

NOTES ON BLACKFOOT DATA

1. #7 Elk Creek has a high Zn, Fe level
2. #5 Union Creek has a high Fe level
3. #23 Lander's Fork is high in Zn
4. On the Blackfoot, all metals get more concentrated as you go downstream except for Zn and Cu, especially Zn (~~4/6/68~~ ~~pop~~ ~~4/17/68~~)
5. Nitrate at #24 is 5.3 ppm on 3-17-68 which is noticeably higher than the rest.
6. Note how high sulfate is at Pop's and progressively diminishes as you go downstream.
7. There are two dates which have high fluoride levels in all samples analysed, this might be just analytical error. ~~6-14-68~~ or 3-17-68
8. The East and West Twin Creeks have soft water and high acidities

24

BLACKFOOT WATER QUALITY STUDY

1969 - 1969

MONTANA FISH AND GAME DEPARTMENT

CONTENTS AND ARRANGEMENT

1. Collecting Sites Identification
2. For each collecting site, the following is included:
 - a. table of field data
 - b. table of laboratory analyses data
 - c. graphs of field data
 - d. graphs of laboratory data
 - a. above includes: date of collection, time of collection, H₂O temperature, air temperature, pH, dissolved oxygen, alkalinity, calcium hardness, total hardness, turbidity, CO₂, weather at time of collection, and collector.
 - b. above includes: date of collection, turbidity, total dissolved solids, hardness, CO₃, HCO₃, SO₄, Cl, NO₃, F, Ca, Mg, Na&K, Fe, As, Zn, Pb, and Cu.
 - c. above includes: graph of alkalinity, Ca hardness and total hardness, graph of pH, graph of D.O., and graph of H₂O temperature.
 - d. above includes: graph of TDS, HCO₃, & hardness, graph of NO₃ and F, graph of SO₄, Cl, Ca, Mg, and Na & K, and graph of turbidity.
3. Comparisons among the tributary streams and the sites of the Blackfoot River include the following:
 - a. Table for Fe showing collecting site, total # samples collected, # samples greater than zero, and maximum concentration for each site during 1968, during 1969, and for both years combined.
 - b. Table for As as in a.
 - c. Table for Zn as in a.
 - d. Table for Pb as in a.
 - e. Table for Cu as in a.
 - f. Table for the six Blackfoot sites as in no. a through e.

- g. Graph of hardness (lab) for sites 2 -15, graph for sites 16-23, graph for sites 24-30, and graph for all sites combined
 - h. Graphs showing concentrations at each site for two year period, one each for F, Fe, Cu, Zn, and As
 - i. Graph showing ranges of pH for all collecting sites during two year period
 - j. Graph showing range of hardness (lab) for all collecting sites during two year period
 - k. Graph showing range of dissolved oxygen for all collecting sites during two year period
4. Special Comparisons and Data
- a. for Pass Creek, graph of hardness and zinc
 - b. for the Blackfoot R. at Pop's Place,
 - 1) monthly variations of dissolved oxygen in graph
 - 2) graph of monthly variations in pH
 - 3) Table of monthly instantaneous suspended sediment and concentration values , including water temperature and gage height
 - 4) Graph of diurnal variations in dissolved oxygen, monthly samples for 1/4 months
 - 5) Graph of diurnal variations in pH, monthly samples for 4 months
 - 6) Graph of diurnal variations in water and air temperatures, monthly for 4 months
 - 7) Table of spectrographic analyses of metals, monthly samples for 4 months
 - c. for Alice Creek, Graph of hardness and zinc
 - d. for Lander's Fork, graph of hardness and zinc
 - e. ACM and FG data for four comparable collecting sites on metals
5. Omissions
- a. Graphs for Sandbar and Hogum Cr. since there is just one collection from each site
6. All information above is arranged by Collecting Site in duplicate loose-leaf notebooks with one division for comparisons of streams and Blackfoot R.

BLACKFOOT RIVER STUDY
by
MONTANA FISH AND GAME DEPT.

1968 - 1969

COLLECTING SITES

SITE NO.	LOCATION	RIVER MILEAGE NUMBER
1	Blackfoot River at Rainbow Bend	364.6 9.7-0.0
2	West Twin Cr., at Hwy 20 crossing	10.0 0.0
3	East Twin Cr., " " " "	10.3 0.0
4	Gold Cr., at McNamara Bridge	13.0 0.0
5	Union Cr., at Hwy 20 crossing	12.32 0.0
6	Belmont Cr., at culvert	21.2 0.1
7	Elk Cr., Hwy 20 crossing	27.9 1.0
8	Blanchard Cr., at culvert crossing Hwy 20	33.8 2.6 0.2
9	Clearwater R., Hwy 20 crossing	33.8 3.0
10	Cottonwood Cr., " " " at culvert	41.6 0.6
11	Monture Cr., " " "	44.2 3.0
12	Warren Cr., " " "	48.2 4.4
13	North Fork of the Blackfoot River	51.8 5.6
14	Kleinschmidt Cr. (unnamed warm spring)	51.8 5.6 0.1
15	Arrastra Cr., Hwy 20 crossing	79.9 0.1
16	Blackfoot R., 4.5 mi. above Arrastra Cr.	84.7 0.0
17	Beaver Cr. (<i>Linnets Cr.?</i>)	94.6 0.0
18	Blackfoot River, at Dalton Mtn. road bridge	95.2
19	Willow Cr.	94.2 1.2
20	Keep Cool Cr.	95.8 2.2
21	Spring Cr. (& Spring Cr. overflow)	95.8 2.0 0.2
22	Poorman Cr.	97.6 2.2
23	Lander's Fork	103.8 0.8

Blackfoot R. collecting sites

2

24	Blackfoot River at Hogum Cr. bridge	106.8	
25	Hogum Cr.	106.6	0.2
26	Alice Cr., at Hwy 20 crossing	109.6	0.7
27	Blackfoot River at Flescher Pass bridge	110.7	
28	Sandbar Cr.	110.6	2.6
29	Blackfoot River at Pop's Place	114.5	
30	Pass Cr.	115.3	0.4

Big Blackfoot River Mileages 1/

<u>Location along stream</u>	<u>River Mile</u>
Mouth (in center of Milltown Reservoir)	0
Wishard Bridge (old)	6.3
West Twin Creek	10.0
East Twin Creek	10.3
McNamara Bridge	12.2
Union Creek	12.3
Gold Creek	12.9
Belmont Creek	21.2
Ninemile Prairie Dam site.	21.8
Elk Creek	27.9
Roundup Bar (highway bridge)	29.4
Clearwater River	33.8
Cottonwood Creek	41.6
Scotty Brown Bridge (NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec.33 T15NR13W)	44.0
Monture Creek	44.2
North Fork Blackfoot River	51.8
Bridge in NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec.33 T14NR13W	57.5
Bridge in SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec 12 T13NR12W	63.0
Nevada Creek	64.4
Bridge in SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec 32 T14NR11W	67.8
Highway 20-Helmville (Highway 271) Bridge	75.8
Arrastra Creek	79.9
Willow Creek	94.2
Bridge in Lincoln(Stemple Pass road)	99.6
Landers Fork Cr.	106.9
Hogum Cr. road bridge	110.8
Alice Creek	112.5
Flesher Pass road bridge	114.0
Cadotte Creek	117.3
Pass Creek	120.0
Source (Junction of Anaconda and Beartrap Creeks)	121.8

OK. same as CE mileage
 Alice
 not same as CE mileage
 Alice

1/ Mileages from Mouth to Willow Creek are from USGS map-Plan and Profile of Blackfoot River, to mile 95, and Tributaries, Montana, Miscellaneous Dam Sites, dated 1937. Mileages from Willow Creek to Alice Creek from USFS maps 2"=1 mile, and from Alice Creek to Source from USGS 7 $\frac{1}{2}$ min. Quad. + USFS 2"=1 mile map.

Liter Spence
 October 10, 1967

at Rainbow Bend

SITE #1 BLACKFOOT RIVER FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL
2-18-68	1530	0	6	8.5	10	135	80	130	0	2	rain	B.D
3-16-68	0815	4	4	8.4	11	115	70	115	4	2	p.c.	"
4-20-68	0900	4	4	8.3	11	110	70	105	0	2	p.c.	"
5-25-68	0745	9	8	8.4	9	80	50	80	20	2	p.c.	"
6-20-68	1030	13	18	8.3	10	90	55	85	8	2	p.c.	"
7-22-68	1330	17	26	8.6	9	130	80	120	0	2	clear	"
9- 9-68	1200	14	23	8.4	10	145	85	130	0	2	clear	"
10-19-68	0835	4	-1	8.1	10	135	90	130	0	2	clear	"
11-30-68	1100	0	1	8.1	12	135	85	130	0	2	p.c.	"
1- 2-69	0930	0	-7	7.9	11	140	85	135	0	2	cloud	"
2-8- 69	0930	1	0	7.8	12	130	90	120	0	2	cloud	"
3-28-69	1000	3	8	7.9	12	115	80	110	22	2	p.c.	"
5- 3-69	0920	7	7	7.9	11	100	65	95	10	2	clear	"
6-16-69	1130	13	23	8.1	10	140	70	105	2	2	clear	"
7-16-69	0930	16	17	8.1	10	115	70	110	0	2	clear	"
8-26-69	1115	16	22	8.2	7	140	95	135	0	2	clear	"
10- 7-69	0920	7	2.5	8.6	10		100	170			clear	L.S.
11-29-69	1000	0	4.5	8.65	13			140			p.c.	L.S.
1-20-70	1000	0	3.5	8.6	11.5						p.c.	"
Σ		128		-	200	1925	1240	2145				
n		19		19	19	16	17	18				
x̄		7		-	10	120	73	119				
Range	L	0		7.8	7	80	50	80				
	H	17		8.6	12	145	100	170				

SITE #1 BLACKFOOT RIVER AT RAINBOW BEND

LAB ANALYSES

~~XXXXXXXXXX~~

Date	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	MLK	
2-17-68	0	146	100	0	143	6	3	0.0	0.1		117
3-17-68	0	130	115	0	146	8	2	4.0	0.22		120
4-21-68		130	110	0	143	0	2	0.00	0.06		117
5-25,26-68	0	110	80	0	98	7	1	.1	0		80
6-20,21-68	8	60	84	0	110	6	3	0.40	0.10		90
7-22,23-68	0	140	124	0	155	.4	.6	0	0.00		127
8											
9-9-68	3	150	155	0	171	9	4	0	-		140
10-19,20-68	6	144	140	12	140	9	7	0	0.38		135 115-20
11-30-68	2	140	145	0	164	0	4	0.1	-		134
12											
1-2,3-69	5	144	150	0	172	2	8	0.6	0.44		141
2-8,9-69	8	138	140	0	158	6	5	0	-		130
3-28,29-69	16	140	130	0	128	10	6	0.5	-		105
4											
5-3,4-69	10	112	120	0	104	8	3.0 31	0	0		85
6-16,17-69	2	114	124	0	138	0	5	0	0.24		113
7-16,17-69	0	118	130	0	140	3	6	0	0.08		115
8-27-69	0	154	230	0	171	3	5	0	0.02		140
9											
10-7-69	-	156	220	0	177	9	25	0	0		145
11-29-69	-	140	180	0	171	2	8	0	0.10		140
12											
1-20-70	0	135	125	0	160	7	3	0.10	0.15		131
2											
3-27-70	20	158	130	0	180	8	3	0.6	0.4		148
4-21-70	-	170	140	0	180	3	0.5	0.4	0.1		148
4-27-70	-	140	160	0	180	4	1	0.2	0.2		148
5-22-70	-	100	90	0	110	4	0	0.3	0.2		90
6-16-70	-	120	130	0	160	1	0	0.1	0.1		131
7-21-70	-	160 ¹⁴⁰	140 ¹⁶⁰	0	180	2	0	0	0.1		148
8-20-70	-	150	190	0	170	6	0	0	0.1		139
9-22-70	-	160	200	0	170	9	0	0	0		139
10-21-70		160	220	0	180	10	0	0	0.2		148
12-17-70		170	200	0	180	7	0	0.04	0.1		148
1-18-71		150	210	0	180	6	0	0.1	0.1		148

Range 85-148
3840
300

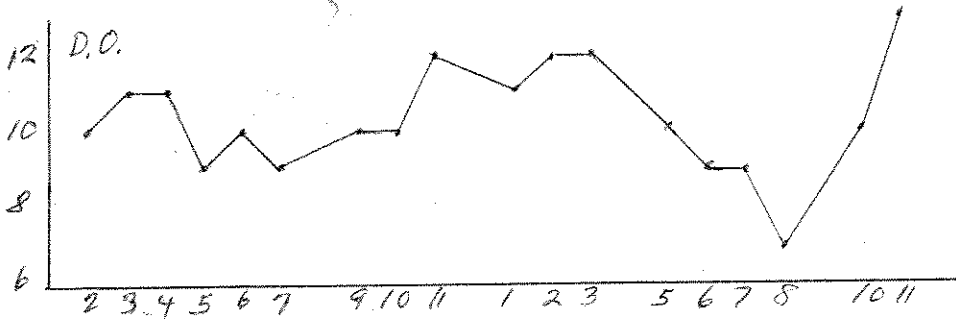
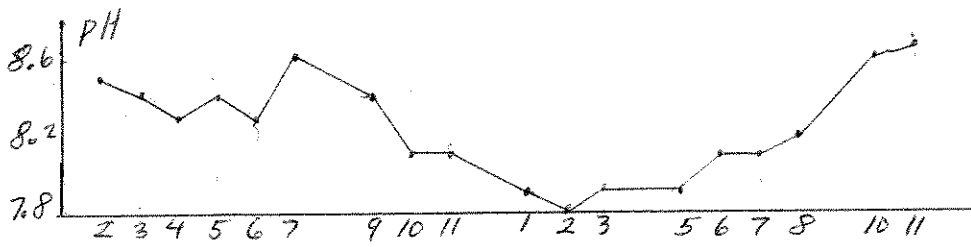
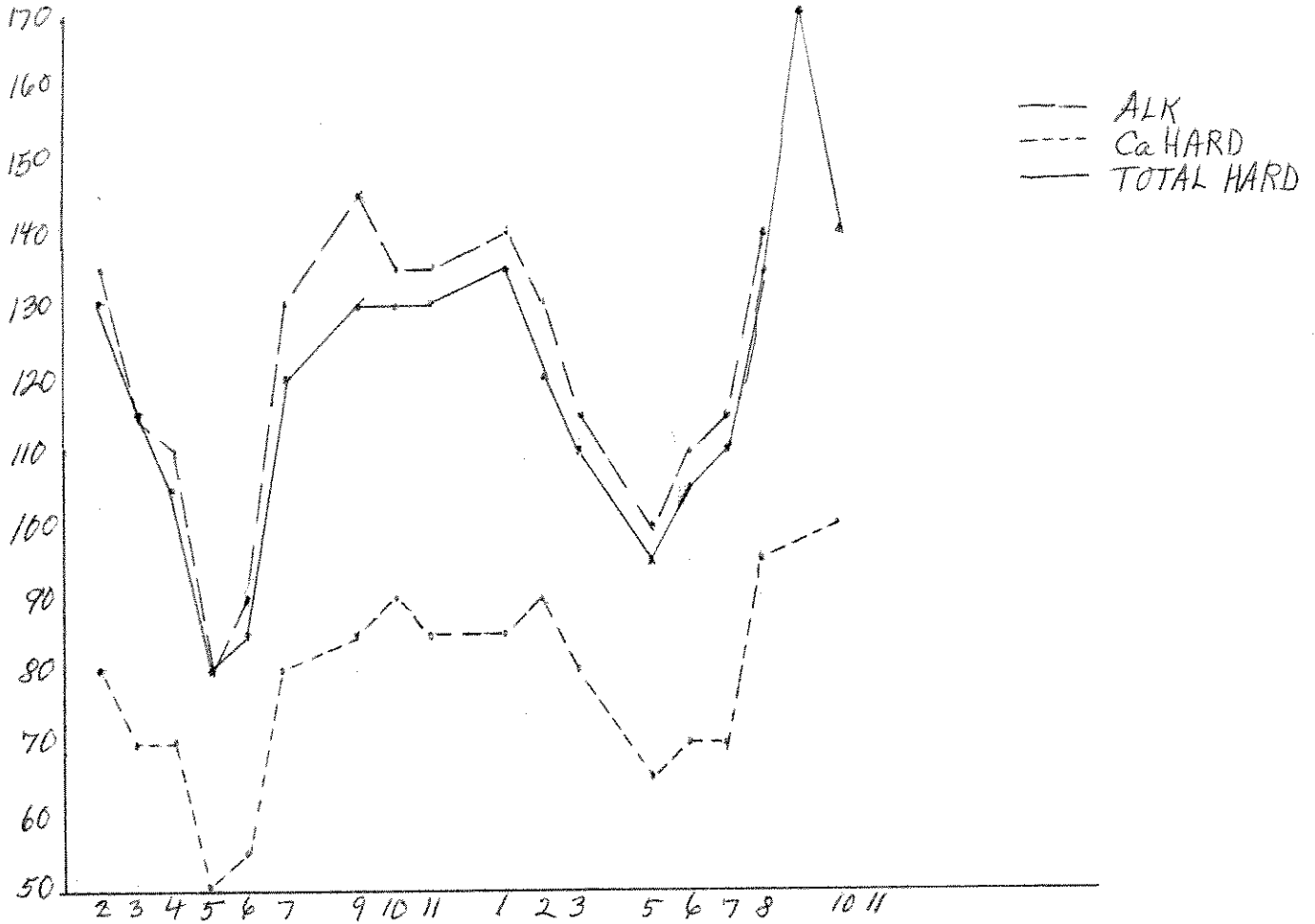
SITE #1 BLACKFOOT RIVER AT RAINBOW BEND

LAB ANALYSES - METALS

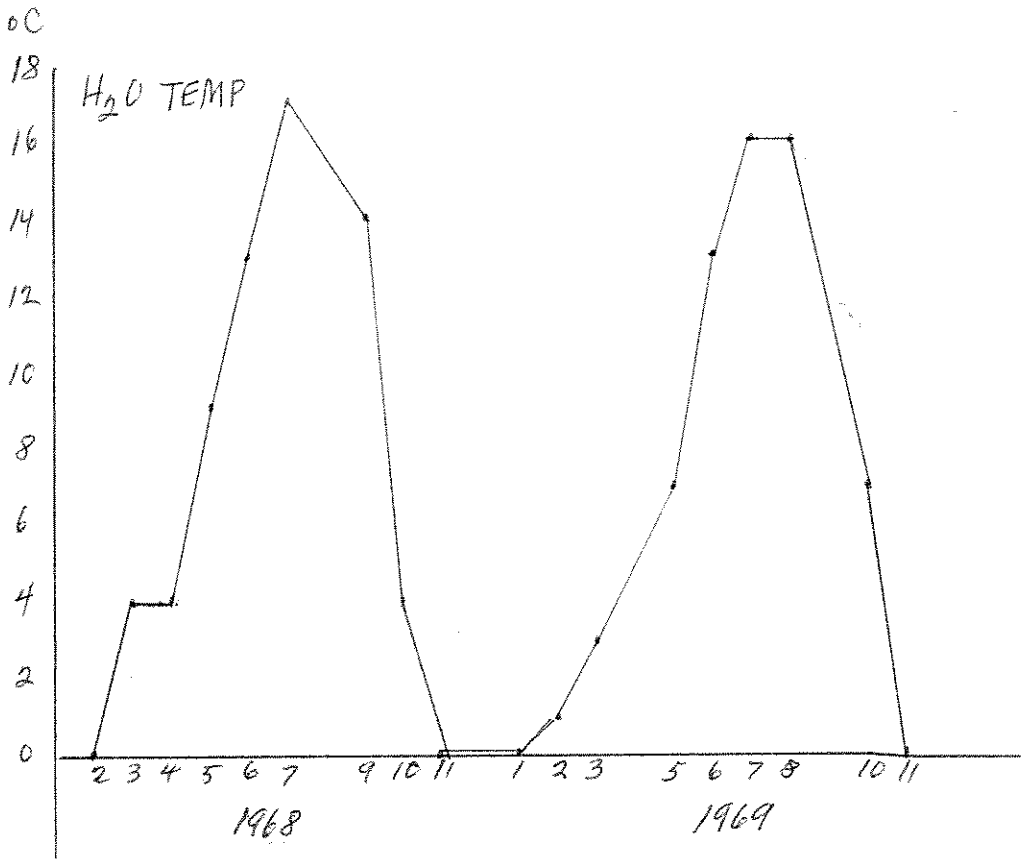
Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
2-17-68	32	5	13	0.09		0.00		0.00				
3-17-68	28	11	9	0.00	0.00	0.06	0.00	0.00				
4-21-68	24	12	5	0.00	0.00	0.00	0.00	0.00				
5-25,26-68	19	8	3	.5	0	0	NES*	0				
6-20-21-68	31	1	9	0.05	0.00	0.00		0.00				
7-22,23-68	38	7.1	3	0.3	0.00	0.00		0.00				
8-												
9-9-68	46	10	0	0.0		ND ⁰		ND ⁰	<i>df</i>	NO - NO	detectable	
10-19,20-68	28	17	7	0.0		0		0				
11-30-68	36	13	0	0		0		0				
12-												
1-2,3-69	32	17	2	0.2		0.0		0.0				
2-8,9-69	36	12	3	0.8		0.0		0.02				
3-28,29-69	36	10	0	0.1	-	0	-	0				
4-												
5-3,4-69	28	12	0	0	0	0 ⁴		0 ⁴				
6-16,17-69	42	5	0	0.2	-	.05	-	0				
7-16,17-69	32	12	0	0	-	0.03	-	0.00				
8-27-69	36	34	0	0	.008	0	-	0				
9-												
10-7-69	36	32	0	0.1	-	0.02	-	0.0				
11-29-69	36	22	0	0.12	-	0.00	-	0.00				
12-												
1-20-70	30	10	13	0.12	-	0	-	0				
2-												
3-27-70	34	11	15	0.2	-	0	-	0				
4-21-70	32	13	20	0.01	-	2.01 0.005	-	0				
4-27-70	30	20	0	0.06	-	0.01	-	0.04				
5-22-70	20	10	2	1.0	-	0.0	-	0.0				
6-16-70	32	12	1	0.7	-	not analyzed	-	not analyzed				
7-21-70	28	22	0	0.04	-	0.03	-	0.06				
8-20-70	36	24	0	0.02	-	0	-	0.03				
9-22-70	36	27	0	0	-	0.06	-	0				
10-21-70	40	29	0	0.14	-	0.03	-	0.0				
12-17-70	44	22	0	0.1		0.08		0.0				
1-16-71	44	24	0	0.0		0.03		0.0				
*NES - Not enough sample												

SITE #1 BLACKFOOT RIVER

FIELD DATA



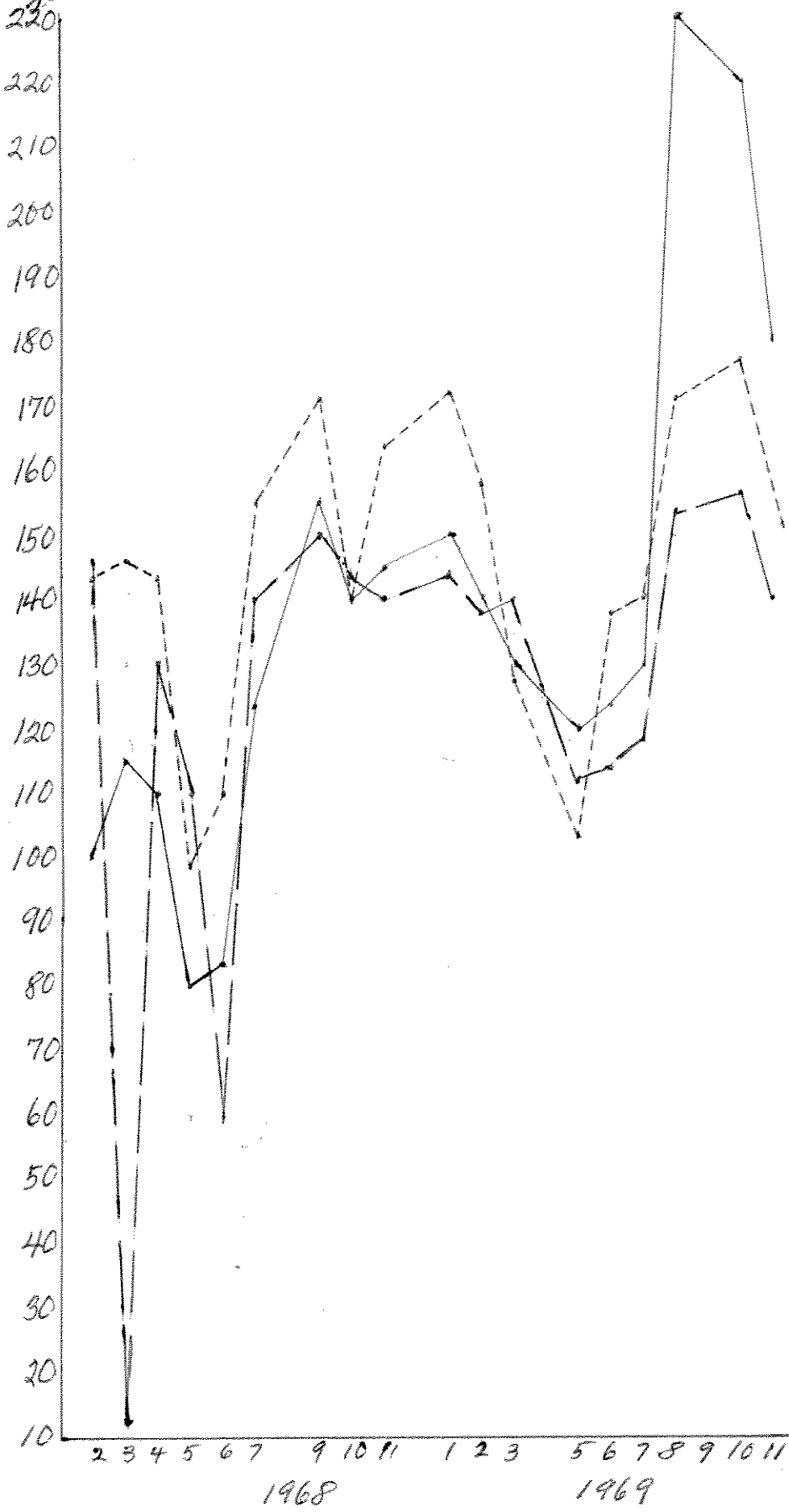
SITE #1 BLACKFOOT RIVER FIELD DATA page 2



SITE #1 BLACKFOOT R.
AT RAINBOW BEND

LAB ANALYSES

mg/l



--- TDS
-.- HCO₃
— HARD

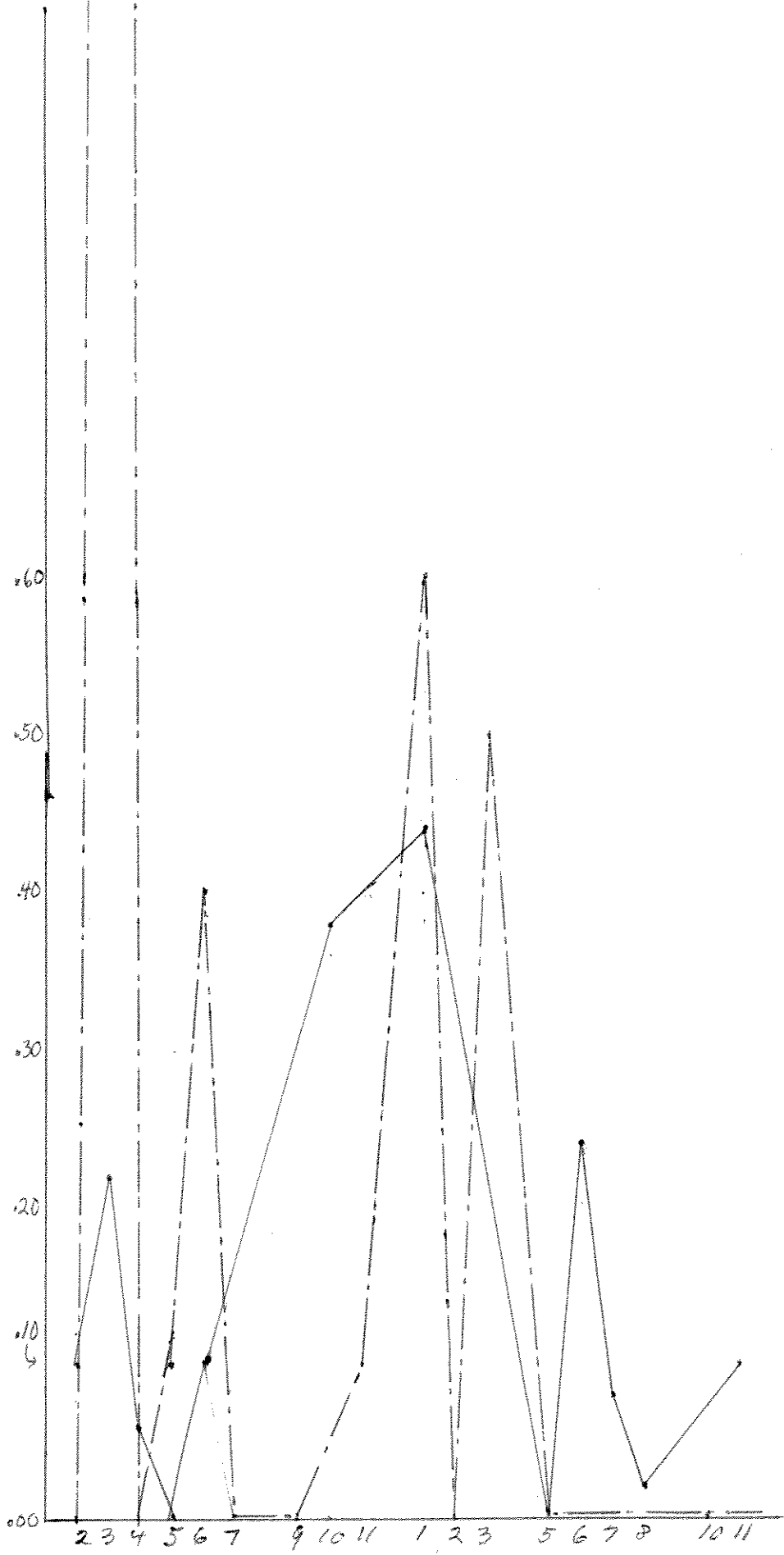
SITE # 1 BLACKFOOT R.
AT RAINBOW BEND

LAB ANALYSES

page 2

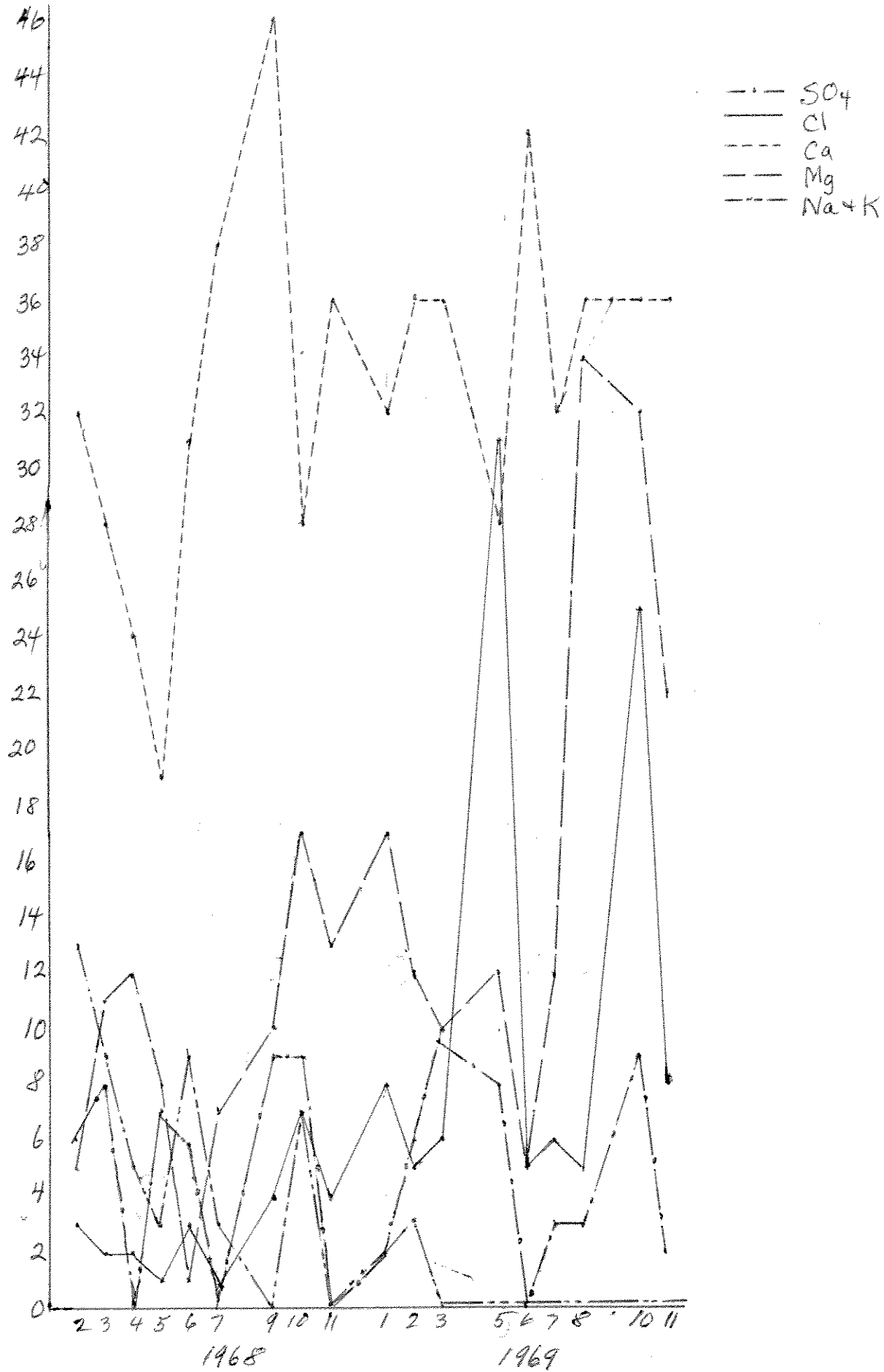
mg/l

--- NO₃
— F



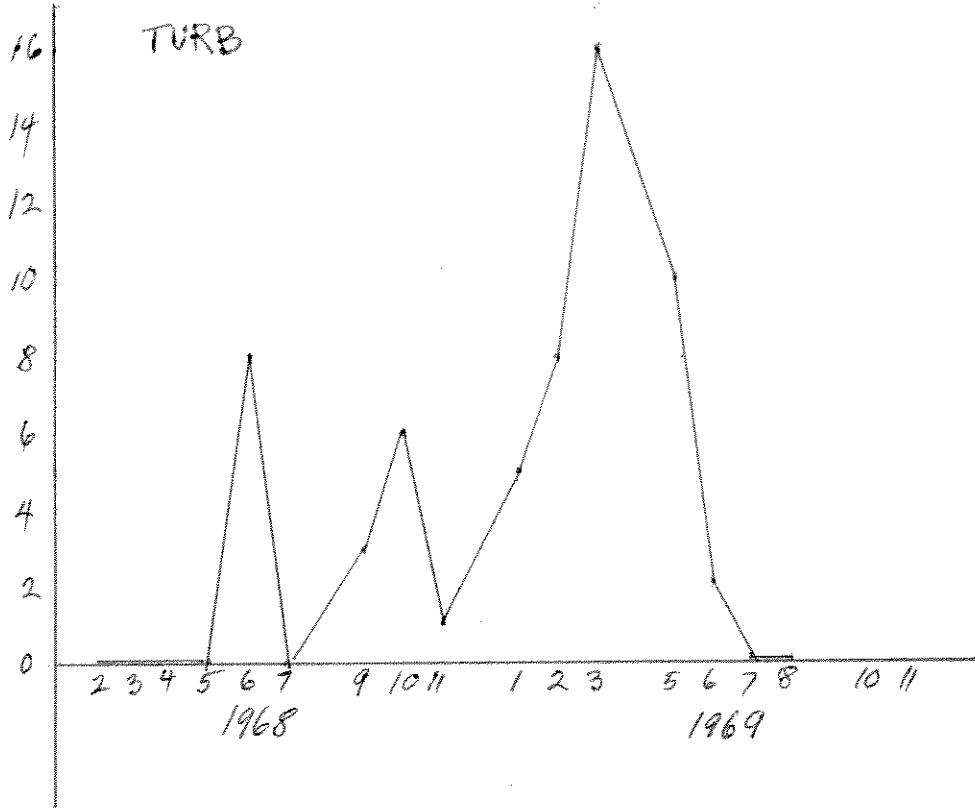
mg/l SITE #1 BLACKFOOT R.
AT RAINBOW BEND

LAB ANALYSES page 3

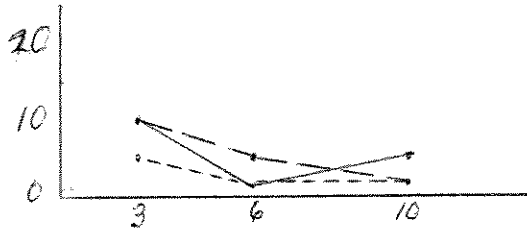


SITE #1 BLACKFOOT R.
AT RAINBOW BEND

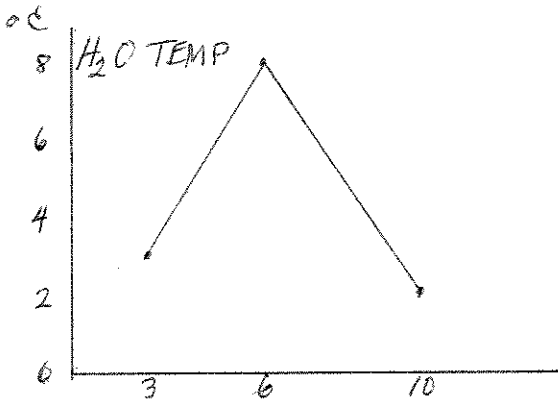
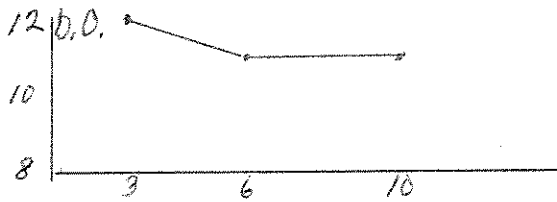
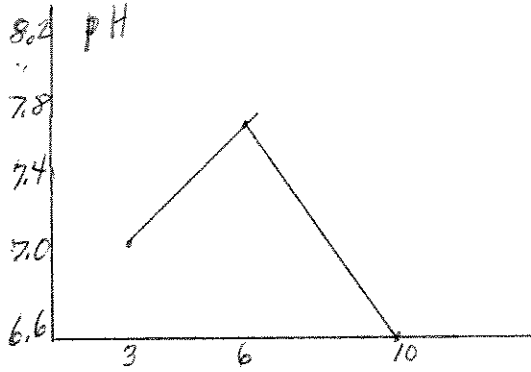
LAB ANALYSES page 4



SITE #2 WEST TWIN CR. FIELD DATA



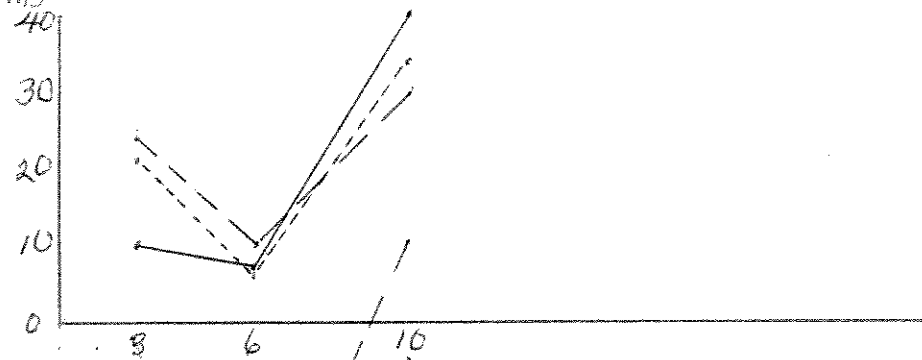
--- ALK
-.- Ca HARD
— TOTAL HARD



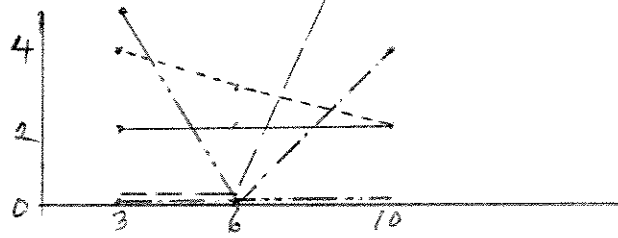
SITE # 2 WEST TWIN CR.

