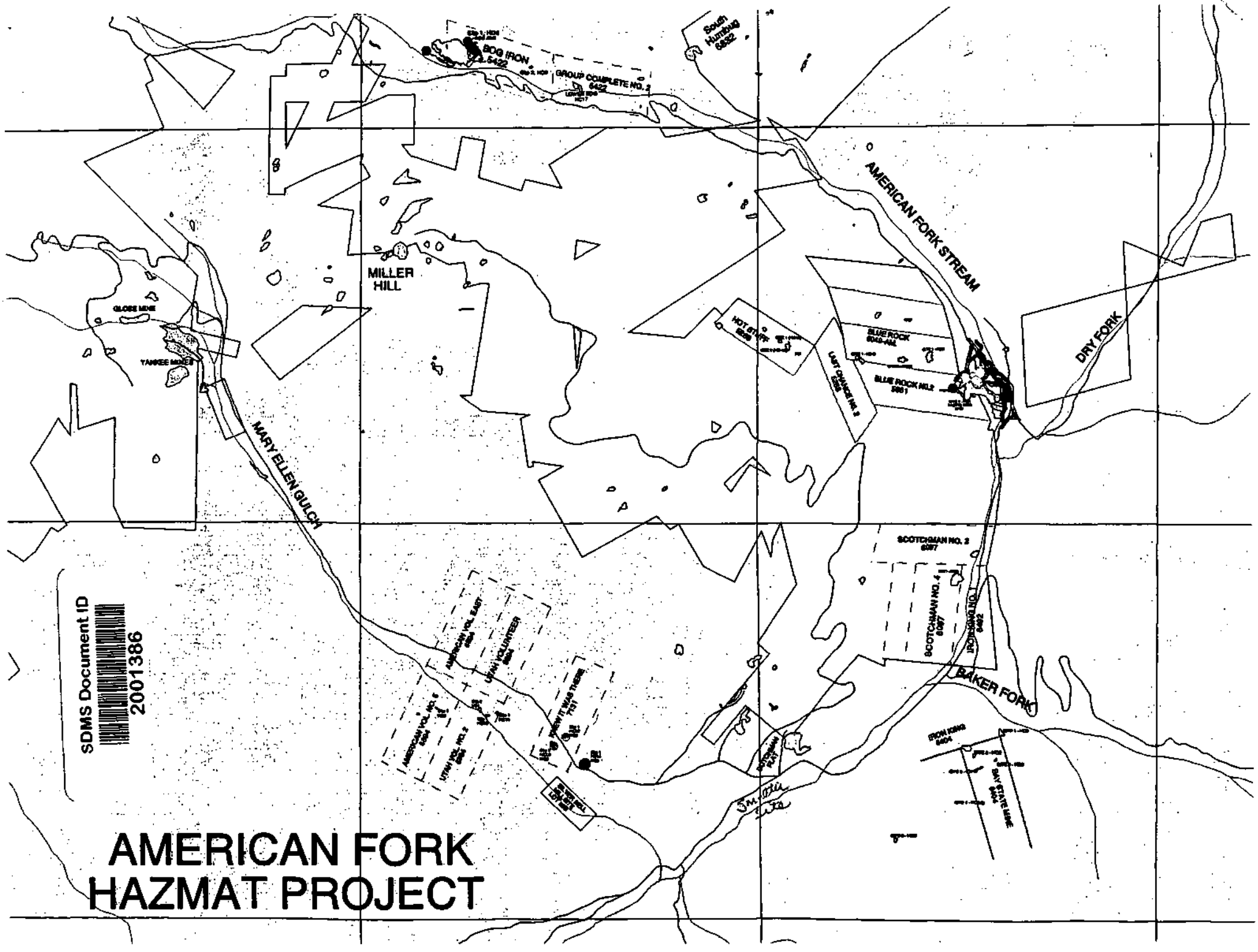


SDMS Document ID
2001386

AMERICAN FORK HAZMAT PROJECT

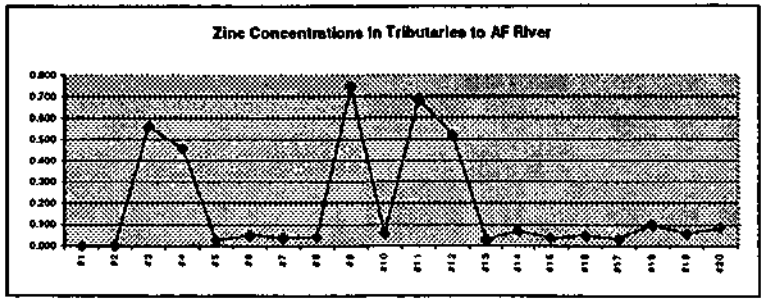
Pan - 253

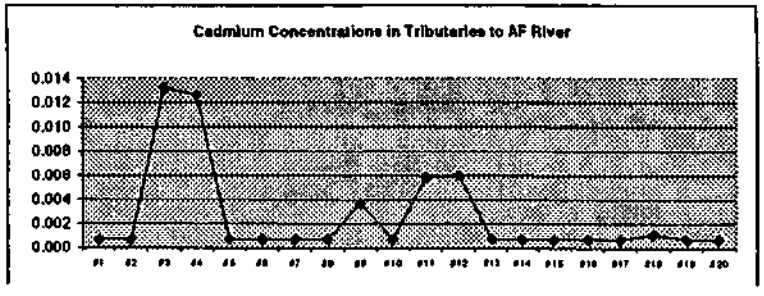
Yankee Mine

Photo 245

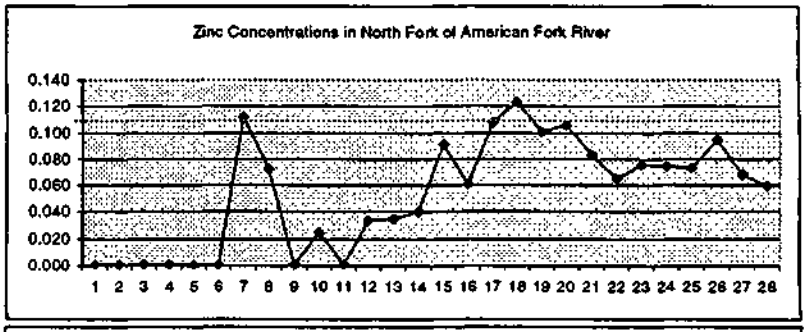
Pacific Mine

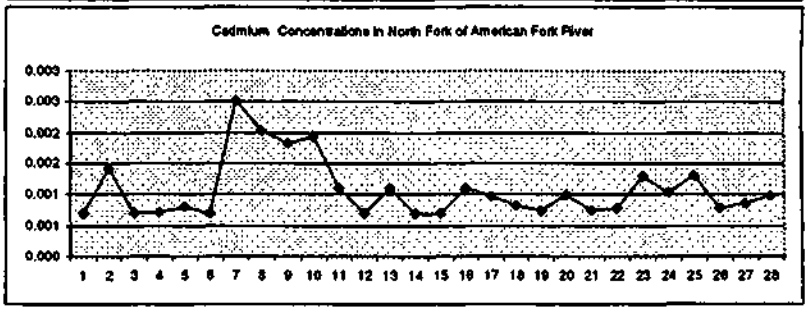
Site	Trib	Dist	Filter	ID	pH	Cond	Li	Na	Al	As	Ca	Cd	Cu	Fe	K	Mg	Mn	Sr	Zn
#1	1	59	0.45	Drains marsh with Fe ppt	6.52	116.67	0.004	1.40	0.026	0.019	11.6	0.001	0.001	0.173	0.999	4.49	0.384	0.034	0.001
#2	1	416	0.45	Cascades down bedrock	7.09	42.38	0.001	1.05	0.140	0.016	4.52	0.001	0.001	0.122	0.344	1.48	0.001	0.021	0.001
#3	1	735	0.45	Discharge from Lower Bog Adit	4.38	138.17	0.001	1.51	1.23	0.002	10.4	0.013	0.013	0.039	1.12	3.46	0.526	0.044	0.558
#4	1	736	0.45	Spring draining out toe of mine dump	5.42	134.26	0.001	1.49	0.537	0.001	10.0	0.013	0.014	4.43	1.15	3.28	0.281	0.042	0.457
#5	1	3,128	0.45	Draining LB ponds	8.37	248.66	0.001	1.01	0.015	0.007	29.9	0.001	0.001	0.016	0.374	15.4	0.001	0.026	0.026
#6	1	3,198	0.45	Red ppt draining pond	8.27	247.66	0.001	1.08	0.022	0.008	30.0	0.001	0.001	0.061	0.391	15.5	0.005	0.027	0.048
#7	1	3,303	0.45	Also draining LB ponds	8.08	256.66	0.001	1.11	0.023	0.006	30.9	0.001	0.001	0.221	0.439	15.8	0.075	0.028	0.038
#8	1	3,331	0.45	Draining ponds enters just above culvert	8.26	292.67	0.001	1.24	0.025	0.014	36.1	0.001	0.003	0.125	0.478	18.2	0.032	0.032	0.040
#9	1	3,345	0.45	Draining beaver pond that receives adit flow	7.62	370.68	0.001	1.42	0.018	0.004	45.2	0.004	0.001	0.093	0.723	23.1	0.241	0.060	0.747
#10	1	3,385	0.45	Draining LB ponds--crosses road	8.22	313.67	0.001	1.32	0.023	0.004	38.8	0.001	0.001	0.068	0.471	19.5	0.025	0.035	0.057
#11	1	3,475	0.45	Discharge draining tailings	8.10	379.68	0.002	1.48	0.022	0.027	45.7	0.006	0.001	0.022	0.810	23.5	0.119	0.063	0.687
#12	1	3,485	0.45	Drains from tailings pile	8.38	359.68	0.002	1.43	0.030	0.001	43.3	0.006	0.004	0.017	0.804	22.8	0.008	0.065	0.521
#13	1	4,200	0.45	Flow from moss-covered rocks	8.17	367.68	0.002	1.62	0.020	0.003	45.5	0.001	0.001	0.017	0.500	23.7	0.001	0.045	0.028
#14	1	4,255	0.45	Seepage from mine waste at Beaver pond	8.74	270.67	0.005	1.72	0.022	0.031	29.6	0.001	0.001	0.022	1.66	18.8	0.002	0.048	0.069
#15	1	4,435	0.45	Spring from limestone	7.92	338.68	0.012	1.28	0.019	0.003	43.4	0.001	0.001	0.015	0.612	20.1	0.001	0.047	0.036
#16	1	5,065	0.45	Discharge from base of hill	7.98	396.69	0.002	1.69	0.018	0.011	53.7	0.001	0.001	0.015	0.583	23.5	0.001	0.058	0.047
#17	1	5,140	0.45	Another discharge from base of hill	8.17	422.69	0.002	1.72	0.018	0.008	57.2	0.001	0.001	0.017	0.547	25.0	0.001	0.057	0.033
#18	1	6,290	0.45	Mary Ellen Gulch	8.33	260.66	0.001	0.911	0.023	0.001	35.2	0.001	0.001	0.020	0.553	13.3	0.001	0.046	0.099
#19	1	8,407	0.45	Maj. Evans	8.69	331.68	0.001	1.09	0.021	0.014	45.7	0.001	0.001	0.016	0.537	19.0	0.001	0.065	0.055
#20	1	10,307	0.45	Silver Fork	7.95	360.68	0.002	1.96	0.018	0.010	65.1	0.001	0.001	0.019	0.604	7.79	0.001	0.279	0.084
				Maximum Concentration	8.74	422.69	0.01	1.96	1.23	0.03	65.14	0.01	0.01	4.43	1.66	24.95	0.53	0.28	0.75
				Minimum Concentration	4.38	42.38	0.00	0.91	0.02	0.00	4.52	0.00	0.00	0.02	0.34	1.48	0.00	0.02	0.00
				Average Concentration	7.73	282.51	0.00	1.38	0.11	0.01	35.61	0.00	0.00	0.28	0.68	15.89	0.09	0.06	0.18





