--	--	183
Sep									
18...	0815	251	537	--	--	7.0	--	--	--
Feb 1986									
16...	1650	345	--	--	--	3.0	--	--	--
24...	1715	1,920	262	7.7	15.0	3.0	100	0	84
Apr									
15...	1205	347	510	7.9	5.5	7.5	160	0	126
May									
27...	1800	560	295	7.7	27.0	19.0	99	0	79

Date	Arsenic, total (µg/L as As)	Arsenic, dis-solved (µg/L as As)	Cadmium, total recov-erable (µg/L as Cd)	Cadmium, dis-solved (µg/L as Cd)	Copper, total recov-erable (µg/L as Cu)	Copper, dis-solved (µg/L as Cu)	Iron, total recov-erable (µg/L as Fe)	Iron, dis-solved (µg/L as Fe)	Lead, total recov-erable (µg/L as Pb)
Mar 1985									
29...	11	7	<1	<1	35	9	720	4	5
Apr									
11...	21	10	1	<1	130	12	2,000	14	13
22...	13	8	<1	<1	44	7	940	<3	7
May									
07...	17	12	<1	<1	80	10	1,200	13	13
30...	20	11	1	<1	59	17	950	26	4
Aug									
03...	15	12	<1	<1	22	9	290	11	<2
13...	14	13	<1	<1	30	5	430	10	4
Sep									
18...	18	12	3	<1	60	9	600	10	12
Feb 1986									
16...	53	18	2	1	300	14	16,000	20	46
24...	130	39	<1	<1	630	33	29,000	65	100
Apr									
15...	16	10	<1	<1	51	7	640	11	6
May									
27...	53	19	2	<1	290	8	5,300	17	49

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12324200--CLARK FORK AT DEER LODGE, MONT.--Continued

Date	Lead, dissolved (µg/L as Pb)	Manganese, total recoverable (µg/L as Mn)	Manganese, dissolved (µg/L as Mn)	Zinc, total recoverable (µg/L as Zn)	Zinc, dissolved (µg/L as Zn)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended, sieve diameter, percent finer than 0.062 mm
Mar 1985								
29...	4	290	210	70	19	20	14	69
Apr								
11...	2	380	130	140	34	63	61	78
22...	2	210	64	80	27	30	28	76
May								
07...	<1	290	24	90	15	51	55	70
30...	5	210	41	80	26	34	32	87
Aug								
03...	1	170	50	70	23	15	1.7	53
13...	<1	180	22	60	13	21	4.3	48
Sep								
18...	<1	220	<10	70	20	28	19	--
Feb 1986								
16...	6	1,200	10	370	20	671	625	--
24...	2	1,800	78	770	16	1,390	7,210	86
Apr								
15...	<1	210	57	70	15	35	33	46
May								
27...	1	840	46	340	14	201	304	58

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12324590--LITTLE BLACKFOOT RIVER NEAR GARRISON, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance, onsite (µS/cm)	pH, onsite (standard units)	Temperature, air (°C)	Temperature, water (°C)	Bicarbonate, onsite (mg/L as HCO_3)	Carbonate, onsite (mg/L as CO_3)	Alkalinity, onsite (mg/L as $CaCO_3$)
Mar 1985									
29...	1730	77	300	8.3	3.5	6.0	--	--	--
Apr									
11...	1030	299	208	7.6	7.0	5.0	--	--	--
22...	0930	271	215	8.0	3.0	3.5	--	--	92
May									
07...	0915	313	182	7.9	10.0	7.5	--	--	81
Feb 1986									
24...	1415	569	125	7.6	11.0	0.5	52	0	41
Apr									
15...	0945	296	215	7.9	4.0	5.0	110	0	90

Date	Arsenic, total (µg/L as As)	Arsenic, dissolved (µg/L as As)	Cadmium, total recoverable (µg/L as Cd)	Cadmium, dissolved (µg/L as Cd)	Copper, total recoverable (µg/L as Cu)	Copper, dissolved (µg/L as Cu)	Iron, total recoverable (µg/L as Fe)	Iron, dissolved (µg/L as Fe)	Lead, total recoverable (µg/L as Pb)
Mar 1985									
29...	5	4	<1	<1	3	2	110	10	2
Apr									
11...	6	5	2	<1	7	2	1,200	85	3
22...	4	4	1	<1	3	3	350	48	5
May									
07...	4	4	<1	<1	6	3	440	23	15
Feb 1986									
24...	17	5	<1	<1	30	4	12,000	71	25
Apr									
15...	5	5	<1	<1	6	4	310	33	1

Date	Lead, dissolved (µg/L as Pb)	Manganese, total recoverable (µg/L as Mn)	Manganese, dissolved (µg/L as Mn)	Zinc, total recoverable (µg/L as Zn)	Zinc, dissolved (µg/L as Zn)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended, sieve diameter, percent finer than 0.062 mm
Mar 1985								
29...	<1	20	4	<10	<3	4	.83	82
Apr								
11...	1	70	13	10	4	38	31	94
22...	2	20	10	10	3	15	11	74
May								
07...	<1	20	5	10	7	18	15	86
Feb 1986								
24...	3	1,100	10	100	4	728	1,120	75
Apr								
15...	<1	30	8	<10	8	15	12	71

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12331500--FLINT CREEK NEAR DRUMMOND, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Spe-cific con-duct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, air (°C)	Temper-ature, water (°C)	Bicar-bonate, onsite (mg/L as HCO_3)	Car-bonate, onsite (mg/L as CO_3)	Alka-linity, onsite (mg/L as $CaCO_3$)
Mar 1985									
29...	1200	130	310	8.2	3.0	3.5	--	--	--
Apr									
11...	1550	201	275	8.1	11.0	9.5	--	--	--
22...	1615	166	275	8.5	7.0	5.5	--	--	123
May									
07...	1450	92	255	8.8	15.0	13.0	--	--	117
31...	1500	108	365	8.2	19.5	13.5	--	--	--
Aug									
03...	1215	174	430	8.2	13.0	13.0	--	--	210
Feb 1986									
25...	1030	892	157	7.5	8.0	0.5	79	0	60
Apr									
15...	1545	214	260	8.1	10.5	8.5	130	0	109
May									
28...	1405	386	140	7.6	25.0	11.5	76	0	60