LAB ANALYSES

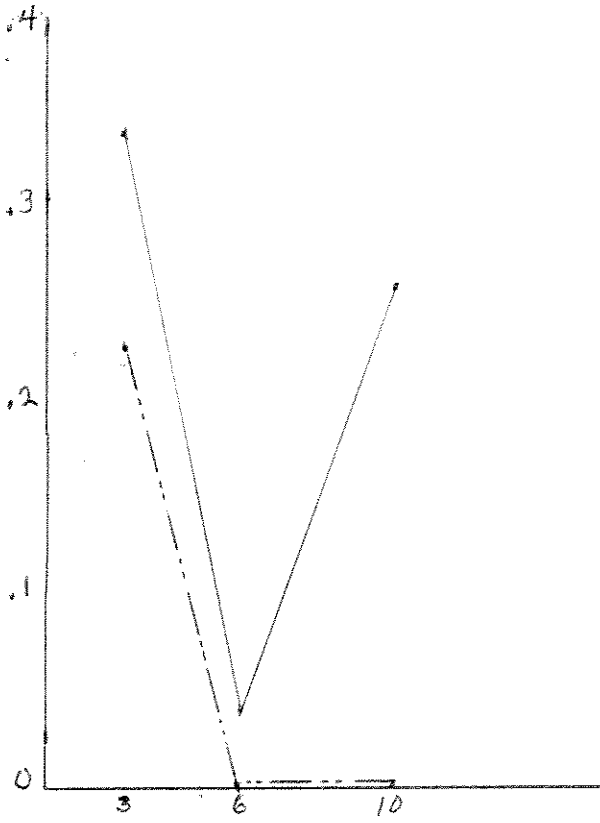
mg/l



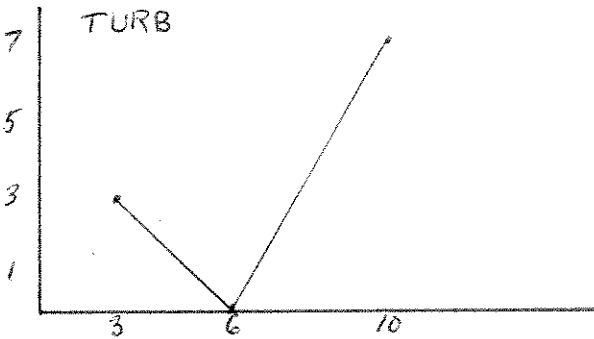
--- TDS
 - - - HCO₃
 ——— HARD



--- SO₄
 ——— Cl
 - - - Ca
 - - - Mg
 - - - Na+K



--- NO₃
 ——— F



TURB

SITE #3 EAST TWIN CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
3-16-68	1045	3	10	7.3	13	10	5	10	4	2	p.c.	B.D
6-20-68	1200	8	19	8.1	11	15	5	10	0	2	p.c.	"
10-19-68	1045	2	3	6.9	11	15	5	15	0	2	clear	"
E		13			35	40	15	35				
N		3		3	3	3	3	3				
X̄		4			12	13	5	12				
Range L		2		6.9	11	10	5	10				
H		8		8.1	13	15	5	15				

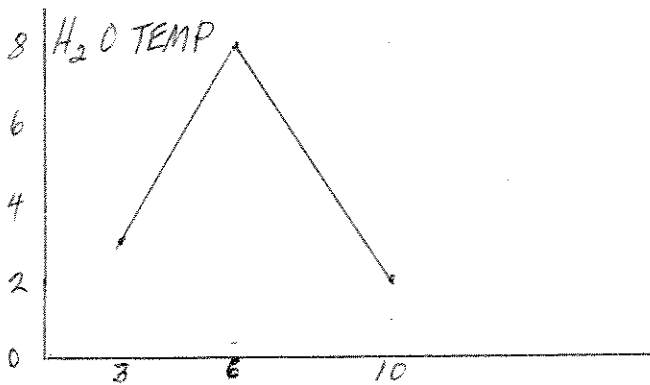
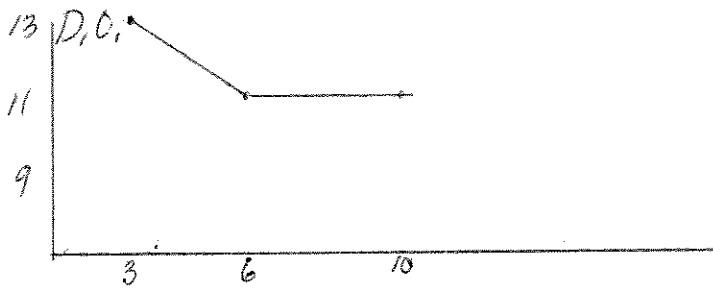
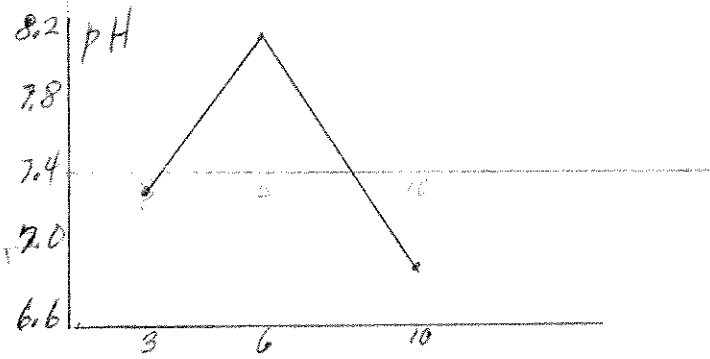
SITE #3 EAST TWIN CREEK

LAB ANALYSES

Date	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	No3	F	Calc. Alk
3-17-68	11	44	10	0	27	8	2	2.7	0.44	22
6-20-68	0	24	8	0	24	0	2	0.20	0.10	20
10-19-68	7	50	20	0	36	5	3	0	-	30

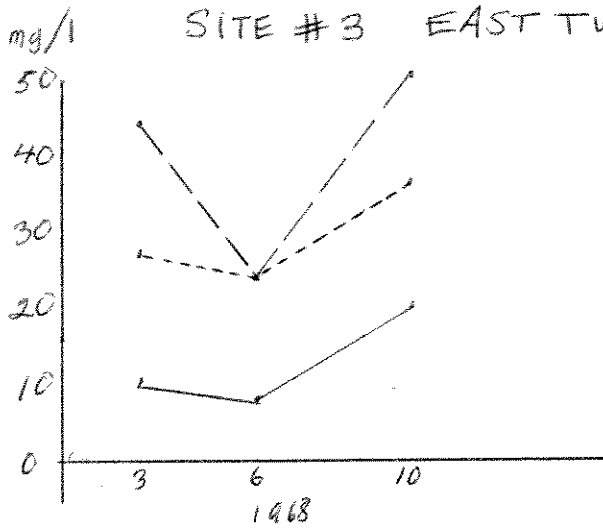
Range - 20
H 30

SITE#3 EAST TWIN CR, FIELD DATA

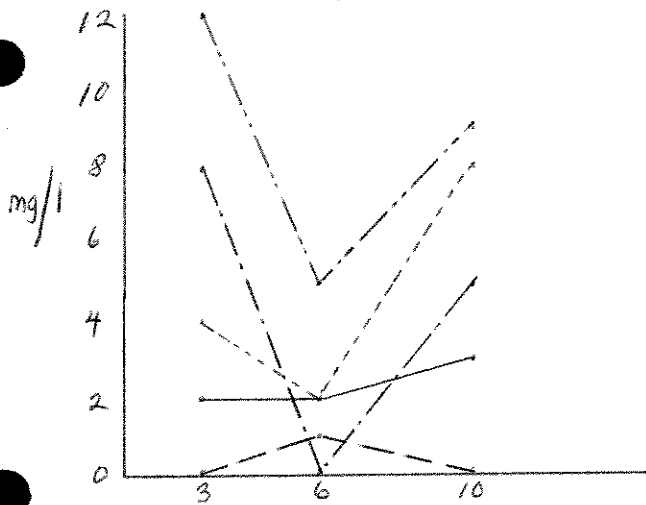


SITE #3 EAST TWIN CR.

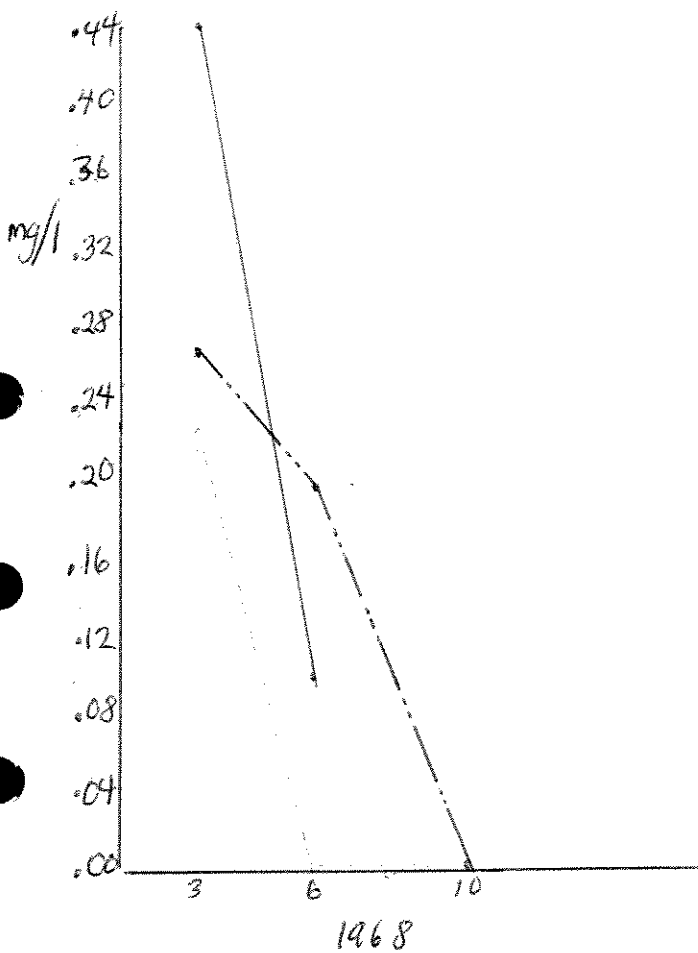
LAB ANALYSES



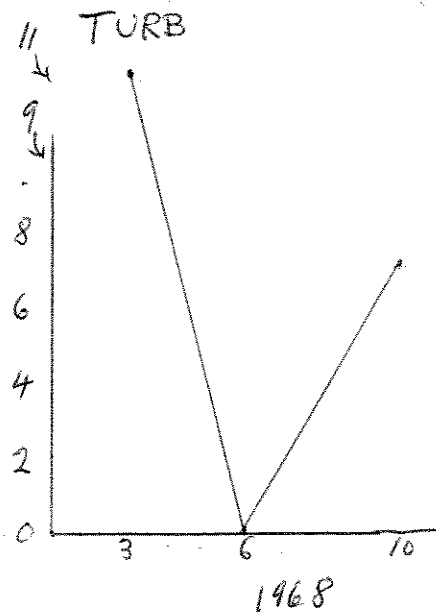
--- TDS
 - - - HCO₃
 ——— HARD



--- SO₄
 ——— Cl
 - - - Ca
 - · - · Mg
 - · - · Na+K



--- NO₃
 - · - · F



1968

SITE #4 GOLD CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL
4-20-68	1030	3	6	8.4	11	80	50	75	0	2	p.c.	B.D
7-22-68	1130	14	29	8.5	9	100	65	95	0	2	clear	"
11-30-68	1200	0	2	8.0	11	100	65	95	0	2	p.c.	"
Σ		17			31	280	180	265				
n		3		3	3	3	3	3				
\bar{x}		6			10	93	60	88				
Range L		0		8.0	9	80	50	75				
H		14		8.5	11	100	65	95				

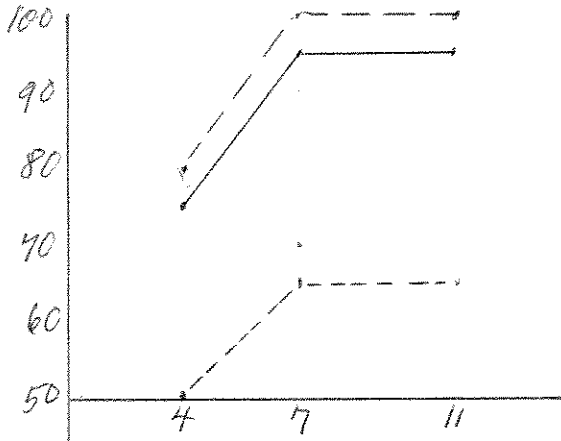
SITE #4 GOLD CREEK

LAB ANALYSES

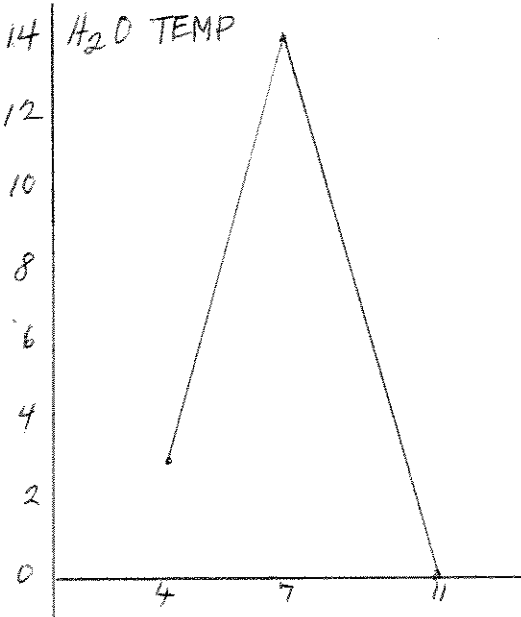
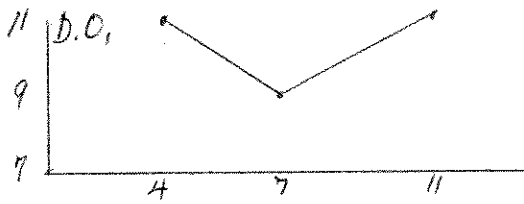
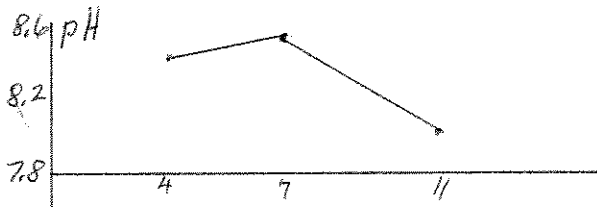
Date	Turb	TDS	Hard	CO ₃	HCO ₃	SO ₄	Cl	NO ₃	F	Calc. Alk		
4-21-68		100	95	0	104	0	2	0.00	0.00	85		
7-22-68	0	110	125	0	122	4	5	0	0.00	100		
11-30-68	7	100	120	0	119	0	4	0	-	98		

Range L 85
 H 100

SITE #4 GOLD CR. FIELD DATA

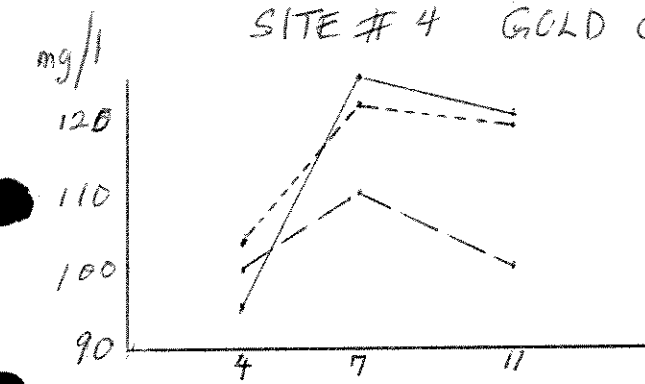


— ALK
--- Ca HARD
— TOTAL HARD

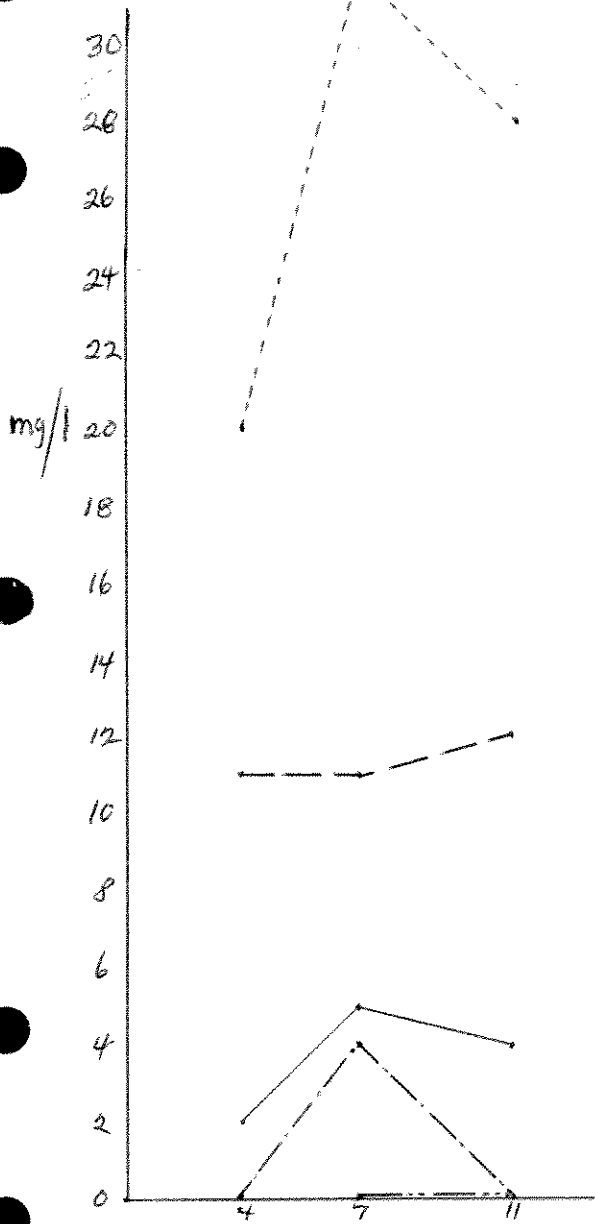


SITE # 4 GOLD CREEK

LAB ANALYSES

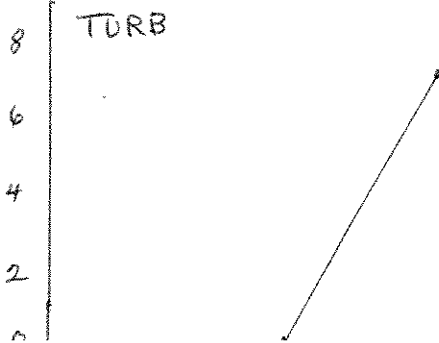


--- TDS
 HCO₃
 ——— HARD



--- SO₄
 ——— Cl
 Ca
 - - - Mg
 Na+K

NO₃ & F all zero



MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Union Creek

Station ^{first} Country bridge above mouth
off Highway 200

Sampling Method ^{1/} Integrated w/
DH-48 sampler

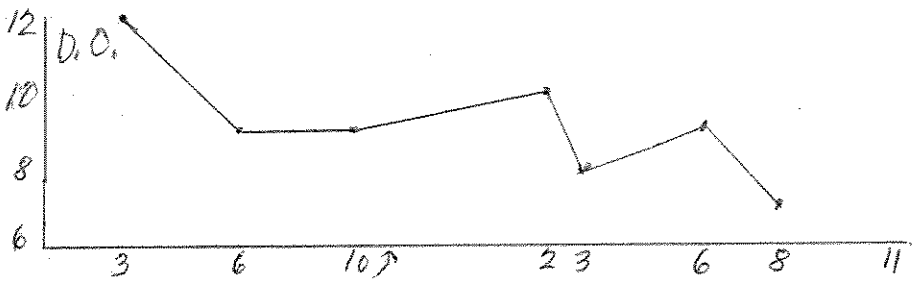
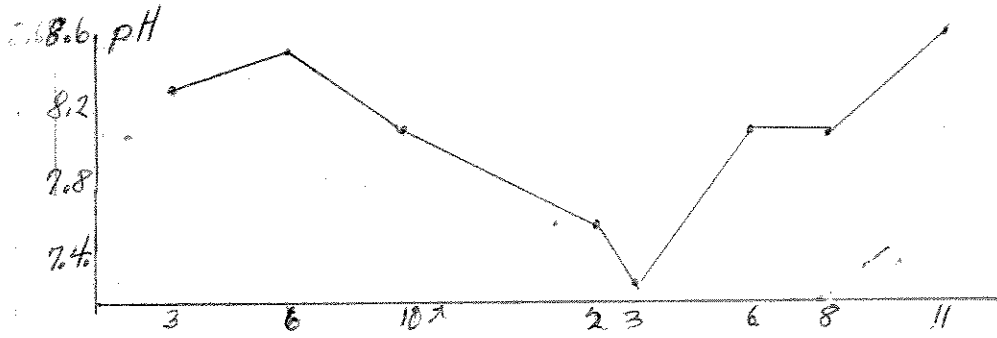
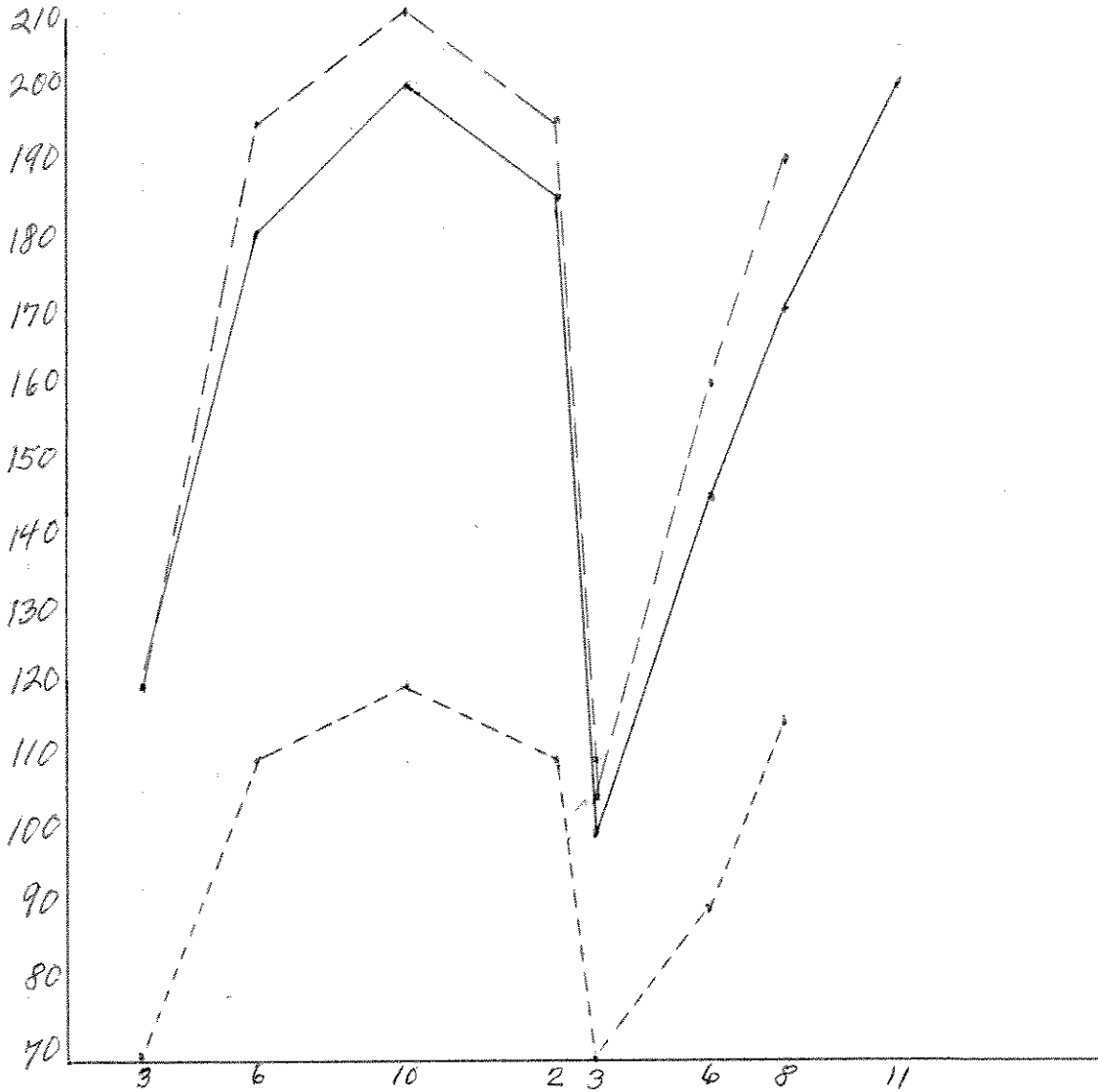
Analytical Instrument Used Hach
Model 2100 A meter

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
3-13-72	48	52	51	50	50	gray-brown	stream high & muddy, flooding in some spots.

^{1/} Surface Grab, Integrated, Other
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971,
pg. 352

SITE #5 UNION CR. FIELD DATA



0C

SITE # 5 UNION CR.

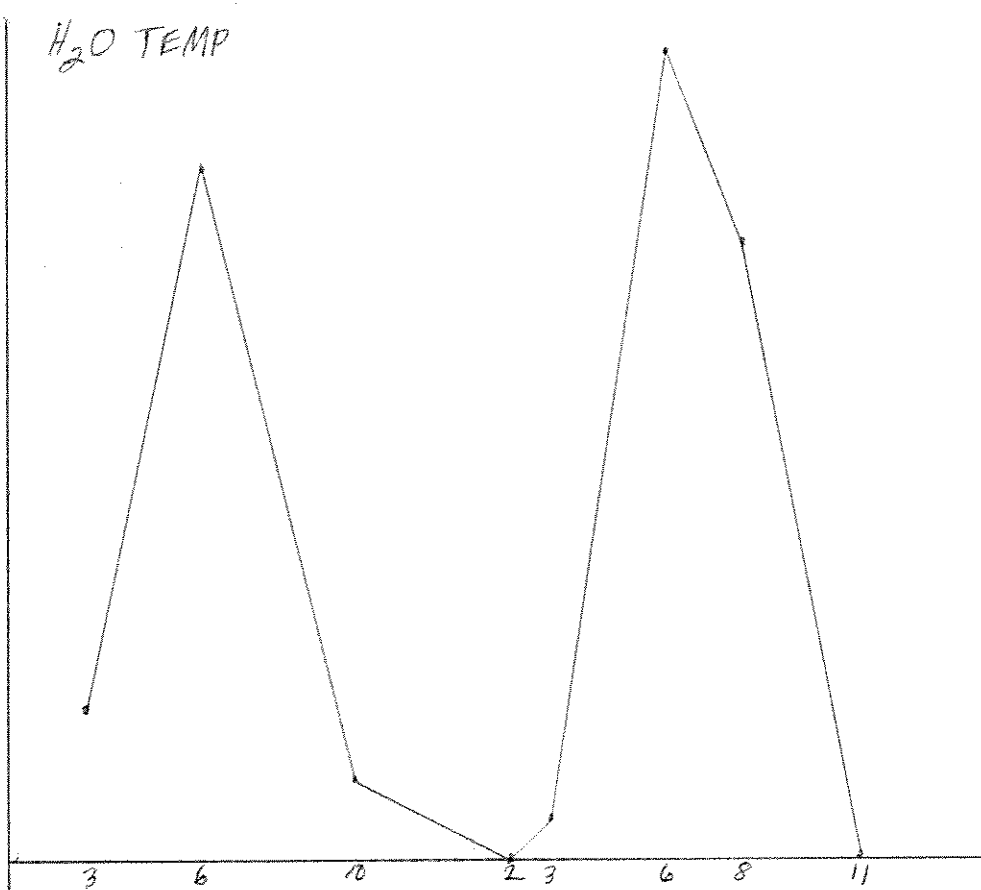
FIELD DATA

page 2

22
20
18
16
14
12
10
8
6
4
2
0

H₂O TEMP

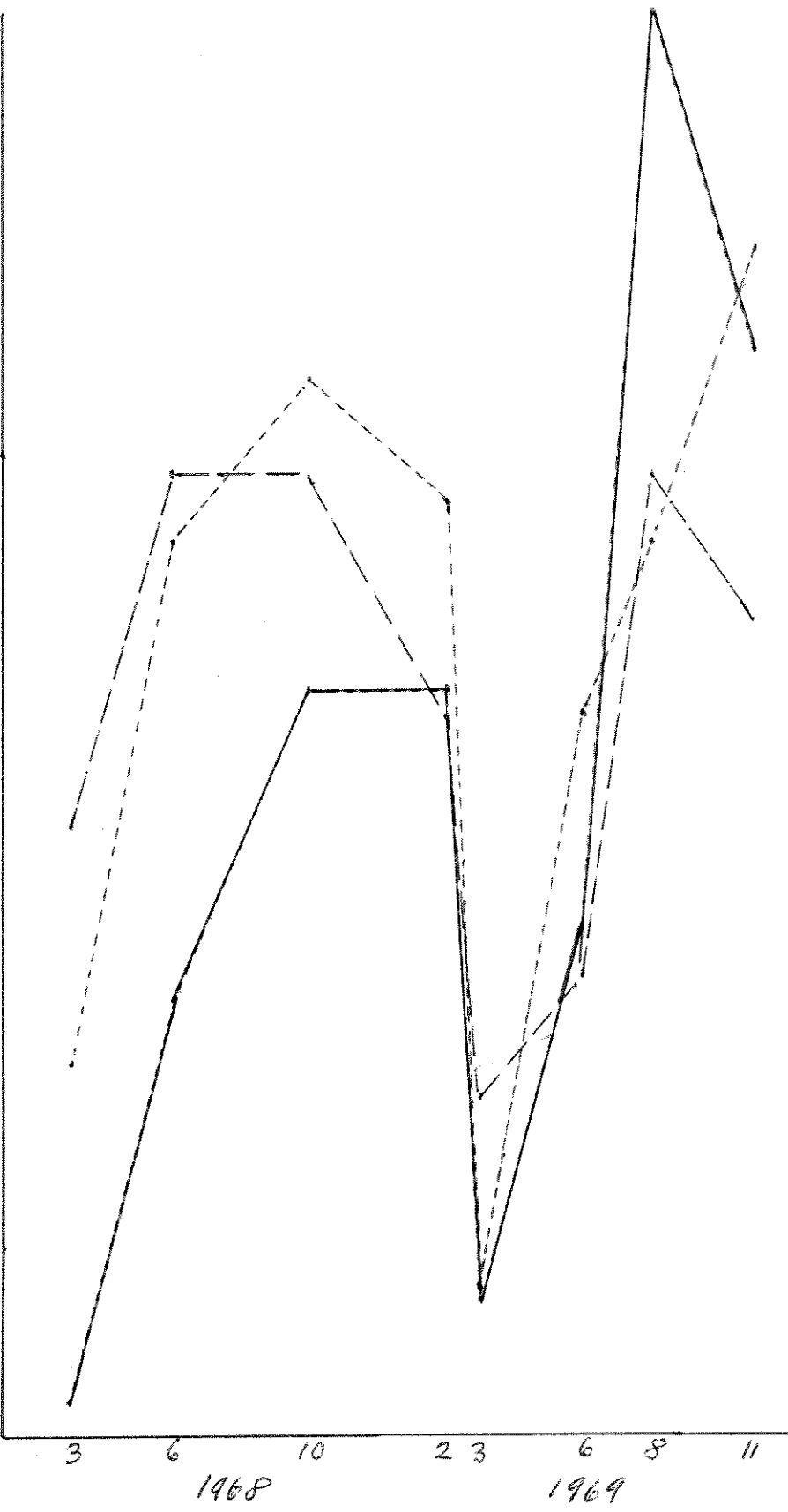
3 6 10 2 3 6 8 11



mg/l

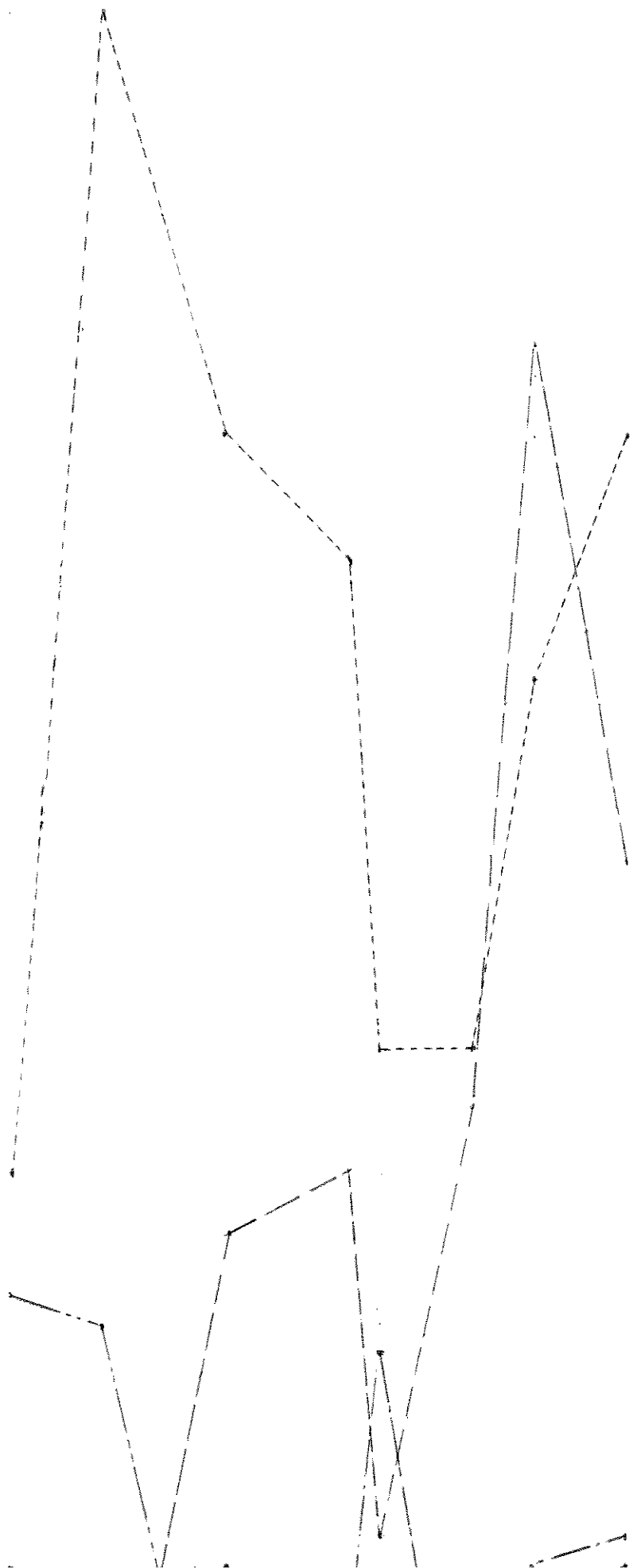
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100

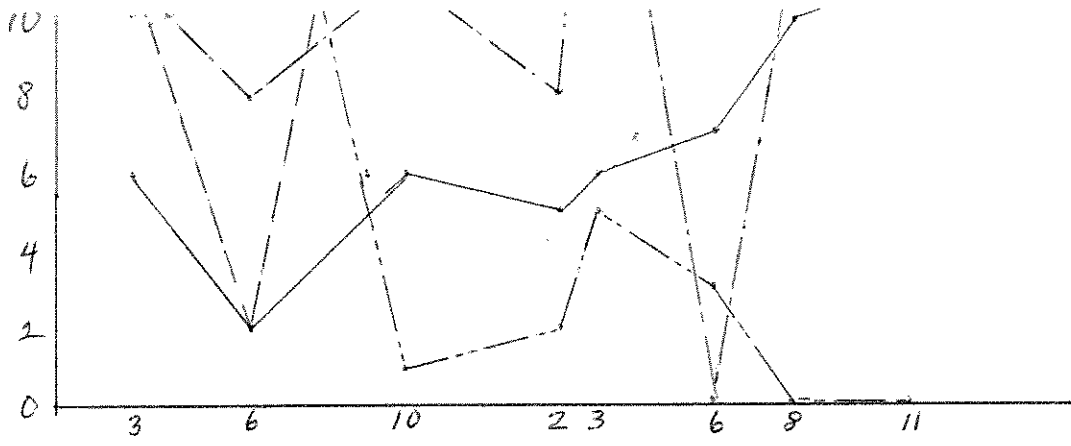
--- TDS
--- HCO₃
--- HARD



--- SO₄
— Cl
- - - Ca
- - - Mg
- - - Na + K

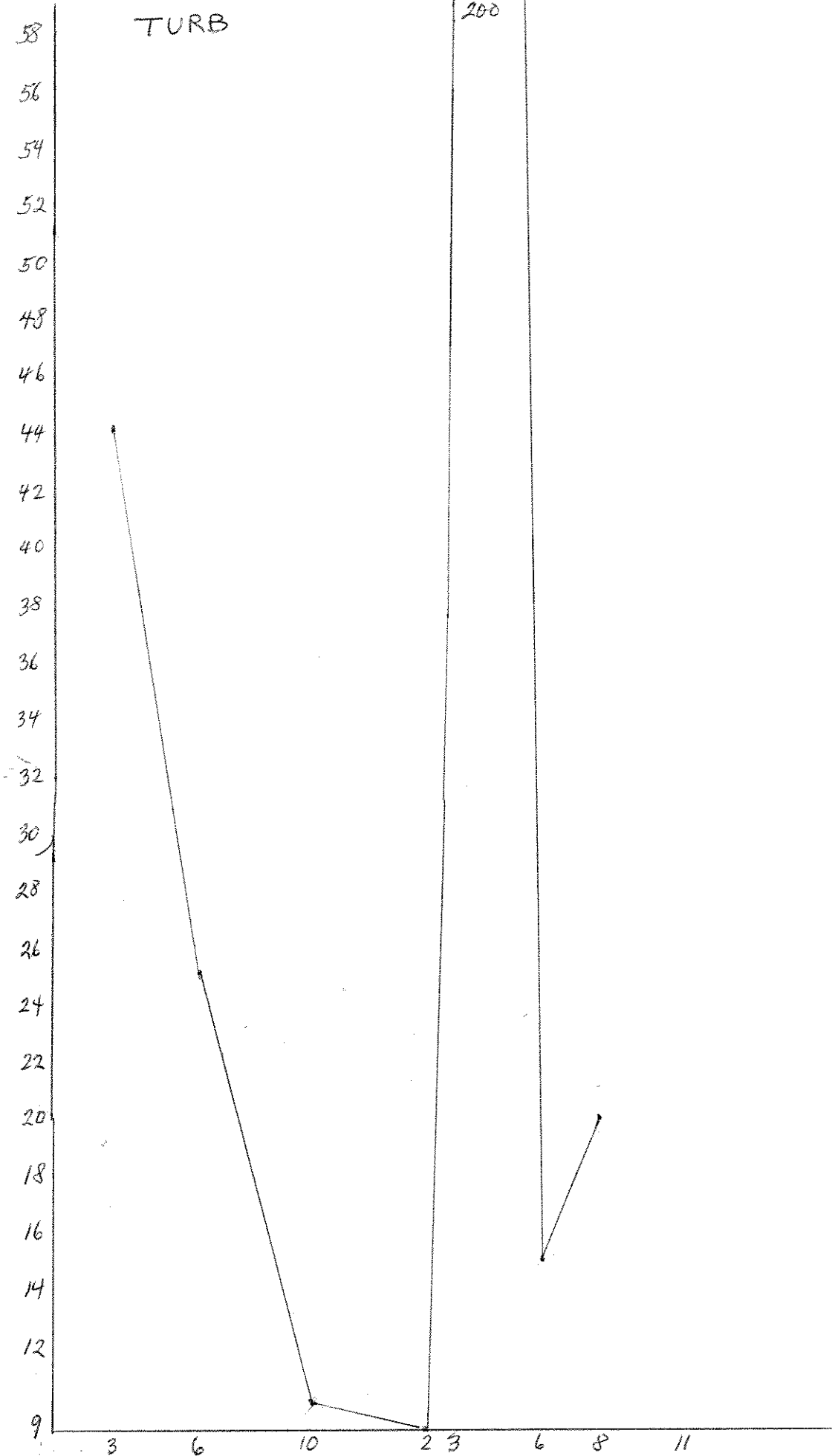
62
60
58
56
54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12





TURB

↑
200



mg/l

SITE # 5

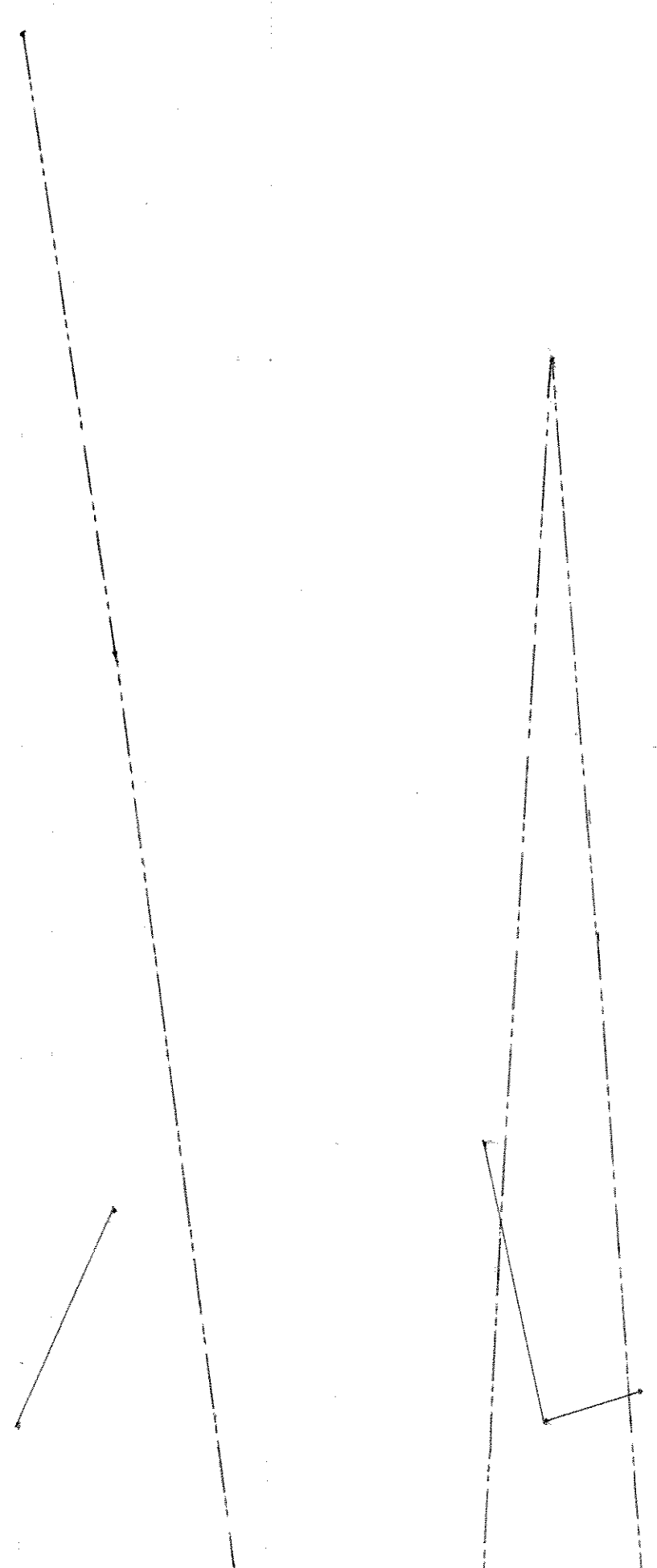
UNION CR.