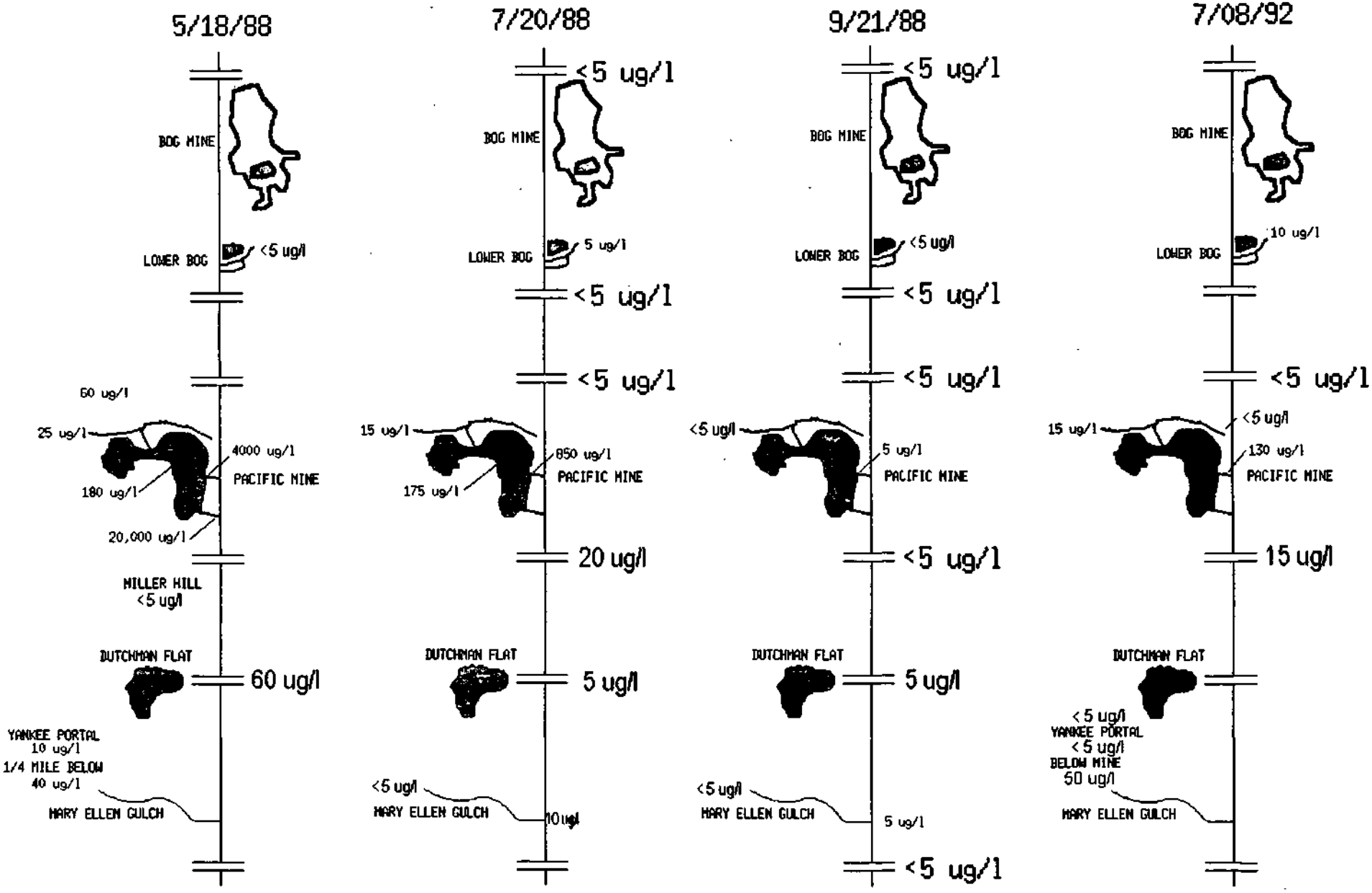
Site	Trib	Dist	Filter	ID	pH	Cond	Li	Na	Al	As	Ca	Cd	Cu	Fe	K	Mg	Mn	Sr	Zn
#1	0	0	0.45	T0--Above injection site	7.46	248.63	0.001	0.893	0.033	0.001	32.5	0.001	0.001	0.107	0.837	11.8	0.022	0.063	0.001
#2	0	25	0.45	Upstream from first beaver pond	7.91	329.76	0.001	16.8	0.042	0.023	32.5	0.001	0.001	0.148	0.940	11.7	0.024	0.064	0.001
#3	0	109	0.45	Near beginning of Bog Mine waste	7.80	318.03	0.001	15.2	0.035	0.017	31.4	0.001	0.001	0.182	0.957	11.3	0.044	0.062	0.001
#4	0	259	0.45	On bedrock blw Bog Mine influence	8.07	311.19	0.001	13.9	0.072	0.003	31.2	0.001	0.001	0.204	0.976	11.3	0.048	0.063	0.001
#5	0	414	0.45	At base of bedrock cascades ab LB inflow	8.10	307.28	0.001	13.8	0.085	0.007	31.3	0.001	0.002	0.221	0.987	11.3	0.045	0.062	0.001
#6	0	651	0.45	Above lower Bog Mine	7.56	288.71	0.001	11.8	0.071	0.019	30.1	0.001	0.001	0.188	0.957	10.9	0.033	0.061	0.001
#7	0	835	0.45	Below Lower Bog Mine	7.90	248.63	0.001	9.48	0.115	0.006	25.3	0.003	0.002	0.116	1.02	9.16	0.105	0.056	0.112
#8	0	1,035	0.45	300 m below Lower Bog Mine	8.13	242.77	0.001	8.81	0.104	0.011	25.0	0.002	0.001	0.139	0.982	9.05	0.088	0.055	0.073
#9	0	1,253	0.45	Above LB inflow	8.13	238.86	0.001	8.13	0.099	0.011	24.9	0.002	0.001	0.141	0.976	9.04	0.073	0.055	0.001
#10	0	1,603	0.45	"Almost" to truck parking	8.18	235.92	0.001	7.09	0.093	0.008	25.2	0.002	0.001	0.177	0.980	9.33	0.051	0.054	0.025
#11	0	2,003	0.45	Above series of beaver ponds--end of top	8.19	241.79	0.001	4.38	0.072	0.003	28.1	0.001	0.001	0.131	0.881	11.0	0.019	0.054	0.001
#12	0	2,983	0.45	T0 Site--Above lower injection	7.87	270.67	0.001	1.13	0.031	0.009	34.8	0.001	0.001	0.053	0.699	15.0	0.011	0.048	0.034
#13	0	3,123	0.45	Ab pond inflows	8.31	281.67	0.738	1.15	0.030	0.001	34.7	0.001	0.001	0.052	0.697	15.0	0.008	0.047	0.035
#14	0	3,344	0.45	Below draining pond at end of culvert	8.38	269.67	0.404	1.11	0.022	0.011	33.3	0.001	0.001	0.046	0.565	15.4	0.008	0.039	0.040
#15	0	3,625	0.45	T1 site--Below Pacific tailings--B	8.41	275.67	0.349	1.21	0.024	0.007	34.3	0.001	0.003	0.058	0.573	16.0	0.015	0.040	0.091
#16	0	3,625	0.45	T1 site--Below Pacific tailings--A	8.42	276.67	0.353	1.17	0.025	0.011	34.0	0.001	0.001	0.056	0.584	15.9	0.015	0.040	0.061
#17	0	3,775	0.45	Upstream from Dry Fork	8.40	276.67	0.351	1.16	0.025	0.003	34.2	0.001	0.001	0.058	0.588	16.0	0.015	0.040	0.108
#18	0	4,035	0.45	Below small beaver pond	8.51	275.67	0.343	1.16	0.024	0.006	33.9	0.001	0.001	0.059	0.582	15.9	0.015	0.040	0.123
#19	0	4,385	0.45	T2 Site--Below beaver ponds at bedrock	8.44	279.67	0.333	1.16	0.026	0.017	34.7	0.001	0.001	0.051	0.565	16.3	0.013	0.040	0.101
#20	0	4,685	0.45	Below limestone stream	8.34	297.67	0.246	1.20	0.024	0.009	37.0	0.001	0.001	0.043	0.576	17.5	0.010	0.042	0.106
#21	0	4,985	0.45	Above Baker Fork	8.32	297.67	0.240	1.23	0.024	0.002	37.5	0.001	0.001	0.041	0.578	17.6	0.009	0.042	0.083
#22	0	5,370	0.45	T3 site--Above Dutchman Flat culvert	8.43	299.67	0.222	1.21	0.025	0.008	37.8	0.001	0.001	0.038	0.583	17.7	0.008	0.043	0.065
#23	0	5,715	0.45	Below larger beaver pond below culvert	8.40	297.67	0.212	1.14	0.026	0.015	38.1	0.001	0.001	0.043	0.576	17.8	0.010	0.042	0.076
#24	0	6,452	0.45	Below Mary Ellen Gulch	8.13	293.67	0.186	1.13	0.024	0.009	37.4	0.001	0.001	0.041	0.569	17.0	0.009	0.043	0.075
#25	0	6,717	0.45	Within canyon below Mary Ellen Gulch	7.97	292.67	0.163	1.14	0.026	0.014	37.7	0.001	0.001	0.035	0.575	17.0	0.008	0.043	0.073
#26	0	8,507	0.45	Blw Maj. Evans	8.64	299.67	0.150	1.23	0.026	0.013	39.0	0.001	0.001	0.033	0.608	17.4	0.004	0.047	0.095
#27	0	10,407	0.45	Blw Silver Fork	8.32	337.68	0.087	1.46	0.021	0.012	45.5	0.001	0.001	0.024	0.564	17.7	0.001	0.105	0.068
#28	0	11,962	0.45	Ab Tibble Reservoir	8.29	567.71	0.037	2.55	0.023	0.006	84.4	0.001	0.001	0.020	0.669	26.6	0.001	0.981	0.059
				Maximum Concentration	8.64	567.71	0.738	18.817	0.115	0.023	84.351	0.003	0.003	0.221	1.016	26.580	0.105	0.981	0.123
				Minimum Concentration	7.46	235.92	0.001	0.893	0.021	0.001	24.948	0.001	0.001	0.020	0.564	9.044	0.001	0.039	0.001
				Average Concentration	8.18	292.93	0.157	4.710	0.045	0.009	35.209	0.001	0.001	0.089	0.737	14.566	0.025	0.085	0.054