Date	Arsenic, total (µg/L as As)	Arsenic, dis-solved (µg/L as As)	Cadmium, total recov-erable (µg/L as Cd)	Cadmium, dis-solved (µg/L as Cd)	Copper, total recov-erable (µg/L as Cu)	Copper, dis-solved (µg/L as Cu)	Iron, total recov-erable (µg/L as Fe)	Iron, dis-solved (µg/L as Fe)	Lead, total recov-erable (µg/L as Pb)
Mar 1985									
29...	8	5	<1	<1	5	1	330	4	3
Apr									
11...	32	10	3	<1	14	2	2,000	33	27
22...	12	7	<1	<1	3	2	620	17	9
May									
07...	8	8	<1	<1	5	2	280	10	7
31...	17	13	1	<1	10	4	730	22	9
Aug									
03...	45	20	2	<1	13	3	2,200	47	25
Feb 1986									
25...	49	14	<1	<1	29	7	4,700	180	56
Apr									
15...	11	7	<1	<1	9	3	600	62	9
May									
28...	31	8	<1	<1	15	3	1,300	39	36

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12331500--FLINT CREEK NEAR DRUMMOND, MONT.--Continued

Date	Lead, dissolved (µg/L as Pb)	Manganese, total recoverable (µg/L as Mn)	Manganese, dissolved (µg/L as Mn)	Zinc, total recoverable (µg/L as Zn)	Zinc, dissolved (µg/L as Zn)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended, sieve diameter, percent finer than 0.062 mm
Mar 1985								
29...	<1	70	19	30	<3	11	3.9	94
Apr								
11...	2	330	29	70	19	88	48	93
22...	<1	110	23	30	9	26	12	93
May								
07...	<1	70	38	20	4	8	2.0	93
31...	7	210	58	40	18	43	13	93
Aug								
03...	1	560	62	120	13	103	48	61
Feb 1986								
25...	4	940	97	170	20	230	554	55
Apr								
15...	1	110	23	30	6	28	16	80
May								
28...	3	630	47	140	10	130	135	65

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12334510--ROCK CREEK NEAR CLINTON, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific con-duct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, air (°C)	Temper-ature, water (°C)	Bicar-bonate, onsite (mg/L as HCO_3)	Car-bonate, onsite (mg/L as CO_3)	Alka-linity, onsite (mg/L as $CaCO_3$)
Mar 1985									
28...	1800	196	148	8.4	2.0	4.0	--	--	--
Apr									
11...	1800	521	120	7.9	12.0	8.0	--	--	--
22...	1830	660	90	7.7	8.0	5.5	--	--	43
May									
07...	1745	1,380	70	7.6	15.0	10.0	--	--	33
21...	2015	1,650	70	7.6	18.0	12.0	--	--	32
Feb 1986									
26...	1345	866	100	7.5	12.0	0.5	57	0	46
Apr									
15...	1800	759	95	7.7	12.0	6.5	52	0	42

Date	Arsenic, total (µg/L as As)	Arsenic, dis-solved (µg/L as As)	Cadmium, total recov-erable (µg/L as Cd)	Cadmium, dis-solved (µg/L as Cd)	Copper, total recov-erable (µg/L as Cu)	Copper, dis-solved (µg/L as Cu)	Iron, total recov-erable (µg/L as Fe)	Iron, dis-solved (µg/L as Fe)	Lead, total recov-erable (µg/L as Pb)
Mar 1985									
28...	<1	<1	<1	<1	2	2	80	9	2
Apr									
11...	<1	<1	2	<1	3	<1	300	42	5
22...	<1	<1	2	<1	1	1	200	44	4
May									
07...	<1	<1	1	<1	13	4	290	38	15
21...	2	1	<1	<1	41	4	450	30	19
Feb 1986									
26...	2	1	3	<1	6	3	800	110	5
Apr									
15...	<1	<1	<1	<1	3	1	150	50	1

Date	Lead, dis-solved (µg/L as Pb)	Manga-nese, total recov-erable (µg/L as Mn)	Manga-nese, dis-solved (µg/L as Mn)	Zinc, total recov-erable (µg/L as Zn)	Zinc, dis-solved (µg/L as Zn)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended, sieve diameter, percent finer than 0.062 mm
Mar 1985								
28...	<1	20	<1	10	<3	1	.53	84
Apr								
11...	1	30	4	20	<3	12	17	75
22...	5	10	<1	10	<3	5	8.9	88
May								
07...	3	20	5	20	15	12	45	74
21...	5	20	<1	20	13	33	147	66
Feb 1986								
26...	3	40	8	30	<3	36	84	63
Apr								
15...	<1	10	<1	<10	3	7	14	51

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance, onsite ($\mu S/cm$)	pH, onsite (standard units)	Temperature, air (°C)	Temperature, water (°C)	Bicarbonate, onsite (mg/L as HCO_3)	Carbonate, onsite (mg/L as CO_3)	Alkalinity, onsite (mg/L as $CaCO_3$)
Mar 1985									
28...	1230	1,020	412	8.2	5.0	4.0	--	--	--
Apr									
12...	1050	1,730	310	8.0	9.0	9.0	--	--	--
23...	1130	1,750	292	8.0	5.0	5.0	--	--	101
May									
08...	0915	2,290	212	8.1	12.0	9.5	--	--	74
31...	0945	2,400	245	8.3	10.0	8.0	--	--	81
Aug									
03...	1545	677	375	8.5	20.0	17.0	--	--	128
13...	1500	830	360	8.7	16.0	15.5	--	--	138
Sep									
18...	1500	1,230	382	--	--	11.5	--	--	--
Feb 1986									
25...	1530	9,370	165	7.6	11.0	0.5	74	0	59
Apr									
16...	1130	1,970	285	8.0	5.5	7.0	120	0	95
May									
28...	0845	4,820	165	7.6	18.0	12.0	70	0	57