LAB ANALYSES

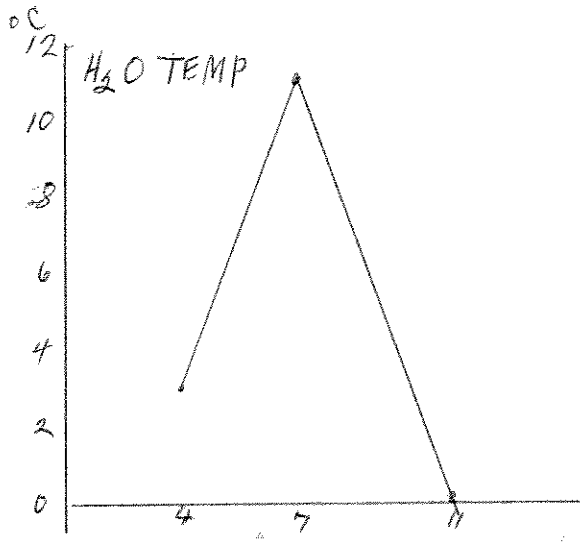
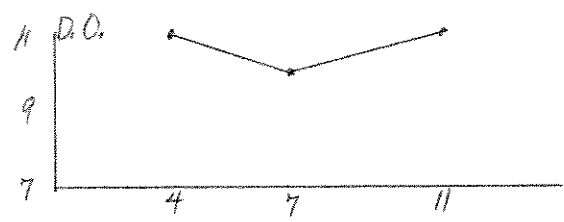
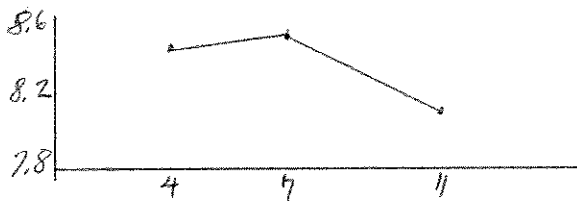
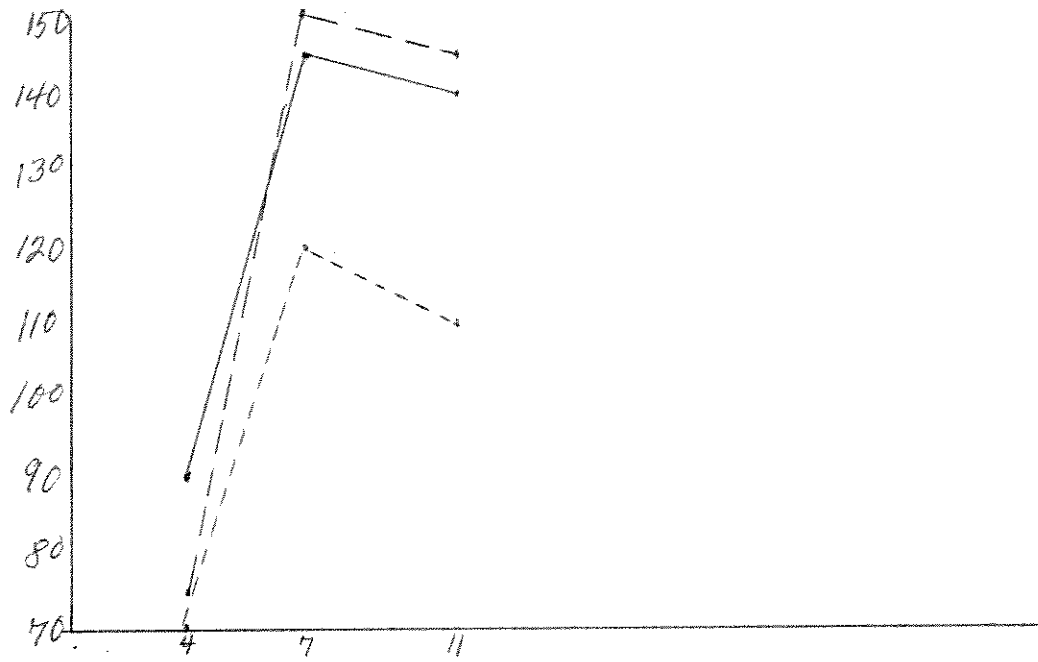
page 4

1.20
1.00
0.60
0.40
0.36
0.32
0.28
0.24
0.20
0.16
0.12
0.08
0.00

--- NO₃
— F



SITE # 6 BELMONT CR. FIELD DATA



mg/l

SITE #6 BELMONT CR.

LAB ANALYSES

210
200
190
180
170
160
150
140
130
120
110
100
90
80

4 7 11

--- TDS
--- HCO₃⁻
--- HARD

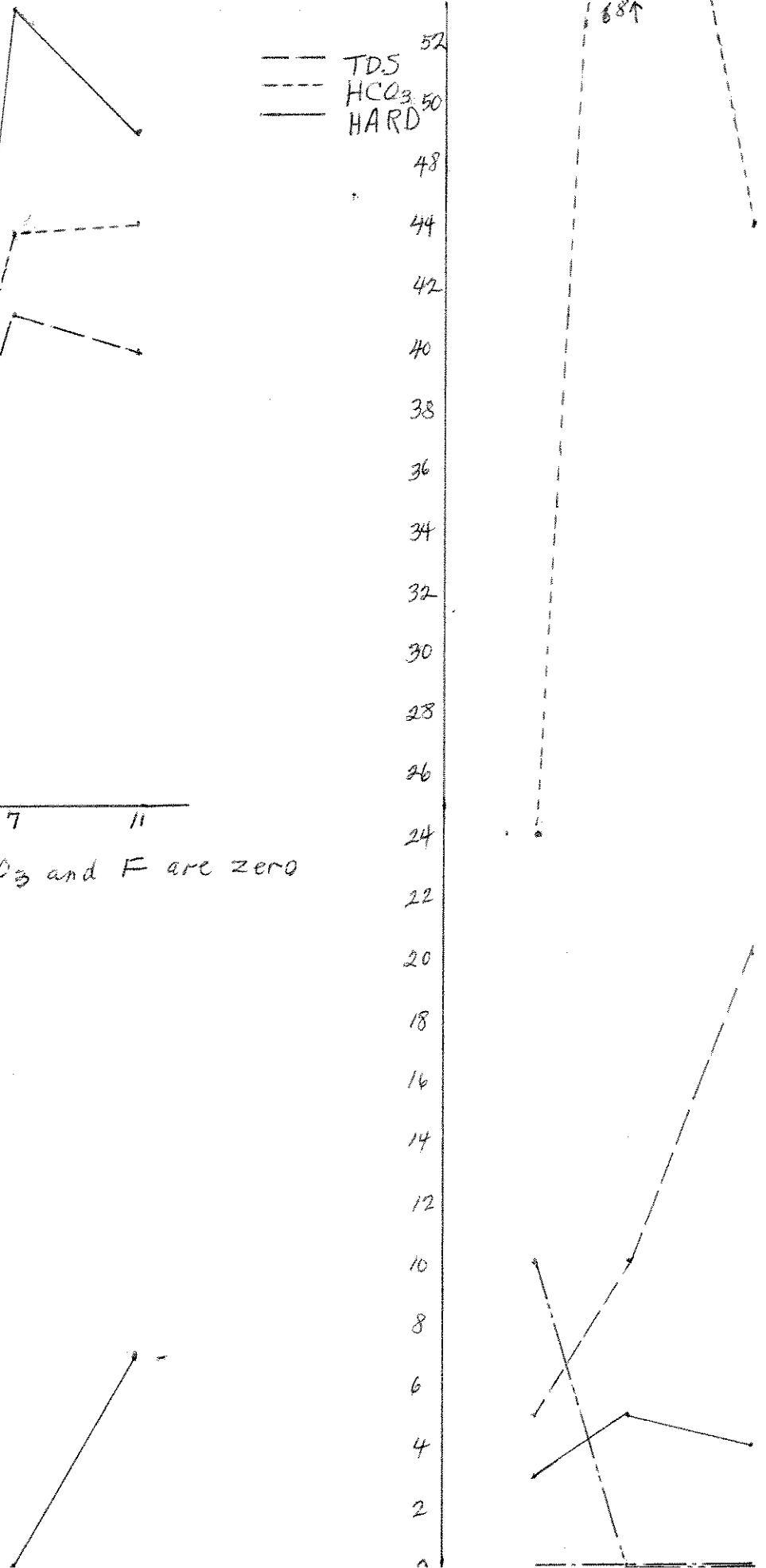
52
50
48
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2

--- SO₄
--- Cl
--- Ca
--- Mg
--- Na+K

68↑

ALL NO₃ and F are zero
TURB

20
18
16
14
12
10
8
6
4
2



SITE #7 ELK CREEK FIELD DATA

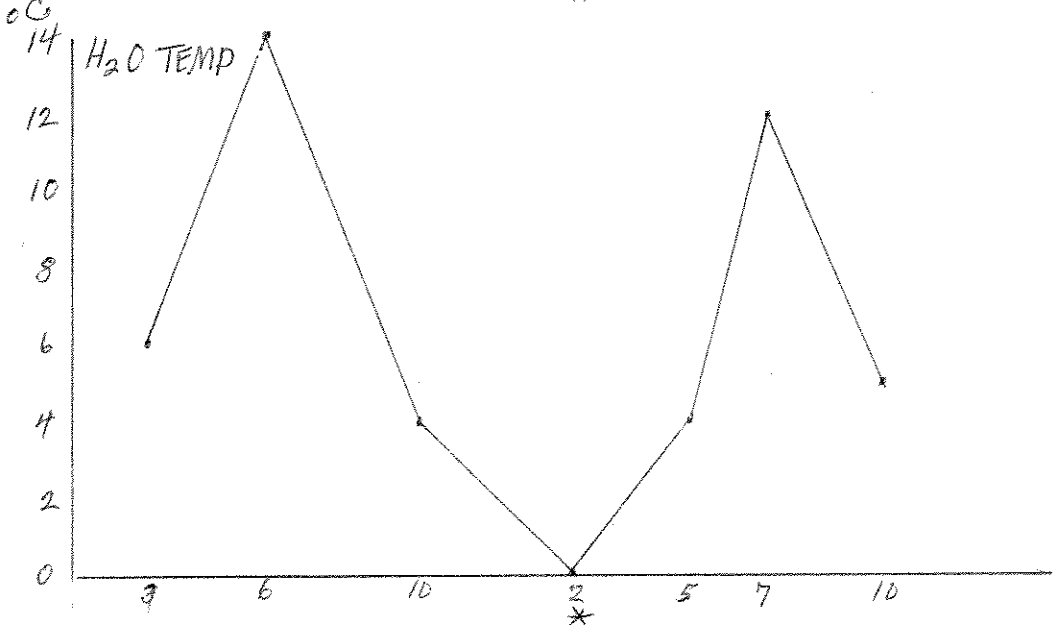
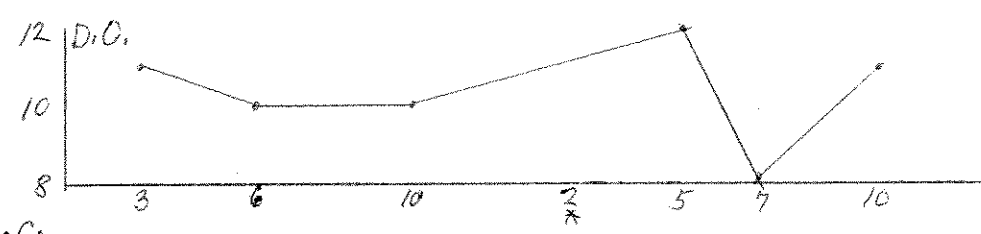
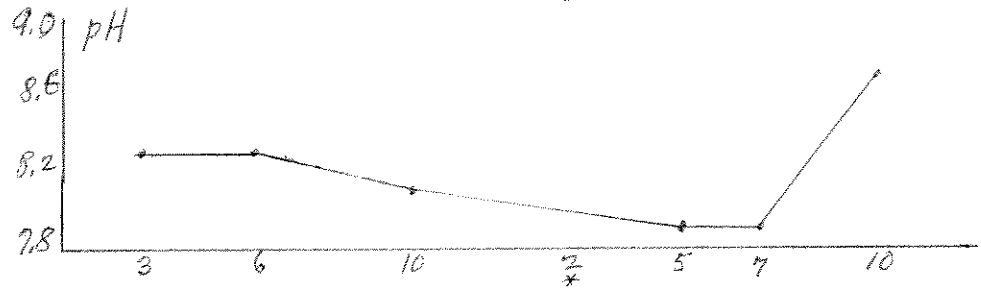
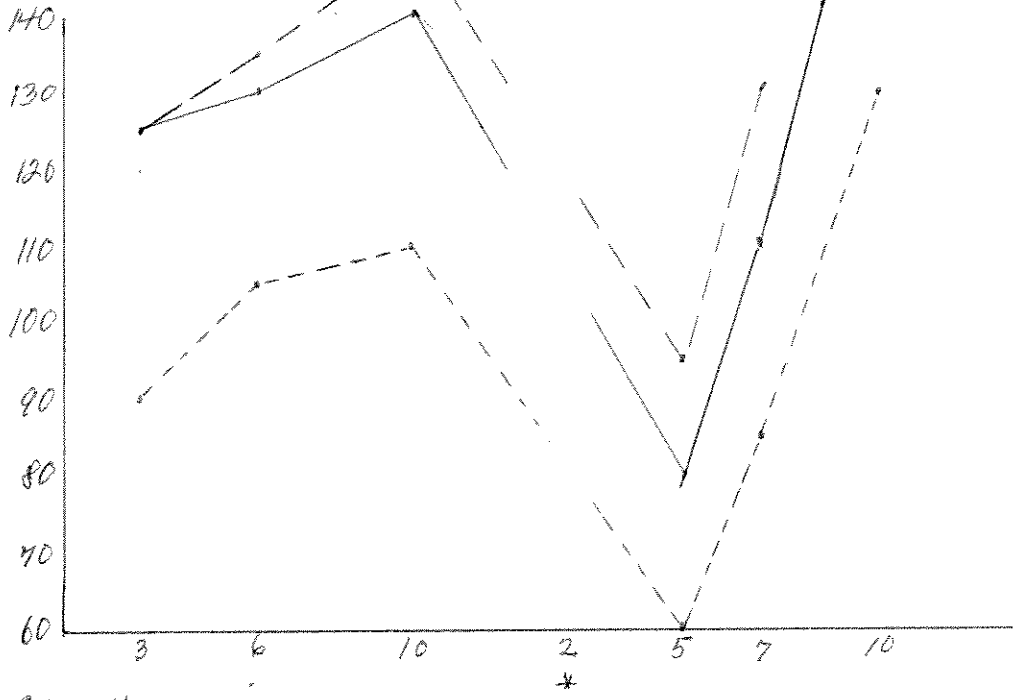
DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	CA HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL.
3-16-68	1315	6	15	8.3	11	125	90	125	60	2	p.c.	B.D.
6-20-68	1110	11	22	8.3	10	135	105	130	18	2	p.c.	"
10-19-68	1215	4	7	8.1	10	150	110	140	10	2	clear	"
2- 8-69	no sample due to ice											
5-3 -69	1030	4	12	7.9	12	95	60	80	28	2	p.c.	"
7-16-69	1035	12	23	7.9	8	130	85	110	24	2	clear	"
10- 7-69	1030	5	1	8.7	11	130	130	170			clear	L.S.
1-20-70	1100	Creek frozen solid, no sample taken										"
	E	45			62	635	580	755				
	M	6		6	6	5	6	6				
	X	8			10	127	97	126				
	Range L	4		7.9	8	95	85	80				
	H	12		8.7	12	135	130	170				

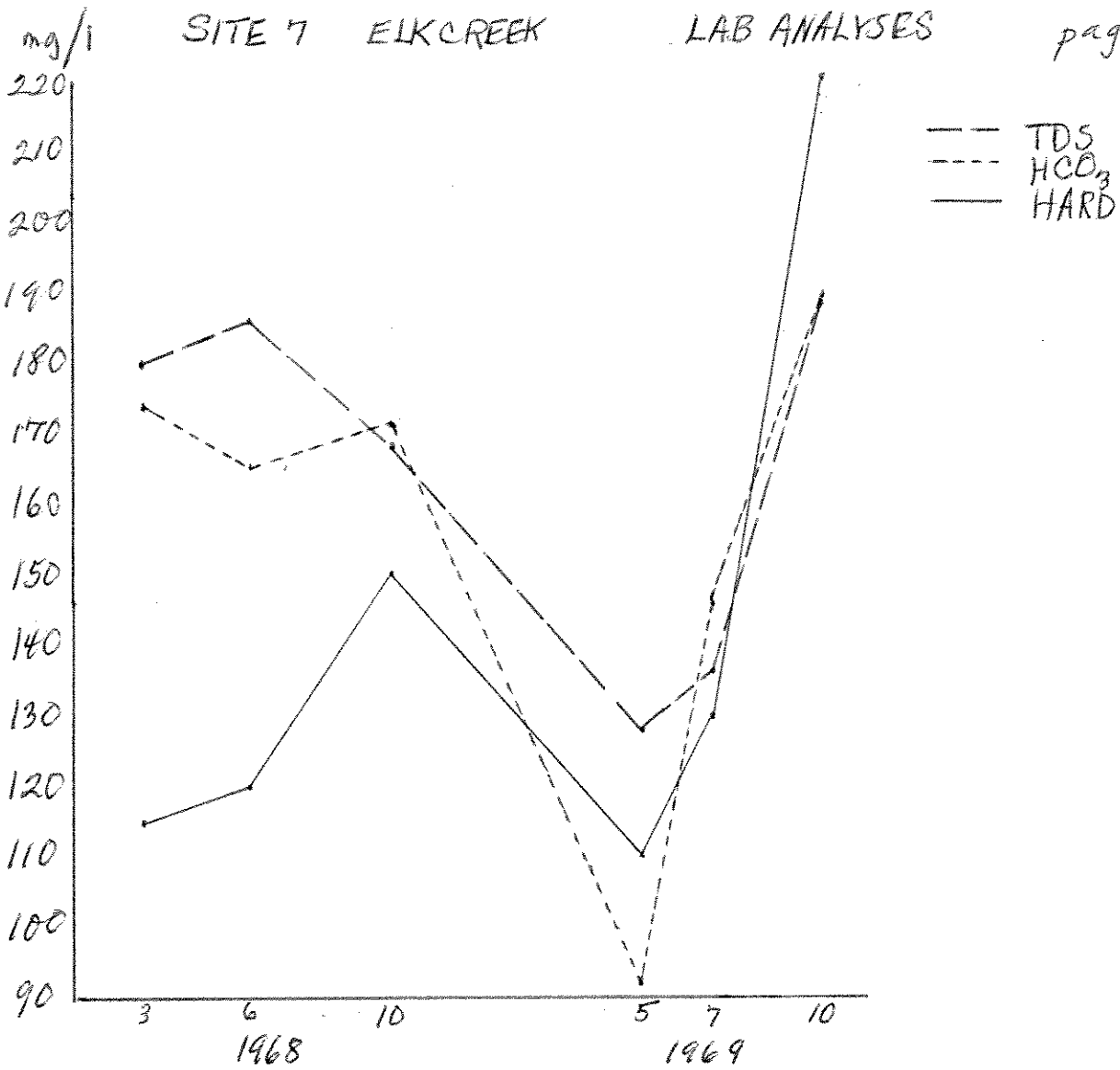
SITE # 7, ELK CREEK

FIELD DATA

* no sample due to ice

— ALK
 - - - Ca Hard
 — TOTAL HARD



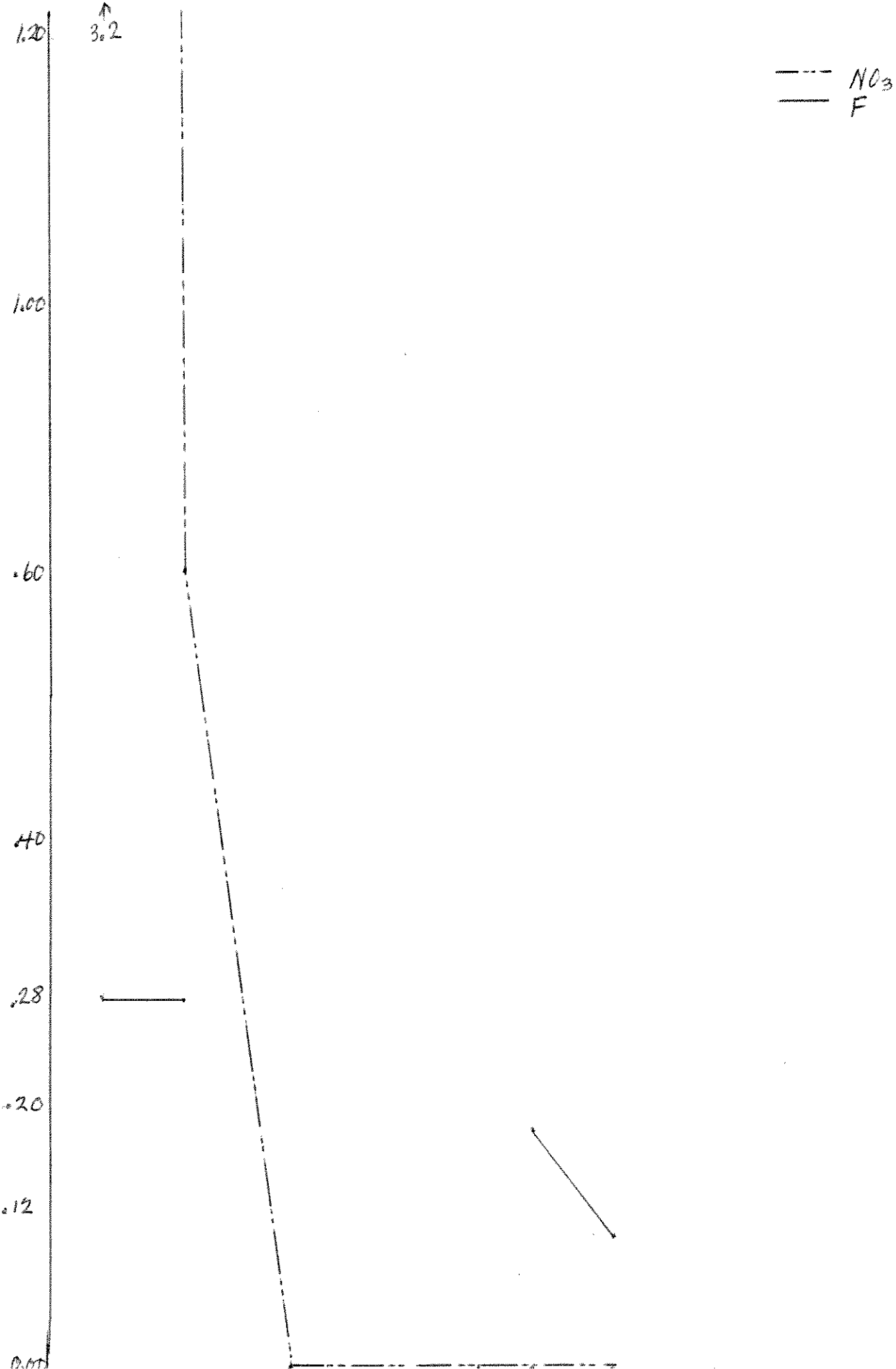


mg/l

46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0

--- SO4
--- Cl
--- Ca
--- Mg
--- Na + K



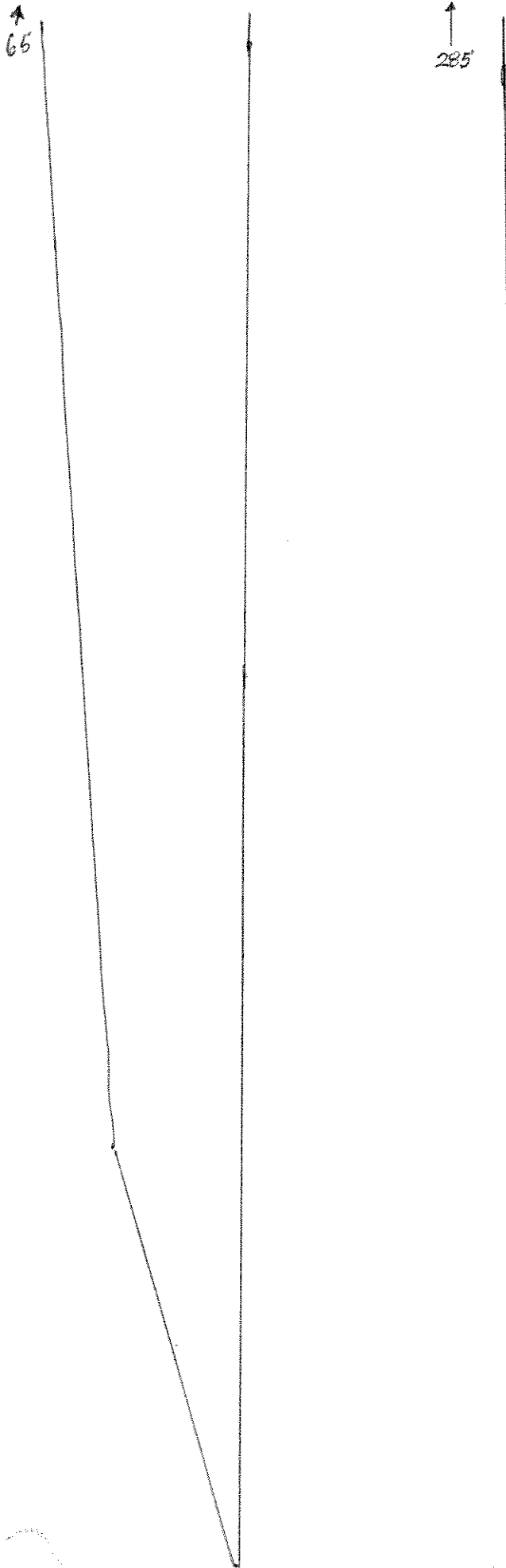


54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
..

↑
65

↑
285

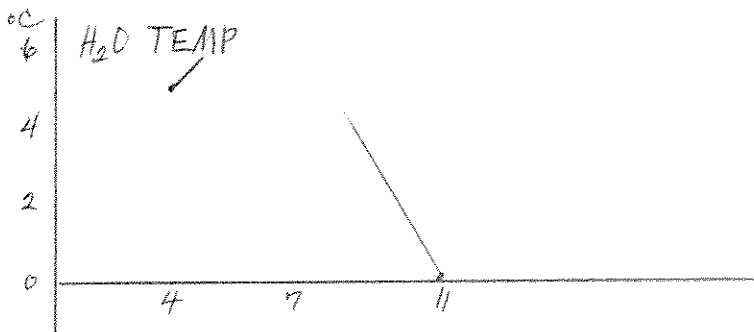
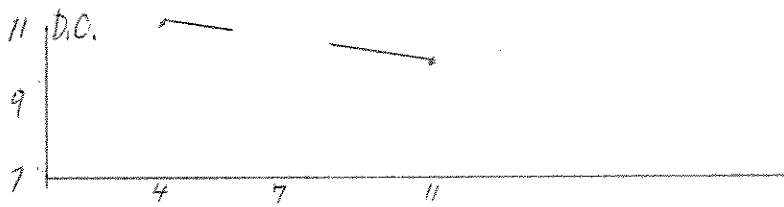
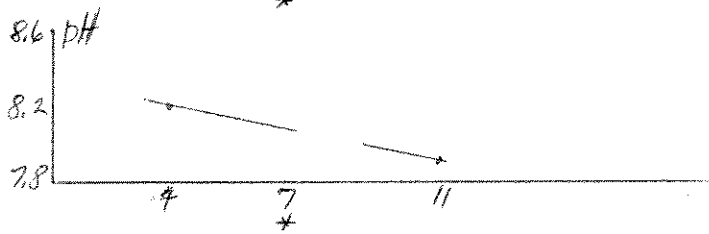
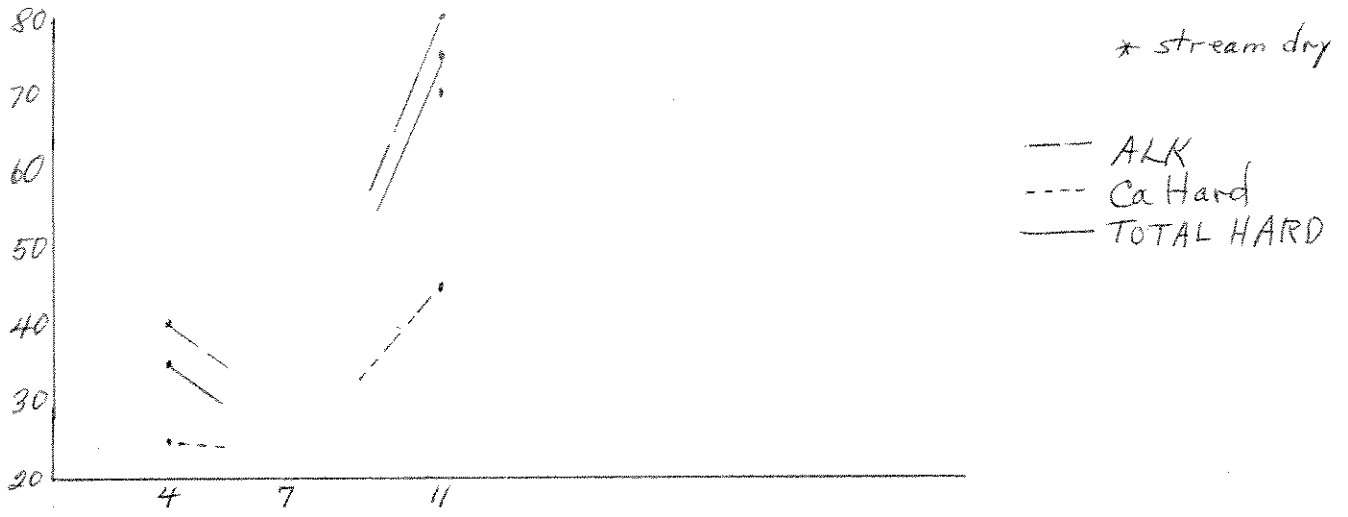
TURB



SITE #8 BLANCHARD CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
4-21-68	1520	5	6	8.2	11	140	25	35	0	2	p.c.	B.D.
7-23-68	1230	stream dry										
11-30-68	1130	0	2	7.9	10	80	45	75	0	2	p.c.	"
E		5			21	120	70	110				
N		2		2	2	2	2	2				
X̄		2			10	60	35	55				
Range L		0		7.9	10	40	25	35				
H		5		8.2	11	80	45	75				

SITE #8 BLANCHARD CR. FIELD DATA

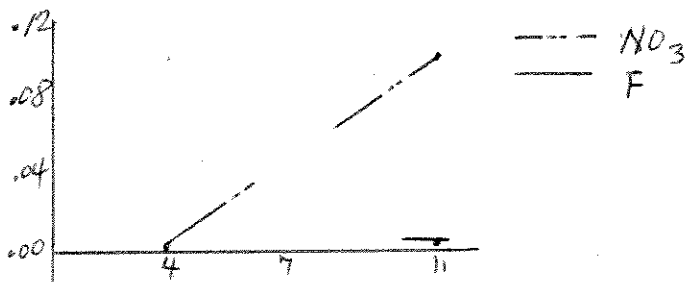
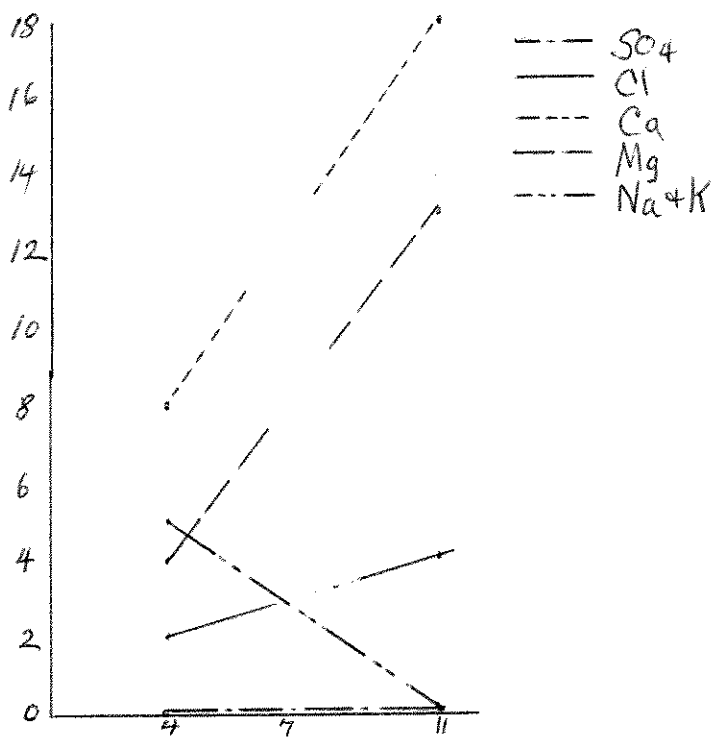
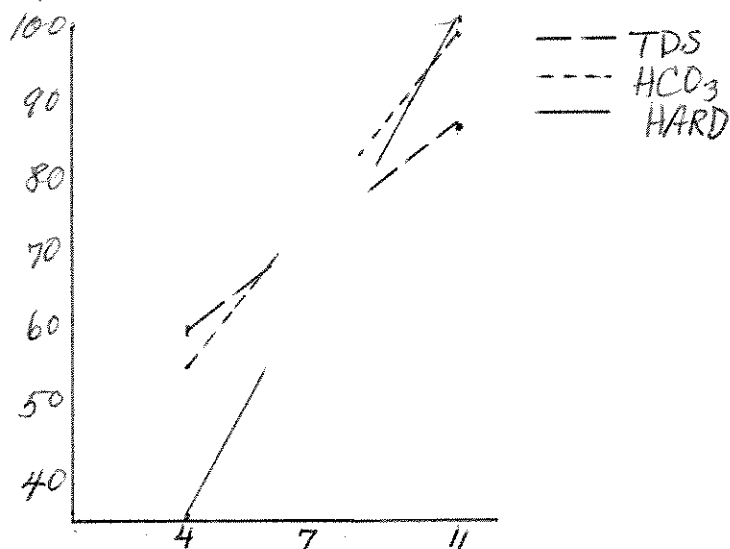


mg/l

SITE # 8

BLANCHARD CR.

LAB ANALYSES



TURB 8 on 11-30-68

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu
3-17-68	14	9	10	0.10	0.00	0.00	0.00	0.00
6-20-68	19	0	8	0.00	0.00	0.02		0.00
10-19-68	20	7	6	0.0		0		0
2-8-69	16	10	3	0.0		0.0		0.03
5-3-69	20	7	0	0	0	0		0
7-16-69	20	10	0	0	-	0.01	-	0.00
10-7-69	28	22	0	0	-	0.0	-	0.0
1-20-70	30	5	5	0.06	-	0	-	0

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Clearwater River
 Sampling Method ^{1/} Integrated w/
DA-48 sampler

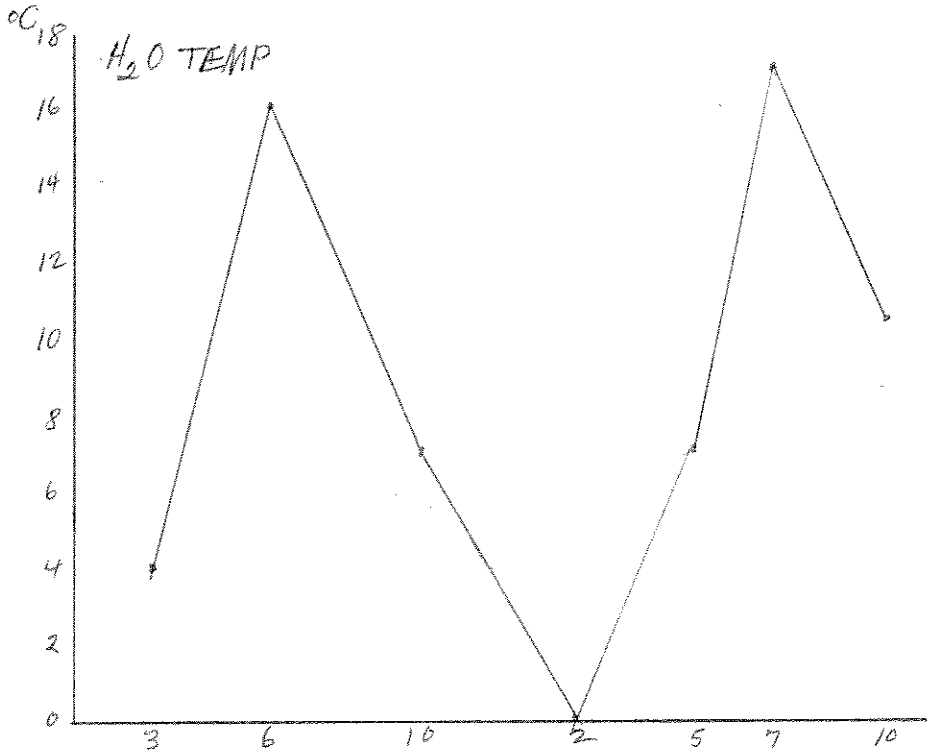
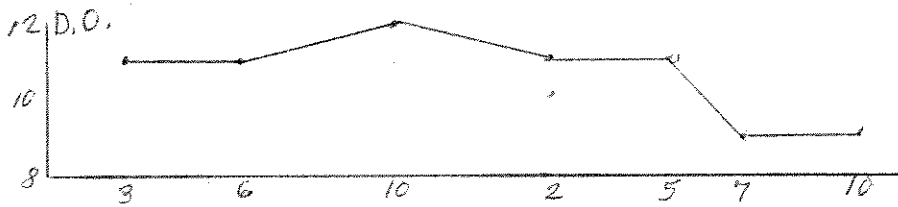
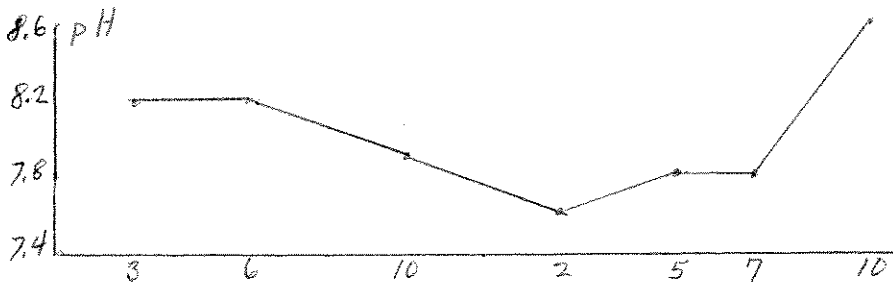
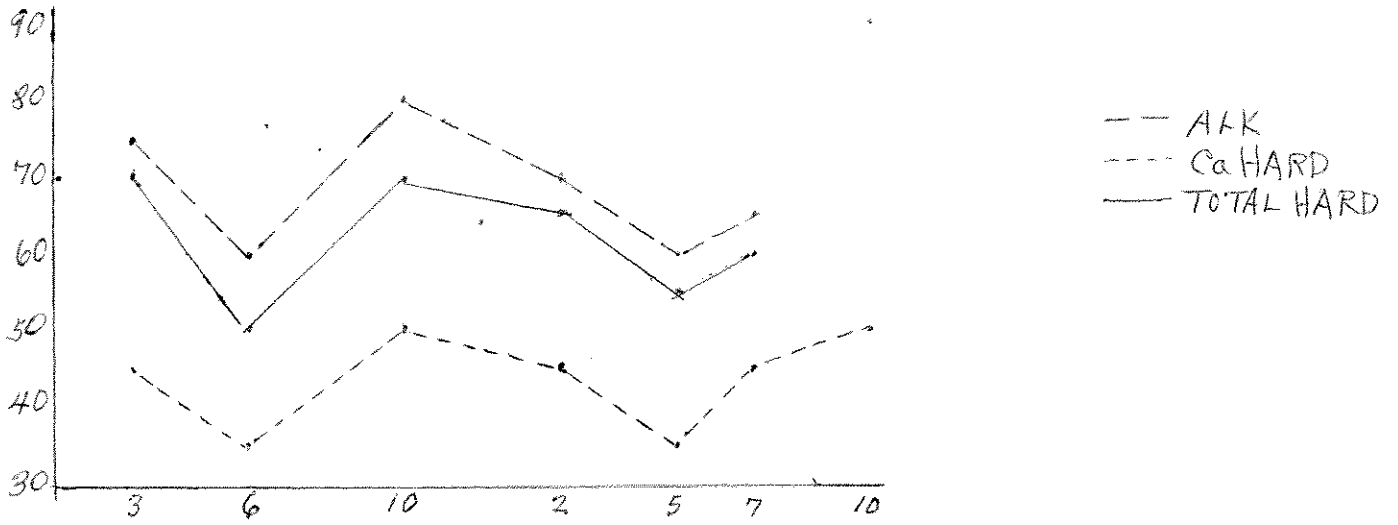
Station Hiway 200 bridge
 Analytical Instrument Used Hach 2100 A meter

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
4-18-72	2.3	2.2	2.3	2.3	2.3	Slightly yellow-brown	Water high. Sample collected near shore (too deep to wade.)