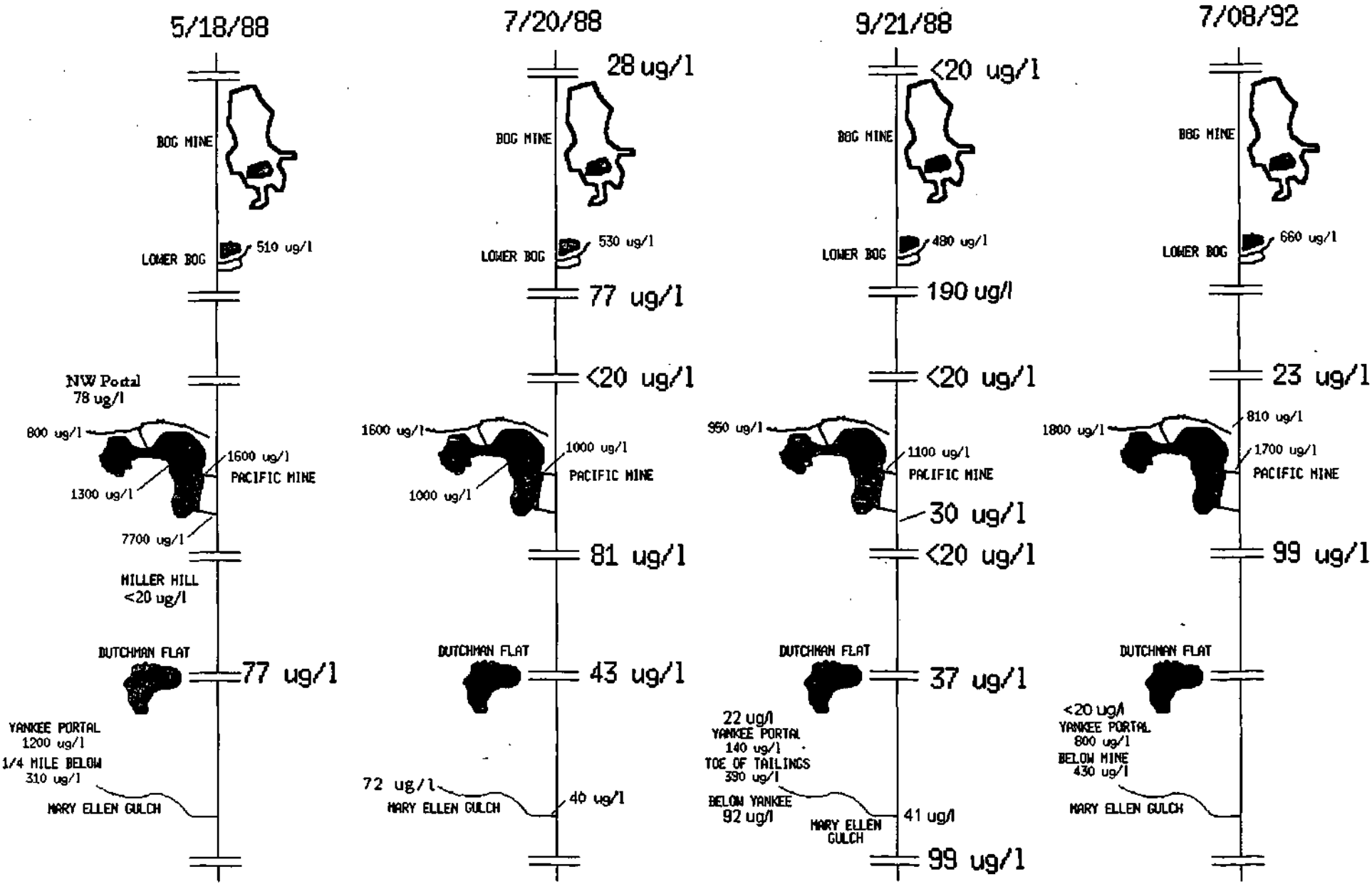


Line Diagrams

LEAD - 3.2 ug/l



ZINC - 110 ug/l


5/18/88
BOG MINE
LOWER BOG
510 ug/l
NW Portal
78 ug/l
800 ug/l
1600 ug/l
PACIFIC MINE
1300 ug/l
7700 ug/l
MILLER HILL
<20 ug/l
DUTCHMAN FLAT
77 ug/l
YANKEE PORTAL
1200 ug/l
1/4 MILE BELOW
310 ug/l
MARY ELLEN GULCH
7/20/88
28 ug/l
BOG MINE
LOWER BOG
530 ug/l
77 ug/l
<20 ug/l
1600 ug/l
1000 ug/l
PACIFIC MINE
1000 ug/l
81 ug/l
DUTCHMAN FLAT
43 ug/l
72 ug/l
MARY ELLEN GULCH
40 ug/l
9/21/88
<20 ug/l
BOG MINE
LOWER BOG
480 ug/l
190 ug/l
<20 ug/l
950 ug/l
1100 ug/l
PACIFIC MINE
30 ug/l
<20 ug/l
DUTCHMAN FLAT
37 ug/l
22 ug/l
YANKEE PORTAL
140 ug/l
TOE OF TAILINGS
390 ug/l
BELOW YANKEE
92 ug/l
MARY ELLEN
GULCH
41 ug/l
99 ug/l
7/08/92
BOG MINE
LOWER BOG
660 ug/l
23 ug/l
1800 ug/l
810 ug/l
1700 ug/l
PACIFIC MINE
99 ug/l
DUTCHMAN FLAT
<20 ug/l
YANKEE PORTAL
800 ug/l
BELOW MINE
430 ug/l
MARY ELLEN GULCH

Metal Concentrations in Soils at Dutchman Flat Sites

05/24/2000 Ted V. Fitzgerald, FS
Linda Calton, BOR

PPM

FS ID #	Location	North Coord	East Coord	Method	Mo	Zr	Sr	Rb	Pb	As	Hg	Zn	Cu	Fe	Mn	Ba	Sb	Sn	Cd
1	Parking Area	4,486,344	449,055	In-Situ	7	8	17	*	5718	*	*	1250	89	2390	*	1100	129	161	*
2	Parking Area	4,486,347	449,055	In-Situ	7	32	21	16	4058	*	*	1460	*	3869	*	1300	112	128	*
3	Parking Area	4,486,324	449,045	In-Situ	13	115	57	84	3259	147	*	5968	*	16691	*	1150	163	152	78
4	Tailings Pile	4,486,369	449,023	In-Situ	18	137	91	158	8384	581	*	5680	*	41498	*	1659	468	116	*
5	Tailings Pile	4,486,381	449,023	In-Situ	*	*	15	36	3600	155	*	6269	*	15898	546	303	317	107	57
5A	Tailings Pile	4,486,381	449,023	Dry Lab	*	*	34	34	3370	107	*	5248	*	16090	718	451	312	184	105
6	Tailings Pile	4,486,401	449,015	In-Situ	16	130	92	92	4650	942	*	3718	*	41498	*	5949	404	194	61
7	Tailings Pile	4,486,408	449,017	In-Situ	55	*	*	*	21491	771	*	24691	385	15296	*	1610	338	*	138
7A	Tailings Pile	4,486,408	449,017	Dry Lab	198	*	148	*	68454	2440	297	54477	1160	44186	*	5440	527	263	217
8	Tailings Pile	4,486,370	448,991	In-Situ	27	109	46	170	1110	59	*	301	*	13197	*	251	59	121	*
9	Tailings Pile	4,486,359	448,983	In-Situ	13	69	13	122	156	51	*	945	*	24794	*	142	*	82	*
10	Tailings Pile	4,486,361	448,993	In-Situ	9	67	27	57	984	71	*	1150	*	16000	*	204	*	127	*
11	Access Road	no gps		In-Situ	11	168	100	100	1979	148	*	1810	*	16896	752	694	*	154	*
1	Mine Spoils	4,486,484	448,812	In-Situ	*	*	30	*	2659	111	*	7706	289	9619	1560	700	112	116	45
1A	Mine Spoils	4,486,484	448,812	Dry Lab	*	*	47	*	4400	*	*	9824	410	13888	2019	1739	281	188	85
2	Mine Spoils	4,486,485	448,792	In-Situ	*	*	91	*	11200	286	71	12000	1190	25894	*	5459	802	*	173
3	Mine Spoils	4,486,470	448,822	In-Situ	*	*	17	*	2709	98	*	3728	208	9606	2019	161	73	114	*
4	Mine Spoils	4,486,433	448,785	In-Situ	*	*	11	22	233	*	*	339	*	10995	519	39	*	115	*
5	Mine Spoils	4,486,424	448,802	In-Situ	*	*	10	13	1110	*	*	1580	*	6147	1010	180	*	95	*

* <LOD Measurement result does not exceed the detection limit

Metal Concentrations in Soils at the Smelter Site Near Dutchman Flat

05/24/2000 Ted V. Fitzgerald, FS
Linda Calton, BOR

FS ID #	Location	North Coord	East Coord	Method	Mo	Zr	Sr	Rb	Pb	As	Hg	Zn	Cu	Co	Fe	Mn	Ba	Sb	Sn	Cd
2	AFC Smelte	4,485,862	448,483	In-Situ	22	*	45	*	21990	966	*	13696	2659	*	69376	2170	701	201	113	*
2A	AFC Smelte	4,485,862	448,483	Dry	29	*	78	*	38400	1160	*	23296	4189	*	109978	2600	616	332	157	*
3	AFC Smelte	4,485,853	448,504	In-Situ	*	26	64	29	3629	92	23	1140	227	235	10598	630	299	*	103	*
4	AFC Smelte	4,485,852	448,483	In-Situ	*	*	40	*	9837	343	*	18688	1250	*	48282	990	83	208	107	58