Date	Arsenic, total (µg/L as As)	Arsenic, dissolved (µg/L as As)	Cadmium, total recoverable (µg/L as Cd)	Cadmium, dissolved (µg/L as Cd)	Copper, total recoverable (µg/L as Cu)	Copper, dissolved (µg/L as Cu)	Iron, total recoverable (µg/L as Fe)	Iron, dissolved (µg/L as Fe)	Lead, total recoverable (µg/L as Pb)
Mar 1985									
28...	7	5	2	<1	80	8	550	70	65
Apr									
12...	13	7	2	<1	80	8	2,000	25	34
23...	7	5	<1	<1	22	6	600	14	15
May									
08...	5	4	<1	<1	31	7	780	19	23
31...	7	4	<1	<1	34	6	770	23	14
Aug									
03...	9	6	1	<1	10	3	360	5	<3
13...	7	7	<1	<1	14	2	370	10	4
Sep									
18...	9	8	4	<1	21	6	250	10	5
Feb 1986									
25...	64	15	3	<1	470	25	17,000	170	92
Apr									
16...	7	5	<1	<1	36	4	410	19	11
May									
28...	13	5	1	<1	100	5	3,700	32	19

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.--Continued

Date	Lead, dissolved (µg/L as Pb)	Manganese, total recoverable (µg/L as Mn)	Manganese, dissolved (µg/L as Mn)	Zinc, total recoverable (µg/L as Zn)	Zinc, dissolved (µg/L as Zn)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended, sieve diameter, percent finer than 0.062 mm
Mar 1985								
28...	5	80	13	50	5	20	55	86
Apr								
12...	1	200	13	110	11	90	420	72
23...	7	70	6	40	14	27	128	78
May								
08...	<1	90	5	50	8	47	291	55
31...	5	110	<1	60	24	42	272	57
Aug								
03...	1	90	7	50	12	26	48	38
13...	<1	90	6	30	<3	23	52	50
Sep								
18...	<1	60	<10	40	10	18	60	--
Feb 1986								
25...	5	1,700	31	1,100	27	1,370	34,700	52
Apr								
16...	<1	50	7	40	5	23	122	67
May								
28...	1	320	9	160	8	242	3,150	47

Table 2.--*Water-quality data for cross-sectional samples collected from the Clark Fork and selected tributaries*--Continued

12340000--BLACKFOOT RIVER NEAR BONNER, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature, air (°C)	Temperature, water (°C)	Bicarbonate, onsite (mg/L as HCO_3)	Carbonate, onsite (mg/L as CO_3)	Alkalinity, onsite (mg/L as $CaCO_3$)
Mar 1985									
28...	1515	535	262	8.4	12.0	5.0	--	--	--
Apr									
12...	1340	1,420	190	8.2	10.5	10.0	--	--	--
23...	1500	2,410	172	8.0	5.5	5.5	--	--	84
May									
08...	1200	4,300	160	8.2	13.0	9.0	--	--	82
21...	1715	5,150	150	8.2	22.0	12.5	--	--	78
31...	1130	4,720	170	8.3	11.5	8.5	--	--	--
Feb 1986									
26...	1015	1,890	167	7.6	7.0	0.0	100	0	82
Apr									
16...	0830	2,910	185	8.0	4.0	6.5	110	0	89

Date	Arsenic, total (µg/L as As)	Arsenic, dissolved (µg/L as As)	Cadmium, total recoverable (µg/L as Cd)	Cadmium, dissolved (µg/L as Cd)	Copper, total recoverable (µg/L as Cu)	Copper, dissolved (µg/L as Cu)	Iron, total recoverable (µg/L as Fe)	Iron, dissolved (µg/L as Fe)	Lead, total recoverable (µg/L as Pb)
Mar 1985									
28...	<1	<1	<1	<1	8	3	210	15	15
Apr									
12...	1	<1	1	<1	10	3	710	48	17
23...	<1	<1	<1	<1	5	4	230	22	15
May									
08...	<1	<1	1	<1	10	4	570	15	17
21...	<1	<1	1	<1	12	5	950	10	15
31...	12	<1	1	<1	9	4	440	15	10
Feb 1986									
26...	1	<1	2	1	7	2	720	100	3
Apr									
16...	1	<1	<1	<1	34	3	240	32	11

Date	Lead, dissolved (µg/L as Pb)	Manganese, total recoverable (µg/L as Mn)	Manganese, dissolved (µg/L as Mn)	Zinc, total recoverable (µg/L as Zn)	Zinc, dissolved (µg/L as Zn)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended, sieve diameter, percent finer than 0.062 mm
Mar 1985								
28...	2	40	4	10	<3	3	4.3	53
Apr								
12...	5	40	5	<10	7	31	119	89
23...	7	20	<1	10	8	8	52	82
May								
08...	<1	40	5	20	8	32	372	81
21...	8	60	<1	20	12	71	987	85
31...	4	30	<1	20	15	27	344	89
Feb 1986								
26...	3	40	6	<10	4	22	112	48
Apr								
16...	<1	10	1	<10	<3	24	189	46

Table 3.--*Summary statistics of water-quality data for cross-sectional samples*

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; mm, millimeter; <, less than detection limit]