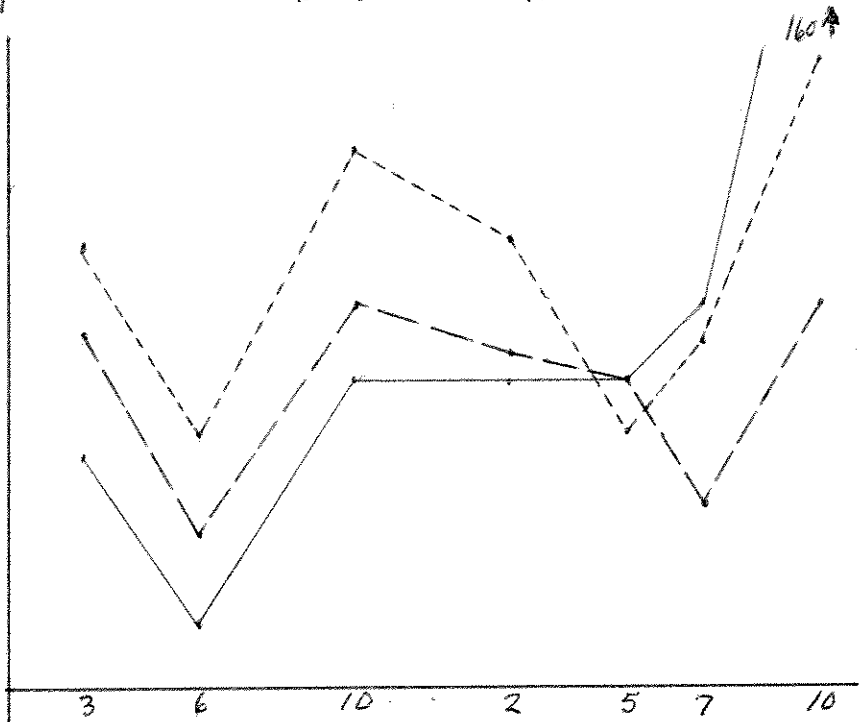
^{1/} Surface Grab, Integrated, Other
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

SITE #9 CLEAR WATER R. FIELD DATA



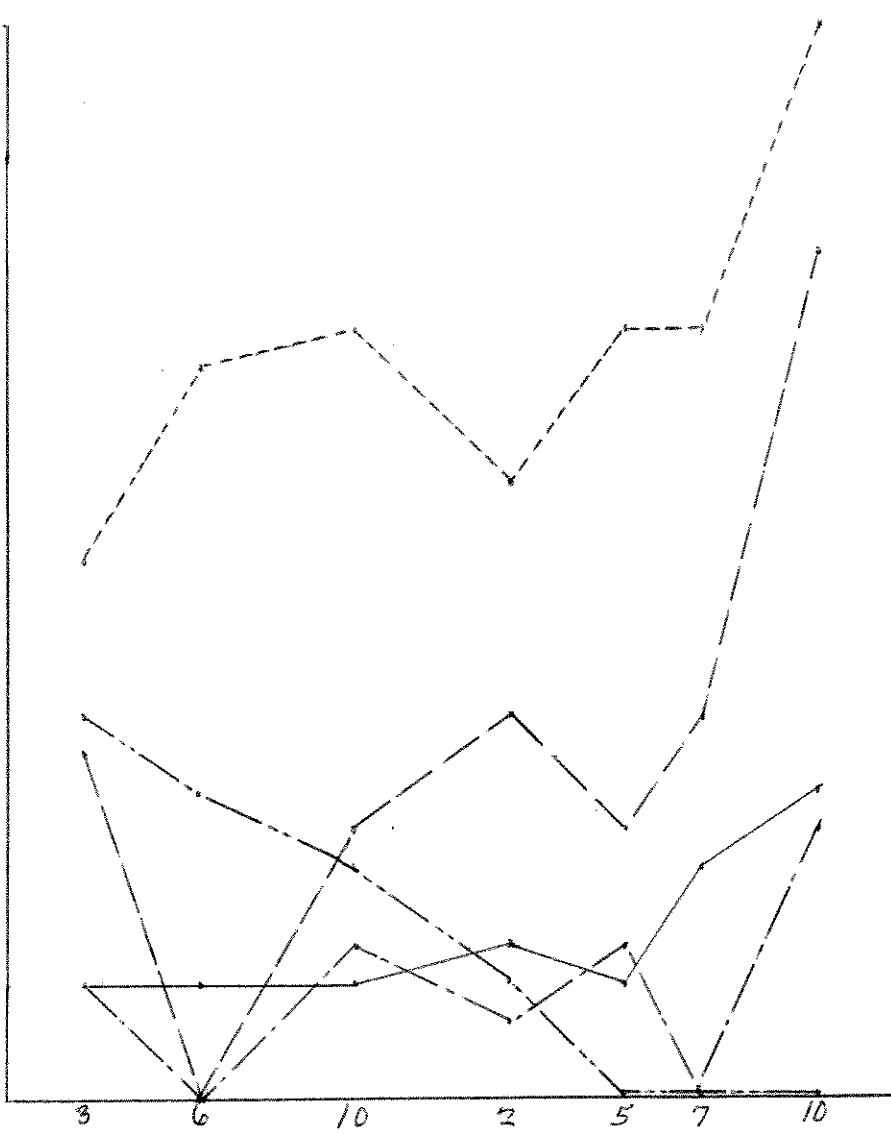
SITE # 9 CLEARWATER R. LAB ANALYSES

mg/l
120
110
100
90
80
70
60
50
40

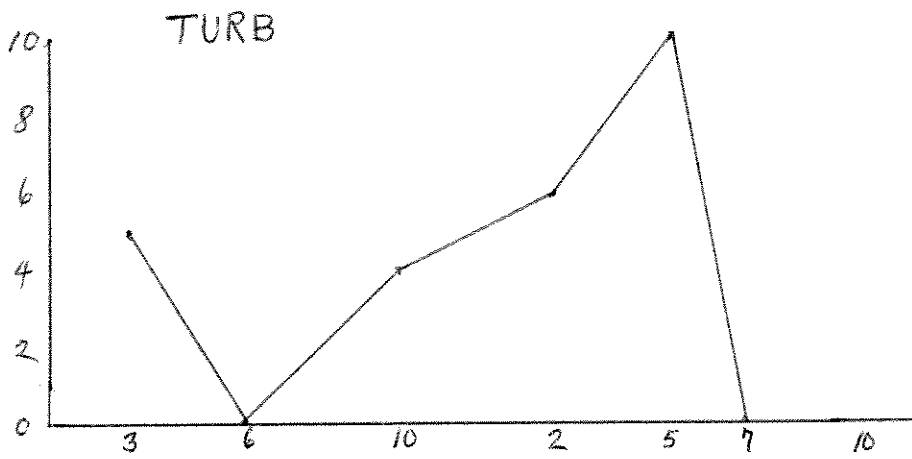


--- TDS
-.- HCO₃
— HARD

mg/l 28
26
24
22
20
18
16
14
12
10
8
6
4
2
0



--- SO₄
-.- Cl
— Ca
- - - Mg
... Na+K



MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Cottonwood Creek

Station Highway 200 Crossing

Sampling Method ^{1/} Integrated w/ DH-48 sampler

Analytical Instrument Used Hach 2100 A meter

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
4-18-72	1.8	1.9	2.2	2.0	2.0	colorless	water up but not too high.

^{1/} Surface Grab, Integrated, Other
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Cottonwood Creek
Sampling Method ^{1/} Integrated w/
DH-48 sampler

Station Blackfoot-Clearwater Game
Range entry road
Analytical Instrument Used HACH 2100A
meter

Turbidity (JTU)

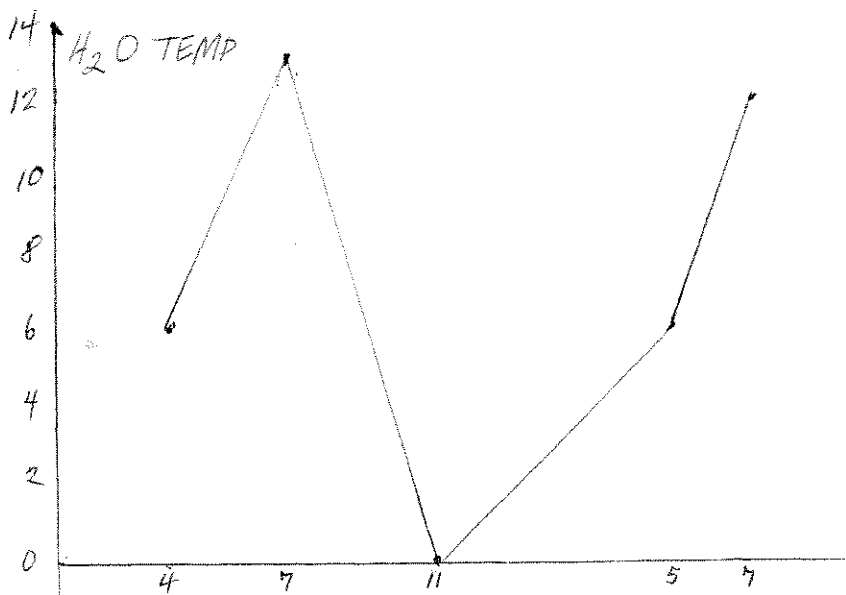
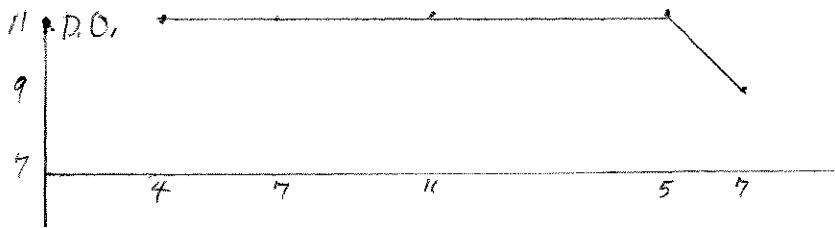
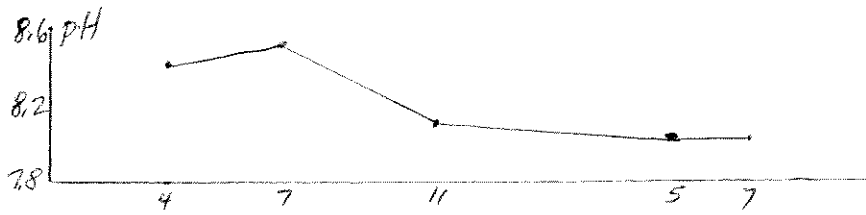
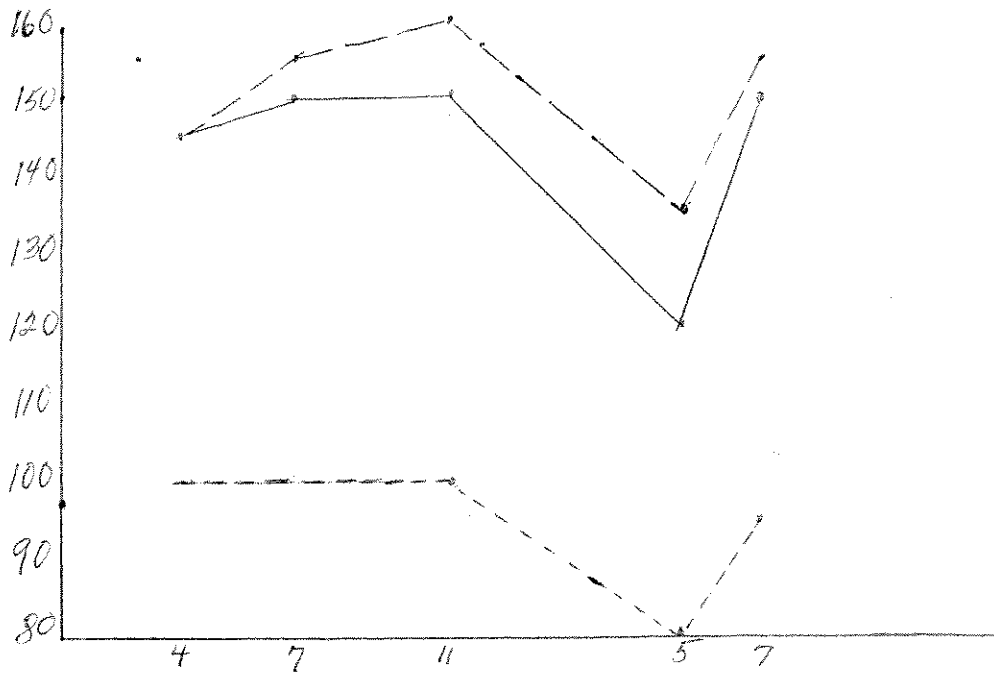
collector: L. Spence

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
4-10-72	2.0	2.2	2.1	2.1	2.1	colorless	water high & clear. slight flooding of grass near bridge
5-16-72	14	15	14	14	14	light brown	water flooding out of stream banks into field. high & fast, turbid
6-5-72 ¹⁶⁰⁰	4.7	5.0	4.8	4.8	4.8	greenish-brown	high & flooding but can see bottom some places. Almonds seed & detritus on sample

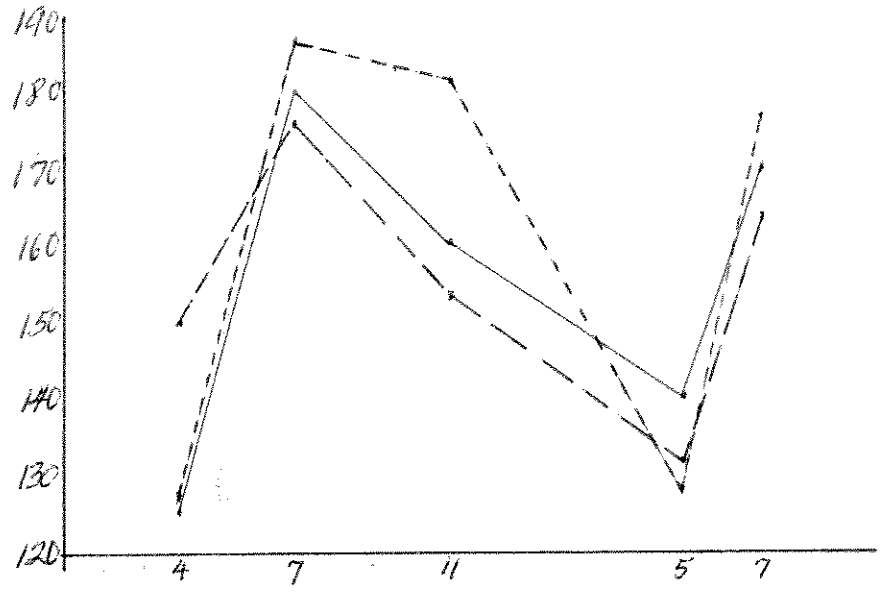
^{1/} Surface Grab, Integrated, Other
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

SITE # 10 COTTONWOOD CR.

FIELD DATA

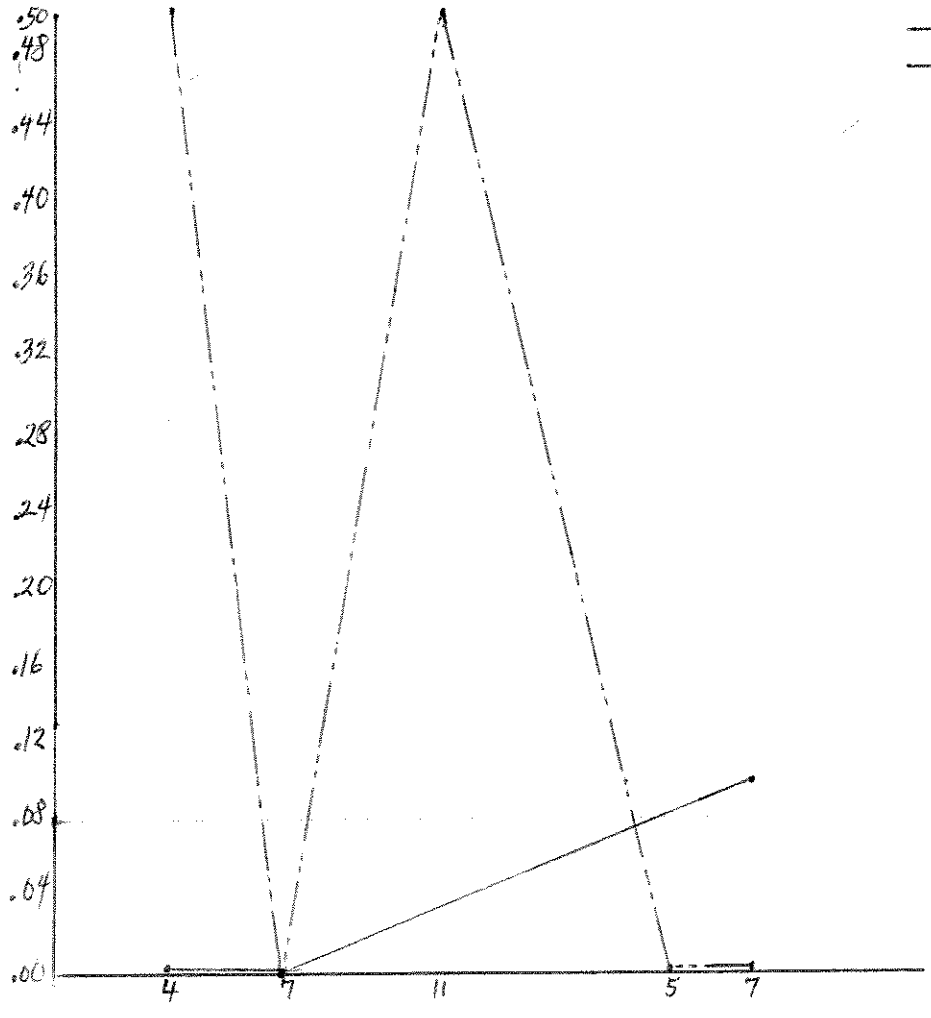


mg/l



--- TDS
 -.- HCO₃
 — HARD

mg/l



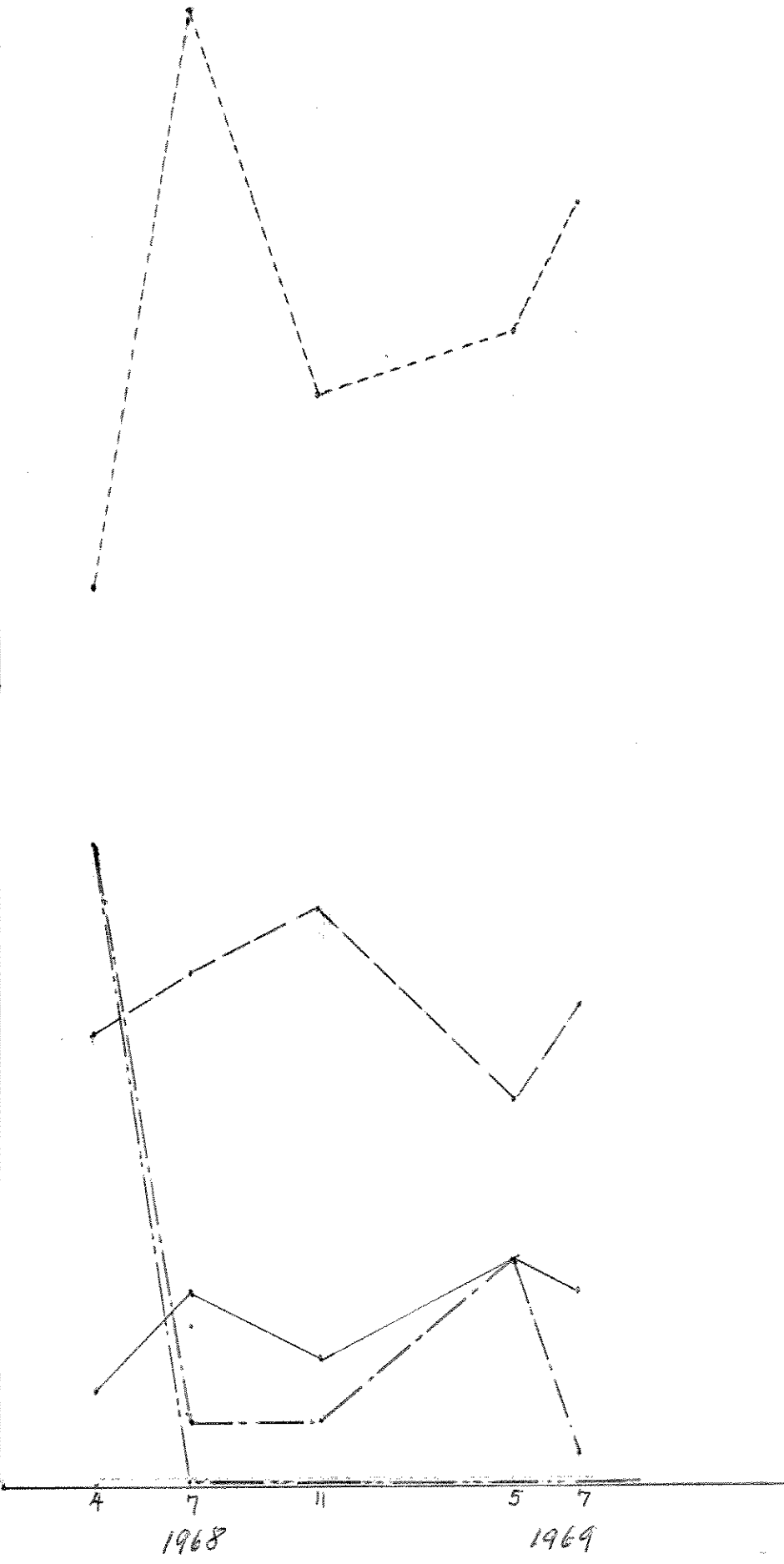
-.-
 —

mg/l

SITE #10 COTTONWOOD CR. LAB ANALYSES page 2

46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0

- SO₄
- _____ Cl
- Ca
- Mg
- Na+K

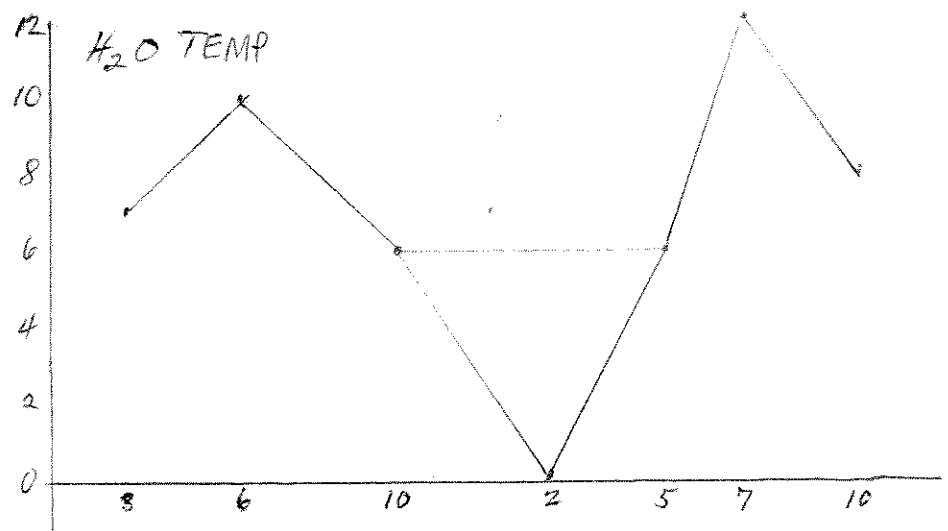
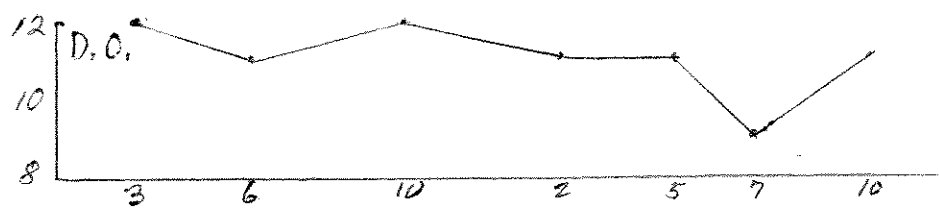
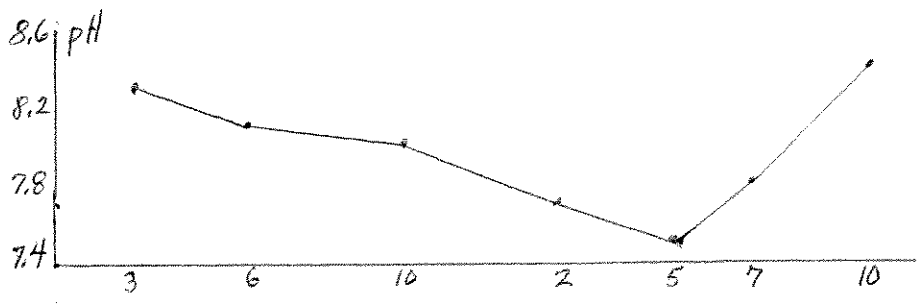
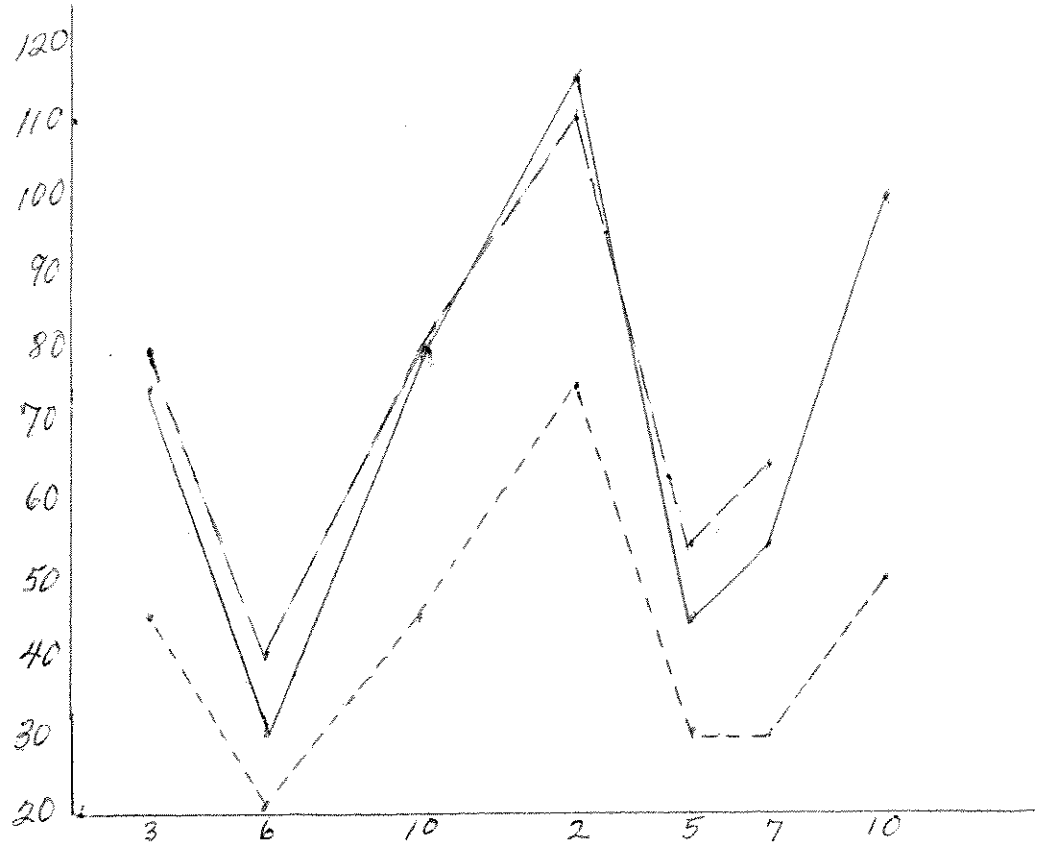


SITE #11 MONTURE CREEK

FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	CO
3-16-68	1520	7	9	8.3	12	80	45	75	0	2	cloud	B.D
6-20-68	1600	10	24	8.1	11	40	20	30	2	2	p.c.	"
10-19-68	1350	6	8	8.0	12	80	45	80	0	2	p.c.	"
2- 8-69	1335	0	-5	7.7	11	110	75	115	0	2	p.c.	"
5- 3-69	1245	6	18	7.5	11	55	30	45	0	2	p.c.	"
7-16-69	1320	12	22	7.8	9	65	30	55	0	2	clear	"
10- 7-69	1300	8	15	8.4	11		50	100				L.S
1-20-70	1130	1.0	1.5	8.6	9.0*						RAIN Cloudy	L.S
* Oxygen/ ^{sample} could not be fixed immediately. Could have been some O ₂ loss.												
E		50			86	430	295	500				
n		8		8	8	6	7	7				
X		6			11	72	42	71				
Range	L	0		7.5	9	40	20	30				
	H	12		8.6	12	110	75	115				

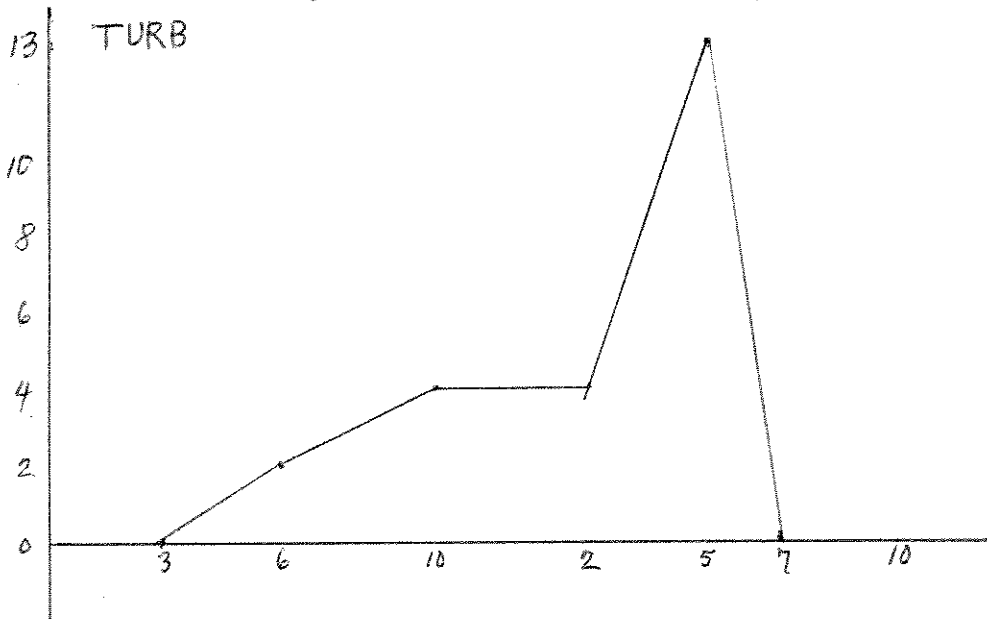
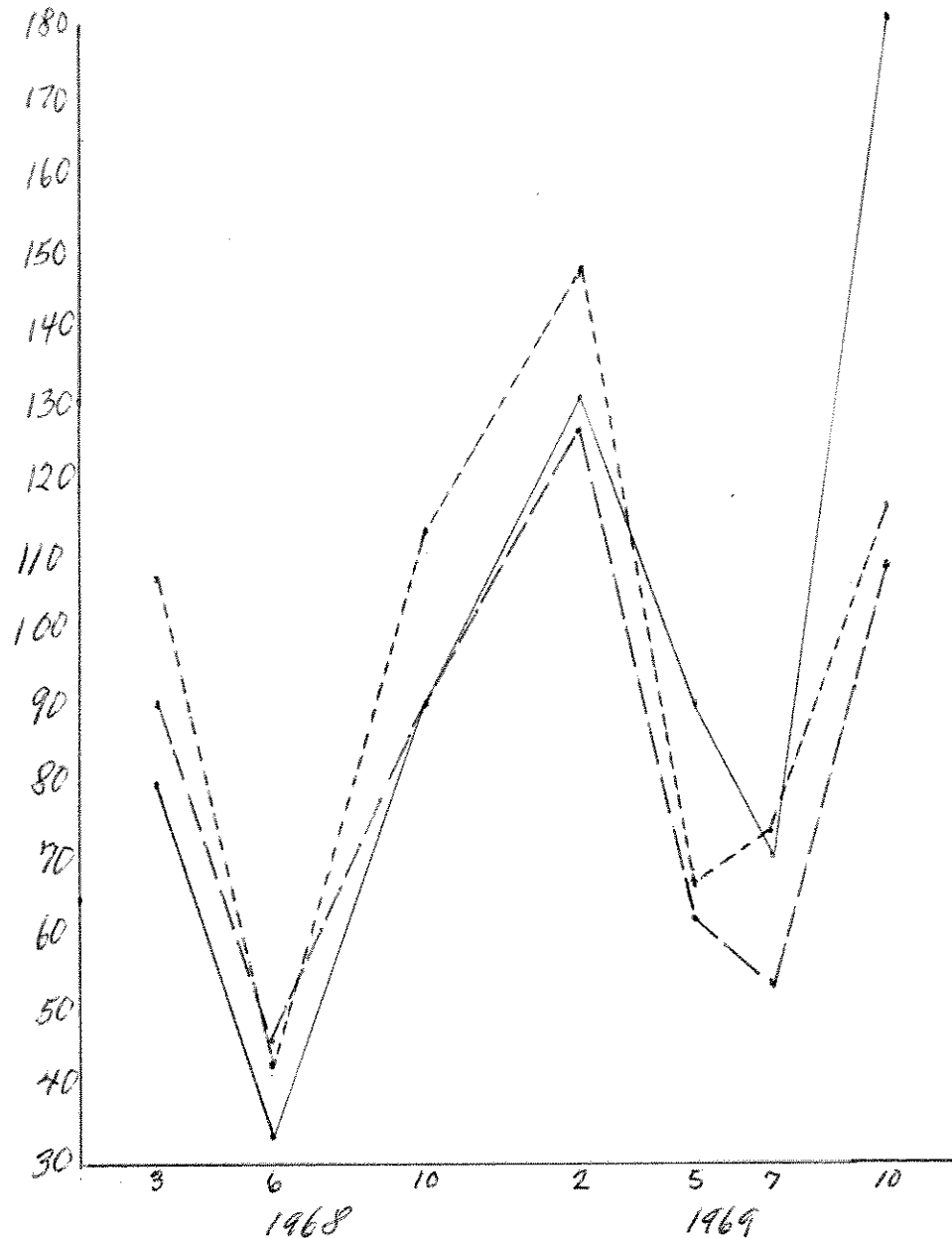
SITE # 11 MONTURE CR. FIELD DATA

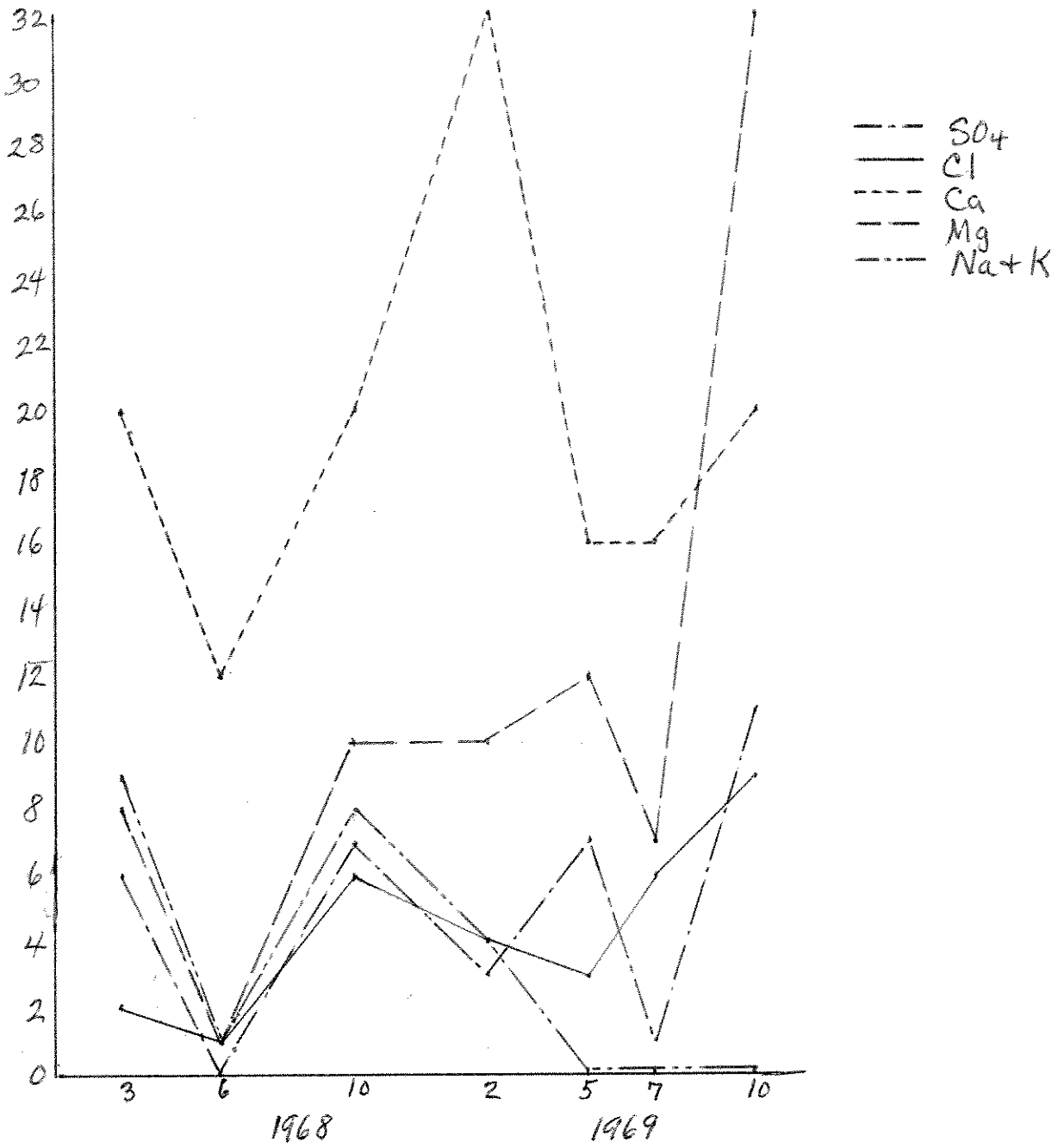


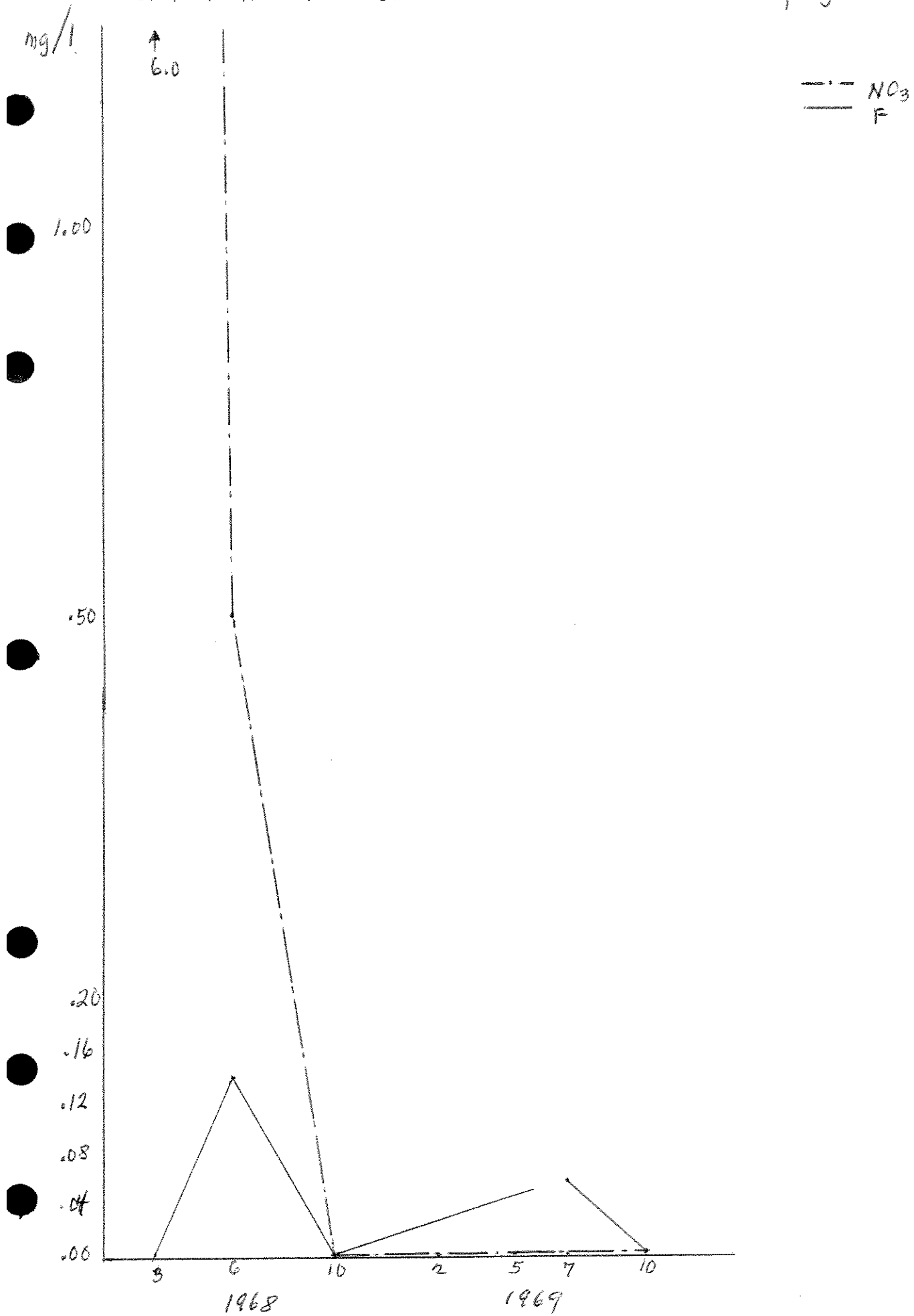
mg/l

SITE # 11 MONTURE CR. LAB ANALYSES

page 1

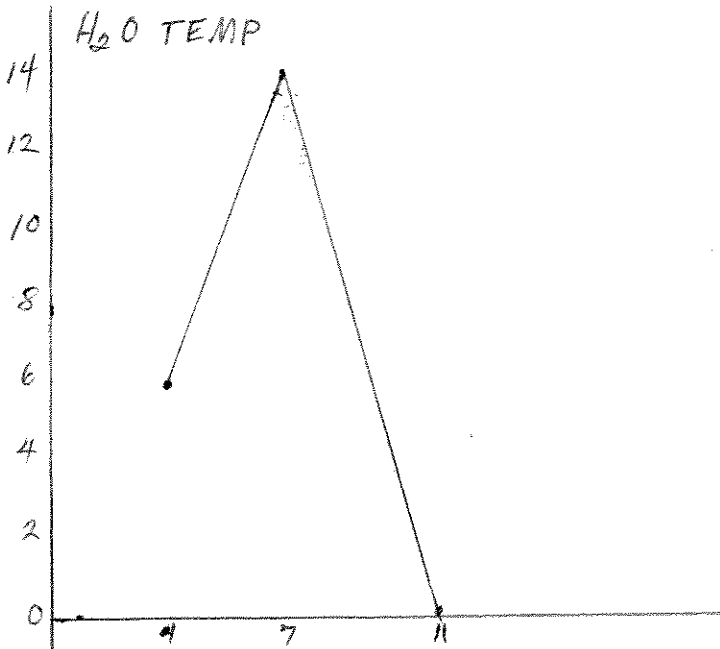
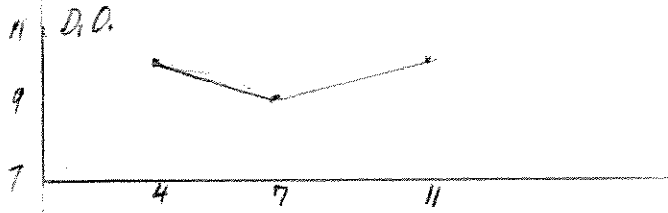
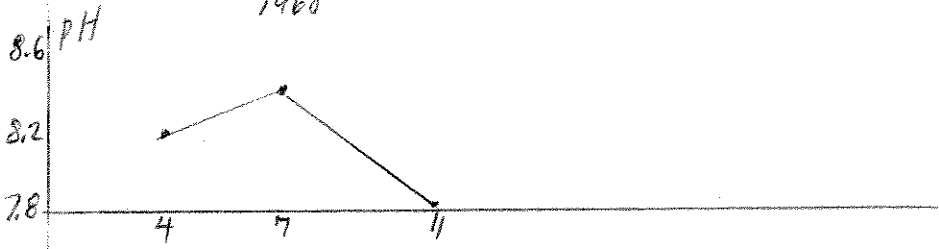
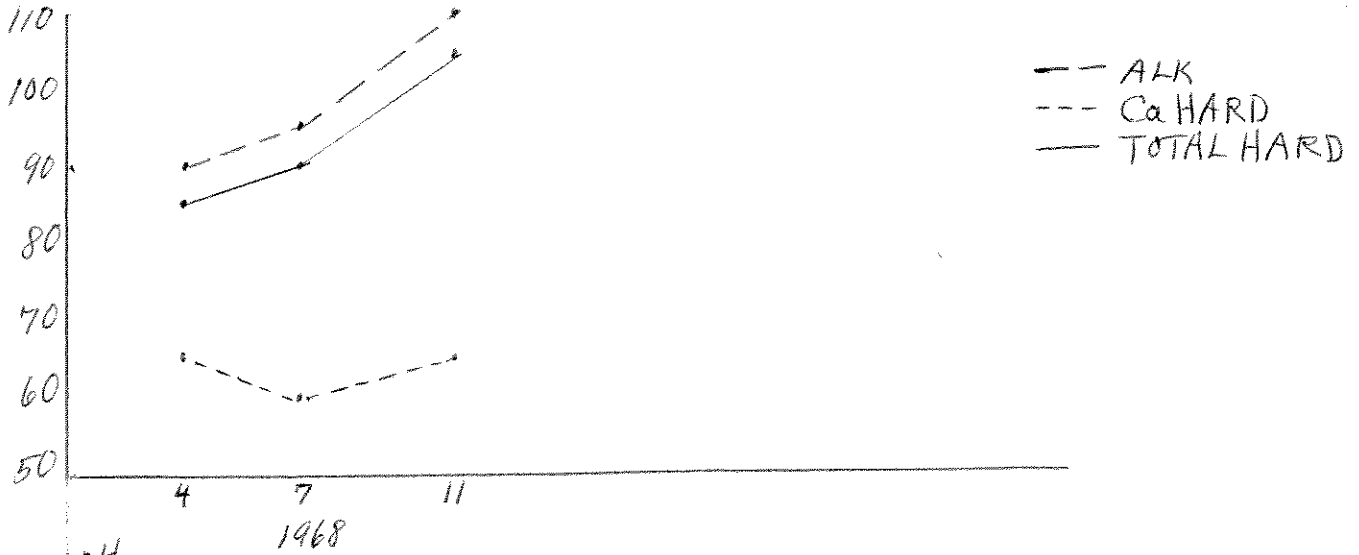