* <LOD Measurement result does not exceed the detection limit

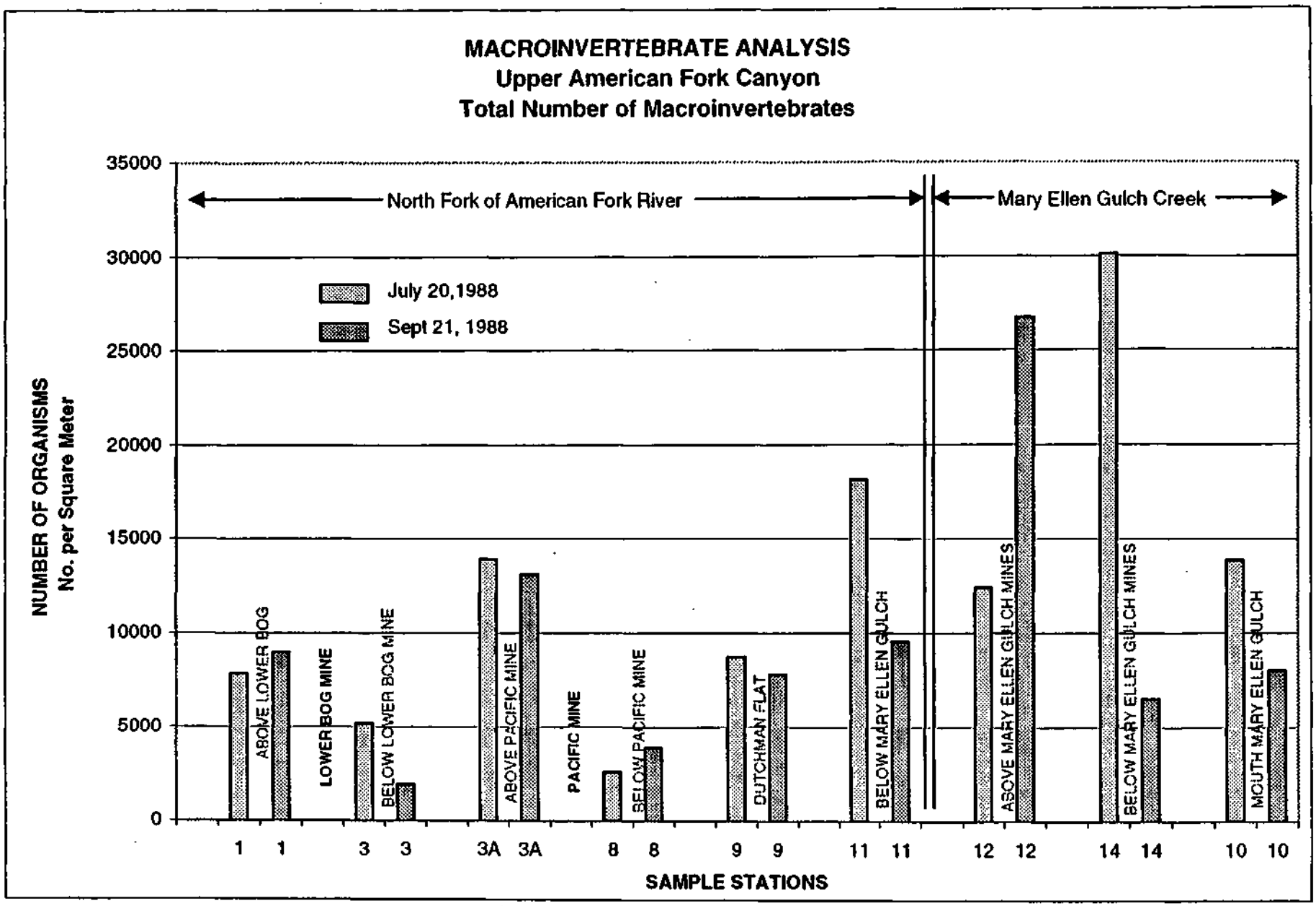
MACROINVERTEBRATE ANALYSIS

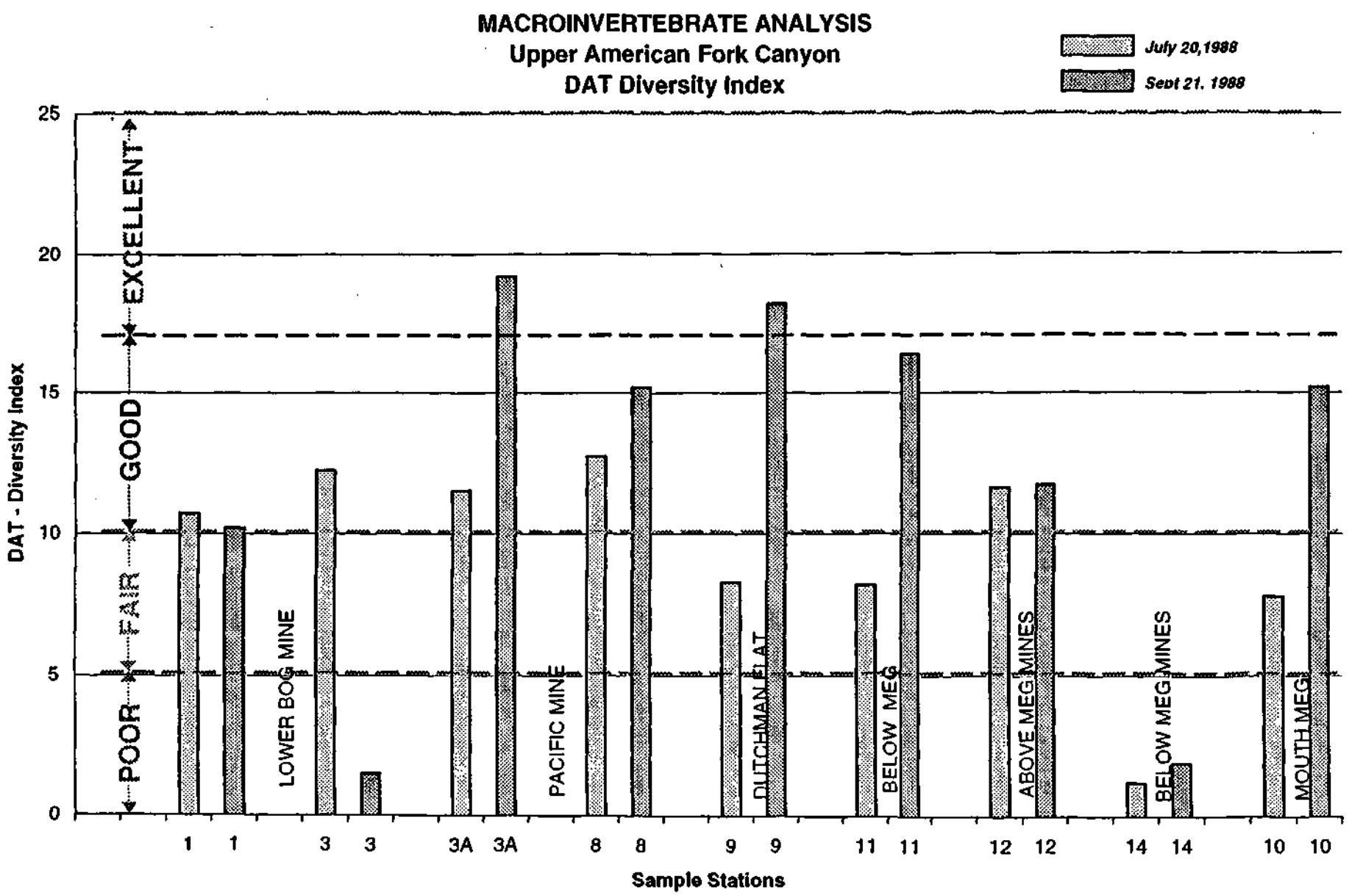
Fred A. Magnum, Regional Aquatic Ecologist
Data Reformatted 01/19/00 By TVF

Station	Location	Organisms # per m2	DAT	SC g/m2	BCI 50	# Taxa	Zinc ug/l	Date
1	Above Bog Mine	7,866	10.7	1	100	20	28	07/20/1988
1	Above Bog Mine	8,981	10.2	0.9	93	21	< 20	09/21/1988
3	Below Lower Bog Mine	5,193	12.2	0.6	82	25	77	07/20/1988
3	Below Lower Bog Mine	1,922	1.5	0.1	79	21	190	09/21/1988
3A	Above Pacific Mine	13,891	11.5	1.8	91	25	<20	07/20/1988
3A	Above Pacific Mine	13,091	19.2	1.4	100	32	< 20	09/21/1988
8	Below Pacific Mine	2,582	12.7	0.7	98	25	81	07/20/1988
8	Below Pacific Mine	3,888	15.2	0.4	100	31	< 20	09/21/1988
9	Dutchman Flat	8,730	9.3	0.9	88	23	43	07/20/1988
9	Dutchman Flat	7,819	18.2	0.6	98	32	37	09/21/1988
11	Below Mary Ellen Gulch	18,163	8.2	1.3	85	22	40	07/20/1988
11	Below Mary Ellen Gulch	9,555	16.4	2.1	100	25	99	09/21/1988
12	Above Mines @ MEG	12,424	11.6	2.1	88	25	< 20	07/21/1988
12	Above Mines @ MEG	26,685	11.7	2.3	89	20	22	09/22/1988
14	Below Mines @ MEG	30,110	1.2	2	79	17	110	07/21/1988
14	Below Mines @ MEG	6,528	1.9	0.4	78	15	92	09/22/1988
10	Mouth Mary Ellen Gulch	13,884	7.8	2.1	100	22	72	07/20/1988
10	Mouth Mary Ellen Gulch	8013	15.2	1.4	100	25	41	09/22/1988