STORET parameter code	Parameter and units of measurement	Number of samples	Minimum	Maximum	Mean	Median
	12324200 Clark Fork at Deer Lodge, Mont.					
00061	Streamflow, instantaneous (ft^3/s)	12	41	1,920	438	346
00095	Specific conductance (µS/cm)	11	262	610	477	508
00400	pH (standard units)	10	7.7	8.2	8.0	8.0
00010	Temperature (°C)	12	3.0	19.0	8.2	8.0
00410	Alkalinity, onsite (mg/L as $CaCO_3$)	8	79	196	128	120
01002	Arsenic, total (µg/L)	12	11	130	32	18
01000	Arsenic, dissolved (µg/L)	12	7	39	14	12
01027	Cadmium, total recoverable (µg/L)	12	< 1	3	1	1
01025	Cadmium, dissolved (µg/L)	12	< 1	1	< 1	< 1
01042	Copper, total recoverable (µg/L)	12	22	630	144	60
01040	Copper, dissolved (µg/L)	12	5	33	12	9
01045	Iron, total recoverable (µg/L)	12	290	29,000	4,840	945
01046	Iron, dissolved (µg/L)	12	3	65	17	12
01051	Lead, total recoverable (µg/L)	12	2	100	22	10
01049	Lead, dissolved (µg/L)	12	< 1	6	2	2
01055	Manganese, total recoverable (µg/L)	12	170	1,800	500	255
01056	Manganese, dissolved (µg/L)	12	10	210	62	48
01092	Zinc, total recoverable (µg/L)	12	60	770	184	80
01090	Zinc, dissolved (µg/L)	12	13	34	20	20
80154	Sediment, suspended (mg/L)	12	15	1,390	213	35
70331	Sediment, suspended (percent finer than 0.062 mm)	10	46	87	67	70
	12324590 Little Blackfoot River near Garrison, Mont.					
00061	Streamflow, instantaneous (ft^3/s)	6	77	569	304	298
00095	Specific conductance (µS/cm)	6	125	300	208	212
00400	pH (standard units)	6	7.6	8.3	7.9	7.9
00010	Temperature (°C)	6	.5	7.5	4.6	5.0
00410	Alkalinity, onsite (mg/L as $CaCO_3$)	4	41	92	76	86
01002	Arsenic, total (µg/L)	6	4	17	7	5
01000	Arsenic, dissolved (µg/L)	6	4	5	4	4
01027	Cadmium, total recoverable (µg/L)	6	< 1	2	1	< 1
01025	Cadmium, dissolved (µg/L)	6	< 1	< 1	< 1	< 1
01042	Copper, total recoverable (µg/L)	6	3	30	9	6
01040	Copper, dissolved (µg/L)	6	2	4	3	3
01045	Iron, total recoverable (µg/L)	6	110	12,000	2,400	395
01046	Iron, dissolved (µg/L)	6	10	85	45	40
01051	Lead, total recoverable (µg/L)	6	1	25	8	4
01049	Lead, dissolved (µg/L)	6	< 1	3	2	1
01055	Manganese, total recoverable (µg/L)	6	20	1,100	210	25
01056	Manganese, dissolved (µg/L)	6	4	13	8	9
01092	Zinc, total recoverable (µg/L)	6	10	100	25	10
01090	Zinc, dissolved (µg/L)	6	3	8	5	4
80154	Sediment, suspended (mg/L)	6	4	728	136	16
70331	Sediment, suspended (percent finer than 0.062 mm)	6	71	94	80	78

Table 3.--*Summary statistics of water-quality data for cross-sectional samples*--Continued

STORET parameter code	Parameter and units of measurement	Number of samples	Minimum	Maximum	Mean	Median
	12331500 Flint Creek near Drummond, Mont.					
00061	Streamflow, instantaneous (ft^3/s)	9	92	892	263	174
00095	Specific conductance (µS/cm)	9	140	430	274	275
00400	pH (standard units)	9	7.5	8.8	8.1	8.2
00010	Temperature (°C)	9	.5	13.5	8.7	9.5
00410	Alkalinity, onsite (mg/L as $CaCO_3$)	6	60	210	113	113
01002	Arsenic, total (µg/L)	9	8	49	24	17
01000	Arsenic, dissolved (µg/L)	9	5	20	10	8
01027	Cadmium, total recoverable (µg/L)	9	< 1	3	1	< 1
01025	Cadmium, dissolved (µg/L)	9	< 1	< 1	< 1	< 1
01042	Copper, total recoverable (µg/L)	9	3	29	11	10
01040	Copper, dissolved (µg/L)	9	1	7	3	3
01045	Iron, total recoverable (µg/L)	9	280	4,700	1,420	730
01046	Iron, dissolved (µg/L)	9	4	180	46	33
01051	Lead, total recoverable (µg/L)	9	3	56	20	9
01049	Lead, dissolved (µg/L)	9	< 1	7	2	1
01055	Manganese, total recoverable (µg/L)	9	70	940	337	210
01056	Manganese, dissolved (µg/L)	9	19	97	44	38
01092	Zinc, total recoverable (µg/L)	9	20	170	72	40
01090	Zinc, dissolved (µg/L)	9	3	20	11	10
80154	Sediment, suspended (mg/L)	9	8	230	74	43
70331	Sediment, suspended (percent finer than 0.062 mm)	9	55	94	81	93
	12334510 Rock Creek near Clinton, Mont.					
00061	Streamflow, instantaneous (ft^3/s)	7	196	1,650	862	759
00095	Specific conductance (µS/cm)	7	70	148	99	95
00400	pH (standard units)	7	7.5	8.4	7.8	7.7
00010	Temperature (°C)	7	.5	12.0	6.6	6.5
00410	Alkalinity, onsite (mg/L as $CaCO_3$)	5	32	46	39	42
01002	Arsenic, total (µg/L)	7	< 1	2	1	< 1
01000	Arsenic dissolved (µg/L)	7	< 1	1	< 1	< 1
01027	Cadmium, total recoverable (µg/L)	7	< 1	3	2	1
01025	Cadmium, dissolved (µg/L)	7	< 1	< 1	< 1	< 1
01042	Copper, total recoverable (µg/L)	7	1	41	10	3
01040	Copper, dissolved (µg/L)	7	< 1	4	2	2
01045	Iron, total recoverable (µg/L)	7	80	800	324	290
01046	Iron, dissolved (µg/L)	7	9	110	46	42
01051	Lead, total recoverable (µg/L)	7	1	19	7	5
01049	Lead, dissolved (µg/L)	7	< 1	5	3	3
01055	Manganese, total recoverable (µg/L)	7	10	40	21	20
01056	Manganese, dissolved (µg/L)	7	< 1	8	3	< 1
01092	Zinc, total recoverable (µg/L)	7	<10	30	17	20
01090	Zinc, dissolved (µg/L)	7	< 3	15	6	< 3
80154	Sediment, suspended (mg/L)	7	1	36	15	12
70331	Sediment, suspended (percent finer than 0.062 mm)	7	51	88	72	74

Table 3.--*Summary statistics of water-quality data for cross-sectional samples*--Continued