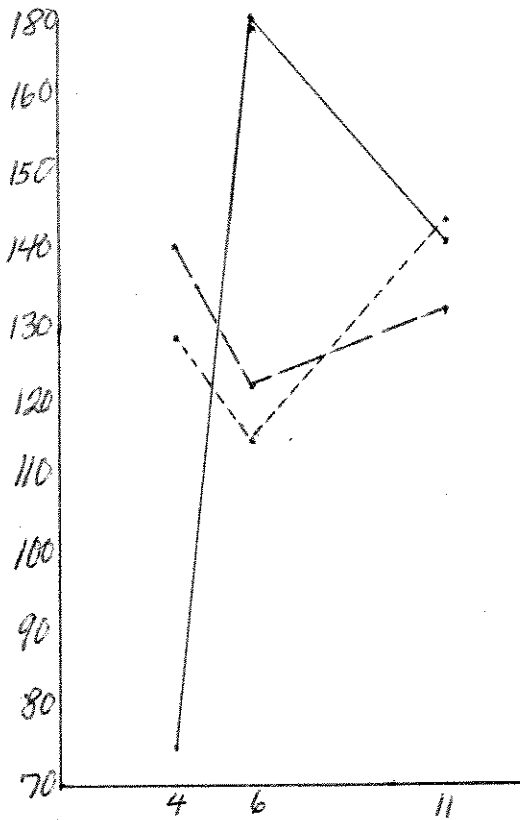
SITE #12 WARREN CR.

FIELD DATA



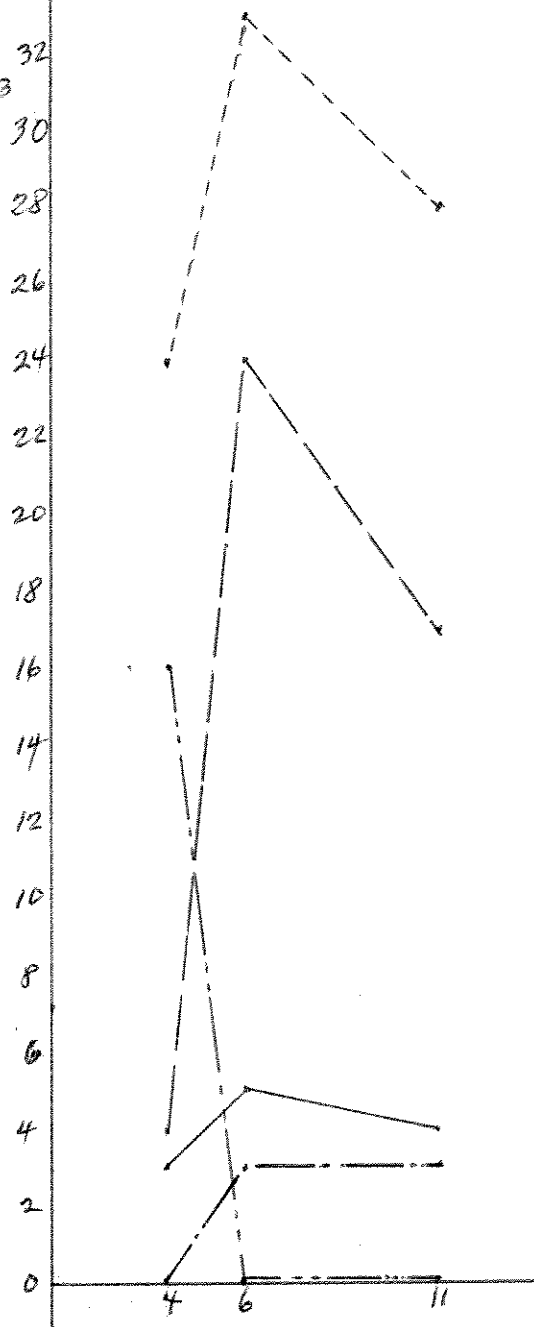
mg/l

SITE #12 WARREN CR. LAB ANALYSES

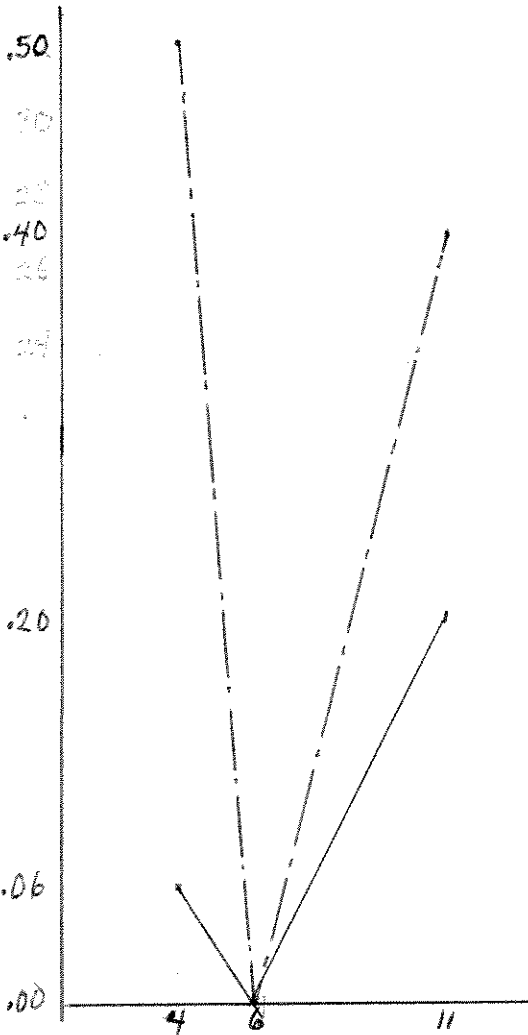


--- TDS
 --- HCO₃
 --- HARD

mg/l



--- SO₄
 --- Cl
 --- Ca
 --- Mg
 --- Na+K



--- NO₃
 --- F

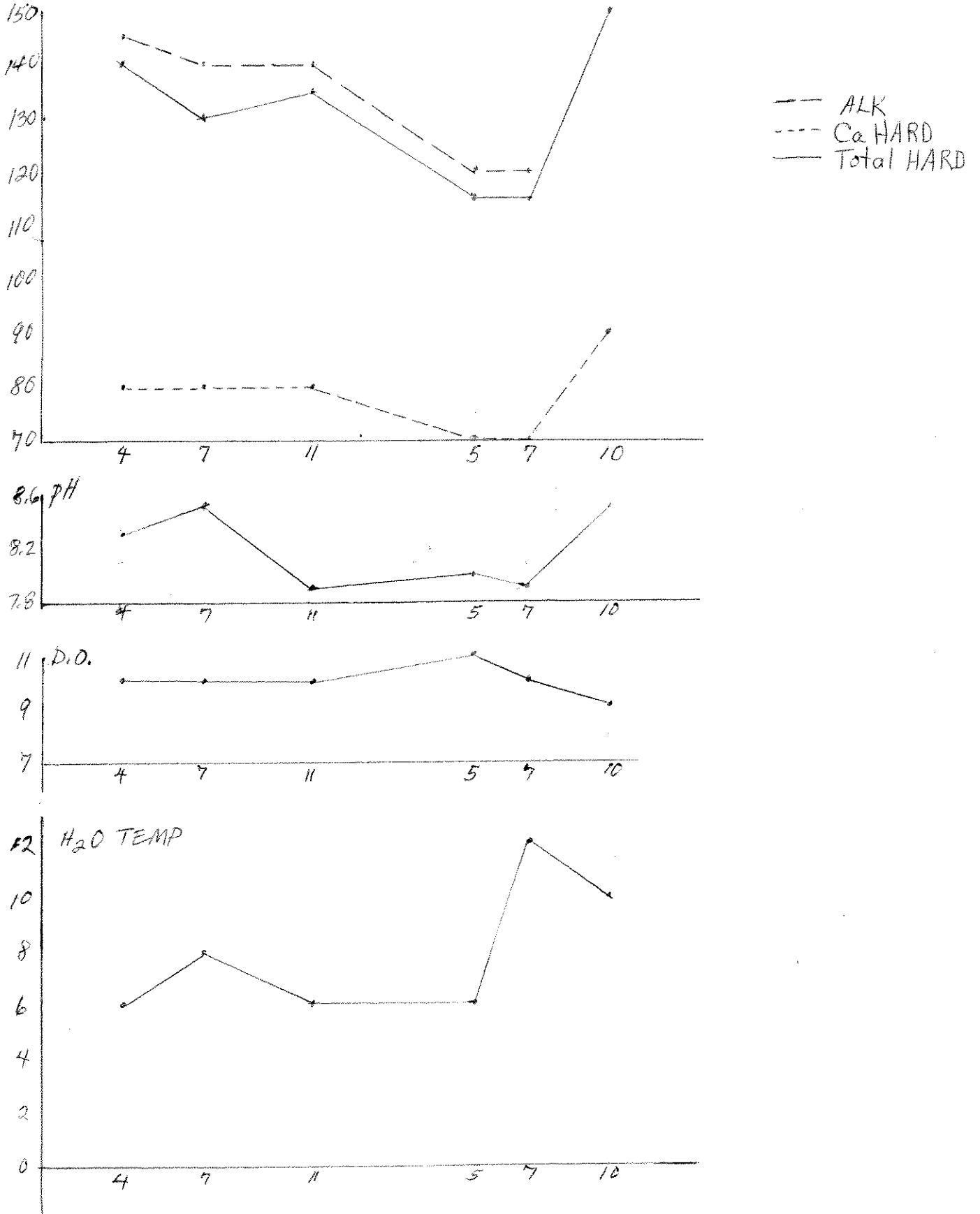
TURB 8 on 6-22-68 +
 11-30-68

#13 NORTH FORK OF BLACKFOOT RIVER FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	Ca ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL
4-21-68	1230	6	7	8.3	10	145	80	140	0	2	p.c.	B.D
7-23-68	0945	8	15	8.5	10	140	80	130	0	2	p.c.	"
11-30-68	1630	6	0	7.9	10	140	80	135	0	2	p.c.	"
5-3-69	1330	6	15	8.0	11	120	70	115	0	2	p.c.	"
7-16-69	1105	12	26	7.9	10	120	70	115	0	2	clear	"
10-7-69	1340	10	22	8.5	9.0		90	150			clear	"
1-20-70	1315	6.0	1.5	8.6	9.0						o'cast	"
E		54			69	665	470	785				
n		7		7	7	5	6	6				
x		8			10	133	78	131				
Range L		6		7.9	9	120	70	115				
H		12		8.6	11	145	90	150				

SITE #13 NORTH FORK OF BLACKFOOT R.

FIELD DATA



mg/l

SITE # 13 NORTH FORK BLACKFOOT R. LAB ANALYSES page 1

220
210
200
190
180
170
160
150
140
130
120
110
100

--- TDS
--- HCO₃
--- HARD

4 6 11 5 7 10

1968

1969

.34
.30
.20
.06
.00

--- NO₃
--- F

4 6 11 5 7 10

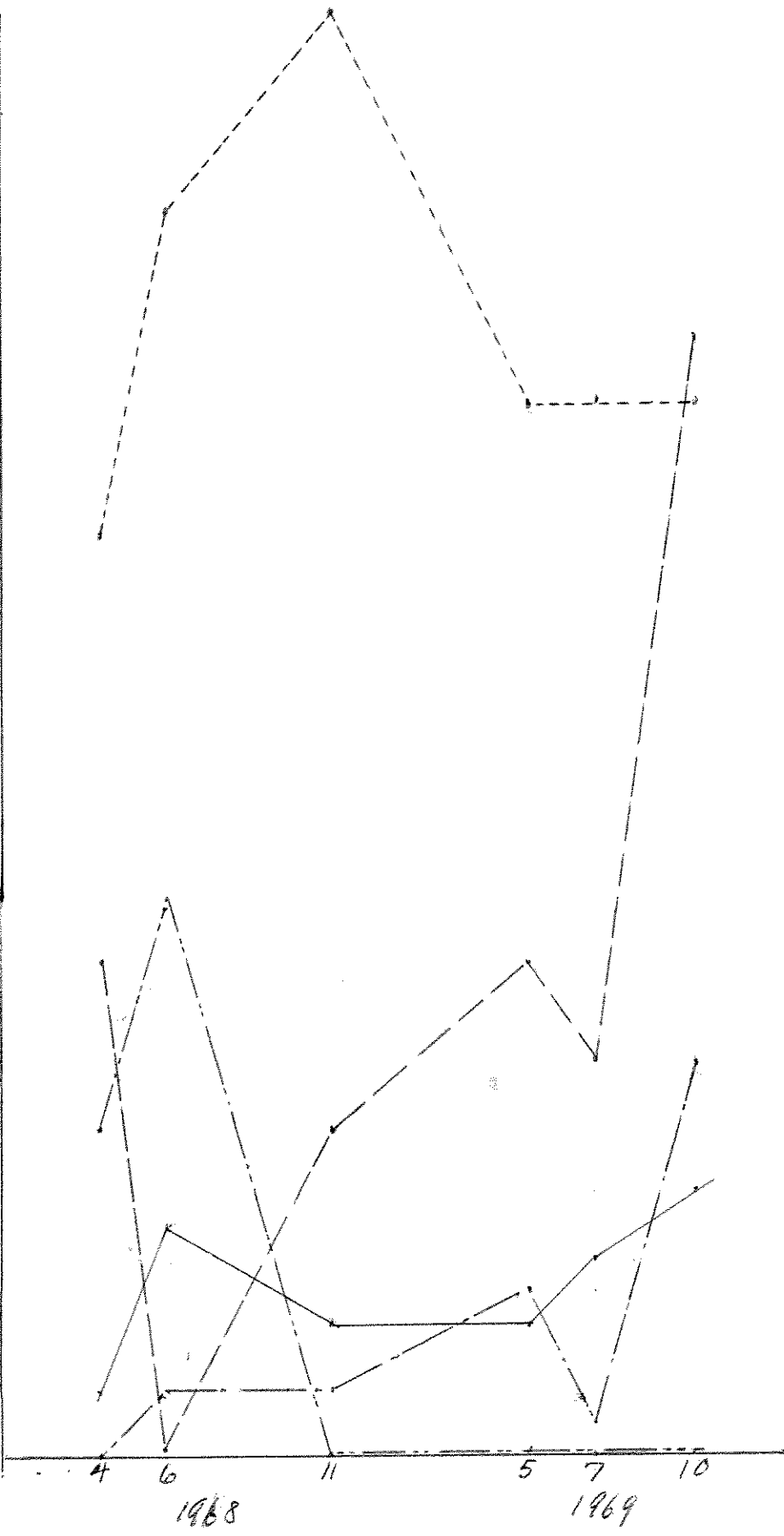
↑
.7

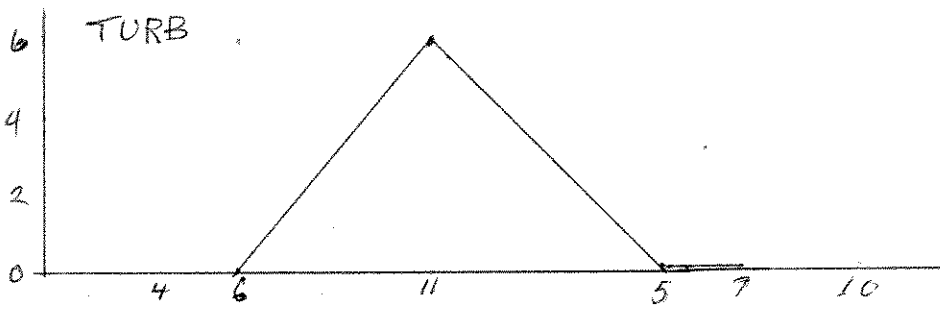


mg/l

44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0

- SO₄
- Cl
- Ca
- Mg
- Na+K

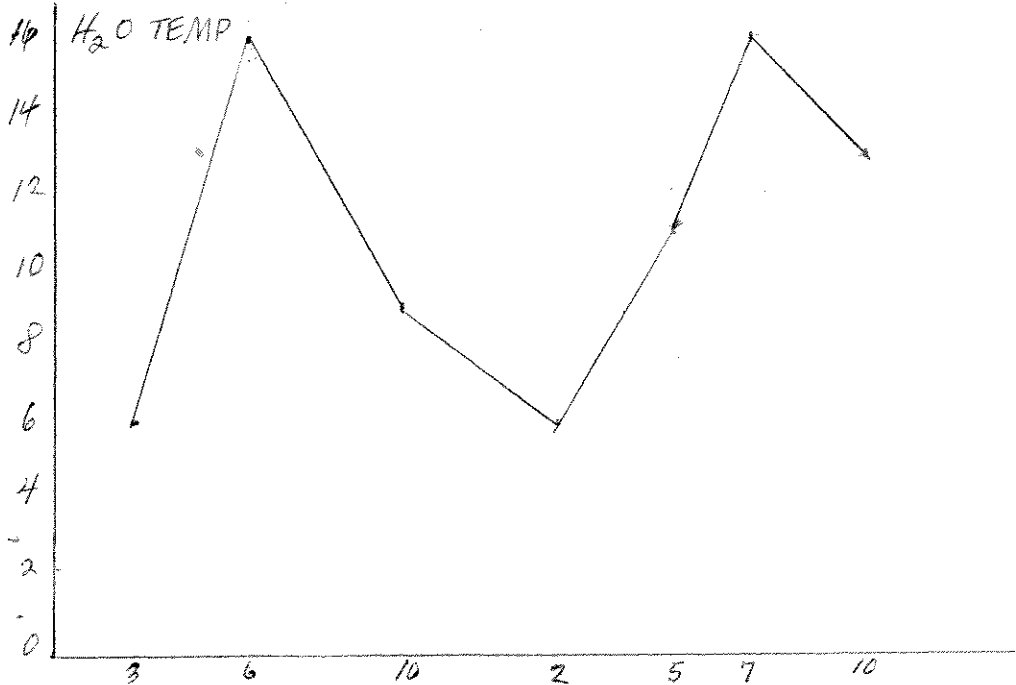
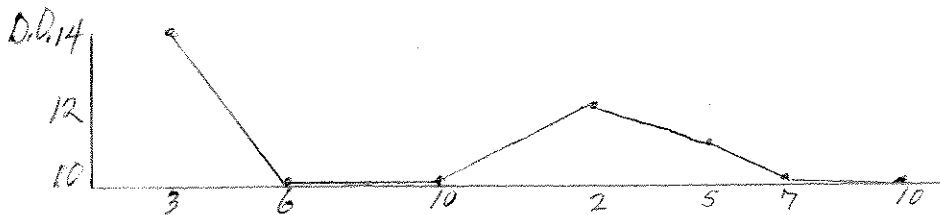
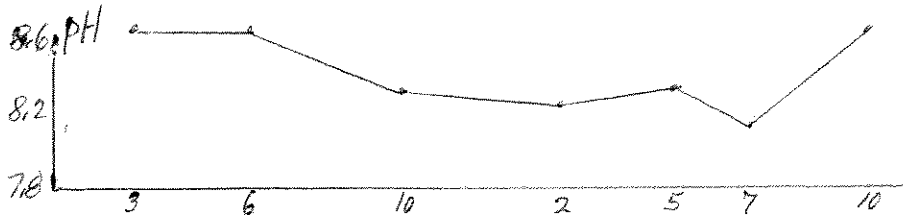
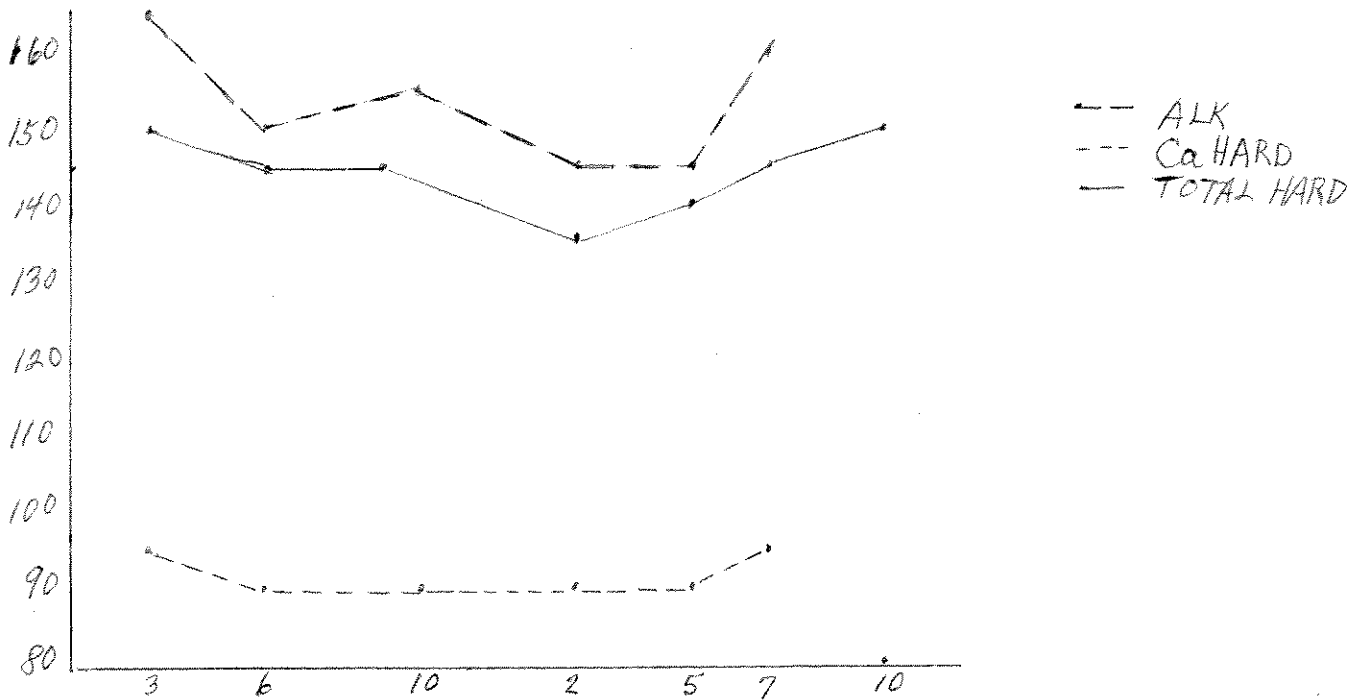




SITE #11 KLEINSCHMIDT CREEK FIELD DATA

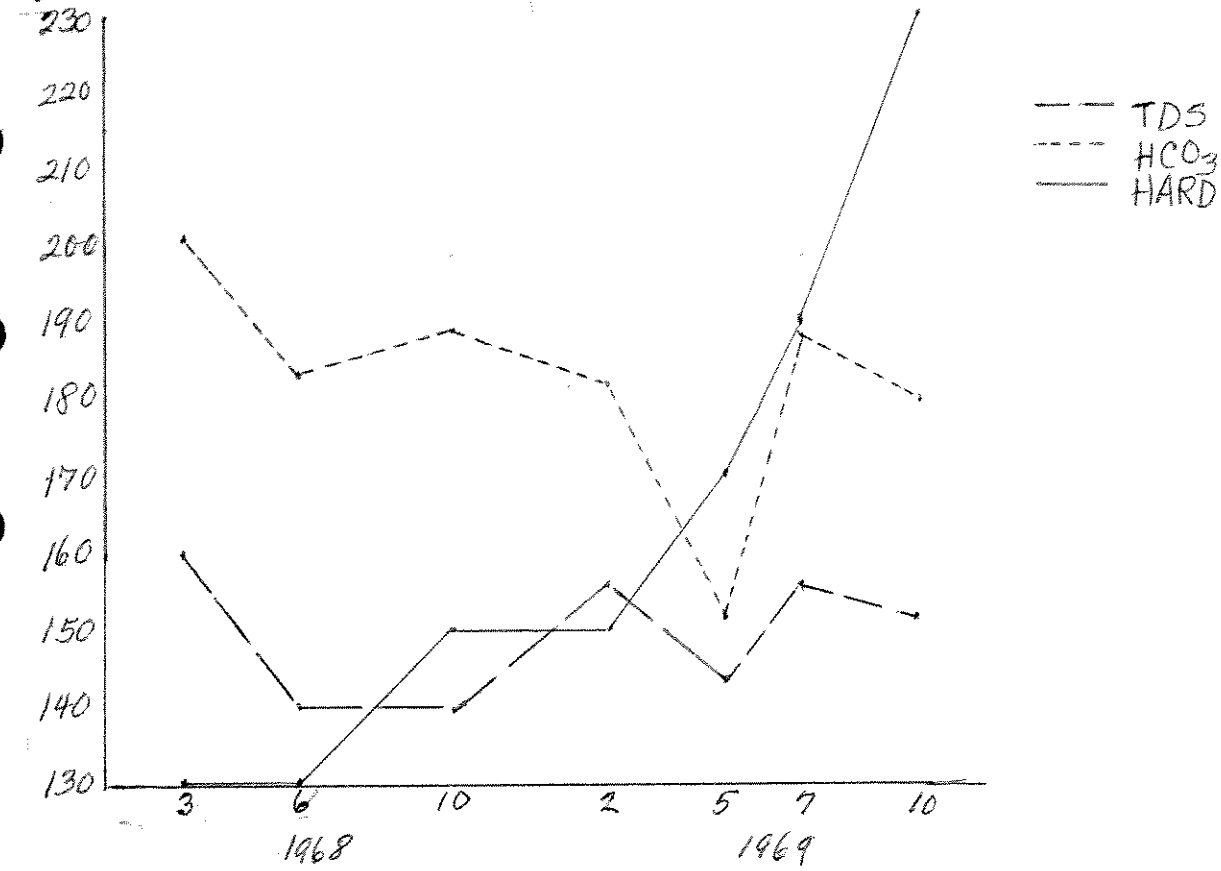
DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
3-17-68	1500	6	2	8.6	11	165	95	150	2	2	rain	B.I
6-20-68	1615	16	21	8.6	10	150	90	145	0	2	p.c.	"
10-20-68	1115	9	8	8.3	10	155	90	145	0	2	cloud	"
2-8-69	1130	6	-5	8.2	12	145	90	135	0	2	p.c.	"
5-3-69	1105	11	15	8.3	11	145	90	140	0	2	clear	"
7-16-69	1135	16	26	8.1	10	160	95	145	0-2	2	clear	"
10-7-69	1115	13	19	8.6	10		80	150			clear	L-S
1-20-70	1330	6.5	2.0	8.6	10.0						0'Cast	"
E		83			87	920	630	1010				
n		8		8	8	6	7	7				
x		10			11	153	90	144				
Range L		6		8.1	10	145	80	135				
H		16		8.6	14	145	95	150				

SITE # 14 KLEINSCHMIDT CR. FIELD DATA

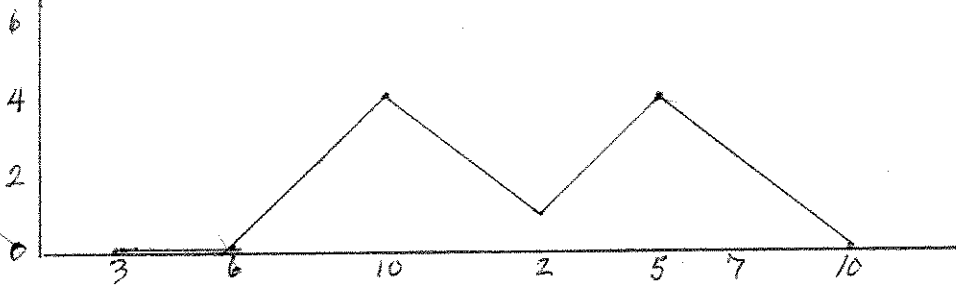


mg/l

SITE # 14 KLEINSCHMIDT CR. LAB ANALYSES

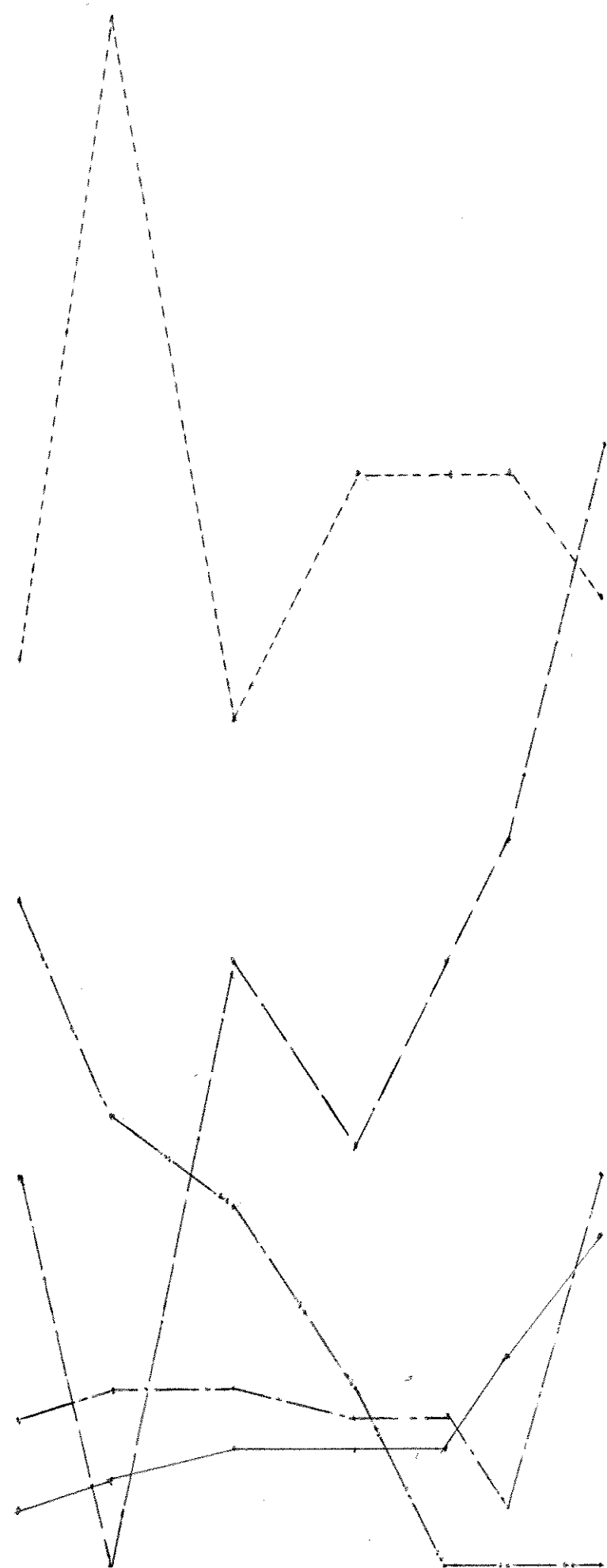


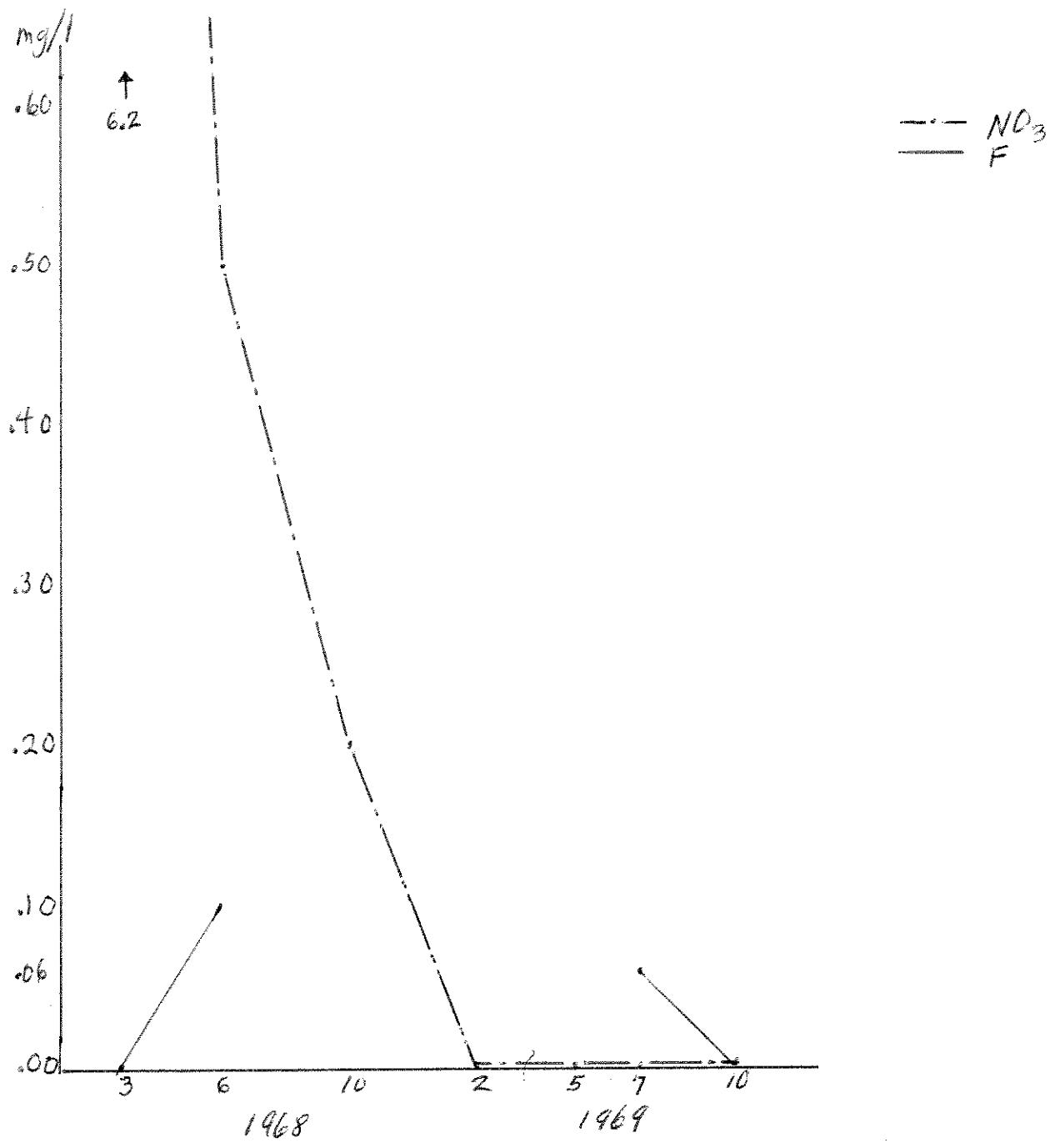
TURB



mg/l
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
1

--- SO₄
— Cl
- - - Ca
- - - Mg
- - - Na+K





November 1971

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Blackfoot River

Station Helmsville turnout at Jct of Highways 200 + 271

Sampling Method ^{1/} Integrated
w/ DH-48 sampler

Analytical Instrument Used Hach 2100A meter

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
5-18-72	87	93	89	90	90	muddy brown	high but slow, shore sample only - too deep

^{1/} Surface Grab, Integrated, Other
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

SITE #15 ARRASTRA CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
3-17-68	1400	4	2	8.4	11	100	65	95	0	2	rain	B.D
6-20-68	1730	11	21	8.3	11	60	30	60	0	2	p.c.	"
10-20-68	1315	6	9	8.2	12	105	60	100	0	2	cloud	"
2-8-69	1510	2	-2	8.0	11	100	60	100	0	2	p.c.	"
5-3-69	1410	7	12	8.0	11	90	50	85	0	2	clear	"
7-16-69	1505	15	26	7.9	9	100	55	85	0	2	p.c.	"
10-7-69	1500	8	19	8.5	10		60	110			p.c.	"L.S
1-20-70	1400	3.5	2.0	8.6	11.0						O'cast	"
E		57			86	555	380	635				
A		8		8	8	6	7	7				
R		7			11	92	54	91				
Range L		2		7.9	9	60	30	60				
H		15		8.6	12	105	65	110				