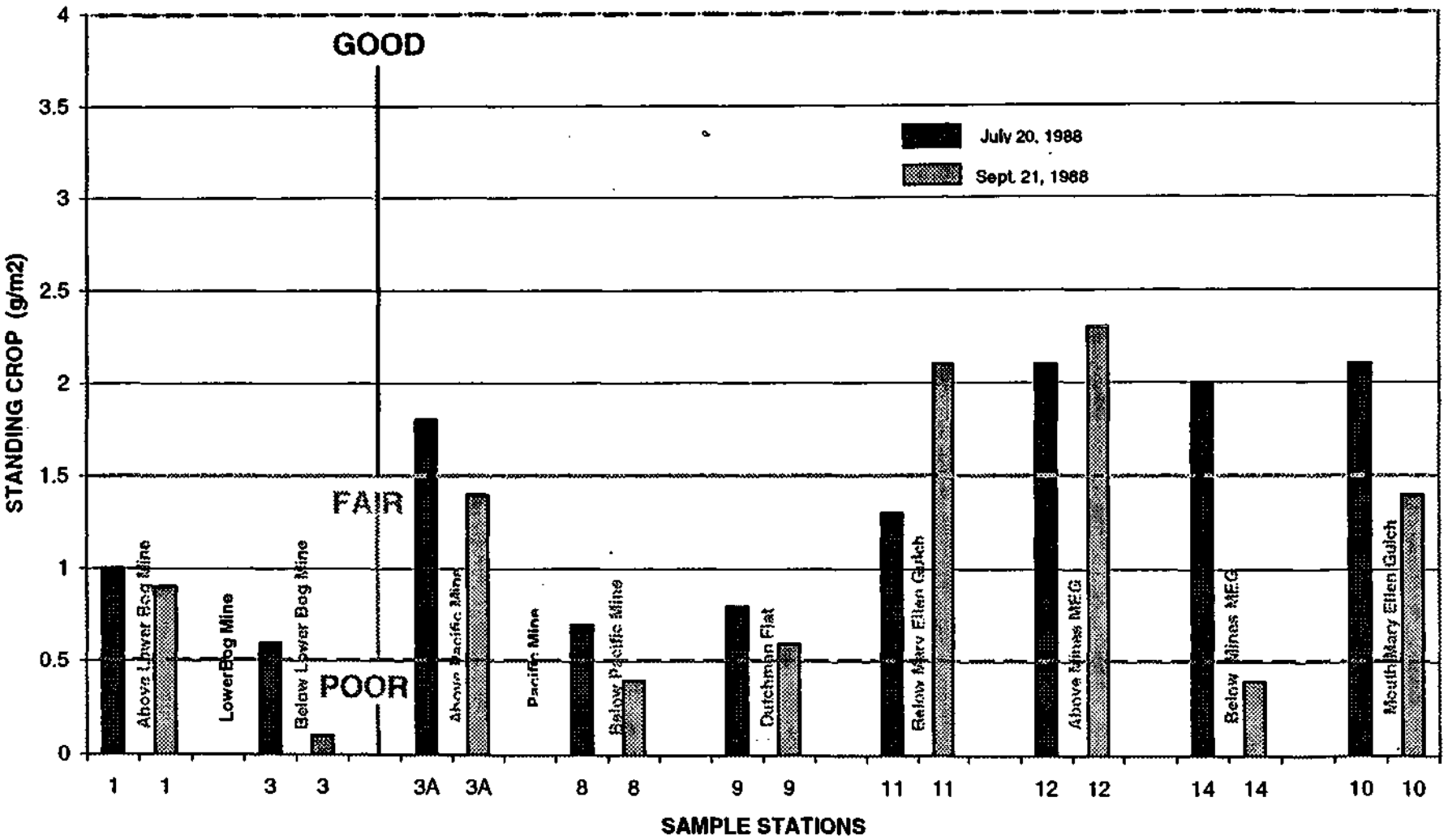
DAT - Diversity Index (mean)
SC - Standing Crop
BIC 50 - Biotic Condition Index
Zinc - 100 ppbillion =threshold for sensitive invertebrates

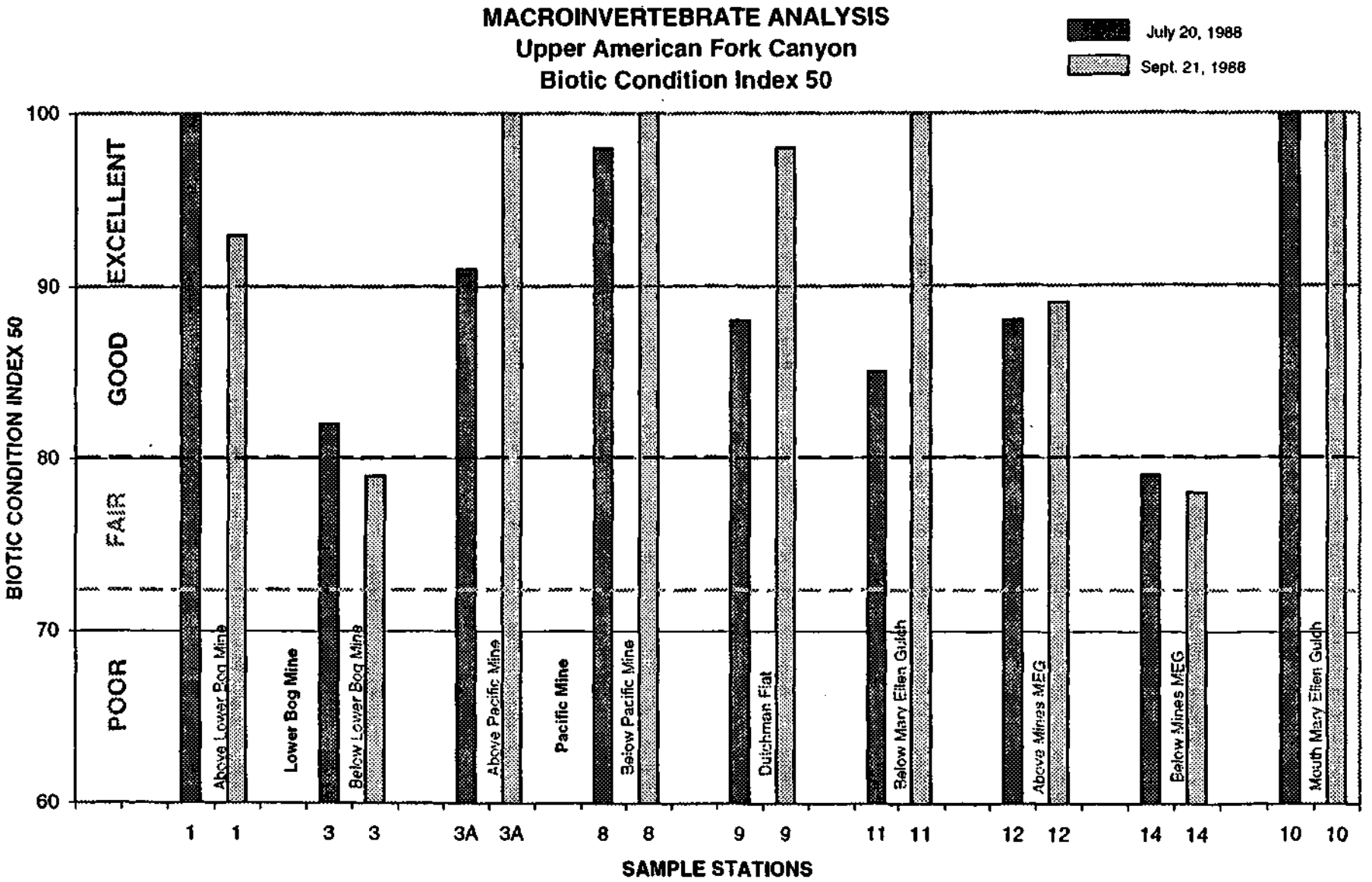
SCALE	*DAT*	*SC*	*BCI*
Excellent	17 - 26	4.0 - 12.0	> 90
Good	10 - 17	1.6 - 4.0	80 - 90
Fair	5 - 10	0.6 - 1.5	72 - 79
Poor	0 - 5	0.0 - 0.5	< 72


MACROINVERTEBRATE ANALYSIS
Upper American Fork Canyon
Total Number of Macroinvertebrates
North Fork of American Fork River
Mary Ellen Gulch Creek
July 20,1988
Sept 21, 1988
NUMBER OF ORGANISMS
No. per Square Meter
35000
30000
25000
20000
15000
10000
5000
0
ABOVE LOWER BOG
LOWER BOG MINE
BELOW LOWER BOG MINE
ABOVE PACIFIC MINE
PACIFIC MINE
BELOW PACIFIC MINE
DUTCHMAN FLAT
BELOW MARY ELLEN GULCH
ABOVE MARY ELLEN GULCH MINES
BELOW MARY ELLEN GULCH MINES
MOUTH MARY ELLEN GULCH
1 1 3 3 3A 3A 8 8 9 9 11 11 12 12 14 14 10 10
SAMPLE STATIONS


MACROINVERTEBRATE ANALYSIS
Upper American Fork Canyon
DAT Diversity Index
July 20,1988
Sept 21, 1988
DAT - Diversity Index
25
20
15
10
5
0
EXCELLENT
GOOD
FAIR
POOR
LOWER BOG MINE
PACIFIC MINE
DUTCHMAN FLAT
BELOW MEG
ABOVE MEG MINES
BELOW MEG MINES
MOUTH MEG
1 1 3 3 3A 3A 8 8 9 9 11 11 12 12 14 14 10 10
Sample Stations

MACROINVERTEBRATE ANALYSIS
Upper American Fork Canyon
Standing Crop




MACROINVERTEBRATE ANALYSIS
Upper American Fork Canyon
Biotic Condition Index 50
July 20, 1988
Sept. 21, 1988
BIOTIC CONDITION INDEX 50
100
90
80
70
60
EXCELLENT
GOOD
FAIR
POOR
Above Lower Bog Mine
Lower Bog Mine
Below Lower Bog Mine
Above Pacific Mine
Pacific Mine
Below Pacific Mine
Dutchman Flat
Below Mary Ellen Gulch
Above Mines MEG
Below Mines MEG
Mouth Mary Ellen Gulch
1 1 3 3 3A 3A 8 8 9 9 11 11 12 12 14 14 10 10
SAMPLE STATIONS

Fish Samples - North Fork of American Fork

Species+sample description by site

All samples collected 8/5/99

Data (re)confirmed correct 2/28/00 from original field sheets

Site 1	Fish #1	Fish #2	Fish #3	Fish #4	Above Pacific Mine
length (mm):	197	270	234	230	
length (in):	7.8	10.6	9.2	9.1	
weight (gm):	74	212	138	136	
species:	hybrid	cutthroat	cutthroat	rainbow	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	

Site 2	Fish #1	Fish #2	Fish #3	Fish #4	Below Pacific Mine
length (mm):	204	196	194	189	
length (in):	8.0	7.7	7.6	7.4	
weight (gm):	76	80	56	70	
species:	cutthroat	cutthroat	cutthroat	rainbow	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	

Site 5	Fish #1	Fish #2	Fish #3	Fish #4	Above Major Evans Gulch
length (mm):	258	180	211	195	
length (in):	10.2	7.1	8.3	7.7	
weight (gm):	140	64	84	76	
species:	cutthroat	cutthroat	cutthroat	cutthroat	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	

Site 4	Fish #1	Fish #2	Fish #3	Fish #4	Above Tibble Fork Reservoir
length (mm):	275	221	247	260	
length (in):	10.8	8.7	9.7	10.2	
weight (gm):	192	106	164	164	
species:	brown	brown	brown	brown	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	

Site 3	Fish #1	Fish #2	Fish #3	Fish #4	Below Tibble Fork Reservoir
length (mm):	249	210	210	203	
length (in):	9.8	8.3	8.3	8.0	
weight (gm):	146	102	100	96	
species:	brown	brown	brown	brown	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	