STORET parameter code	Parameter and units of measurement	Number of samples	Minimum	Maximum	Mean	Median
	12334550 Clark Fork at Turah Bridge near Bonner, Mont.					
00061	Streamflow, instantaneous (ft^3/s)	11	677	9,370	2,550	1,750
00095	Specific conductance (µS/cm)	11	165	412	291	292
00400	pH (standard units)	10	7.6	8.7	8.1	8.0
00010	Temperature (°C)	11	.5	17.0	9.0	9.0
00410	Alkalinity, onsite (mg/L as $CaCO_3$)	8	57	138	92	88
01002	Arsenic, total (µg/L)	11	5	64	14	7
01000	Arsenic, dissolved (µg/L)	11	4	15	6	5
01027	Cadmium, total recoverable (µg/L)	11	< 1	4	2	1
01025	Cadmium, dissolved (µg/L)	11	< 1	< 1	< 1	< 1
01042	Copper, total recoverable (µg/L)	11	10	470	82	34
01040	Copper, dissolved (µg/L)	11	2	25	7	6
01045	Iron, total recoverable (µg/L)	11	250	17,000	2,440	600
01046	Iron, dissolved (µg/L)	11	5	170	36	19
01051	Lead, total recoverable (µg/L)	11	< 3	92	26	15
01049	Lead, dissolved (µg/L)	11	< 1	7	3	1
01055	Manganese, total recoverable (µg/L)	11	50	1,700	260	90
01056	Manganese, dissolved (µg/L)	11	< 1	31	10	7
01092	Zinc, total recoverable (µg/L)	11	30	1,100	157	50
01090	Zinc, dissolved (µg/L)	11	< 3	27	12	10
80154	Sediment, suspended (mg/L)	11	18	1,370	175	27
70331	Sediment, suspended (percent finer than 0.062 mm)	10	38	86	60	56
	12340000 Blackfoot River near Bonner, Mont.					
00061	Streamflow, instantaneous (ft^3/s)	8	535	5,150	2,920	2,660
00095	Specific conductance (µS/cm)	8	150	262	182	171
00400	pH (standard units)	8	7.6	8.4	8.1	8.2
00010	Temperature (°C)	8	.0	12.5	7.1	7.5
00410	Alkalinity, onsite (mg/L as $CaCO_3$)	5	78	89	83	82
01002	Arsenic, total (µg/L)	8	< 1	12	2	< 1
01000	Arsenic, dissolved (µg/L)	8	< 1	< 1	< 1	< 1
01027	Cadmium, total recoverable (µg/L)	8	< 1	2	1	1
01025	Cadmium, dissolved (µg/L)	8	< 1	1	< 1	< 1
01042	Copper, total recoverable (µg/L)	8	5	34	12	10
01040	Copper, dissolved (µg/L)	8	2	5	4	4
01045	Iron, total recoverable (µg/L)	8	210	950	509	505
01046	Iron, dissolved (µg/L)	8	10	100	32	18
01051	Lead, total recoverable (µg/L)	8	3	17	13	15
01049	Lead, dissolved (µg/L)	8	< 1	8	4	4
01055	Manganese, total recoverable (µg/L)	8	10	60	35	40
01056	Manganese, dissolved (µg/L)	8	< 1	6	3	2
01092	Zinc, total recoverable (µg/L)	8	<10	20	14	10
01090	Zinc, dissolved (µg/L)	8	< 3	15	8	8
80154	Sediment, suspended (mg/L)	8	3	71	27	26
70331	Sediment, suspended (percent finer than 0.062 mm)	8	46	89	72	82

Table 4.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Deer Lodge, March 1985 through June 1986*

[ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day; ---, no data]

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1985					
		MARCH			APRIL			MAY	
1	275	---	---	301	48	39	315	26	22
2	261	---	---	333	76	68	335	33	30
3	249	---	---	408	188	207	381	66	68
4	242	---	---	450	170	207	469	149	189
5	250	---	---	423	96	110	466	114	143
6	238	36	23	363	52	51	429	83	96
7	242	32	21	320	44	38	400	55	59
8	233	28	18	315	45	38	395	55	59
9	239	31	20	322	50	43	390	53	56
10	247	37	25	333	57	51	383	38	39
11	247	35	23	353	62	59	372	27	27
12	254	33	23	369	65	65	352	25	24
13	257	33	23	371	62	62	340	20	18
14	270	38	28	383	61	63	308	18	15
15	288	44	34	397	71	76	264	15	11
16	294	49	39	404	89	97	257	14	9.7
17	305	47	39	442	105	125	256	11	7.6
18	323	51	44	435	93	109	256	13	9.0
19	331	65	58	431	92	107	259	15	10
20	329	53	47	410	66	73	259	12	8.4
21	323	41	36	375	48	49	226	8	4.9
22	301	32	26	341	30	28	251	15	10
23	294	32	25	339	35	32	231	11	6.9
24	305	41	34	308	28	23	244	14	9.2
25	301	35	28	295	20	16	279	23	17
26	295	29	23	292	17	13	327	35	31
27	286	25	19	293	17	13	308	28	23
28	272	21	15	291	19	15	295	20	16
29	271	20	15	289	22	17	298	22	18
30	270	25	18	302	22	18	337	37	34
31	275	34	25	---	---	---	302	20	16
TOTAL	8,567	---	729	10,688	---	1,912	9,984	---	1,086.7

Table 4.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Deer Lodge, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1985					
		JUNE			JULY			AUGUST	
1	257	20	14	41	22	2.4	26	12	0.84
2	335	124	112	39	23	2.4	31	21	1.8
3	348	80	75	38	21	2.2	44	18	2.1
4	327	28	25	37	21	2.1	41	17	1.9
5	306	28	23	36	20	1.9	39	15	1.6
6	305	39	32	33	20	1.8	40	15	1.6
7	302	32	26	32	25	2.2	39	16	1.7
8	282	22	17	32	25	2.2	37	15	1.5
9	247	22	15	31	21	1.8	33	13	1.2
10	202	12	6.5	31	18	1.5	31	20	1.7
11	169	8	3.7	30	17	1.4	46	41	5.1
12	160	6	2.6	30	16	1.3	67	32	5.8
13	147	4	1.6	29	16	1.3	77	26	5.4
14	140	4	1.5	28	16	1.2	74	19	3.8
15	131	4	1.4	28	16	1.2	72	18	3.5
16	104	4	1.1	29	20	1.6	69	17	3.2
17	92	7	1.7	27	19	1.4	70	16	3.0
18	77	8	1.7	28	18	1.4	69	15	2.8
19	71	6	1.2	30	20	1.6	75	14	2.8
20	65	5	.88	25	16	1.1	72	13	2.5
21	57	6	.92	31	20	1.7	82	20	4.4
22	59	8	1.3	27	18	1.3	82	16	3.5
23	56	8	1.2	25	15	1.0	83	18	4.0
24	53	7	1.0	26	13	.91	80	17	3.7
25	61	18	3.0	26	11	.77	80	17	3.7
26	57	19	2.9	27	10	.73	79	18	3.8
27	51	16	2.2	26	11	.77	80	19	4.1
28	49	16	2.1	25	13	.88	85	21	4.8
29	46	16	2.0	26	14	.98	87	24	5.6
30	43	16	1.9	27	13	.95	89	26	6.2
31	---	---	---	26	13	.91	90	29	7.0
TOTAL	4,599	---	381.40	926	---	44.90	1,969	---	104.64