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Arastra Creek

Station Highway 200 crossing

Sampling Method 1/ Integrated
w/ D.H. 48 sampler

Analytical Instrument Used Hach 2100 A meter

Turbidity (JTU)

L. Spence

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
5-18-72	3.3	3.8	3.4	3.5	3.5	very slight grayish-yellow	water clear. Detritus evident in flow; very little silt
6-7-72 ¹¹⁵⁵	2.8	2.5	2.7	2.7	2.7	colorless	high & clear. Silt not evident in sample. Mostly detritus & colloidal matter

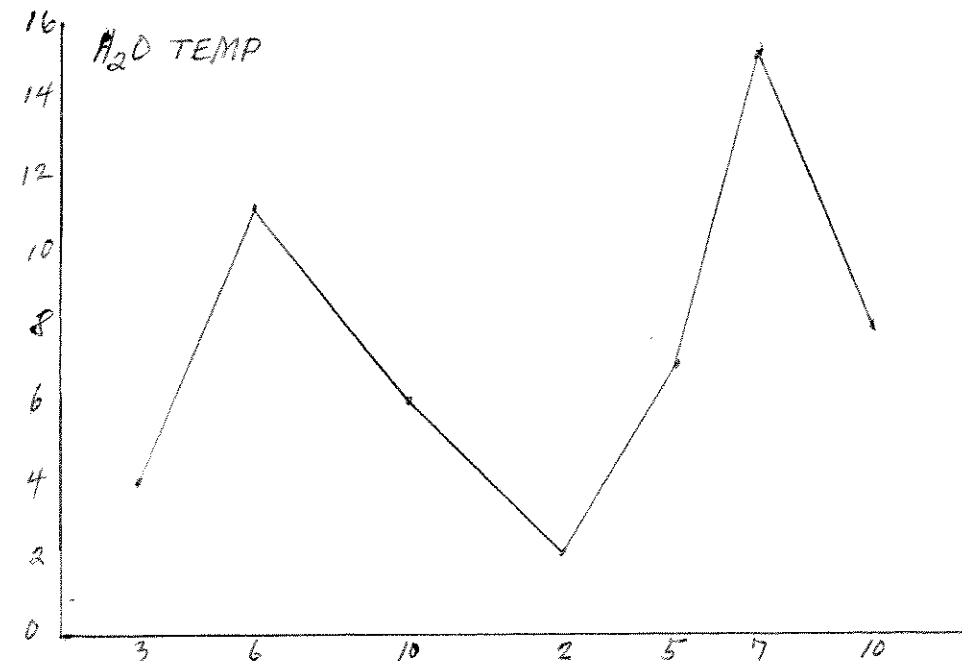
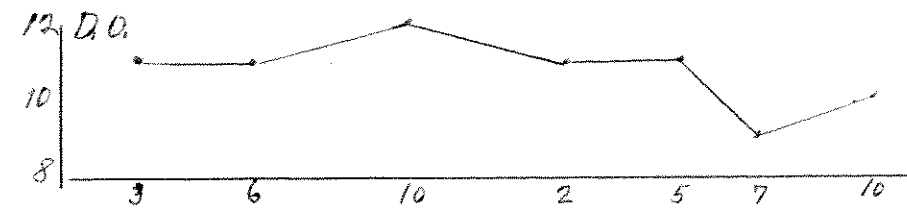
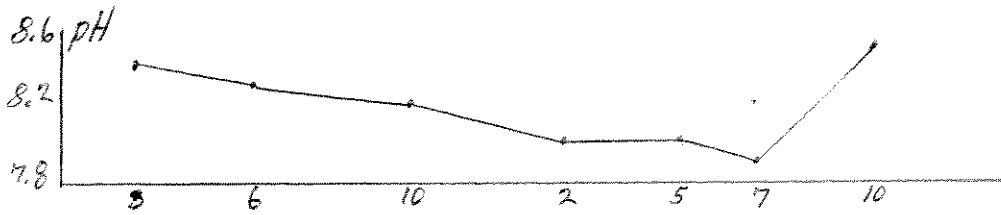
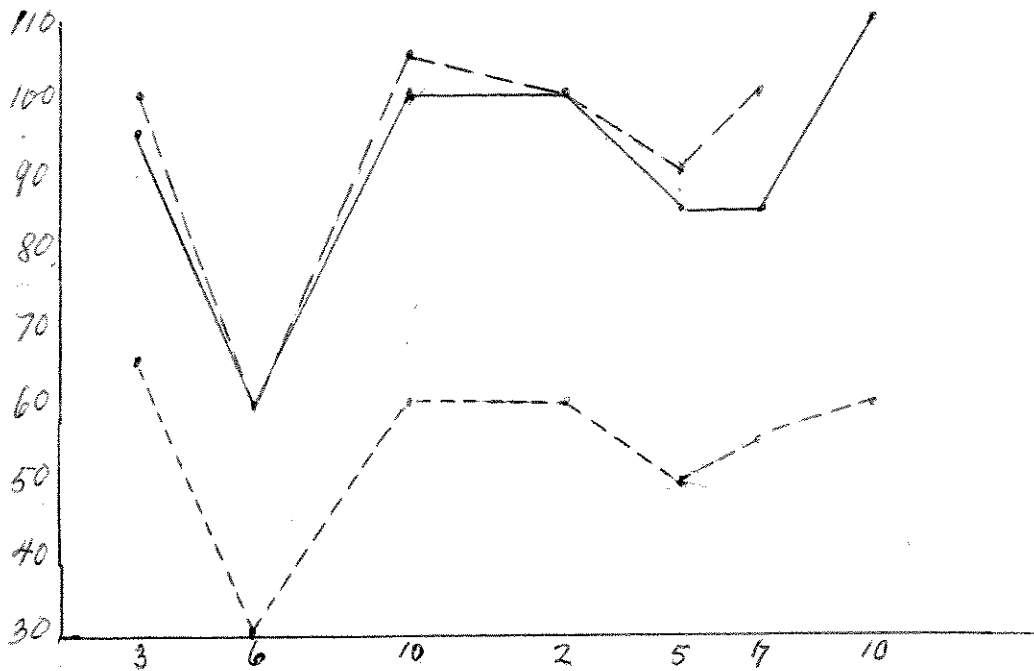
^{1/}Surface Grab, Integrated, Other

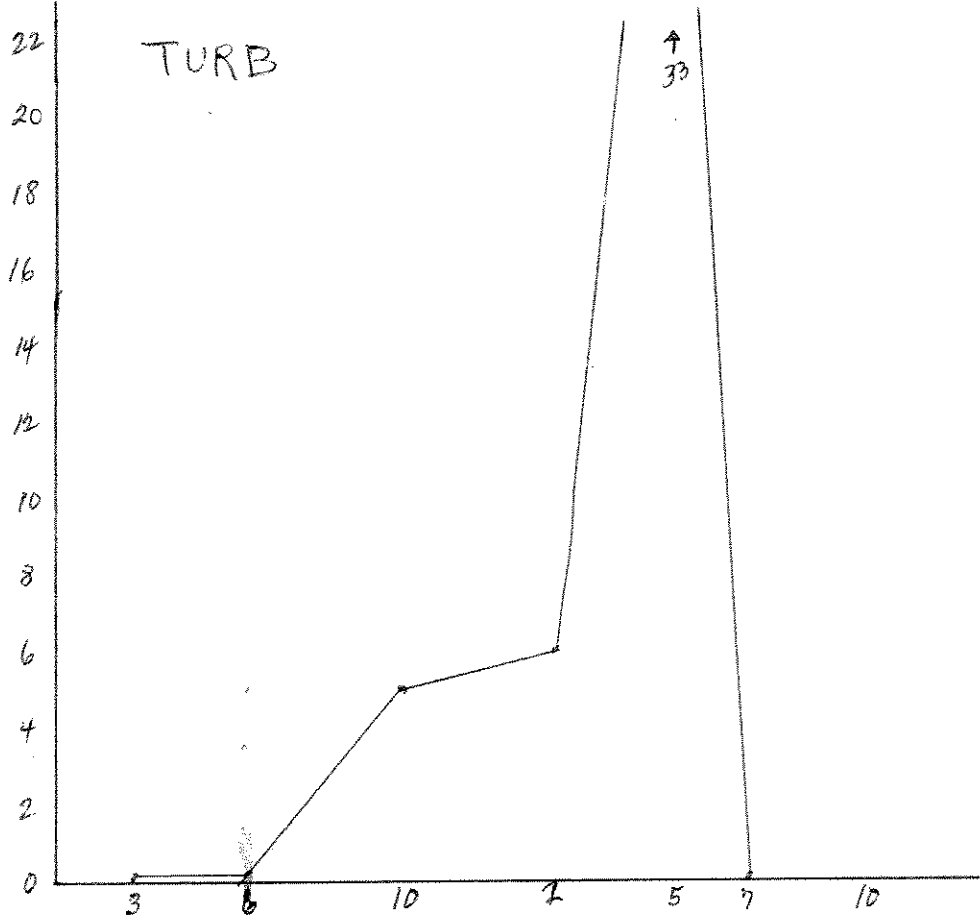
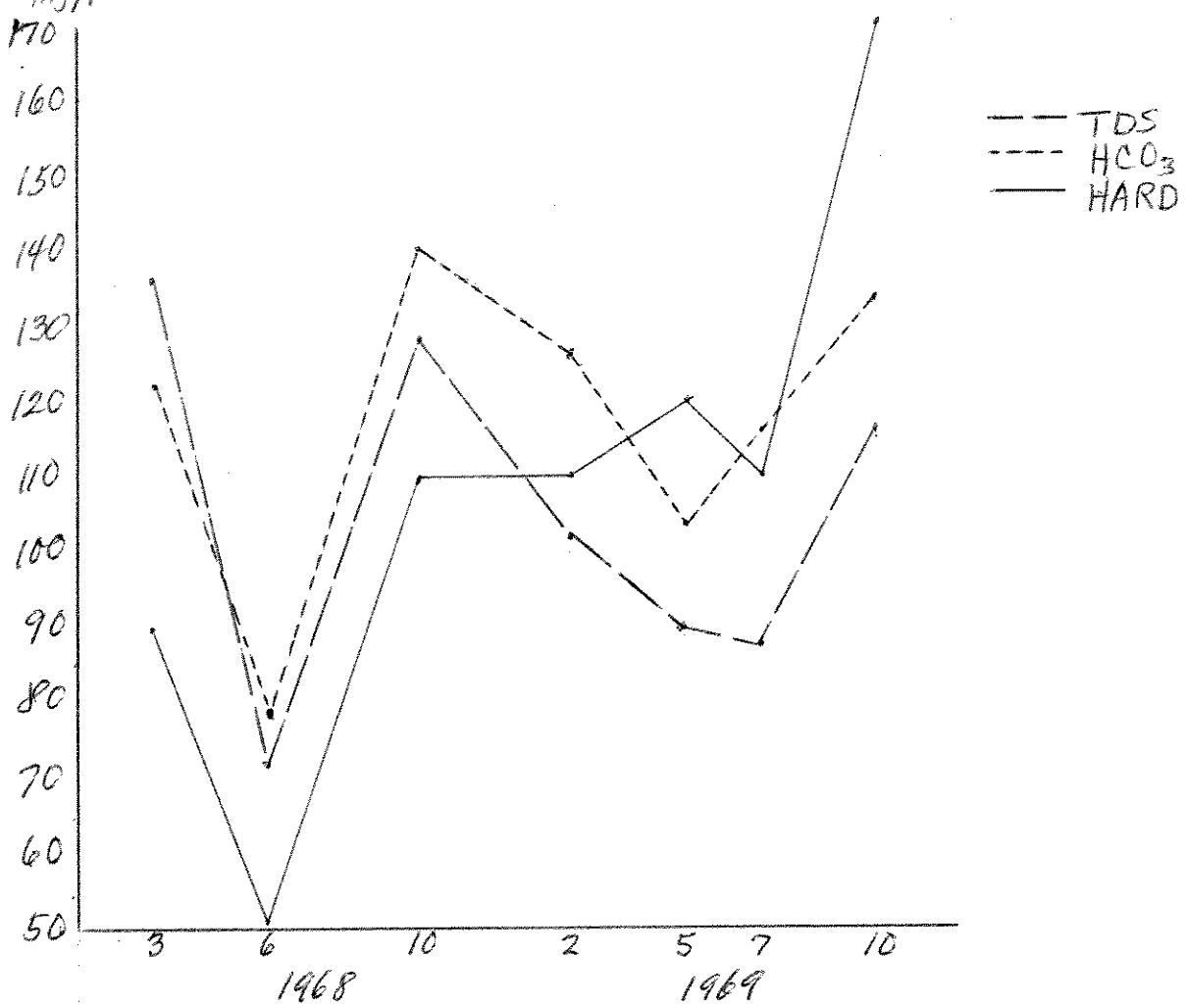
^{2/}According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

SITE #15

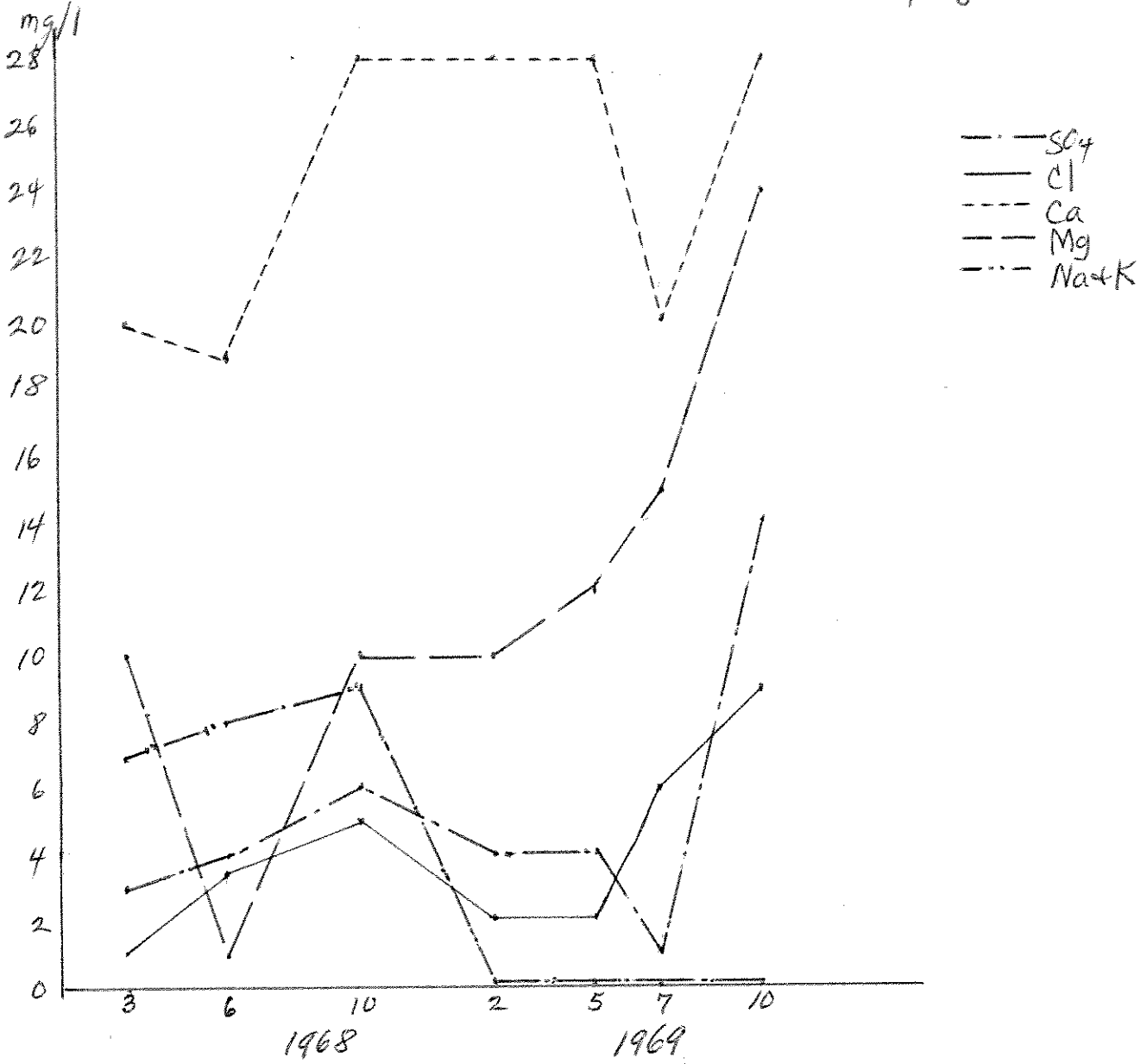
ARRASTRA CR.

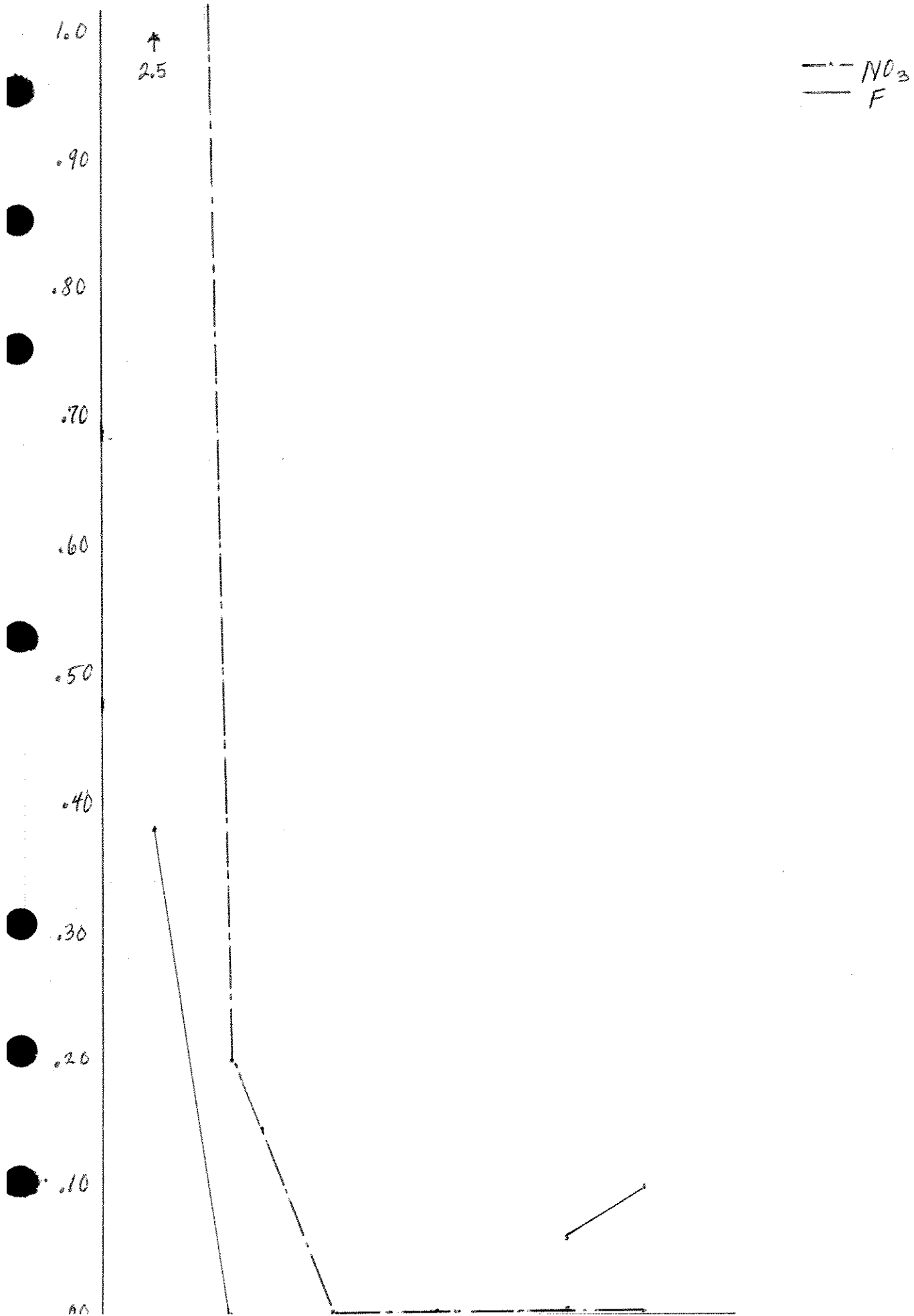
FIELD DATA





SITE # 15 ARRASTRA CR. LAB ANALYSES





at Blackfoot Canyon Camp
BLACKFOOT RIVER, 3.5 MILES ABOVE ARRASTRA CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	CO
2-18-68	1330	2	5	8.4	12	155	60	160	0	2	rain	B.D
3-17-68	1300	5	1	8.4	11	160	110	150	4	2	snow	"
4-20-68	1430	7	10	8.5	11	155	110	150	0	2	p.c.	"
5-25-68	1000	7	10	8.3	9	110	75	110	12	2	p.c.	"
6-20-68	1815	14	17	8.4	11	120	80	110	9	2	p.c.	"
7-23-68	0815	9	12	8.4	9	160	110	155	0	2	p.c.	"
9-10-68	1520	11	25	8.3	9	165	110	160	0	2	clear	"
10-19-68	1445	6	8	8.1	11	170	115	160	0	2	p.c.	"
12-1 -68	1315	2	3	8.1	11	170	115	160	0	2	p.c.	"
1- 2-69	1200	0	0	7.9	9	165	115	160	0	2	cloud	"
2- 8-69	1605	2	-2	8.1	12	165	120	165	0	2	p.c.	"
3-28-69	1215	5	8	8.1	12	165	120	155	0	2	p.c.	"
5- 3-69	1520	8	12	8.1	10	125	95	70	2	0	clear	"
6-16-69	1355	11	23	8.0	10	110	100	135	2	2	clear	"
7-16-69	1550	15	26	8.0	9	145	95	135	0	2	p.c.	"
8-26-69	1355	13	23	8.1	8	170	115	160	0	2	clear	"
10- 7-69	1540	¹⁵ 9.5	16	8.6	10	1	120	160	0	0	p.c.	#LS
11-29-69	1300	² 2.5	2	8.6	12	0	0	160	0	0	clear	LS
1/20-70	1440	3.0	1.5	8.6	8.5						O'cast	"
<hr/>												
4-27-71	0910	3.0										
5-21-71	0915	4.5										
6-23-71	1600	13.0										
7- 71	No Data											
8-23-71		10.0										
9-21-71	1030	5.5										
10 -71	No Data											
11-22-71	0925	3.0										
12-21-71	1430	3.0										
E		135			194	2440	1765	2615				
N		19		19	19	16	17	18				
X		7			10	152	104	145				
Range L		0		7.9	8	110	60	70				
H		14		8.6	12	170	120	165				

(Blackfoot Campground)

SITE #16 BLACKFOOT RIVER 3.5 MILES ABOVE ARRASTRA CR.

LAB ANALYSES

Date	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc alk.	
2-17-68	0	180	130	0	210	0	1	0.0	0.1	172	
3-17-68	0	170	105	0	189	6	3	1.4	0.38	155	
4-21-68		150	110	6	192	0	3	0.00	0.06	169 157+10	
5-25-68	0	140	112	0	122	10	1	.3	0	100	
6-20-68	9	130	103	0	140	14	2	0.30	0.10	115	
7-22-68	0	166	216	0	189	2	5	0	0.00	155	
9-9-68	1.5	184	176	0	195	5	4	0	-	160	
10-19-68	No data										
11-30-68	10	172	170	0	196	0	5	0.1	-	161	
1-2-69	-	166	190	0	196	0	5	0.4	0	161	
2-8-69	6	168	180	0	200	2	5	0	-	164	
3-28-69	No data										
5-3-69	10	136	140	0	134	6	2	0	-	110	
6-16-69	2	150	140	0	173	0	4	0	0.26	142	
7-16-69	0	142	160	0	171	3	5	0	0.08	140	
8-27-69	0	176	250	0	195	2	6	0	0.02	160	
10-27-69	-	168	240	0	201	16	9	0	0	165	
11-29-69	-	174	210	0	207	4	9	0	0.16	170	
1-20-70	0	160	155	0	195	5	3	0	0.15	160	
3-27-70	3	204	165	0	210	4	3	0	0.4	172	
4-21-70		200	170	0	220	2	0.5	0.1	0.1	180	
4-27-70		170	230	0	220	3	0.5	0.2	0.2	180	
5-22-70		130	60	0	150	8	0.5	0.1	0.2	123	
6-16-70		120	150	0	150	3	0	0	0.1	123	
7-21-70		140 ¹⁶⁰	180 ¹⁴⁰	0	200	2	0	0	0.2	164	
8-20-70		160	180	0	190	8	0	0.1	0.2	156	
9-22-70		180	240	0	200	6	0	0	0.1	164	
10-21-70		180	240	0	200	8	0	0	0.1	164	
12-17-70		180	250	0	200	5	0	0.04	0.1	164	
1-16-71		180	250	0	210	5	0	0.0	0.1	172	
2-2-71		170 ¹⁶⁰	170 ¹⁷⁰	0.0	170	0.4	0.0	0.2	0.2	139	
2-24-71		170 ¹⁷⁰	170 ¹⁸⁰	0.0	200	0.0	0.0	0.01	0.3	164	
3-26-71		170 ¹⁷⁰	170 ¹⁷⁰	0.0	200	4.0	0.0	1.1	0.3	164	
4-27-71		110	110	0	140	10	1	0.05	0.1	115	
5-21-71		120	120	0	160	5	0	0.08	0.1	131	
6-23-71		140	105	0.0	180	0.0	0.0	0.1	0.3	148	
7- 71		No Data									

(Blackfoot Campground)

SITE #16

BLACKFOOT RIVER 3.5 MILES ABOVE ARRASTRA CR.

Date	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	LAB ANALYSES	
										Calc	alk
8-23-71		170	150	0	200	0	0	0.03	0.2		164
9-21-71		150	151	0	200	7	0	0.2	0.2		164
10 -71		No Data									
11-22-71		160	150	0	200	9	0	0	0.2		164
12-21-71		170	150	0	200	3.3	0	0	0.1		164
End of "Complete" Analyses.											
										Σ	5836
										n	38
										\bar{x}	154
										Range	L 100
											H 180

(Blackfoot Campground)

SITE #16 BLACKFOOT RIVER 3.5 MILES ABOVE ARRASTRA CR.

LAB ANALYSES # METALS

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
2-17-68	40	8	16	0.06		0.00		0.00				
3-17-68	32	6	28	0.00	0.00	0.00	0.00	0.00				
4-21-68	32	8	28	0.00	0.00	0.00	0.00	0.00				
5-25-68	27	10		.6	0	0	NES*	0				
6-20-68	38	1	16	0.05	0.00	0.00		0.00				
7-22-68	50	22		0.2	0.00	0.002		0.00				
9-9-68	44	16	0	0.0		<0.1 ND		<0.1 ND			ND = not detectable = <.01	
10-19-68	No data											
11-30-68	48	12	0	0		0		0				
1-2-69	44	20	0	0		0.0		0.0				
2-8-69	44	17	0	0.3		0.1		0.03				
3-28-69	No data											
5-3-69	36	12	0	0.5	0	0		0				
6-16-69	30	16	4	0	-	-	-	-				
7-16-69	40	15	0	0	-	0.02	-	0.00				
8-27-69	48	32	0	0	0.001	0	-	0				
10-27-69	44	32	0	0	-	0.0	-	0.0				
11-29-69	56	17	0	0.07	-	0.01	-	0.03				
1-20-70	45	10	8	0.06	-	0	-	0				
3-27-70	44	13	9	0.0	-	0	-	0				
4-21-70	44	15	0	0.0	-	0.01	-	0				
4-27-70	40	30	0	0		0.01		0				
5-22-70	24	0	33	1.5	-	0	-	<0.01				
6-16-70	32	17	0	0.5		Not Analyzed		Not Analyzed				
7-21-70	40	10	12	0.02		.03		.06				
8-20-70	44	17	0	0.3		0		0.03				
9-22-70	48	29	0	0	-	0.03	-	0				
10-21-70	48	29	0	0.04	-	0.05	-	0.0				
12-17-70	56	27	0	0.0		0.03		0.0				
1-18-71	48	32	0	0.00		0.04		0.0				
2-2-71	40	17	2.5	0.1		0.07		0.0				
2-24-71	48	10	2.0	0.0		0.03		0.0				
3-26-71	48	17	1.9	0.0		0.09		0.0				
4-27-71	32	7	1.4	0.4		0.30		0.06				
5-21-71	32	9	2	0.41		0		0				
6-23-71	30	8	1.2	0.1		0.10		0.0				

*NES Not enough sample

(Blackfoot Campground)

SITE #16

BLACKFOOT RIVER 3.5 MILES ABOVE ARRASTRA CR.

LAB ANALYSES - METALS

T= Total Recoverable

D= Dissolved

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu			
7-71		NO	Data								
8-23-71	43	11	2	0		0.01		0.00			
9-21-71	43	11	2.4	0		<0.01		0.02	T		
				0		<0.01		0.01	D		
10-71		NO	Data								
11-22-71	42	12	2.3	0.03	0.0	<0.01	0.00	0.01	D		
				0.03		<0.01	0	0.01	T		
12-21-71	42	12	2.2	0		<0.01	0	.01	D		
JAN + Feb '72 - No samples				0		<0.01	0	.01	T		
3-23-72				.06	.000	<0.01	0.00	.01	D		
				.26	.000	<0.01	0	.01	T		
4-20-72				.07	.000	<0.01	0.00	0.02	T		
				.04		<0.01	0.00	0.02	D		
5-22-72				.68	.000	.01	0.00	.01	T		
				0		<0.01	0.00	.00	D		
6-20-72				.33	.001	.01	.01	.01	T		
				0		.01	.01	.01	D		
7-19-72				.14	.002	.01	.01	.01	T		
				0		.01	.01	.01	D		
8-31-72				ND	.007	<0.01	<0.01	<0.01	T		
						<0.01	<0.01	<0.01	D		
9-26-72				ND	.002	<0.01	<0.01	<0.01	T		
						<0.01	<0.01	<0.01	D		
10-31-72				.02	.000	<0.01	<0.01	<0.01	T		
				0		<0.01	<0.01	<0.01	D		

FIELD REPORT

Water-quality measurements

1 set sample at site - station discont. moved by State F.D.C.

Type: 3

Station ID: 17 4 2 14 00

Date: Sept 11 1973 Time: 0935 Collected by: A. H. [unclear]

Station Name: Blackfoot River at Blackfoot Canyon Campground on [unclear]

Parameter	Code	Result	F	S
Discharge (cfs) <u>GH 0.87</u>	00060	_____		
Air Temperature (°C)	00020	<u>15.0</u>		
Water Temperature (°C)	00010	<u>10.0</u>		
pH	00400	_____		
Alkalinity	00410	_____	F	<u>820</u> X ml sample
Specific conductance (umhos/cm)	00095	_____	S	
Dissolved Oxygen	00300	_____	F	
Coliform bacteria (per 100 ml)	31501	<u>050</u>	S	X 2 *
<u>50</u> ml <u>464</u> colonies				
<u>10</u> ml <u>4640</u> colonies				
<u>100</u> ml <u>464</u> colonies				
_____ ml _____ colonies				
Fecal coliform bacteria (per 100 ml)	31616	<u>9</u>		
<u>50</u> ml <u>5</u> colonies				
<u>10</u> ml <u>6</u> colonies				
<u>100</u> ml <u>10</u> colonies				
_____ ml _____ colonies				

PROVISIONAL

Observations and Remarks

Appearance of surface: algae

Appearance of bottom: very a base

Weather conditions: cool, a lot of rain, light sun above

General biologic conditions: little aquatic growth on rocks on left

Nature of streamflow: low base flow

Any unusual conditions: none - no [unclear] or [unclear] visible in sampling area

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3349.00

Date: 13 Apr 1973 Time: 0930 Collected by: H.C. FLADLAND

Station Name: BLACKFOOT R. m. CANYON CAMPGROUND

Parameter	Code	Result	
Discharge (cfs) (<u>gag height</u>)	00060	<u>.90</u>	
Air Temperature (°C)	00020	<u>20.5</u>	
Water Temperature (°C)	00010	<u>11.0</u>	
pH	00400		
Alkalinity	00410		F _____ X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095		S _____
Dissolved Oxygen	00300		F _____
Coliform bacteria (per 100 ml)	31501	<u>61</u>	S _____ X 2 =
<u>5</u> ml <u>9</u> colonies			
<u>50</u> ml <u>39</u> colonies			
<u>100</u> ml <u>52</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>2</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>1</u> colonies			
<u>100</u> ml <u>2</u> colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: Clear & Clean (good clean mtn stream)

Appearance of bottom: Clean

Weather conditions: clear & warm

General biologic conditions: lot of aquatic growth on stream bed

Nature of streamflow: low flow - slightly turbulent

Any unusual conditions: willows & pine along both banks
few fish jumping.

* Reported value based on nonideal count of colonies

Water-quality measurements

Type: 3

Station ID: 12.334900

Date: 16 JULY 73 Time: 0900 Collected by: L. C. FLADLAND

Station Name: BLACK FOOT R. III. CANYON CAMPGROUND, LINCOLN

Parameter	Code	Result	
Discharge (cfs) <u>Gage height</u>	00060	<u>1.08</u>	
Air Temperature (°C)	00020	<u>18.0</u>	
Water Temperature (°C)	00010	<u>11.5</u>	
pH	00400		
Alkalinity	00410		F _____ S _____ X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095		
Dissolved Oxygen	00300		F _____ S _____
Coliform bacteria (per 100 ml)	31501	<u>43</u>	X 2 =
<u>5</u> ml <u>6</u> colonies			
<u>50</u> ml <u>18</u> colonies			
<u>100</u> ml <u>43</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>9</u>	
<u>5</u> ml <u>1</u> colonies			
<u>50</u> ml <u>4</u> colonies			
<u>100</u> ml <u>9</u> colonies			
_____ ml _____ colonies			

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN (GOOD CLEAN MTD. STREAM)

Appearance of bottom: CLEAR (GRAVEL & SAND)

Weather conditions: CLEAR and WARM

General biologic conditions: Aquatic growth on log under bridge

Nature of streamflow: normal stream flow

Any unusual conditions: fisherman up stream from sampling site and under bridge

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334900

Date: 18 JUNE 1973 Time: 0915 Collected by: L.C. FLADLAND & M.L. KASMAN

Station Name: BLACKFOOT RIVER NR. CANYON CAMPGROUND NR. LINCOLN, MONTANA

Parameter	Code	Result	
Discharge (cfs) <u>(Gage ht. 7.00)</u>	00060	<u>471 cfs</u>	
Air Temperature (°C)	00020	<u>6.5</u>	
Water Temperature (°C)	00010	<u>6.5</u>	
pH	00400		
Alkalinity	00410		F _____ X <u>820</u> S _____ ml sample
Specific conductance (umhos/cm)	00095		
Dissolved Oxygen	00300		F _____ S _____
Coliform bacteria (per 100 ml)	31501	<u>50</u>	X 2 =
<u>5</u> ml <u>2</u> colonies			
<u>50</u> ml <u>10</u> colonies			
<u>100</u> ml <u>50</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria, (per 100 ml)	31616	<u>14</u>	
<u>5</u> ml _____ colonies			
<u>50</u> ml _____ colonies			
<u>100</u> ml <u>14</u> colonies			
_____ ml _____ colonies			

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN

Appearance of bottom: CLEAR (OLD LOGS AND BRANES REMOVED)

Weather conditions: CLOUDY (NO SUN TO BE SEEN) SOME LIGHT RAIN

General biologic conditions: VERY LITTLE TO NO AQUATIC GROWTH

Nature of streamflow: MODERATE

Any unusual conditions: None

L.C. FLADLAND

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334900

Date: MAY 21, 1973 Time: 0930 Collected by: LC. FLADLAND & M.L. KASHMAN

Station Name: BLACKFOOT R. J.M. CANYON CAMPGROUND IN LINCOLN

Parameter	Code	Result	
Discharge (cfs) gage height (3.16)	00060	<u>1,000</u>	
Air Temperature (°C)	00020	<u>8.5</u>	
Water Temperature (°C)	00010	<u>6.5</u>	
pH	00400		
Alkalinity	00410		F _____ X <u>820</u> S _____ ml sample
Specific conductance (umhos/cm)	00095		
Dissolved Oxygen	00300		F _____ S _____
Coliform bacteria (per 100 ml)	31501	<u>260</u>	X 2 =
<u>5</u> ml <u>13</u> colonies			
<u>50</u> ml <u>*</u> colonies			
<u>100</u> ml <u>*</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>9</u>	
<u>5</u> ml <u>**</u> colonies			
<u>50</u> ml <u>6</u> colonies			} MEAN = 9 per 100-ml plate
<u>100</u> ml <u>8</u> colonies			
_____ ml _____ colonies			

Other

* sediment interfered with incubation
** water in plate

PROVISIONAL

Observations and Remarks

Appearance of surface: muddy - milky color in appearance - some tree branches
 Appearance of bottom: not visible
 Weather conditions: Cool & Partly Cloudy (WINDY)
 General biologic conditions: water fowl up stream (ducks) water with
 Nature of streamflow: normal stream flow
 Any unusual conditions: gravel and sand moving with
stream flow on stream bed.

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334900

Date: 25 April 73 Time: 0900 Collected by: H.C. FLADLAND

Station Name: BLACKFOOT R. IN CANYON CAMPGROUND W. LINCOLN

Parameter	Code	Result	
Discharge (cfs) <small>gauge height</small>	00060	<u>0.96</u>	
Air Temperature (°C)	00020	<u>6.5°C</u>	
Water Temperature (°C)	00010	<u>6.5°C</u>	
pH	00400	_____	
Alkalinity	00410	_____	F _____ X $\frac{820}{\text{ml sample}}$
Specific conductance (umhos/cm)	00095	_____	S _____
Dissolved Oxygen	00300	_____	F _____
Coliform bacteria (per 100 ml)	31501	<u>24</u>	S _____ X 2 =
<u>5</u> ml <u>1</u> colonies			
<u>50</u> ml <u>14</u> colonies			
<u>100</u> ml <u>24</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>4</u>	
<u>5</u> ml <u>1</u> colonies			
<u>50</u> ml <u>2</u> colonies			
<u>100</u> ml <u>4</u> colonies			
_____ ml _____ colonies			

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN

Appearance of bottom: CLEAR VERY LITTLE ALGAL GROWTH

Weather conditions: SUNNY & WINDY

General biologic conditions: _____

Nature of streamflow: NORMAL RAPID FLOW

Any unusual conditions: _____

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3349.00

Date: 25 MARCH 73 Time: 0815 Collected by: L.C. FLADLAND

Station Name: BLACKFOOT R. IN CANYON CAMPGROUND IN LINCOLN

<u>Parameter</u>	<u>Code</u>	<u>Result</u>	
Discharge (cfs)	00060	<u>0.98</u>	
Air Temperature (°C)	00020	<u>+1°</u>	
Water Temperature (°C)	00010	<u>+3°</u>	
pH	00400		
Alkalinity	00410		F <u>820</u> S <u>X ml sample</u>
Specific conductance (umhos/cm)	00095		
Dissolved Oxygen	00300		F S
Coliform bacteria (per 100 ml)	31501	<u>0</u>	S <u>X 2 =</u>
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
<u> </u> ml <u> </u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
<u> </u> ml <u> </u> colonies			

PROVISIONAL

Other

Observations and Remarks

Appearance of surface: near stream

Appearance of bottom: in, little aquatic growth

Weather conditions: partly cloudy

General biologic conditions: nothing noticed

Nature of streamflow: low spring flow

Any unusual conditions: None

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3349.00

Date: 27 FEB. 73 Time: 0745 Collected by: LC, FRADLAND

Station Name: BLACKFOOT R. in CANYON CAMPBELL, in LINCOLN, WY.