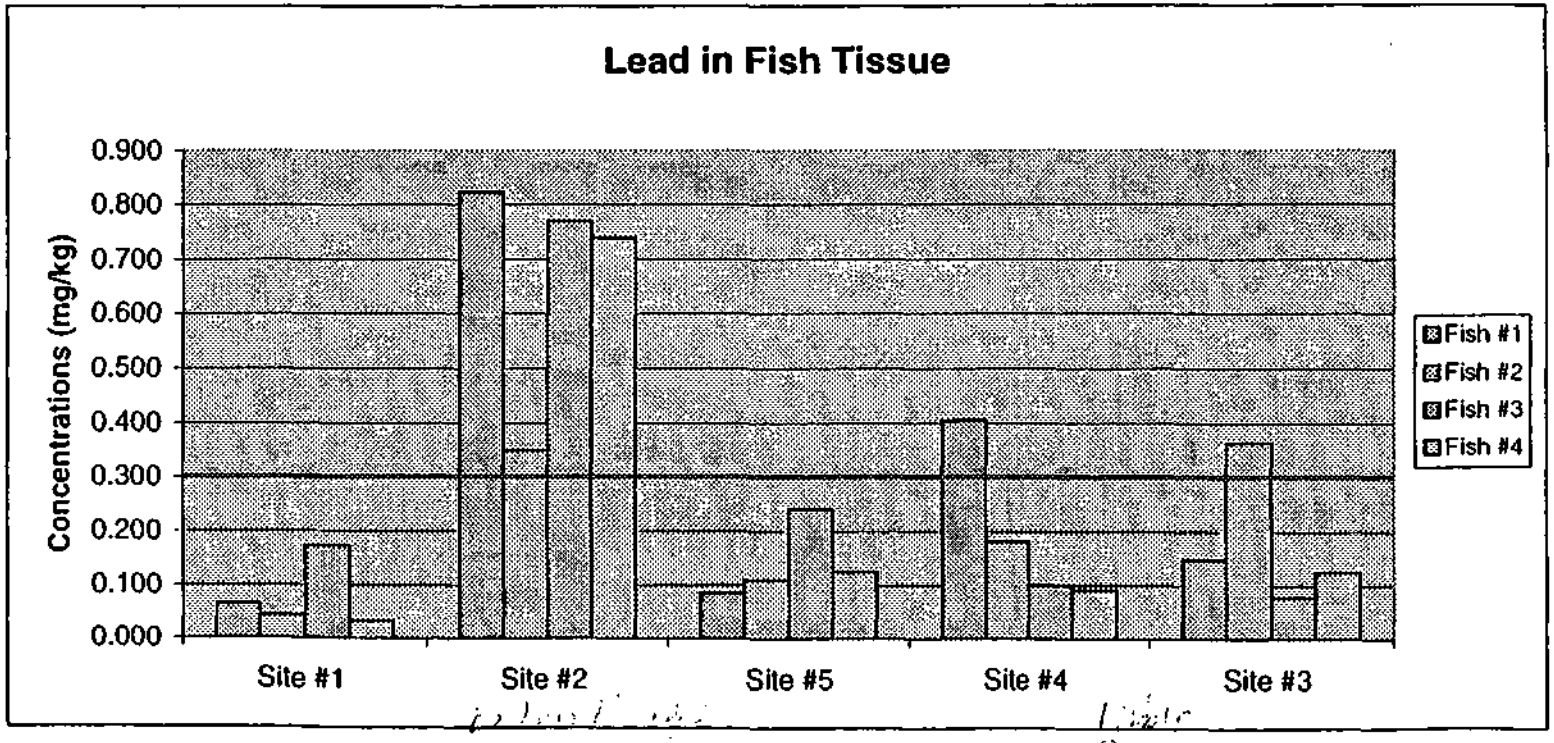
Bioaccumulates

Lead Concentrations By Site

SAMPLE LOCATIONS	Sites	Fish #1	Fish #2	Fish #3	Fish #4	Average
Above Pacific Mine	Site #1	0.065	0.043	0.173	0.032	0.078
Below Pacific Mine	Site #2	0.824	0.349	0.770	0.740	0.671
Above Major Evans	Site #5	0.085	0.109	0.241	0.125	0.140
Above Tibble Fork	Site #4	0.405	0.181	0.100	0.091	0.194
Below Tibble Fork	Site #3	0.148	0.365	0.078	0.125	0.179

Maximum	Minimum	Order of Magnitude
0.824	0.043	19

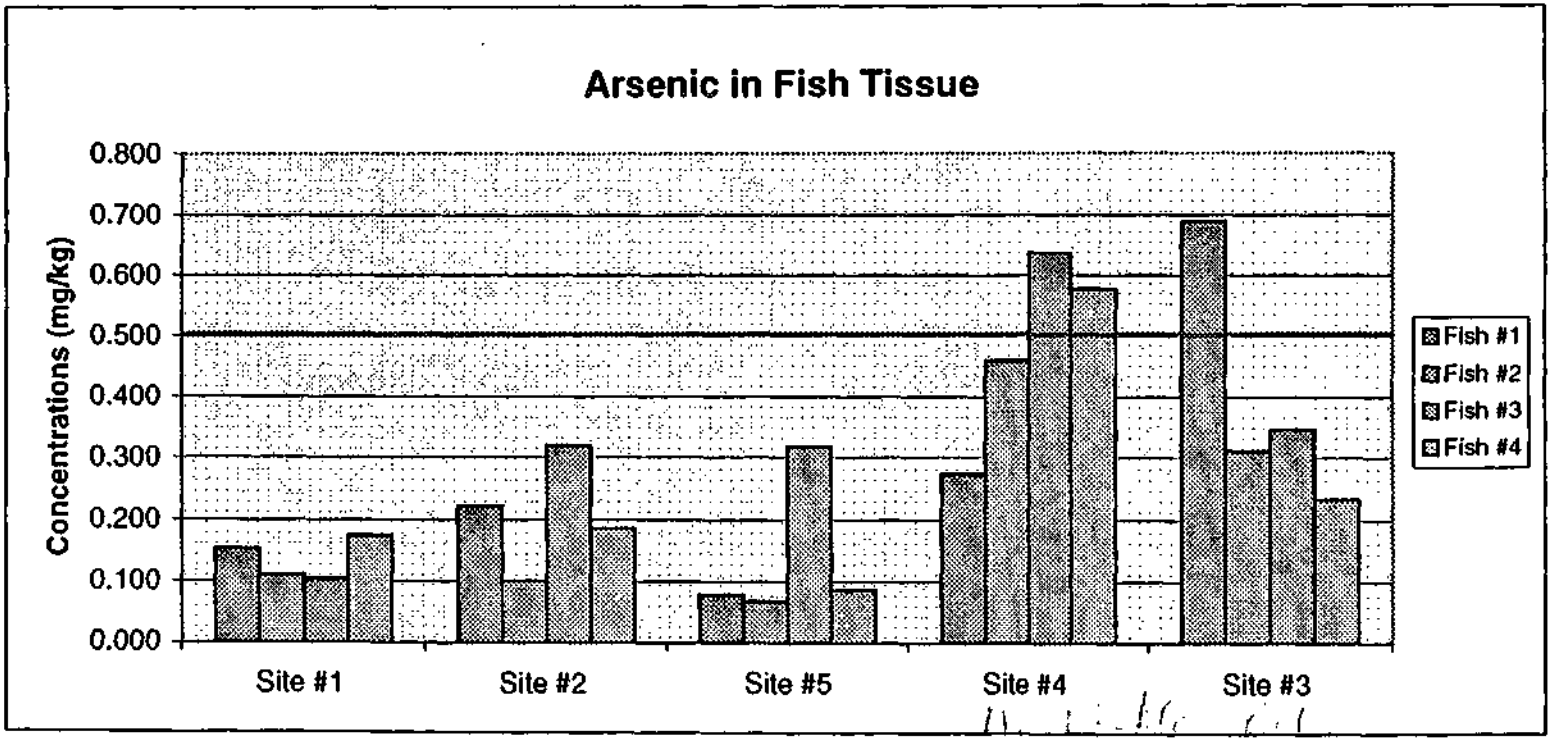
Lead



Arsenic Concentrations By Site

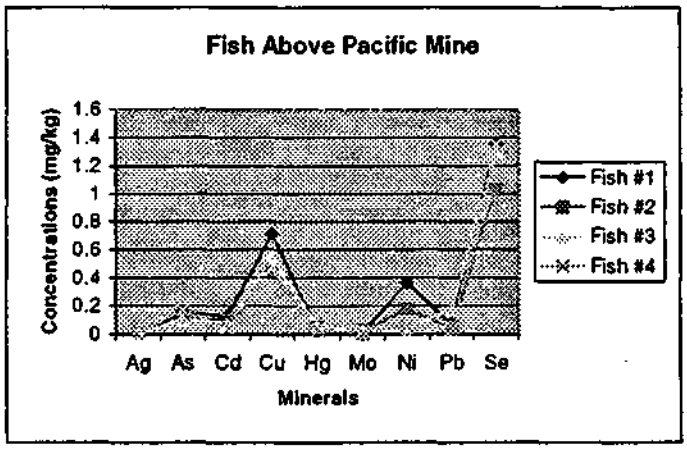
SAMPLE LOCATIONS	Sites	Fish #1	Fish #2	Fish #3	Fish #4	Average
Above Pacific Mine	Site #1	0.153	0.110	0.104	0.174	0.135
Below Pacific Mine	Site #2	0.222	0.101	0.319	0.186	0.207
Above Major Evans	Site #5	0.079	0.067	0.317	0.086	0.137
Above Tibble Fork	Site #4	0.274	0.460	0.637	0.577	0.487
Below Tibble Fork	Site #3	0.688	0.311	0.346	0.234	0.395

Maximum	Minimum	Order of Magnitude
0.688	0.067	10



Site #1 - above Pacific Mine

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	<.001	0.001	0.001	<.001	0.00	0.00
Al	0.725	0.696	0.527	0.511	0.61	0.11
As	0.153	0.11	0.104	0.174	0.14	0.03
B	0.024	0.143	0.008	<.001	0.06	0.07
Ba	0.259	0.159	0.047	0.048	0.13	0.10
Be	<.001	<.001	<.001	<.001	#DIV/0!	#DIV/0!
Ca	1746.369	809.933	300.578	353.667	802.64	669.41
Cd	0.129	0.103	0.065	0.039	0.084	0.04
Co	0.081	0.055	0.06	0.055	0.06	0.01
Cr	1.442	1.266	1.195	1.151	1.26	0.13
Cu	0.714	0.455	0.537	0.475	0.55	0.12
Fe	14.249	9.469	8.979	7.451	10.04	2.94
Hg	0.03	0.05	0.062	0.029	0.043	0.02
K	4071.95	4267.337	4618.108	4653.005	4402.60	280.93
Li	0.01	0.017	0.015	0.007	0.01	0.00
Mg	321.387	298.448	314.006	322.212	314.01	11.01
Mn	0.747	0.344	0.26	0.279	0.41	0.23
Mo	0.002	0.024	0.01	0.007	0.01	0.01
Na	536.915	447.314	456.813	473.64	478.67	40.33
Ni	0.366	0.177	0.043	0.06	0.16	0.15
P	3378.06	2865.441	2784.235	2684.511	2928.06	308.99
Pb	0.065	0.043	0.173	0.032	0.078	0.06
Sb	0.001	0.004	0.002	0.002	0.00	0.00
Se	1.361	1.033	1.296	1.35	1.26	0.15
Si	27.451	26.917	28.224	25.262	26.96	1.25
Sn	0.002	0.003	0.001	0.002	0.00	0.00
Sr	0.562	0.264	0.072	0.089	0.25	0.23
Tl	0.029	0.027	0.013	0.019	0.02	0.01
V	0.027	0.016	0.025	0.025	0.02	0.00
Zn	10.12	5.1	4.674	4.378	6.07	2.72
Ca/K	0.429	0.190	0.065	0.076	0.19	0.17
Ca/M	12.900	6.059	4.333	5.571	7.22	3.86
Na/K	0.000	0.000	0.000	0.000	0.00	0.00
Cu/F	1.930	3.680	4.596	4.125	3.58	1.16
Cu/Z	357.000	18.958	53.700	67.857	124.38	156.44
Pb/F	0.027	0.021	0.020	0.016	0.02	0.00