Table 4.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Deer Lodge, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
					1985				
		SEPTEMBER			OCTOBER			NOVEMBER	
1	96	30	7.8	254	20	14	248	22	15
2	109	41	12	252	20	14	257	23	16
3	129	37	13	258	20	14	252	22	15
4	130	30	11	256	20	14	251	22	15
5	136	28	10	258	20	14	249	22	15
6	137	30	11	256	20	14	246	21	14
7	165	42	19	263	33	23	247	21	14
8	205	94	52	266	24	17	251	20	14
9	208	52	29	248	17	11	244	20	13
10	206	38	21	261	25	18	208	19	11
11	212	38	22	289	30	23	200	18	9.7
12	289	97	76	293	28	22	190	18	9.2
13	288	57	44	285	29	22	200	18	9.7
14	264	38	27	284	27	21	200	20	11
15	270	43	31	275	26	19	210	30	17
16	232	23	14	285	31	24	230	35	22
17	226	19	12	270	31	23	210	36	20
18	251	25	17	264	28	20	200	34	18
19	242	20	13	268	29	21	200	33	18
20	236	17	11	260	30	21	190	33	17
21	229	17	11	265	30	21	190	33	17
22	229	20	12	264	28	20	190	33	17
23	246	21	14	263	28	20	180	33	16
24	249	20	13	252	25	17	180	34	17
25	241	18	12	256	24	17	180	33	16
26	239	17	11	252	23	16	170	27	12
27	222	16	9.6	256	22	15	170	16	7.3
28	224	15	9.1	248	21	14	180	8	3.9
29	228	14	8.6	241	21	14	170	8	3.7
30	243	17	11	243	22	14	170	9	4.1
31	---	---	---	246	22	15	---	---	---
TOTAL	6,381	---	564.1	8,131	---	552	6,263	---	407.6

Table 4.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Deer Lodge, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
		1985				1986			
		DECEMBER			JANUARY			FEBRUARY	
1	170	10	4.6	220	20	12	299	73	59
2	160	9	3.9	240	19	12	291	54	42
3	180	14	6.8	210	18	10	283	45	34
4	200	14	7.6	200	18	9.7	274	36	27
5	190	13	6.7	190	18	9.2	268	29	21
6	190	22	11	210	18	10	245	32	21
7	190	26	13	220	18	11	230	25	16
8	180	33	16	240	18	12	220	27	16
9	180	20	9.7	261	25	18	220	29	17
10	170	17	7.8	276	39	29	210	23	13
11	150	15	6.1	299	59	48	200	28	15
12	160	17	7.3	290	42	33	210	27	15
13	180	19	9.2	280	29	22	220	17	10
14	190	22	11	270	27	20	220	21	12
15	200	25	13	270	26	19	240	13	8.4
16	210	30	17	273	25	18	302	223	212
17	230	39	24	288	28	22	372	300	301
18	250	45	30	285	31	24	372	402	418
19	240	37	24	308	68	57	332	145	130
20	240	29	19	291	69	54	270	35	26
21	230	28	17	265	52	37	260	50	35
22	220	29	17	240	50	32	251	50	34
23	210	30	17	250	52	35	268	100	72
24	220	32	19	255	28	19	1,240	684	2,840
25	230	25	16	250	16	11	1,610	310	1,350
26	220	18	11	240	23	15	870	280	658
27	200	15	8.1	230	30	19	543	150	220
28	190	12	6.2	240	31	20	463	85	106
29	180	9	4.4	246	29	19	---	---	---
30	190	12	6.2	281	64	49	---	---	---
31	200	16	8.6	304	82	67	---	---	---
TOTAL	6,150	---	378.2	7,922	---	772.9	10,783	---	6,728.4

Table 4.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Deer Lodge, for March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
					1986				
		MARCH			APRIL			MAY	
1	409	65	72	340	46	42	310	20	17
2	392	57	60	328	40	35	307	22	18
3	379	48	49	301	29	24	309	20	17
4	369	44	44	283	18	14	313	25	21
5	360	43	42	283	23	18	370	44	44
6	356	41	39	278	20	15	359	30	29
7	358	40	39	277	21	16	338	20	18
8	380	55	56	282	24	18	345	24	22
9	385	55	57	285	23	18	345	24	22
10	373	39	39	282	23	18	341	23	21
11	355	34	33	298	34	27	403	38	41
12	382	38	39	308	18	15	370	32	32
13	383	34	35	307	26	22	339	26	24
14	354	30	29	331	44	39	323	29	25
15	341	26	24	346	39	36	310	26	22
16	325	25	22	325	29	25	294	22	17
17	320	24	21	324	23	20	285	20	15
18	314	21	18	295	20	16	269	16	12
19	307	19	16	289	18	14	261	15	11
20	283	19	15	287	21	16	273	19	14
21	277	20	15	281	15	11	326	38	33
22	267	29	21	286	18	14	432	82	96
23	259	25	17	345	52	48	453	77	94
24	264	23	16	374	44	44	415	54	61
25	257	20	14	390	54	57	374	36	36
26	256	19	13	374	43	43	400	40	43
27	249	25	17	353	33	31	505	125	170
28	263	31	22	337	26	24	640	185	320
29	274	36	27	315	21	18	759	190	389
30	291	40	31	326	20	18	849	180	413
31	316	43	37	---	---	---	886	160	383
TOTAL	10,098	---	979	9,430	---	756	12,503	---	2,480