<u>Parameter</u>	<u>Code</u>	<u>Result</u>	
Discharge (cfs) <u>GH 0.90</u>	00060	<u> </u>	
Air Temperature (°C)	00020	<u>+ 1.5</u>	
Water Temperature (°C)	00010	<u>+ 4.5</u>	
pH	00400	<u> </u>	
Alkalinity	00410	<u> </u>	F <u> </u> X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095	<u> </u>	S <u> </u>
Dissolved Oxygen	00300	<u> </u>	F <u> </u>
Coliform bacteria (per 100 ml)	31501	<u>14</u>	S <u> </u> X 2
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>7</u> colonies			
<u>100</u> ml <u>2</u> colonies			
<u> </u> ml <u> </u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>2</u>	
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>1</u> colonies			
<u>100</u> ml <u>2</u> colonies			
<u> </u> ml <u> </u> colonies			

Other

✓ MUR

Observations and Remarks

Appearance of surface: CLEAN

Appearance of bottom: very little aquatic growth on rocks

Weather conditions: OVERCAST - RAIN & Snow Falling

General biologic conditions: str. bed clear

Nature of streamflow: low Flow (ICE ON BOTH BANKS)

Any unusual conditions:

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3349.00

Date: 1-23-73 Time: 1420 Collected by: J.R. Knapton

Station Name: Blackfoot R at Rkft Campground nr Lincoln 170-1

Parameter	Code	Result	
Discharge (cfs)	00060	_____	
Air Temperature (°C)	00020	_____	
Water Temperature (°C)	00010	<u>2.0°</u>	
pH	00400	_____	
Alkalinity	00410	_____	F _____ X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095	_____	S _____
Dissolved Oxygen	00300	_____	F _____
Coliform bacteria (per 100 ml)	31501	<u>2</u>	S _____ X 2 *
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>1</u> colonies			
<u>100</u> ml <u>2</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: open water, some shore ice

Appearance of bottom: clean, gravel + boulders

Weather conditions: partly cloudy -2°C

General biologic conditions: some moss on rocks

Nature of streamflow: even flow velocity, 2-4 m/s

Any unusual conditions: none

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334900

Date: Dec. 27, 72 Time: 0945 Collected by: L.C. FLADLAND & M.L. KASHMAN

Station Name: BLACKFOOT R @ BLACKFOOT CANYON CAMPGROUND via BULLCOURN

Parameter	Code	Result
Discharge (cfs) <u>G.H. 1.15 (W.S.)</u>	00060	<u>maximum ice surface has been to 3.74 on starting</u>
Air Temperature (°C)	00020	<u>+ 4.0</u>
Water Temperature (°C)	00010	<u>+ 4.0</u>
pH	00400	_____
Alkalinity	00410	_____ F _____ <u>820</u> X ml samp
Specific conductance (umhos/cm)	00095	_____ S _____
Dissolved Oxygen	00300	_____ F _____
Coliform bacteria (per 100 ml)	31501	<u>18</u> S _____ X 2 =
<u>1.0</u> ml <u>0</u> colonies		
<u>50</u> ml <u>8</u> colonies		
<u>100</u> ml <u>18</u> colonies		
_____ ml _____ colonies		
Fecal coliform bacteria (per 100 ml)	31616	<u>2</u>
<u>15</u> ml <u>0</u> colonies *		
<u>50</u> ml <u>1</u> colonies <u>water in all plates</u>		
<u>100</u> ml <u>0</u> colonies		
_____ ml _____ colonies		

Other

Observations and Remarks

Appearance of surface: clean - no ice or any debris floating
 Appearance of bottom: very clean
 Weather conditions: sw-coast, cool, no sun
 General biologic conditions: little aquatic growth, game animals in area
 Nature of streamflow: River open - no ice except for bridged sh
 Unusual conditions: daytime high temps for past week have
been in mid 40's range. No slack in immediate area.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334900

Date: 28 NOV. 72 Time: 0920 Collected by: LC. FLADLAND & ML. CASMIR

Station Name: BLACK FOOT R @ BLACKFOOT CANYON SAMPING POINT W. LINCOLN

<u>Parameter</u>	<u>Code</u>	<u>Result</u>
Discharge (cfs) <u>G.H. 1.16</u>	00060	_____
Air Temperature (°C)	00020	<u>-10.0°</u>
Water Temperature (°C)	00010	<u>+1.0°</u>
pH	00400	_____
Alkalinity	00410	_____ F _____ X <u>82</u> ml sam
Specific conductance (umhos/cm)	00095	_____ S _____
Dissolved Oxygen	00300	_____ F _____
Coliform bacteria (per 100 ml)	31501	<u>1,400</u> * S _____ X 2 =
<u>50</u> ml <u>700</u> colonies*		
<u>100</u> ml <u>TNTC</u> colonies		
_____ ml _____ colonies		
_____ ml _____ colonies		
Fecal coliform bacteria (per 100 ml)	31616	<u>2</u>
<u>50</u> ml <u>1</u> colonies		
<u>100</u> ml <u>2</u> colonies		
_____ ml _____ colonies		
_____ ml _____ colonies		

Other

Observations and Remarks

Appearance of surface: clear

Appearance of bottom: very slight aquatic growth on s & ravel bed

Weather conditions: mostly clear - cold - calm

General biologic conditions: very clear & clear mountain stream

Nature of streamflow: low base flow

Any unusual conditions: 8" snow in area - river open, no ice along either bank & no b.w.

New T-G site - 1973 w

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334900

Date: Oct 26, 1978 Time: 0800 Collected by: M.L. Kasman & L. Fladland

Station Name: Blackfoot Pt at Blackfoot Canyon Campground nr Lincoln, MT

<u>Parameter</u>	<u>Code</u>	<u>Result</u>	
Discharge (cfs) <u>C.H. 1.28</u>	00060	<u> </u>	
Air Temperature (°C)	00020	<u>+ 1.5</u>	
Water Temperature (°C)	00010	<u>5.5</u>	
pH	00400	<u> </u>	
Alkalinity	00410	<u> </u>	F <u> </u> X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095	<u> </u>	S <u> </u>
Dissolved Oxygen	00300	<u> </u>	F <u> </u>
Coliform bacteria (per 100 ml)	31501	<u>20</u>	S <u> </u> X 2 =
<u>1</u> ml <u>2</u> colonies			
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>16</u> colonies			
<u>100</u> ml <u>20</u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1</u> ml <u>0</u> colonies			
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			

Other

BOD's taken

Observations and Remarks

Appearance of surface:

Appearance of bottom: gray, little aquatic growth on rocks - almost clear

Weather conditions: overcast - w/ snow falling

General biologic conditions: few grasses growing & on str. bed. water clear

Nature of streamflow: low flow

Any unusual conditions:

Z 1.28 - 1.40 = - 0.12

BOD Determinations - by USGS, Helena

Blackfoot River at Blackfoot Canyon Campground, 3.5 miles above Arrastra Cr.

①

BOD DETERMINATION

STATION NAME *Blackfoot R. at Blackfoot Canyon Camp nr. Lincoln, MT.*
STATION I.D. *Mont. F-G site*
SAMPLING DATE *Mar. 23, 1972*
SAMPLING TIME *0815* BOD *1.2* mg/l
FIELD D.O. *L. Spence* *water rising + slightly turbid*

BOD DETERMINATION

STATION NAME *Blackfoot River at Blackfoot Canyon Camp*
STATION I.D.
SAMPLING DATE *4-14-72*
SAMPLING TIME *0915* BOD *1.5* mg/l

Blackfoot River at Blackfoot Canyon Campground, 3.5 miles above Arrastra Cr.

2

water high and muddy gh #5.90
weather cool, overcast and windy
sampled from shore

BOD DETERMINATION

STATION NAME Blackfoot River at Blackfoot Canyon Camp, Mont.

STATION I.D.

SAMPLING DATE 5-19-72

SAMPLING TIME 0915

BOD 1.6 mg/l

Water temp. 53°F. Staff gage 1.92. Water low and clear.
Rain showers last night. Cool today, mostly cloudy, slight
wind.

L. Space

BOD DETERMINATION

STATION NAME Blackfoot R @ Blackfoot Canyon Camp

STATION I.D.

SAMPLING DATE 8-2-72

SAMPLING TIME 0920

BOD 1.0 mg/l

BOD DETERMINATION

STATION NAME BLACK FOOT R. @ BLACK FOOT CANYON CAMP.

STATION I.D.

SAMPLING DATE 9/8/72

SAMPLING TIME 0925

BOD 1.9 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R. at Blackfoot Canyon Campground
near Lincoln
Montana

STATION I.D.

SAMPLING DATE 26 October 1972

SAMPLING TIME 0800

BOD 1.4 mg/l

BOD Determinations - by USGS, Helena

Blackfoot River at Blackfoot Canyon Campground, 3.5 miles above Arrastra Cr.

③

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ BLACKFOOT CANYON CAMPGROUND in LINCOLN

STATION I.D.

SAMPLING DATE 28 NOV. 1972

SAMPLING TIME 0920

BOD 2.4 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ CANYON CAMPGROUND in LINCOLN

STATION I.D. 12-3349.00

SAMPLING DATE 27 DEC. 1972

SAMPLING TIME 0945

BOD 1.3 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. in CANYON CAMPGROUND in LINCOLN

STATION I.D. 12-3349.00

SAMPLING DATE 1/23/73

SAMPLING TIME 1420

BOD 1.4 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R. nr. BLKft. Canyon Campground nr. Lincoln

STATION I.D. 12-3349.00

SAMPLING DATE 27 Feb. 1973

SAMPLING TIME 0745

BOD 0.9 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. in CANYON CAMPGROUND in LINCOLN

STATION I.D. 12 334900

SAMPLING DATE 28 MARCH 1973

SAMPLING TIME 0815

BOD 0.9

Blackfoot River at Blackfoot Canyon Campground, 3.5 miles above Arrastra Cr.

4

PROVISIONAL

BOD DETERMINATION

STATION NAME BLACKFOOT R. m. CANYON CAMPGROUND m. LINCOLN,
STATION I.D. 12334900 MT.
SAMPLING DATE 25 April 1973
SAMPLING TIME 0900 BOD 1.3 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. m. CANYON CAMPGROUND m. LINCOLN, MT
STATION I.D. 12334900
SAMPLING DATE 21 MAY 1973
SAMPLING TIME 0930 BOD 1.2 mg/l DU

BOD DETERMINATION

STATION NAME BLACKFOOT R. m. CANYON CAMPGROUND m. LINCOLN, MT
STATION I.D. 12334900
SAMPLING DATE JUNE 18, 1973
SAMPLING TIME 0915 BOD 2.2 mg/l DU

STATION NAME BLACKFOOT R. m. CANYON
STATION I.D. 12334900
SAMPLING DATE 16 JULY 1973
SAMPLING TIME 0900 BOD 1.4 mg/l

BOD DETERMINATION

STATION NAME Blackfoot Rat Blackfoot Canyon Campground
STATION I.D. 12334900
SAMPLING DATE Sept 11, 1973
SAMPLING TIME 0935 BOD 0.4 mg/l

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Blackfoot River

Station Blackfoot Canyon Camp
3.5 miles above Anaconda Cr

Sampling Method ^{1/} Integrated
w/ DH-48 sampler

Analytical Instrument Used Hach 2100A meter

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
7-10-72	3.8	3.5	3.3	3.5	3.5	milky-green	g.h. 2.63. Clear in shallow
2-14-73	.70	.55	.73	.66	.65	colorless	low & clear. g.h. .88. Shallow in banks + exchanging the banks.
5-19-73	55	55	53	54	55	lt brown	g.h. ± 3.10. well within banks.
5-22-73	20	19	18	19	19	clearish-gray	g.h. ± 2.87. not too high
5-31-73	4.6	4.8	5.0	4.8	4.8	greenish-clear	g.h. ± 2.15. not very high. Gravel bar showing.
6-4-73	2.4	2.7	2.4	2.5	2.5	greenish-blue-clear	g.h. ± 2.10. clearing.
6-8-73	5.0	4.7	5.0	4.9	4.9	greenish-gray	g.h. 2.28. more turbid than last sample
1-16-74	3.8	4.3	4.5	4.2	4.2	bluish-yellow	gauge frozen in. Damway ahead causing low flow. runoff. Not too high, however.
5-28-74	47	47	48	47	45	lt brown	g.h. ± 4.00 rising + fast
6-17-74	75	80	80	78	80	muddy brown	g.h. ± 5.30. high + muddy

^{1/} Surface Grab, Integrated, Other
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Blackfoot River

Station Blackfoot Canyon Camp
3.5 mi above Arvasta cr.

Sampling Method 1/ Integrated w/
DH-48 sampler

Analytical Instrument Used Hach Model 2100A meter

Turbidity (JTU)

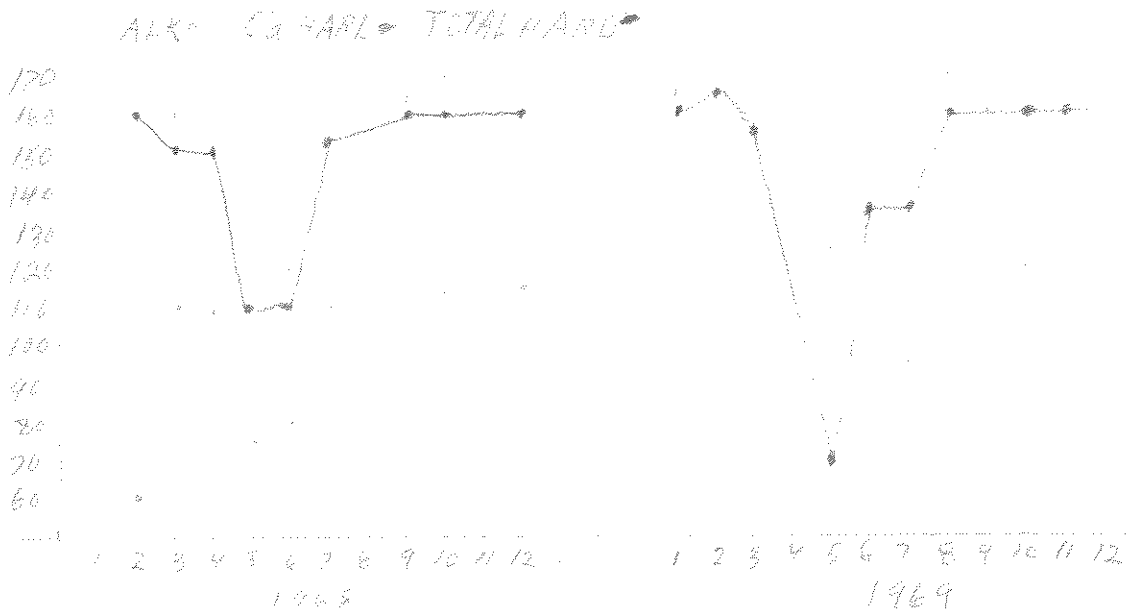
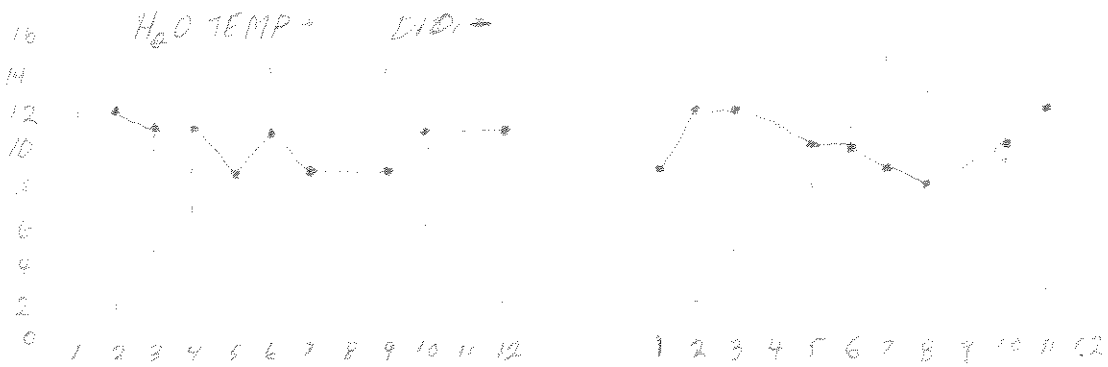
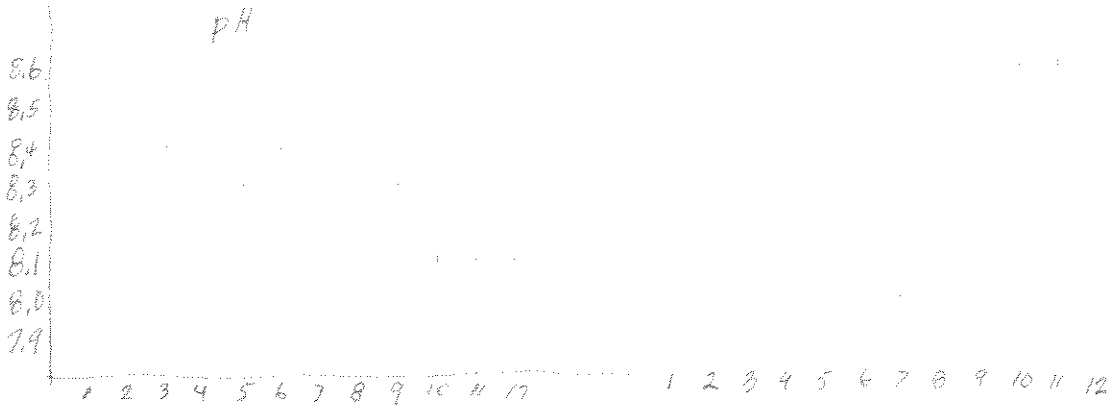
Date	Reading *			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
2-14-72	1.5	1.0	1.6	1.4	1.4	clear	sample into 3 vials open water
3-17-72	5.0	4.0	4.3	4.4	4.4	greenish brown	water rising. filamentous microalgae
4-28-72	8.5	8.7	9.5	8.9	8.9	greenish	9.A. 2.44. Green Sec. bottom in deeper water
5-8-72	3.6	4.5	3.5	3.9	3.9	colorless to light greenish	9.A. 2.78. water only slight turbid
5-17-72	95	100	100	98	100	muddy brown	9.A. 5.80. logs & brush float very high
5-17-72	95	100	99	97	100	muddy brown	9.A. 6.10. very high flooding over banks both sides.
5-24-72	30	30	34	31	31	grayish- brown	9.A. 5.30. collected & fine mud as well as larger silt & detritus
5-31-72	85	89	94	89	90	muddy, brown	9.A. 5.70. detritus & logs. Silt & detritus & collected
6-3-72	130	140	145	138	140	muddy- brown	9.A. 6.40. flooding, muddy water, tal 4' silt, little detritus
6-5-72	115	115	115	115	120	muddy- brown	9.A. 6.15. flooding over road at Camp Site & valley floor
6-7-72	110	105	110	108	110	light muddy brown	9.A. 6.05. still flooding but not over road. collected, silt & detritus.
6-9-72	110	105	100	105	110	muddy- brown	9.A. 6.10. flooding. Fast beginning to flow over road. collected, silt & detritus, and sample
6-13-72	55	53	57	55	55	muddy grayish brown	9.A. 5.46. falling. Cool weather last 2 days. collected silt & detritus in sample.
6-16-72	37	39	35	37	37	light brown	9.A. 4.58. no flooding. Still some debris floating. Collected, silt & detritus.
6-20-72	20	23	25	23	23	gray- green	9.A. 4.08. clearing & falling. Mostly collected, some silt & detritus
6-27-72	6.9	7.0	7.5	7.3	7.3	methyl- green	9.A. 2.38. clearing & falling.

* Integrated sample placed into 3 separate vials = Reading 1, 2 + 3

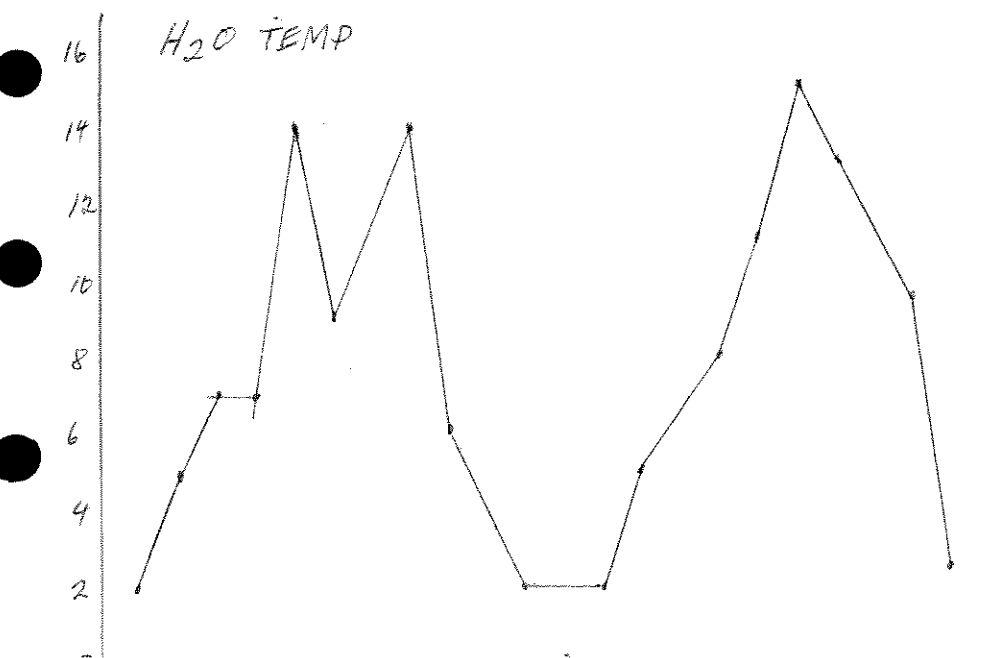
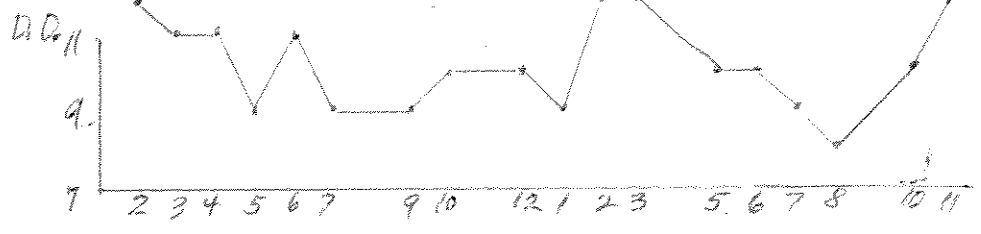
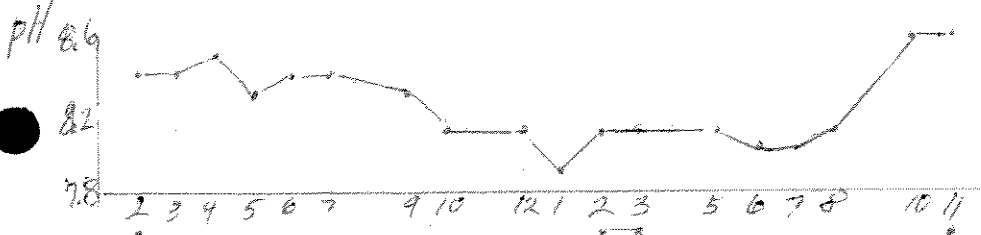
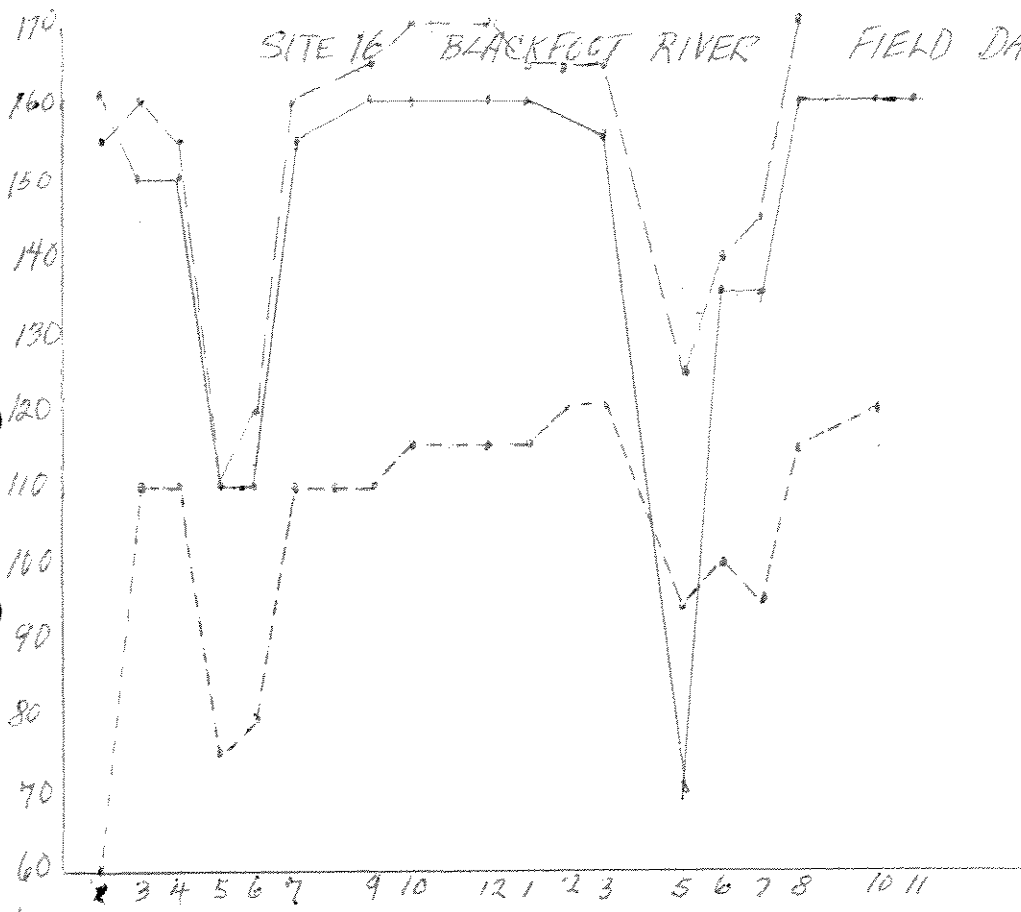
1/ Surface Grab, Integrated, Other

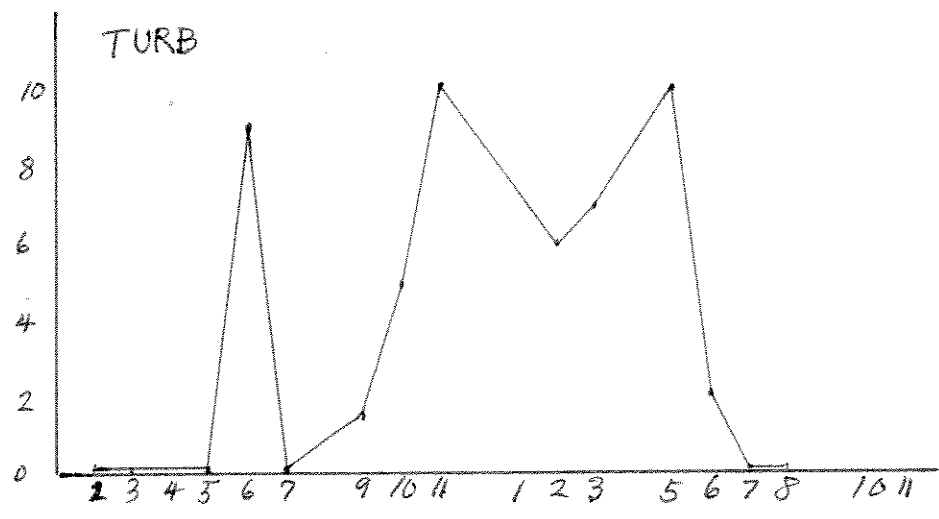
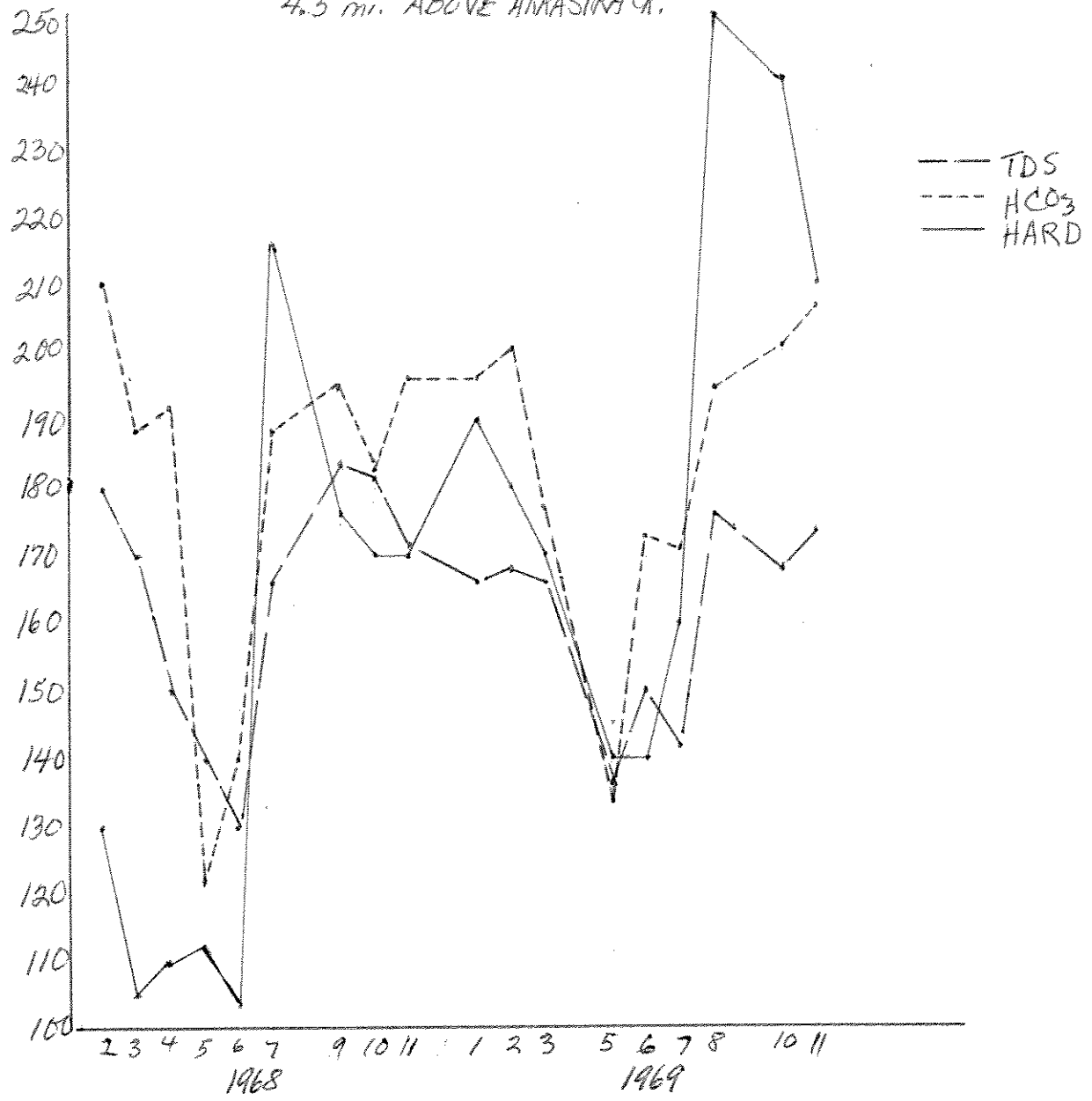
2/ According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971,

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SITE 16 BLACKFOOT RIVER FIELD DATA ARRASTRA

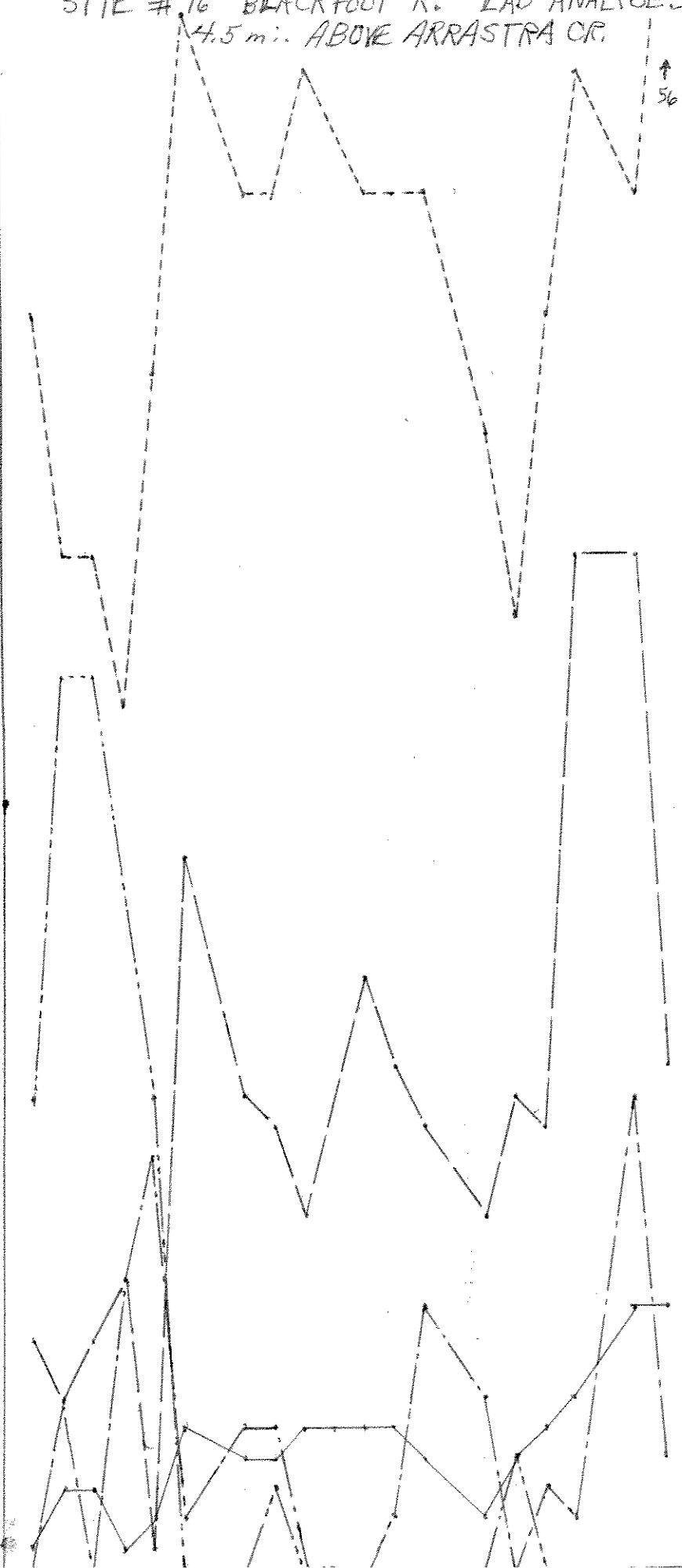




SITE # 16 BLACKFOOT R. LAB ANALYSES
4.5 mi. ABOVE ARRASTRA CR.

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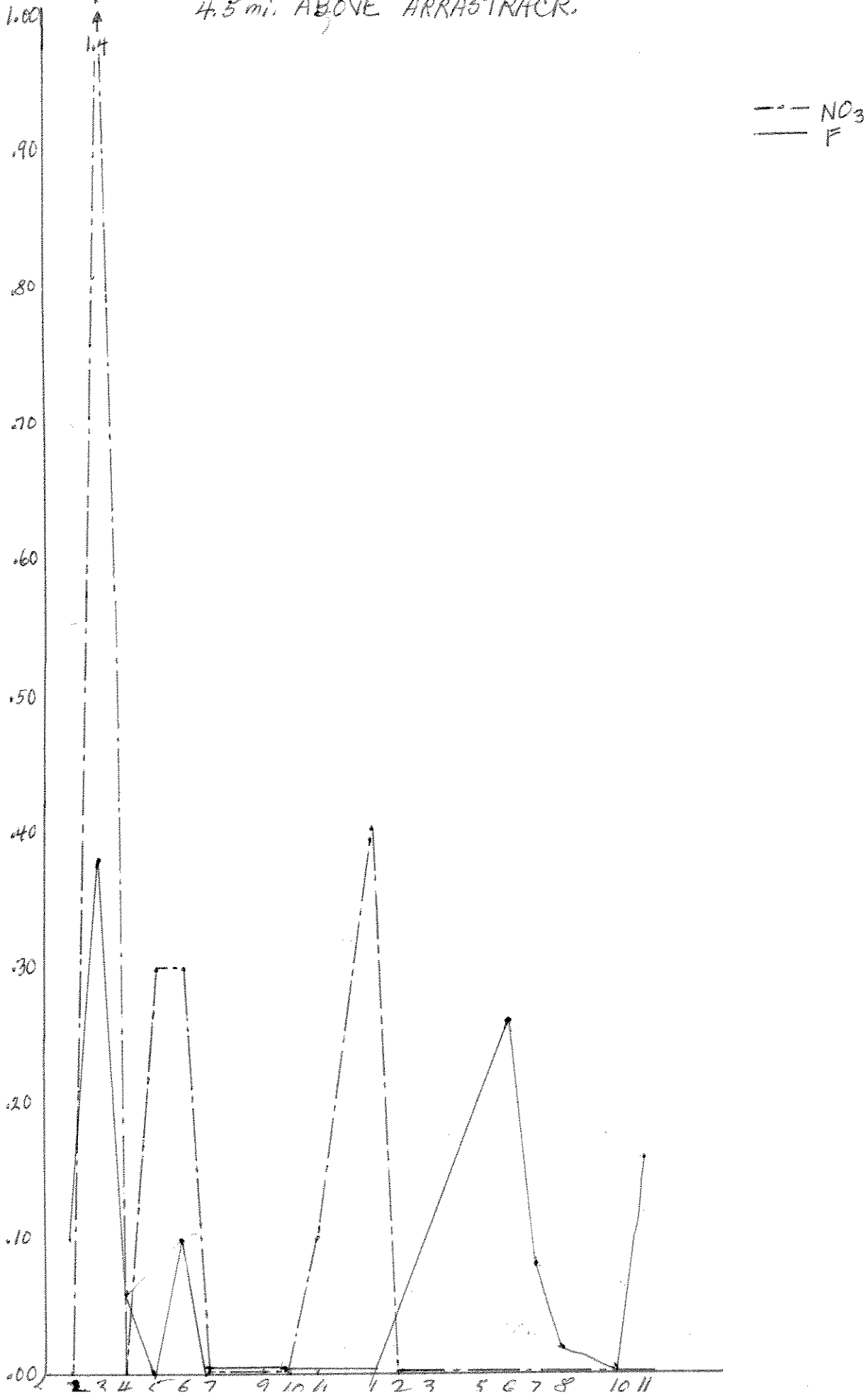


--- SO4
— Cl
- - - Ca
- - - Mg
- · - Na+K

Clayton

SITE #16 BLACKFOOT R.
4.5 mi. ABOVE ARRASTRACR.