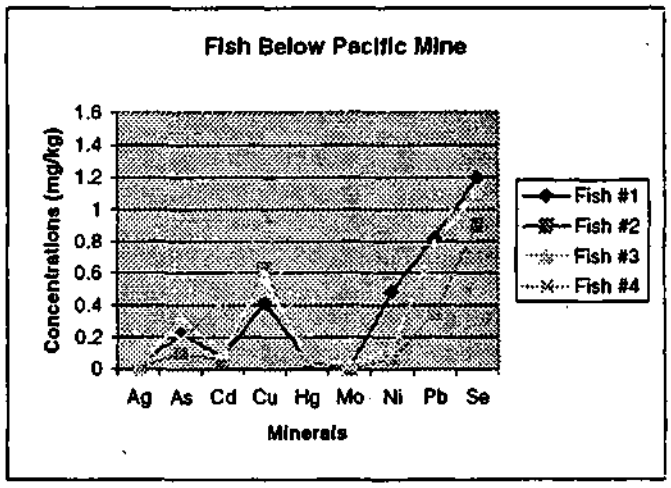


Site #1 - Above Pacific Mine

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Stnd. Dev.	Maximum	Minimum	Order of Magnitude
Ag	<.001	0.001	0.001	<.001	0.001	0.000	0.001	0.001	1.000
As	0.153	0.11	0.104	0.174	0.135	0.034	0.174	0.104	1.673
Cd	0.129	0.103	0.065	0.039	0.084	0.040	0.129	0.039	3.308
Cu	0.714	0.455	0.537	0.475	0.545	0.118	0.714	0.455	1.569
Fe	14.249	9.469	8.979	7.451	10.037	2.937	14.249	7.451	1.912
Hg	0.03	0.05	0.062	0.029	0.043	0.016	0.062	0.029	2.138
Mo	0.002	0.024	0.01	0.007	0.011	0.009	0.024	0.002	12.000
Ni	0.366	0.177	0.043	0.06	0.162	0.149	0.366	0.043	8.512
Pb	0.065	0.043	0.173	0.032	0.078	0.065	0.173	0.032	5.406
Se	1.361	1.033	1.296	1.35	1.260	0.154	1.361	1.033	1.318
Zn	10.12	5.1	4.674	4.378	6.068	2.718	10.120	4.378	2.312

Site #2 - between Pacific Mine and Dutchman Flat

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.002	0.002	0.004	0.011	0.0048	0.00
Al	1.733	0.426	0.004	0.66	0.71	0.74
As	0.222	0.101	0.319	0.186	0.21	0.09
B	0.02	<.001	0.09	0.041	0.05	0.04
Ba	0.474	0.065	0.111	0.226	0.22	0.18
Be	<.001	<.001	0.001	<.001	0.00	#DIV/0!
Ca	2475.174	451.911	691.956	406.244	1006.32	987.22
Cd	0.077	0.055	0.113	0.42	0.166	0.17
Co	0.028	0.081	0.04	0.054	0.05	0.02
Cr	1.217	1.133	1.08	1.267	1.17	0.08
Cu	0.414	0.626	0.577	0.947	0.64	0.22
Fe	15.031	6.292	7.299	16.08	11.18	5.09
Hg	0.056	0.05	0.068	0.063	0.059	0.01
K	4304.733	4244.749	4232.116	3930.97	4178.14	167.80
Li	0.023	0.007	0.025	0.016	0.02	0.01
Mg	341.875	278.71	264.422	251.294	284.08	40.13
Mn	0.823	0.16	0.186	0.185	0.34	0.32
Mo	0.006	0.004	0.027	0.015	0.01	0.01
Na	537.86	549.477	651.168	722.105	615.15	87.60
Ni	0.487	0.065	0.14	0.085	0.19	0.20
P	3980.735	2509.72	2847.32	2578.635	2979.10	683.45
Pb	0.824	0.349	0.77	0.74	0.671	0.22
Sb	0.002	0.001	0.006	0.004	0.00	0.00
Se	1.197	0.902	1.11	1.351	7.85	0.19
Si	23.977	23.856	23.926	28.575	25.08	2.33
Sn	0.003	0.002	0.004	0.003	0.00	0.00
Sr	0.712	0.146	0.163	0.106	0.28	0.29
Tl	0.013	0.012	0.012	0.012	0.01	0.00
V	0.034	0.034	0.03	0.035	0.03	0.00
Zn	12.639	10.778	13.396	10.455	11.82	1.43
Ca/K	0.575	0.106	0.164	0.103	0.24	0.23
Ca/M	3.348	7.857	4.520	26.250	10.49	10.68
Na/K	0.000	0.000	0.000	0.000	0.00	0.00
Cu/F	1.479	7.081	5.806	6.849	5.30	2.61
Cu/Z	69.000	156.500	21.370	63.133	77.50	56.77
Pb/F	0.028	0.011	0.011	0.022	0.02	0.01

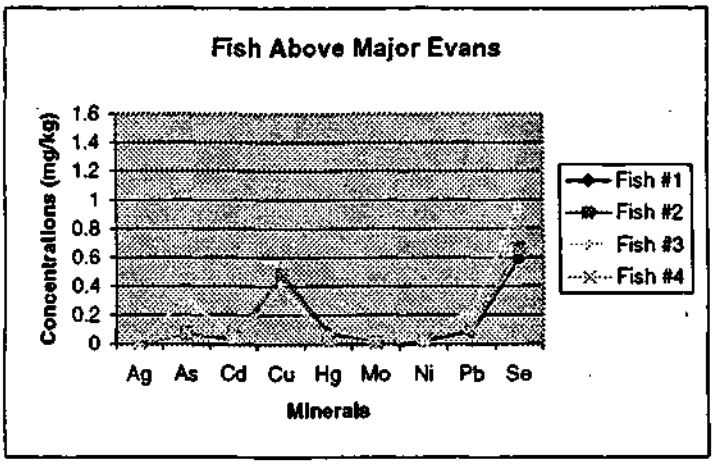


Site #2 - Between Pacific Mine and Dutchman Flat

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Stnd. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.002	0.002	0.004	0.011	**0.005**	0.004	0.011	0.002	5.500
As	0.222	0.101	0.319	0.186	**0.207**	0.090	0.319	0.101	3.158
Cd	0.077	0.055	0.113	0.42	**0.166**	0.171	0.420	0.055	7.636
Cu	0.414	0.626	0.577	0.947	**0.641**	0.223	0.947	0.414	2.287
Fe	15.031	6.292	7.299	16.08	**11.176**	5.092	16.080	6.292	2.556
Hg	0.056	0.05	0.068	0.063	**0.059**	0.008	0.068	0.050	1.360
Mo	0.006	0.004	0.027	0.015	**0.013**	0.010	0.027	0.004	6.750
Ni	0.487	0.065	0.14	0.085	**0.194**	0.198	0.487	0.065	7.492
Pb	0.824	0.349	0.77	0.74	**0.671**	0.217	0.824	0.349	2.361
Se	1.197	0.902	1.11	1.351	**1.140**	0.187	1.351	0.902	1.498
Zn	12.639	10.778	13.396	10.455	**11.817**	1.426	13.396	10.455	1.281

Site #5 - North Fork ab Major Evans Gulch

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.001	0.001	0.001	0.002	0.0013	0.00
Al	0.947	0.605	0.335	0.296	0.55	0.30
As	0.079	0.067	0.317	0.086	0.14	0.12
B	0.046	<.001	0.004	0.002	0.02	0.02
Ba	0.076	0.097	0.046	0.043	0.07	0.03
Be	<.001	0.001	<.001	<.001	0.00	#DIV/0!
Ca	146.77	294.703	288.207	337.817	266.87	83.04
Cd	0.031	0.054	0.045	0.089	0.055	0.02
Co	0.014	0.032	0.012	0.051	0.03	0.02
Cr	1.091	0.965	1.112	1.241	1.10	0.11
Cu	0.478	0.386	0.349	0.441	0.41	0.07
Fe	9.075	5.951	4.81	6.61	6.61	1.80
Hg	0.078	0.054	0.04	0.048	0.055	0.02
K	4216.436	4573.566	4752.937	4676.883	4554.96	237.35
Li	0.011	0.011	0.01	0.014	0.01	0.00
Mg	268.294	315.364	305.532	314.741	300.98	22.25
Mn	0.148	0.162	0.369	0.172	0.21	0.10
Mo	0.01	0.007	0.005	0.004	0.01	0.00
Na	490.221	455.727	429.647	442.217	454.45	26.12
Ni	0.022	0.031	0.045	0.065	0.04	0.02
P	2055.227	2280.238	2652.052	2720.539	2427.01	314.41
Pb	0.085	0.109	0.241	0.125	0.14	0.07
Sb	0.002	0.003	0.001	0.001	0.00	0.00
Se	0.594	0.668	0.954	0.83	0.76	0.16
Si	21.054	19.301	20.532	25.367	21.56	2.64
Sn	<.001	0.001	0.001	<.001	0.00	0.00
Sr	0.06	0.08	0.07	0.124	0.08	0.03
Tl	0.014	0.015	0.012	0.016	0.01	0.00
V	0.023	0.021	0.022	0.027	0.02	0.00
Zn	5.616	5.345	5.85	5.326	5.53	0.25
Ca/K	0.035	0.064	0.061	0.072	0.06	0.02
Ca/M	2.818	4.909	4.500	6.357	4.65	1.46
Na/K	0.000	0.000	0.000	0.000	0.00	0.00
Cu/F	7.372	5.957	3.014	7.215	5.89	2.02
Cu/Z	47.800	68.286	77.200	87.250	70.13	16.78
Pb/F	0.019	0.013	0.011	0.015	0.01	0.00