Table 4.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Deer Lodge, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
		1986	
		JUNE	
1	896	135	327
2	874	120	283
3	852	115	265
4	937	120	304
5	851	88	202
6	891	84	202
7	835	74	167
8	882	82	195
9	858	60	139
10	693	52	97
11	571	47	72
12	491	38	50
13	393	32	34
14	344	29	27
15	331	27	24
16	315	24	20
17	284	22	17
18	285	31	24
19	280	30	23
20	256	20	14
21	214	14	8.1
22	185	10	5.0
23	169	9	4.1
24	169	8	3.7
25	142	7	2.7
26	128	7	2.4
27	124	7	2.3
28	125	7	2.4
29	165	10	4.5
30	230	19	12
31	---	---	---
TOTAL	13,770	---	2,533.2

Table 5.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986*

[ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day; ---, no data]

Day	Mean discharge[1] (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1985					
		MARCH			APRIL			MAY	
1	---	---	---	1,090	60	177	1,720	32	149
2	---	---	---	1,600	284	1,230	1,930	41	214
3	---	---	---	2,320	569	3,560	2,380	95	610
4	---	---	---	1,810	224	1,090	2,950	177	1,410
5	---	---	---	1,450	87	341	2,860	125	965
6	---	---	---	1,420	86	330	2,570	88	611
7	---	---	---	1,410	76	289	2,430	57	374
8	900	19	46	1,370	60	222	2,460	43	286
9	920	22	55	1,410	59	225	2,570	38	264
10	930	27	68	1,490	77	310	2,490	34	229
11	930	37	93	1,630	107	471	2,350	31	197
12	940	46	117	1,770	97	464	2,250	28	170
13	960	56	145	1,800	95	462	2,140	22	127
14	980	66	175	1,850	81	405	1,940	26	136
15	1,050	74	210	1,990	101	543	1,850	29	145
16	1,120	71	215	2,260	145	885	1,840	26	129
17	1,160	67	210	2,200	110	653	1,810	25	122
18	1,270	79	271	2,260	119	726	1,800	24	117
19	1,370	92	340	2,360	109	695	1,810	22	108
20	1,410	82	312	2,300	73	453	1,890	23	117
21	1,400	65	246	2,040	51	281	2,030	29	159
22	1,300	47	165	1,840	37	184	2,190	42	248
23	1,130	31	95	1,760	30	143	2,290	48	297
24	1,170	32	101	1,720	26	121	2,270	39	239
25	1,200	45	146	1,590	22	94	2,450	47	311
26	1,160	46	144	1,550	19	80	2,350	39	247
27	1,090	32	94	1,500	18	73	2,240	27	163
28	1,030	22	61	1,480	17	68	2,050	23	127
29	1,010	26	71	1,520	17	70	2,130	29	167
30	1,010	26	71	1,590	22	94	2,500	57	385
31	1,020	26	72	---	---	---	2,400	45	292
TOTAL	26,460	---	3,523	52,380	---	14,739	68,940	---	9,115

Table 5.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1985					
		JUNE			JULY			AUGUST	
1	2,240	34	206	565	7	11	323	10	8.7
2	2,330	46	289	560	8	12	376	12	12
3	2,600	48	337	590	13	21	670	26	47
4	2,250	30	182	610	14	23	700	21	40
5	2,180	25	147	530	12	17	625	14	24
6	2,310	24	150	510	10	14	575	12	19
7	2,280	29	179	477	8	10	550	12	18
8	2,420	30	196	460	7	8.7	520	12	17
9	2,190	22	130	454	8	9.8	500	11	15
10	1,930	17	89	443	9	11	520	9	13
11	1,710	15	69	478	8	10	575	11	17
12	1,560	13	55	436	8	9.4	720	20	39
13	1,420	10	38	421	8	9.1	760	24	49
14	1,360	12	44	420	8	9.1	740	19	38
15	1,330	16	57	428	8	9.2	730	16	32
16	1,230	14	46	412	8	8.9	725	17	33
17	1,160	10	31	407	7	7.7	650	15	26
18	1,070	7	20	425	7	8.0	620	14	23
19	960	7	18	417	8	9.0	630	13	22
20	850	7	16	413	9	10	740	17	34
21	800	9	19	393	9	9.5	800	18	39
22	830	22	49	399	9	9.7	760	14	29
23	800	20	43	377	10	10	725	13	25
24	900	13	32	361	11	11	680	12	22
25	800	9	19	377	11	11	650	12	21
26	700	10	19	379	10	10	625	13	22
27	670	10	18	356	10	9.6	610	13	21
28	640	10	17	348	9	8.5	580	12	19
29	600	10	16	346	9	8.4	580	11	17
30	590	8	13	348	10	9.4	590	11	18
31	---	---	---	333	10	9.0	575	10	16
TOTAL	42,710	---	2,544	13,473	---	334.0	19,424	---	775.7

Table 5.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1985					
		SEPTEMBER			OCTOBER			NOVEMBER	
1	550	9	13	1,070	11	32	1,030	9	25
2	540	9	13	1,090	12	35	1,040	10	28
3	530	9	13	1,090	13	38	1,050	10	28
4	525	9	13	1,060	13	37	1,050	10	28
5	550	10	15	1,030	14	39	1,060	10	29
6	640	12	21	1,010	14	38	1,070	10	29
7	740	15	30	1,010	12	33	1,090	10	29
8	850	24	55	1,020	9	25	1,110	11	33
9	990	35	94	1,020	8	22	1,090	10	29
10	1,010	29	79	1,030	8	22	971	10	26
11	970	27	71	1,050	10	28	857	9	21
12	1,190	41	132	1,080	12	35	800	8	17
13	1,510	72	294	1,070	13	38	784	8	17
14	1,370	45	166	1,040	13	37	811	10	22
15	1,290	30	104	1,050	13	37	851	13	30
16	1,280	24	83	1,070	12	35	891	14	34
17	1,250	20	67	1,080	12	35	933	14	35
18	1,220	18	59	1,090	12	35	939	14	35
19	1,200	17	55	1,070	12	35	915	13	32
20	1,130	17	52	1,030	12	33	900	13	32
21	1,100	16	48	1,040	12	34	840	13	29
22	1,130	14	43	1,070	13	38	760	12	25
23	1,130	16	49	1,070	12	35	660	11	20
24	1,120	16	48	1,070	11	32	600	11	18
25	1,120	17	51	1,070	10	29	620	10	17
26	1,110	19	57	1,090	10	29	640	10	17
27	1,110	15	45	1,070	10	29	720	10	19
28	1,100	12	36	1,050	9	26	780	10	21
29	1,090	10	29	1,040	8	22	760	10	21
30	1,080	10	29	1,030	8	22	720	9	17
31	---	---	---	1,030	8	22	---	---	---
TOTAL	30,425	---	1,864	32,690	---	987	26,342	---	763

Table 5.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
		1985				1986			
		DECEMBER			JANUARY			FEBRUARY	
1	650	9	16	750	17	34	1,010	30	82
2	605	9	15	770	17	35	1,070	44	127
3	660	10	18	780	17	36	1,100	47	140
4	740	10	20	770	17	35	959	38	98
5	800	10	22	730	17	34	880	29	69
6	840	12	27	720	16	31	822	24	53
7	860	14	33	740	16	32	778	21	44
8	900	16	39	750	16	32	741	20	40
9	880	18	43	790	16	34	715	18	35
10	840	18	41	830	19	43	699	15	28
11	750	18	36	862	18	42	704	11	21
12	660	18	32	845	20	46	715	7	14
13	700	18	34	806	18	39	725	7	14
14	750	18	36	794	17	36	735	8	16
15	820	18	40	789	16	34	757	14	29
16	860	17	39	862	18	42	800	22	48
17	900	17	41	939	22	56	1,120	40	121
18	910	17	42	823	20	44	1,150	40	124
19	905	16	39	868	22	52	1,050	36	102
20	860	16	37	939	23	58	922	28	70
21	820	15	33	958	28	72	823	15	33
22	760	14	29	857	20	46	800	13	28
23	740	14	28	834	18	41	828	17	38
24	770	14	29	800	16	35	1,300	70	246
25	780	15	32	762	14	29	7,940	1,140	24,400
26	770	16	33	751	13	26	6,000	730	11,800
27	750	16	32	746	12	24	4,480	410	4,960
28	725	17	33	822	15	33	2,810	190	1,440
29	700	17	32	839	14	32	---	---	---
30	700	17	32	856	15	35	---	---	---
31	730	17	34	975	25	66	---	---	---
TOTAL	24,135	---	997	25,357	---	1,234	42,433	---	44,220

Table 5.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1986					
		MARCH			APRIL			MAY	
1	2,340	110	695	1,960	27	143	1,940	13	68
2	2,170	68	398	1,970	25	133	1,890	15	77
3	2,150	72	418	1,970	24	128	2,010	14	76
4	1,960	57	302	1,700	16	73	2,230	24	145
5	1,870	44	222	1,670	16	72	2,680	27	195
6	1,690	40	183	1,630	14	62	2,620	34	241
7	1,490	68	274	1,660	13	58	2,470	25	167
8	1,570	82	348	1,660	13	58	2,370	21	134
9	2,310	82	511	1,690	18	82	2,280	26	160
10	1,980	40	214	1,830	19	94	2,240	23	139
11	1,840	26	129	1,990	20	107	2,350	27	171
12	1,780	26	125	1,940	15	79	2,450	33	218
13	1,790	25	121	1,890	15	77	2,290	22	136
14	1,680	19	86	1,800	16	78	2,230	16	96
15	1,630	20	88	1,830	18	89	2,140	25	144
16	1,570	19	81	1,930	20	104	2,010	20	109
17	1,480	19	76	1,870	17	86	1,910	15	77
18	1,460	17	67	1,770	13	62	1,850	13	65
19	1,470	14	56	1,670	12	54	1,850	14	70
20	1,430	14	54	1,650	12	53	2,030	17	93
21	1,370	14	52	1,640	11	49	2,410	35	228
22	1,340	13	47	1,760	20	95	3,030	85	695
23	1,310	12	42	2,620	63	446	3,210	81	702
24	1,350	11	40	2,630	54	383	3,030	55	450
25	1,390	10	38	2,570	38	264	2,910	39	306
26	1,290	10	35	2,570	29	201	3,150	58	493
27	1,280	11	38	2,520	28	191	3,850	164	1,700
28	1,340	13	47	2,380	25	161	5,030	293	3,980
29	1,580	19	81	2,210	18	107	5,900	291	4,640
30	1,770	28	134	2,130	15	86	6,360	232	3,980
31	1,910	36	186	---	---	---	6,470	202	3,530
TOTAL	51,590	---	5,188	59,110	---	3,675	89,190	---	23,285

Table 5.--*Daily mean streamflow, suspended-sediment concentration, and suspended-sediment discharge for the Clark Fork at Turah Bridge, near Bonner, March 1985 through June 1986*--Continued

Day	Mean discharge (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
		1986	
		JUNE	
1	6,050	159	2,600
2	5,830	153	2,410
3	5,480	123	1,820
4	5,320	110	1,580
5	5,150	92	1,280
6	5,340	98	1,410
7	5,020	87	1,180
8	4,780	68	878
9	4,870	68	894
10	4,260	57	656
11	3,730	56	564
12	3,290	47	418
13	3,010	38	309
14	2,720	33	242
15	2,650	28	200
16	2,520	22	150
17	2,280	18	111
18	2,110	15	85
19	2,050	15	83
20	1,990	14	75
21	1,840	12	60
22	1,720	11	51
23	1,590	10	43
24	1,500	10	40
25	1,400	9	34
26	1,330	10	36
27	1,280	10	35
28	1,220	10	33
29	1,210	10	33
30	1,250	9	30
31	---	---	---
TOTAL	92,790	---	17,340

[1]For the period prior to May 9, 1986, mean daily discharge was estimated from once-daily stage readings and a stage-discharge rating table developed from streamflow measurements.