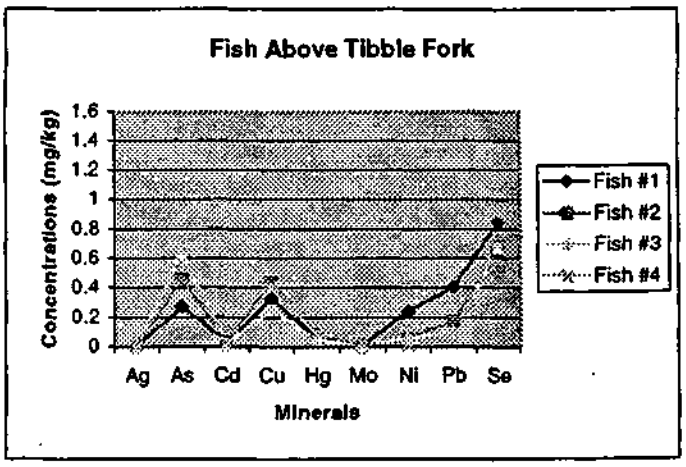


Site #5 - North Fork Above Major Evans Gulch

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Stnd. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.001	0.001	0.001	0.002	**0.001**	0.001	0.002	0.001	2.000
As	0.079	0.067	0.317	0.086	**0.137**	0.120	0.317	0.067	4.731
Cd	0.031	0.054	0.045	0.089	**0.055**	0.025	0.089	0.031	2.871
Cu	0.478	0.478	0.386	0.349	**0.423**	0.066	0.478	0.349	1.370
Fe	9.075	5.951	4.81	6.61	**6.612**	1.803	9.075	4.810	1.887
Hg	0.078	0.054	0.04	0.048	**0.055**	0.016	0.078	0.040	1.950
Mo	0.01	0.007	0.005	0.004	**0.007**	0.003	0.010	0.004	2.500
Ni	0.022	0.031	0.045	0.065	**0.041**	0.019	0.065	0.022	2.955
Pb	0.085	0.109	0.241	0.125	**0.140**	0.069	0.241	0.085	2.835
Se	0.594	0.668	0.954	0.83	**0.762**	0.162	0.954	0.594	1.606
Zn	5.616	5.345	5.85	5.326	**5.534**	0.249	5.850	5.326	1.098

Site #4 - North Fork ab Tibble Fork Res

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.003	0.002	<.001	0.002	0.002	0.001
Al	2.124	0.918	0.382	0.494	0.980	0.797
As	0.274	0.46	0.637	0.577	0.487	0.160
B	0.003	<.001	<.001	0.1	0.052	0.069
Ba	0.178	0.117	0.044	0.029	0.092	0.069
Be	0.001	<.001	<.001	<.001	0.001	#DIV/0!
Ca	1380.538	387.154	405.349	205.836	594.719	531.566
Cd	0.038	0.035	0.013	0.022	0.027	0.012
Co	0.03	0.062	0.04	0.074	0.052	0.020
Cr	1.047	1.03	1.022	1.035	1.034	0.010
Cu	0.33	0.437	0.25	0.409	0.357	0.084
Fe	18.223	9.256	5.652	6.948	10.020	5.668
Hg	0.052	0.081	0.053	0.087	0.068	0.018
K	4251.153	4409.86	4408.144	4508.717	4394.469	106.483
Li	0.012	0.012	0.005	0.017	0.014	0.005
Mg	305.631	305.356	314.277	303.767	307.258	4.751
Mn	0.43	0.278	0.148	0.161	0.254	0.131
Mo	0.009	0.004	0.001	0.025	0.010	0.011
Na	503.688	442.607	415.979	536.393	474.667	55.150
Ni	0.243	0.057	0.062	0.016	0.095	0.101
P	2991.803	2386.542	2341.892	2187.296	2476.883	353.736
Pb	0.405	0.181	0.1	0.091	0.194	0.146
Sb	0.003	0.002	<.001	0.005	0.003	0.002
Se	0.841	0.645	0.675	0.744	0.726	0.087
Si	24.574	21.281	19.482	22.976	22.078	2.192
Sn	0.004	0.009	0.001	0.001	0.004	0.004
Sr	2.556	0.649	0.629	0.305	1.035	1.026
Tl	0.018	0.035	0.02	0.028	0.025	0.008
V	0.043	0.034	0.031	0.017	0.031	0.011
Zn	5.759	5.703	4.37	5.47	5.326	0.649
Ca/K	0.325	0.088	0.092	0.046	0.138	0.127
Ca/M	4.517	1.268	1.290	0.678	1.938	1.743
Na/K	0.118	0.100	0.094	0.119	0.108	0.013
Cu/F	0.018	0.047	0.044	0.059	0.042	0.017
Cu/Z	0.057	0.077	0.057	0.075	0.066	0.011
Pb/F	0.0222	0.0196	0.0177	0.0131	0.018	0.004

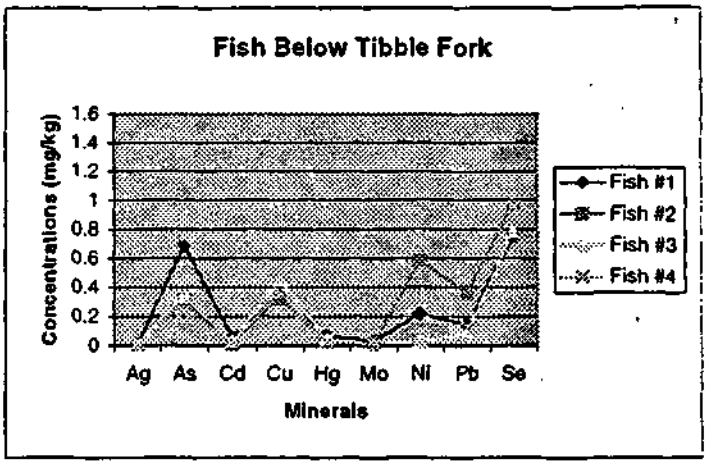


Site #4 - North Fork Above Tibble Fork Res

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Stnd. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.003	0.002	<.001	0.002	0.002	0.001	0.003	0.002	1.500
As	0.274	0.46	0.637	0.577	0.487	0.160	0.637	0.274	2.325
Cd	0.038	0.035	0.013	0.022	0.027	0.012	0.038	0.013	2.923
Cu	0.33	0.437	0.25	0.409	0.357	0.084	0.437	0.250	1.748
Fe	18.223	9.256	5.652	6.948	10.020	5.668	18.223	5.652	3.224
Hg	0.052	0.081	0.053	0.087	0.068	0.018	0.087	0.052	1.673
Mo	0.009	0.004	0.001	0.025	0.010	0.011	0.025	0.001	25.000
Ni	0.243	0.057	0.062	0.016	0.095	0.101	0.243	0.016	15.188
Pb	0.405	0.181	0.1	0.091	0.194	0.146	0.405	0.091	4.451
Se	0.841	0.645	0.675	0.744	0.726	0.087	0.841	0.645	1.304
Zn	5.759	5.703	4.37	5.47	5.326	0.649	5.759	4.370	1.318

Site # 3 North Fork below Tibble Fork

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.003	0.001	0.001	0.001	0.0015	0.00
Al	0.684	0.549	0.665	0.883	0.70	0.14
As	0.688	0.311	0.346	0.234	0.39	0.20
B	0.108	0.061	0.037	0.027	0.06	0.04
Ba	0.083	0.163	0.043	0.066	0.09	0.05
Be	<.001	<.001	<.001	0.001	0.00	#DIV/0!
Ca	1153.04	2867.072	254.201	804.437	1269.69	1127.37
Cd	0.058	0.01	0.027	0.022	0.029	0.02
Co	0.055	0.09	0.045	0.055	0.06	0.02
Cr	1.176	1.278	1.247	1.187	1.22	0.05
Cu	0.339	0.325	0.452	0.364	0.37	0.06
Fe	11.341	23.4	9.283	11.946	13.99	6.37
Hg	0.064	0.039	0.046	0.031	0.045	0.01
K	3865.574	4118.493	4172.818	4432.99	4147.47	232.72
Li	0.016	0.021	0.011	0.007	0.01	0.01
Mg	304.937	366.056	308.599	349.165	332.19	30.19
Mn	0.479	0.588	0.305	0.442	0.45	0.12
Mo	0.025	0.01	0.008	0.003	0.01	0.01
Na	382.521	511.781	448.827	435.164	444.57	53.15
Ni	0.218	0.584	0.028	0.15	0.25	0.24
P	2965.555	4113.361	2403.994	2823.685	3076.65	731.11
Pb	0.148	0.365	0.078	0.125	0.179	0.13
Sb	0.005	0.002	0.001	0.001	0.00	0.00
Se	0.755	0.966	0.779	0.957	0.86	0.11
Si	27.965	28.116	27.06	25.53	27.17	1.19
Sn	0.009	0.003	0.002	0.001	0.00	0.00
Sr	2.301	5.704	0.379	1.381	2.44	2.31
Tl	0.019	0.019	0.016	0.018	0.02	0.00
V	0.018	0.037	0.027	0.029	0.03	0.01
Zn	5.191	8.826	5.377	5.986	6.35	1.69
Ca/K	0.298	0.696	0.061	0.181	0.309	0.28
Ca/M	3.781	7.832	0.824	2.304	3.685	3.02
Na/K	0.099	0.124	0.108	0.098	0.107	0.01
Cu/F	0.030	0.014	0.049	0.030	0.031	0.01
Cu/Z	0.065	0.037	0.084	0.061	0.062	0.02
Pb/F	0.0130	0.0156	0.0084	0.0105	0.0119	0.00



Site # 3 - North Fork Below Tibble Fork

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Stnd. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.003	0.001	0.001	0.001	0.002	0.001	0.003	0.001	3.000
As	0.688	0.311	0.346	0.234	0.395	0.201	0.688	0.234	2.940
Cd	0.058	0.01	0.027	0.022	0.029	0.020	0.058	0.010	5.800
Cu	0.339	0.325	0.452	0.364	0.370	0.057	0.452	0.325	1.391
Fe	11.341	23.4	9.283	11.946	13.993	6.374	23.400	9.283	2.521
Hg	0.064	0.039	0.046	0.031	0.045	0.014	0.064	0.031	2.065
Mo	0.025	0.01	0.008	0.003	0.012	0.009	0.025	0.003	8.333
Ni	0.218	0.584	0.028	0.15	0.245	0.239	0.584	0.028	20.857
Pb	0.148	0.365	0.078	0.125	0.179	0.127	0.365	0.078	4.679
Se	0.755	0.966	0.779	0.957	0.864	0.113	0.966	0.755	1.279
Zn	5.191	8.826	5.377	5.986	6.345	1.688	8.826	5.191	1.700