LAB. ANALYSES page 3



MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Sauerkraut Creek

Station Wooden logging bridge 1/8 mile west of Sauerkraut Cr. road + about 1/2 mile above mouth of stream

Sampling Method 1/ Integrated w/ DH-48 sampler

Analytical Instrument Used HACH Model 2100 A meter

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
5-8-72	7.3	7.3	7.4	7.3	7.3	milky-gray	water not too high

^{1/} Surface Grab, Integrated, Other
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

SITE #19 WILLOW CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL
3-16-68	1630	6	9	8.0	12	55	40	55	10	2	p.c.	B.D
6-20-68	1940	16	17	8.0	8	80	50	75	15	2	p.c.	"
10-19-68	1620	6	9	7.8	9	90	55	75	2	2	p.c.	"
2-9-69	0815	0	-2	7.2	9	85	50	70	0	2	snow	"
5-3-69	1605	11	12	7.4	10	45	25	40	15	2	clear	"
7-17-69	1215	14	25	7.8	8	55	35	50	17	2	clear	"
10-7-69	1610	9	13	8.6	11		60	100			p.c.	L.S.
1-20-70	0920	-0.5	0	8.4	10.0						O'cast	"
E		62			77	410	315	465				
A		8		8	8	6	7	7				
X		8			10	68	45	66				
Range L		0		7.2	8	45	25	40				
H		16		8.6	12	90	60	100				

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Willow Creek

Station Culvert crossing on Dalton Mtn Road

Sampling Method ^{1/} Integrated w/ DH-48 Sampler

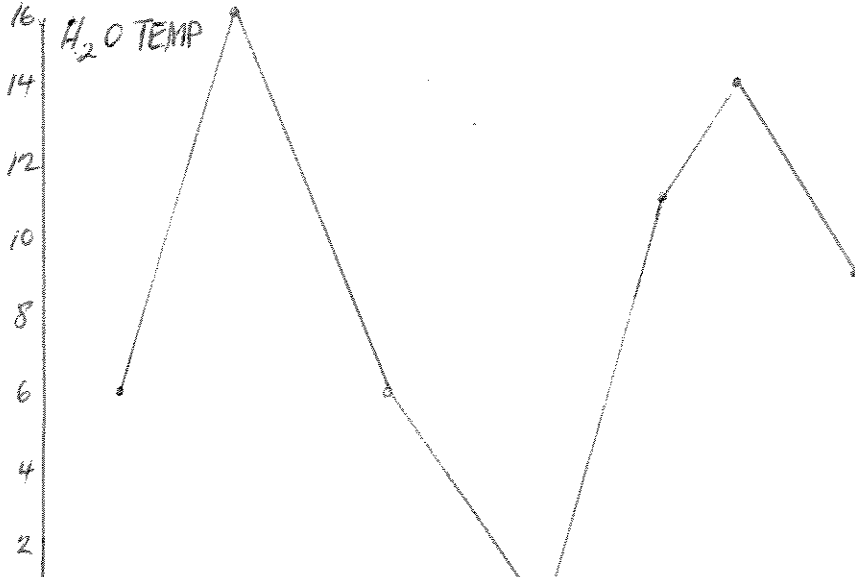
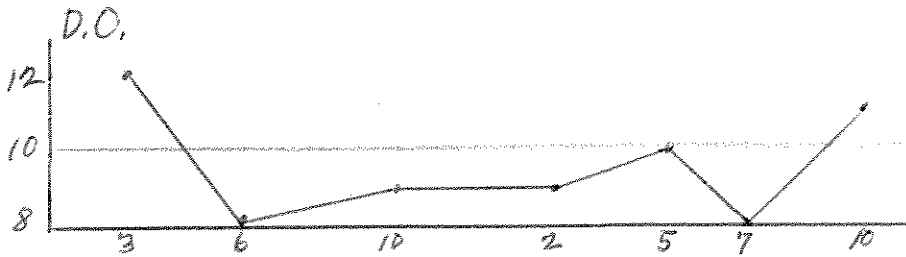
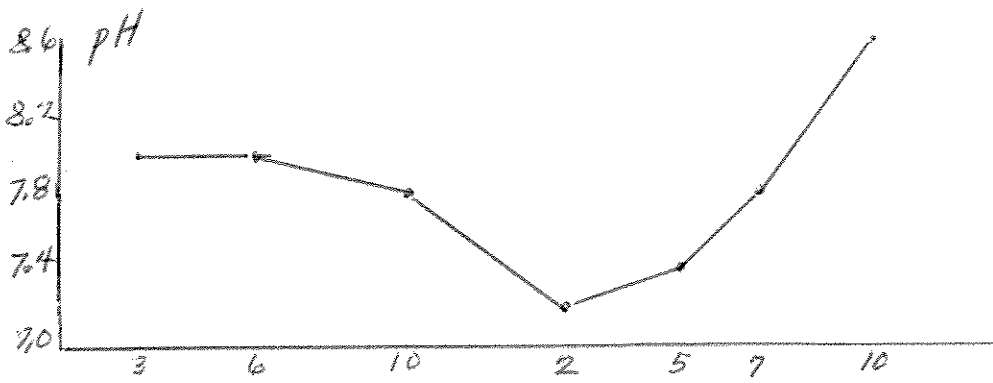
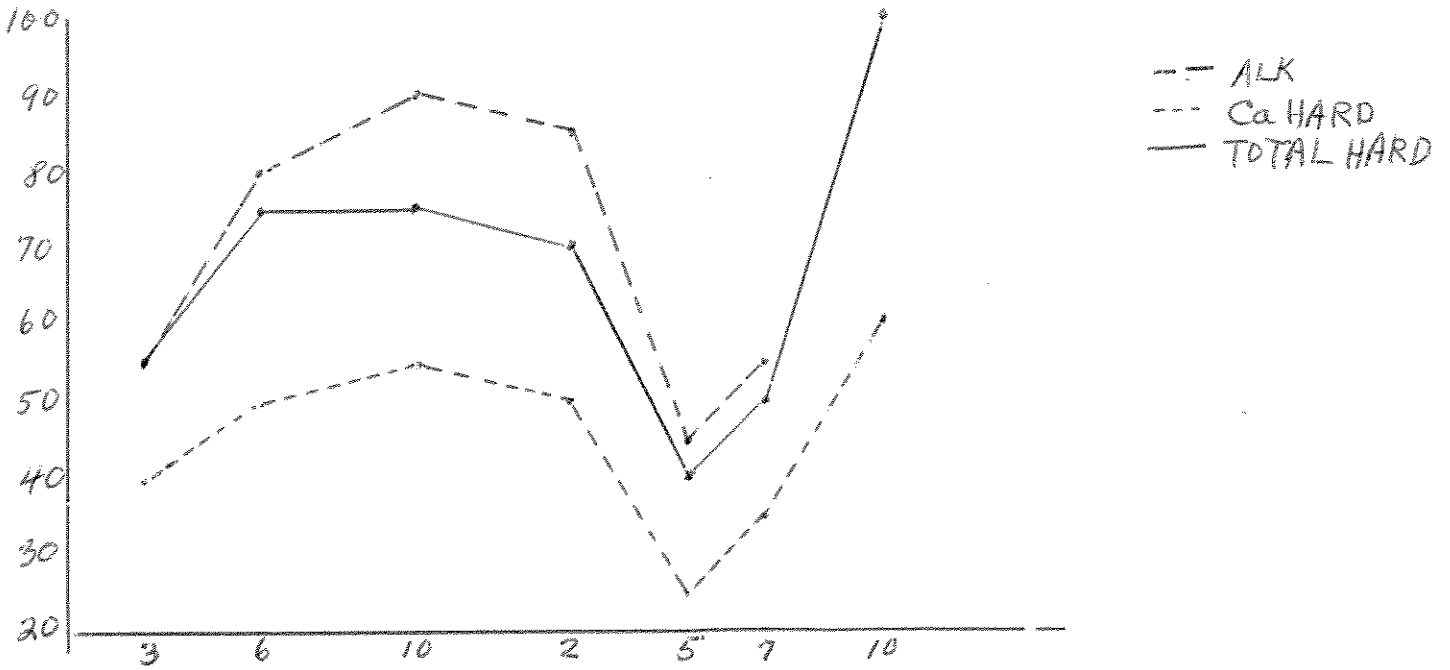
Analytical Instrument Used Hach Model 2100A meter

Turbidity (JTU)

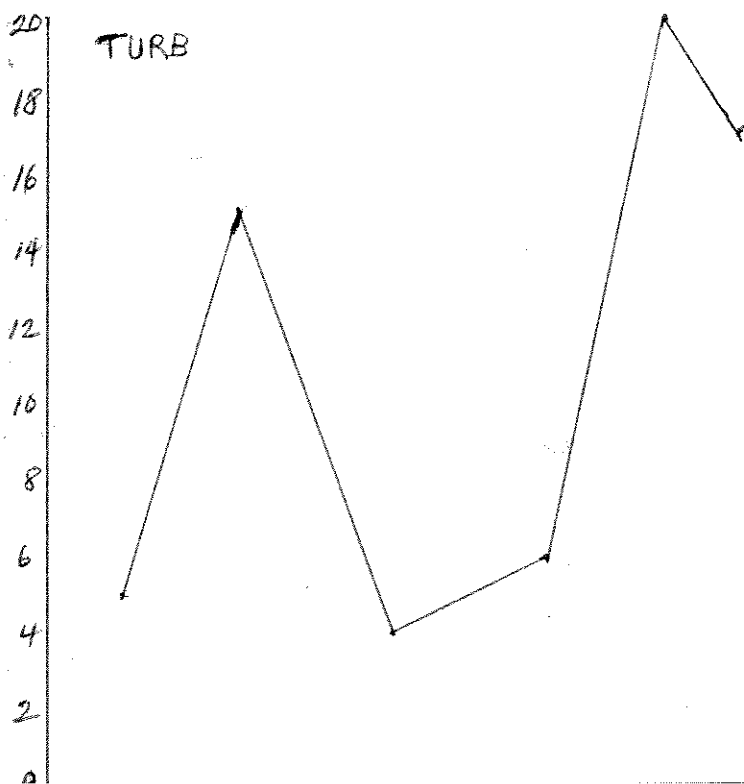
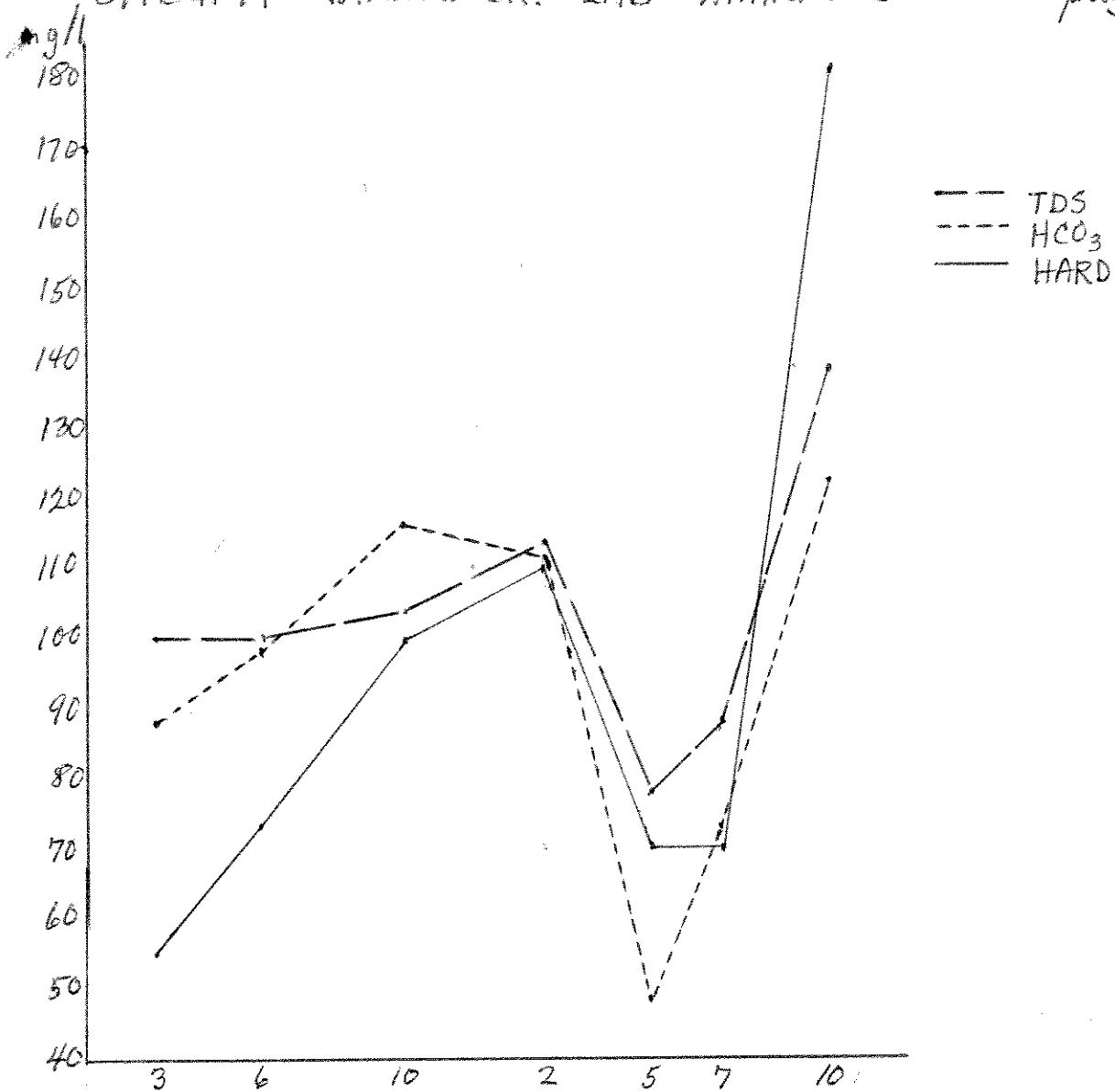
Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
3-17-72	8.5 ⁶⁸	8.7 ⁷²	8.4 ⁷⁰	8.5 ⁷⁰	8.5 ⁷⁰	brownish-yellow	Slightly flooding Thawing weather
5-8-72	9.3	9.5	8.8	9.2	9.2	slightly yellowish white	muddy, grayish-green in stream, not too high
6-3-72 ¹³¹⁵	58	58	59	58	60	light milky-brown	flooding. one culvert washed out on road
6-5-72 ¹⁰⁰⁰	40	42	43	42	40	light brown	high + flooding. culvert still out. mostly silt silt. very little silt in debris.
6-27-72	6.9	7.0	7.4	7.1	7.1	brownish-gray	not too clear. Flowing in single channel. Not too high

1/ Surface Grab, Integrated, Other
 2/ According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352.

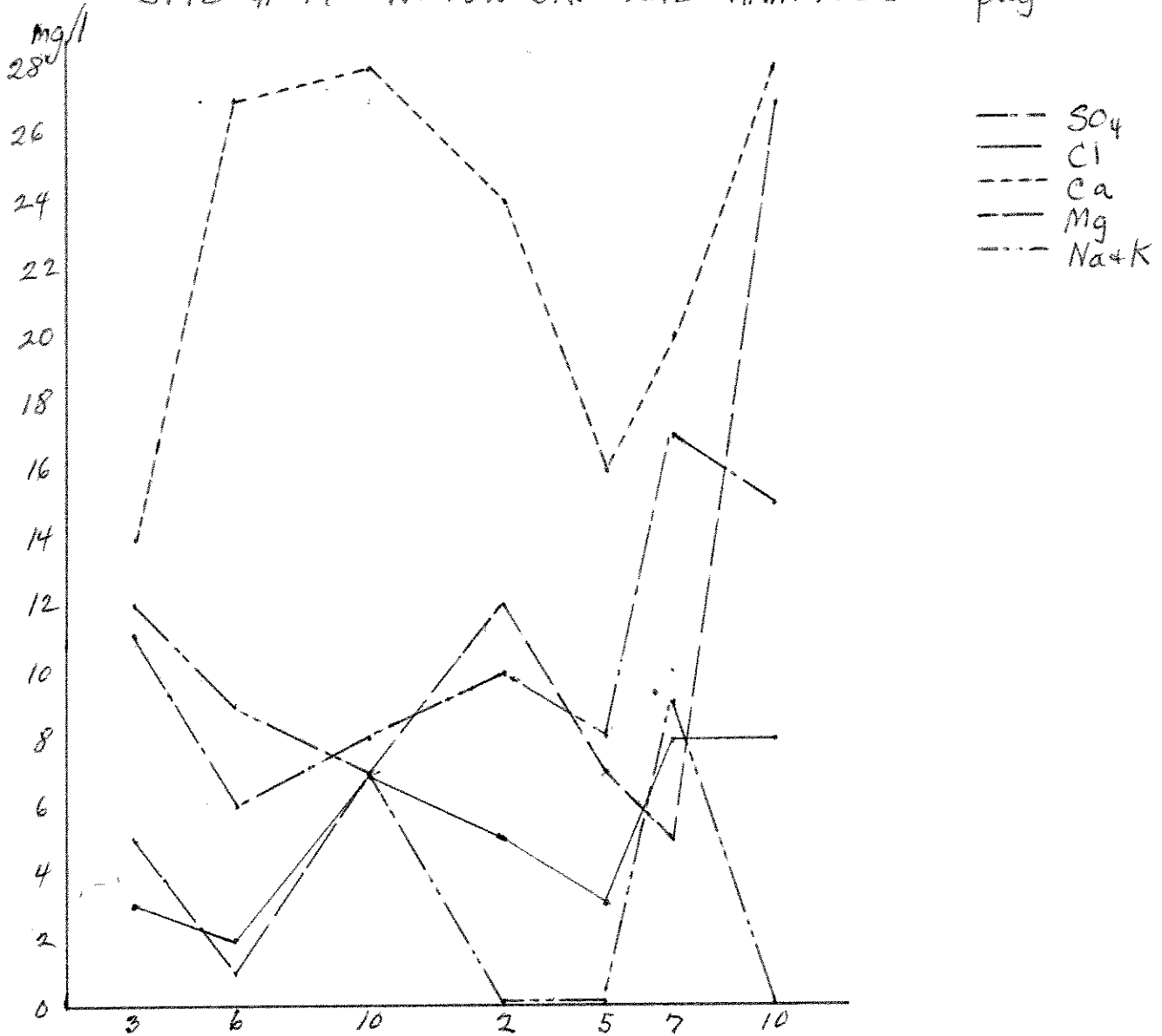
SITE #19 WILLOW CR. FIELD DATA



SITE #19 WILLOW CR. LAB ANALYSES



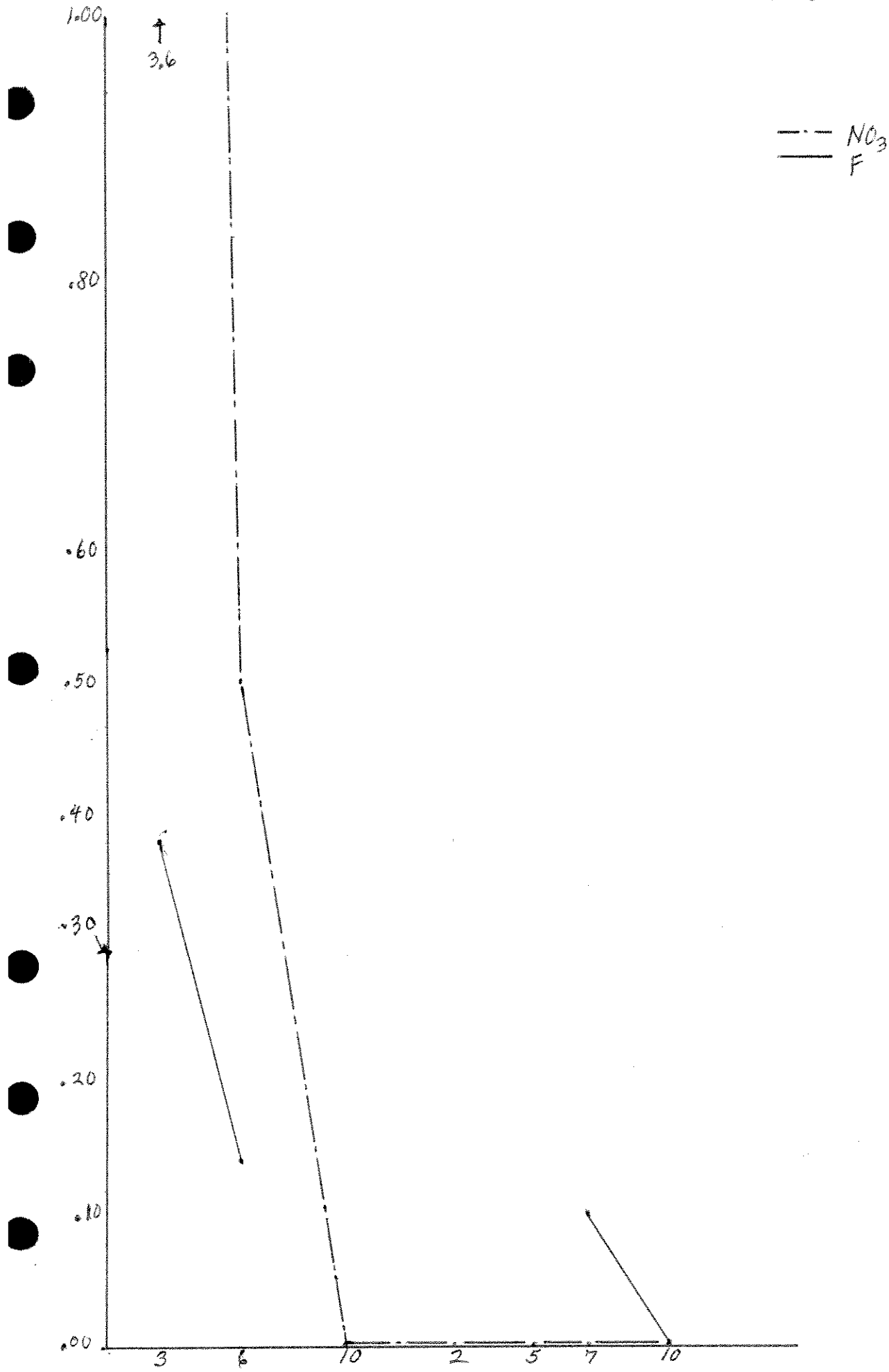
SITE # 19 WILLOW CR. LAB ANALYSES



mg/l

SITE # 19 WILLOW CR. LAB ANALYSES

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October 30, 1974

FIELD NOTES - Blackfoot Study

Field trip to Blackfoot River below Poorman Creek (Poorman-Dalton section) to look for brown trout spawners and redds.

Twenty-eight redds were seen in the 5600-6000 foot section of stream which were distributed as 9 redds from mouth of Poorman Creek down to second meander (where stream meanders into high hill), 5 redds down to first deep pool with log jam, 8 redds down to Sunny Slope irrigation ditch, and 6 redds down to end of section opposite Mr. Tiegen's cabin.

Last year there were 43 redds in this section on November 13.

Side channel below second meander was more shallow than last year and did not have any redds. Last year it did. It did not look suitable for spawning (low velocity, too shallow).

More water was running into sunny slope ditch this year than last. However, water was flowing back toward the main river through a breached ditch bank. The water had flowed through heavy willow thickets and beavers had built several new dams in this side flow which raised the level and where it reentered the river caused one of the small side channels to flow in the opposite direction than it did last year (upstream instead of downstream). There were no redds in this side channel whereas last year there were one or two. There was also a new beaver dam across this side channel where it reentered the main river and only a small amount of flow was going past the dam down the old channel where we shocked fish in previous years.

The main channel opposite Tiegen's cabin was dry this year. The stream had aggraded and shoved the water toward his cabin where it was flowing across grass and not in a definite channel. Last year there was some flow in this area, but most of it was flowing down the main channel. More flow is passing Mrs. Meagher's cabin (downstream from Tiegen's 200 yards) this year than last due to the channel change. Last year there were several trout redds in the stretch of stream which is now dry.

The big pool below the log jam at end of shocking section has filled in with gravel forcing the water down an old side channel. This probably caused the change in flow opposite Tiegen's cabin.

Several brown trout were observed over redds in the section. In most cases the fish spooked off the redds before they could be observed and accurately counted. More trout were seen today than were seen last year on November 13.

Redds were generally in the same locations they were in the past two years. The Sunny Slope ditch is about the half way point in the section. This year 22 of 28 redds (79 percent) were in the upper half of the section.

BLACKFOOT RIVER

Field Notes, Poorman-Dalton Section

November 10, 1972

(1) Looked for spawning fish in Spring Creek (which empties into Keep Cool Cr.) at Lincoln (on Joe Jackson's leased land west of town). Saw several trout in the stream but none acting like spawners and no large numbers. Fish seen looked like ~~rainbow~~ rainbow trout.

(2) Looked in Poorman - Dalton shocking section of river and found up to 12 large brown trout over three large redds about 75 feet below the mouth of Poorman Creek. One of the larger trout had a white Floy T-tag on its back (number unknown). Also saw about 12-15 whitefish schooling and moving up and down the river in the same area. Also saw several fish in Poorman Creek itself right at the mouth (about 15' from the river) which could have been spawning but I spooked them so couldn't tell. One larger trout about 14" was in the grout, but couldn't tell what kind. (However, on November 15, 1972 I saw three large redds in the mouth of Poorman Creek which were definitely spawning areas).

The LL in the Blackfoot River with the ~~LL~~ T-tag must have come upstream since we did not tag or even catch any fish in this area during shocking. This was the beginning of the shocking section in 1972. The fish would have had to come upstream at least 150 yards from where the first trout were caught and marked. (There is also a slight possibility that the tagged fish was from the group of 21 brown trout tagged in the river at the Stemple bridge in Lincoln about $1\frac{1}{4}$ miles upstream. These fish ranged in length from 10.5 - 18.0 inches~~x~~ and were tagged in April, 1971.

Liter Spence

SITE #18

BLACKFOOT RIVER

FIELD DATA

at Dalton mtn road bridge

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
2-18-68	1215	4	6	8.3	11	165	60	160	0	2	rain	B.D
3-17-68	1130	4	1	8.4	11	165	110	160	0	2	snow	"
4-21-68	1045	6	8	8.4	11	160	110	160	0	2	pc & snow	"
5-25-68	1100	7	13	8.0	9	115	75	120	8	2	p.c.	"
6-20-68	1900	13	18	8.4	9	115	80	110	8	2	p.c.	"
7-22-68	2030	13	16	8.4	8	160	105	155	0	2	p.c.	"
9-9-68	1110	13	23	8.3	8	155	110	160	0	2	clear	"
10-19-68	1530	8	9	7.9	9	165	120	170	0	2	p.c.	"
12-1-68	1235	3	-3	8.0	9	180	115	170	0	2	p.c.	"
1-2-69	1300	3	0	7.9	10	175	120	160	0	2	cloud	"
2-9-69	0905	2	-2	8.0	10	170	120	160	0	2	snow	"
3-28-69	1500	8	9	8.0	10	170	115	155	0	2	p.c.	"
5-3-69	1655	10	12	8.0	10	130	90	120	0	2	p.c.	"
6-16-69	1110	12	23	8.0	9	135	95	130	0	2	clear	"
7-17-69	1310	13	26	7.9	9	140	95	130	0	2	p.c.	"
8-26-69	1110	13	31	8.0	7	170	120	160	0	2	clear	"
10-8-69	1130	8	11.5	8.6	8		130	180			cloudy	L.S
11-29-69	1330	4.5	4	8.6				160			p.c.	L.S.
1-20-70	0930	2.5	0	8.7	10.0						O'cast	"
<hr/>												
4-27-71	0935	2.0										
5-21-71	0935	4.0										
6-23-71	1545	13.5										
7-71	No Data											
8-23-71		10.0										
9-21-71	1600	10										
10-71	No Data											
11-22-71	1000	3.0										
12-21-71	1340	3.5										
		146			168	2470	1770	2720				
		19		19	18	16	17	18				
		8			9	154	104	151				
Range L		2		7.9	7	115	60	110				
H		13		8.7	11	180	130	180				

3-72

SITE #18 BLACKFOOT RIVER AT DALTON MTN ROAD BRIDGE

LAB ANALYSES

Date	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc. alk.	
2-17-68	0	170	135	6	195	0	2	0.0	0.1	170	160+10
3-17-68	0	160	135	0	189	9	3	2.8	0.28	155	
4-21-68		150	105	0	200	0	4	0.00	0.06	164	
5-25-68	0	134	112	0	146	8	1	.1	0	120	
6-20-68	8	88	102	0	140	6	4	0.10	0.10	115	
7-22-68	0	168	135	0	183	2	5	0	0.10	150	
9-9-68	3	168	165	0	207	0	5	0	-	170	
10-19-68	3	186	160	0	205	8	6	0	0	168	
11-30-68	9	174	180	0	210	0	3	0	-	172	
1-2-69	1	174	170	0	203	0	6	0	0.12	167	
2-8-69	1	166	180	0	203	4	6	0	-	167	
3-28-69	7	174	180	0	177	8	5	0	-	145	
5-3-69	0	136	140	0	134	9	3	0	-	110	
6-16-69	0	144	150	0	157	0	5	0	0.28	129	
7-16-69	0	146	150	0	171	5	7	0	0.08	140	
8-27-69	0	172	230	0	183	4	7	0	0	150	
10-7-69	-	166	340	0	207	12	7	0	0	170	
11-29-69	-	168	210	0	214	4	7	0	0.14	176	
12 -69	No Data										
1-20-70	0	150	150	0	190	5	3	0.1	0.15	156	
2 -70	No Data										
3-27-70	3	194	165	0	210	5	3	0	0.3	172	
4-21-70	-	190	190	0	230	2	0.5	0.1	0.06	189	
4-27-70	-	150	160	0	180	1.6	1.0	0.2	0.1	148	
5-22-70	-	120	170	0	140	10	0.5	0.2	0.2	115	
6-16-70	-	130	150	0	170	2	0	0	0.1	139	
7-21-70	-	150	190	0	210	2	0	0	0.1	172	
8-20-70	-	160	240	0	200	8	0	0	0.2	164	
9-22-70	-	180	230	0	200	2	0	0	0	164	
10-21-70	-	190	240	0	210	11	0	0	0.2	172	
11- 70	No Data										
12-17-70	-	180	240	0	210	5	0	0.1	0.0	172	
1-15-71	-	140	No Data on Bott cards	No Data on Bott cards	170	7	No Data on Bott cards	0.0	0.0	139	
2-2-71		160 180	160	0.0	180	4.0	0.0	0.1	0.2	148	
2-24-71		170 190	170	0.0	210	0.0	0.0	0.03	0.3	172	
3-26-71		160 180	160	0.0	200	9.0	0.0	0.13	0.3	164	
4-27-71		120	100	0	150	10	1	0.1	0.1	123	

SITE # 18 BLACKFOOT RIVER AT DALTON MTN ROAD BRIDGE

LAB ANALYSES

Date	Turb.	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc. alk.		
5-21-71		110	120	0	160	6	0	0.13	0.1	131		
6-23-71		130	107	0.0	150	0.0	0.0	0.12	0.3	123		
7- 71		No Data Collected										
8-23-71		150	140	0	180	0	0	0	0.1	148		
9-21-71		140	137	0	180	6	0	0.3	0.3	148		
10- 71		No Data										
11-22-71		150	140	0	200	7.0	0	0	0.2	164		
12-21-71		160	140	0	200	2.5	0	0	0.1	164		
End of "complete" Analyses												
										E	6125	
										n	40	
										\bar{x}	153	
										Range	L	110
											H	189

SITE #18 BLACKFOOT RIVER AT DALTON MTN ROAD BRIDGE

LAB ANALYSES - METALS

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
2-17-68	28	16	17	0.09		0.02		0.00				
3-17-68	24	18	17	0.00	0.00	0.00	0.00	0.00				
4-21-68	20	13	30	0.00	0.00	0.00	0.00	0.00				
5-25-68	29	10	3	0	0	0	NES*	0				
6-20-68	40	1	10	0.01	0.00	0.00		0.00				
7-22-68	46	5	12	0.0	0.00	0.00		0.00				
8-												
9-9-68	43	14	6	0.0		<0.01 ND		<0.01 ND		ND = NOT detectable		
10-19-68	48	10	12	0.0		0		0				
11-30-68	48	15	0	0		0		0				
12-												
1-2-69	40	17	4	0.3		0.0		0.0				
2-8-69	40	17	0	0.0		0.0		0.0				
3-28-69	36	22	0	0	-	0	-	0				
4-												
5-3-69	36	12	0	0	0	0 ^{dy}		0 ^{dy}				
6-16-69	24	22	0	0	-	.06	-	0				
7-16-69	36	15	3	0	-	0.02	-	0.02				
8-27-69	44	29	0	0	0	0	-	0				
9-												
10-7-69	52	27	0	0.1	-	0.05	-	0.0				
11-29-69	48	22	0	0.40	-	0.0	-	0.0				
12-												
1-20-70	40	10	12	0.04	-	0	-	0				
2 -70	No Data											
3-27-70	44	13	9	0	-	0	-	0				
4-21-70	44	15	10	0.00	-	2.04 0.005	-	0				
4-27-70	30	20	0	0	-	0.01	-	0				
5-22-70	28	24	0	1.3	-	0	-	<0.01				
6-16-70	32	17	0	1.0		Not Analyzed		Not Analyzed				
7-21-70	40	22	0	0.1	-	0.02	-	0.03				
8-20-70	44	32	0	0.1	-	0	-	0.03 ^{dy}				
9-22-70	48	27	0	0	-	0.06	-	0				
10-21-70	52	27	0	0.06	-	0.05	-	0.0				
11-70	No Data											
12-17-70	36	37	0	0.0		0.04		0.0				

*NES Not enough sample

ND = Not done

SITE # 18 BLACKFOOT RIVER AT DALTON MTN ROAD BRIDGE

LAB ANALYSES - METALS

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu	T= Total Recoverable D= Dissolved
1-15-71	No Data on Cards	No Data on Cards		No Data on Cards		0.02		0.0	(Fe, Zn, Cu) and Pb
2-2-71	36	22	2.1	0.16		0.03		0.0	
2-24-71	44	20	2.0	0.0		0.03		0.0	
3-26-71	52	12	1.7	0.0		0.10		0.0	
4-27-71	32	5	1.3	0.2		0.22		0.05	
5-21-71	32	10	2	0.28		0.30		0.07	
6-23-71	30	8	1.3	0.32		0.59		0.0	
7- 71	No Data Collected								
8-23-71	35	11	2	0		0.01		0.00	
9-21-71	37	11	1.8	0		<0.01		0.02	T
				0		<0.01		<0.01	D
10- 71	No Data								
11-22-71	37	12	2.1	0.01	0.00	<0.01	0.00	.01	D
				0.01	0.00	<0.01	0.00	.02	T
12-21-71	39	12	2.1	0		<0.01	0	.01	D
JAN + Feb ⁷² - no data				0		.01	0	.02	T
3-23-72				.03	.000	<0.01	.00	.02	D
				.20	.000	<0.01	.00	.02	T
4-20-72				.06	.000	<0.01	0	.01	T
				.03		<0.01	0	.01	D
5-22-72				.97	.000	.01	0	.01	T
				0		<0.01	0	0	D
6-20-72				.22	.002	.01	.01	.01	T
				0		.01	.01	.01	D
7-19-72				.02	.002	<0.01	.01	<0.01	T
				0		<0.01	.01	<0.01	D
8-31-72				ND	.002	<0.01	<0.01	<0.01	T
						<0.01	<0.01	<0.01	D
9-26-72				ND	.002	<0.01	<0.01	<0.01	T
						<0.01	<0.01	<0.01	D
10-31-72				.000	.000	<0.01	<0.01	<0.01	T
				0		<0.01	<0.01	<0.01	D

SITE #18 BLACKFOOT RIVER AT DALTON MTN ROAD BRIDGE

LAB ANALYSES - N + P

Date	NO2-N	NH3-N	ORG-N	PO4 Total	PO4 Ortho	NO3-N				
3-23-72	.002	0	.18	.012	.012	.16			1 st	Samples
4-20-72	0	0	.23	.02	.02	.06				
5-22-72	0	0	.47	.17	0	.12				
6-20-72	No Data					.05			Calculated from NO ₃	
7-19-72	0	0	.43	.03	.03	.05				
8-31-72	No Data									
9-26-72	0	0	.85	.01	.01	.02				
10-31-72	0	0	.33	<.01	<.01	.02				

FIELD REPORT

site - station discontinued
by state F & G.

Water-quality measurements

Type: 3

Station ID: 12434300

Date: Sept 11/72 Time: 1040 Collected by: M. Korman

Station Name: Shubert Pt. Dalton Water Treatment Plant, Lawrence, MA.

Parameter	Code	Result	
Discharge (cfs) <u>G.H. 0.82</u>	00060	_____	
Air Temperature (°C)	00020	<u>20.5</u>	
Water Temperature (°C)	00010	<u>9.5</u>	
pH	00400	_____	
Alkalinity	00410	_____	F _____ X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095	_____	S _____
Dissolved Oxygen	00300	_____	F _____
Coliform bacteria (per 100 ml)	31501	<u>100</u>	S _____ X 2 =
<u>20</u> ml <u>98</u> colonies			
<u>10</u> ml <u>245</u> colonies			
<u>20</u> ml <u>418</u> colonies			
<u>100</u> ml <u>710</u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>10</u>	
<u>10</u> ml <u>2</u> colonies			
<u>10</u> ml <u>7</u> colonies			
<u>10</u> ml <u>11</u> colonies			
_____ ml _____ colonies			

PROVISIONAL

Other

Observations and Remarks

Appearance of surface: slimy

Appearance of bottom: little algae or aquatic growth on substrate.

Weather conditions: clear, cool, calm, no frost in this area

General biologic conditions: stream under influence

Nature of streamflow: low flow, low velocity

Any unusual conditions: no shock in area of this sampling
2nd section of station receiving from bridge pipe.

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3348.00

Date: 13 Nov 1973 Time: 1020 Collected by: H.C. FLADLAND

Station Name: BLACKFOOT R. @ DALTON Mtn. BRIDGE ROAD

<u>Parameter</u>	<u>Code</u>	<u>Result</u>	
Discharge (cfs) (<u>gauge height</u>)	00060	<u>.86</u>	
Air Temperature (°C)	00020	<u>20.5</u>	
Water Temperature (°C)	00010	<u>10.5</u>	
pH	00400		
Alkalinity	00410		F <u>820</u> S X ml sample
Specific conductance (umhos/cm)	00095		S
Dissolved Oxygen	00300		F
Coliform bacteria (per 100 ml)	31501	<u>84</u>	S X 2 =
<u>5</u> ml <u>8</u> colonies			
<u>50</u> ml <u>50</u> colonies			
<u>100</u> ml <u>76</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>10</u>	
<u>5</u> ml <u>1</u> colonies			
<u>50</u> ml <u>5</u> colonies			
<u>100</u> ml <u>9</u> colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: Clear & Clean

Appearance of bottom: clear (gravel, sand & few large rocks)

Weather conditions: partly cloudy & warm

General biologic conditions: some aquatic growth on stream bed

Nature of streamflow: turbulent, good mixing, riffles

Any unusual conditions: cottonwood, fur & pine along both banks of stream

* Reported value based on non-ideal count of colonies.

Water-quality measurements

Type: 3

Date: 16 JULY 1973 Time: 1000

Station ID: 123348010

Collected by: H.C. FLADLAND

Station Name: BLACKFOOT R @ DALTON HIGH BRIDGE ROAD

Parameter	Code	Result	
Discharge (cfs) Gage height	00060	<u>.94</u>	
Air Temperature (°C)	00020	<u>19.0</u>	
Water Temperature (°C)	00010	<u>10.5</u>	
pH	00400		
Alkalinity	00410		
Specific conductance (umhos/cm)	00095		F <u>820</u> S X ml sample
Dissolved Oxygen	00300		F
Coliform bacteria (per 100 ml)	31501	<u>48</u>	S <u>820</u> X 2 "
<u>5</u> ml <u>3</u> colonies			
<u>50</u> ml <u>24</u> colonies			
<u>100</u> ml <u>48</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>13</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>4</u> colonies			
<u>100</u> ml <u>13</u> colonies			
_____ ml _____ colonies			

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN

Appearance of bottom: CLEAR (LARGE BOLDERS, GRAVEL & SAND)

Weather conditions: CLEAR & WARM

General biologic conditions: SOME ALGAL GROWTH ON LARGER ROCKS

Nature of streamflow: NORMAL

Any unusual conditions: FISHERMEN DOWN STREAM FROM SITE

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 123348

Date: 18 JUNE 1973 Time: 1040

Collected by: L.C. FLADLAND & M.L. KASMAN

Station Name: BLACKFOOT RIVER AT DALTON MTN. BRIDGE NR. LINCOLN, MONTANA

Parameter	Code	Result	
Discharge (cfs) (Gage height 1.65)	00060	432 cfs	
Air Temperature (°C)	00020	6.0°C	
Water Temperature (°C)	00010	6.5°C	
pH	00400		
Alkalinity	00410		
Specific conductance (umhos/cm)	00095		F _____ X $\frac{820}{\text{ml samp}}$
Dissolved Oxygen	00300		F _____
Coliform bacteria (per 100 ml)	31501	34	S _____ X 2 =
5 ml 1 colonies			
50 ml 19 colonies			
100 ml 24 colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616		
5 ml 0 colonies			
50 ml 2 colonies			
100 ml _____ colonies			
_____ ml _____ colonies			

PROVISIONAL

Other

Observations and Remarks

Appearance of surface: Clear & Green

Appearance of bottom: Gravel, silt, mud, rocks

Weather conditions: Cloudy, light rain, 50-60°F, wind 10-15 mph

General biologic conditions: Algae, diatoms, insects - in water

Nature of streamflow: Low flow, slow moving (no rapids, no cascades)

Any unusual conditions: Some of the water was very turbid, brownish

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334800

Date: MAY 21, 1973 Time: 1120 Collected by: H. E. FLADLAND & M. L. KASMAN

Station Name: BLACKFOOT R. @ DALTON MTD. BEDD. RD. W. LINCOLN

Parameter	Code	Result	
Discharge (cfs) Gage height 2.46	00060	<u>889</u>	
Air Temperature (°C)	00020	<u>10.0</u>	
Water Temperature (°C)	00010	<u>7.0</u>	
pH	00400		
Alkalinity	00410		F <u>820</u> X ml samp
Specific conductance (umhos/cm)	00095		S _____
Dissolved Oxygen	00300		F _____
Coliform bacteria (per 100 ml)	31501	<u>74</u>	S _____ X 2 "
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>37</u> colonies			
<u>100</u> ml <u>*</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>4</u>	
<u>5</u> ml <u>1</u> colonies			
<u>50</u> ml <u>2</u> colonies			
<u>100</u> ml <u>2</u> colonies** no good			
_____ ml _____ colonies			

PROVISIONAL

Other
 * sediment in turbid with incubation
 ** some water in petri dish

Observations and Remarks

Appearance of surface: Muddy (Milky in appearance) few leaves, tree trunk up
 Appearance of bottom: screen, not visible
 Weather conditions: COOL, WINDY & Partly Cloudy
 General biologic conditions: Barn swallows building nest under bridge
 Nature of streamflow: normal spring flow (Screen well within it)
 Any unusual conditions: snow cover on mtn. peaks to the north, no snow in valley or lower mtn peaks, trees & willows along both banks

* measured water based on immediate count of colonies

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334800

Date: 25 April 73 Time: 1000 Collected by: H. C. FLADLAND

Station Name: BLACK FOOT R. @ DALTON Mtn. BRIDGE ROAD, W. LINCOLN

Parameter	Code	Result	
Discharge (cfs) <u>Gage height</u>	00060	<u>0.68</u>	
Air Temperature (°C)	00020	<u>8.0°C</u>	
Water Temperature (°C)	00010	<u>6.0°C</u>	
pH	00400		
Alkalinity	00410		F _____ X $\frac{820}{\text{ml samp}}$
Specific conductance (umhos/cm)	00095		S _____
Dissolved Oxygen	00300		F _____
Coliform bacteria (per 100 ml)	31501	<u>11</u>	S _____ X 2 =
<u>5</u> ml <u>1</u> colonies			
<u>50</u> ml <u>6</u> colonies			
<u>100</u> ml <u>11</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>6</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>3</u> colonies			
<u>100</u> ml <u>1</u> colonies			
_____ ml _____ colonies			

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN

Appearance of bottom: CLEAR SOME ALGAE STAINING

Weather conditions: CLEAR AND WINDY

General biologic conditions: _____

Nature of streamflow: CLEAR AND CLEAN

Any unusual conditions: _____

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3348.00

Date: 28 MARCH 73 Time: 0900 Collected by: L.C. FLADLAND

Station Name: BLACKFOOT R. @ DALTON MTN BRDG. N. LINCOLN

Parameter	Code	Result	
Discharge (cfs)	00060	_____	
Air Temperature (°C)	00020	<u>+ 2.0°</u>	
Water Temperature (°C)	00010	<u>+ 3.5°</u>	
pH	00400	_____	
Alkalinity	00410	_____	F _____ X $\frac{820}{\text{ml sample}}$
Specific conductance (umhos/cm)	00095	_____	S _____
Dissolved Oxygen	00300	_____	F _____
Coliform bacteria (per 100 ml)	31501	<u>3</u>	S _____ X 2 =
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>3</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

PROVISIONAL

Other

Observations and Remarks

Appearance of surface: clear & clean

Appearance of bottom: some aquatic growth

Weather conditions: cool & partly cloudy

General biologic conditions: good clean fresh water stream

Nature of streamflow: low spring flow (no ice)

Any unusual conditions: noticed that on some of the larger rocks, they had brown like growth on them.

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3348.00

Date: 27 FEB 73 Time: 0900 Collected by: L.C. FLADLAND

Station Name: BLACKFOOT R @ DALTON MTD. BRIDGE IN LINCOLN

Parameter	Code	Result	
Discharge (cfs) <i>G.H. not read sunny</i>	00060		
Air Temperature (°C)	00020	<u>+8.0</u>	
Water Temperature (°C)	00010	<u>+4.0</u>	
pH	00400		
Alkalinity	00410		F <u>820</u> S <u>X ml sample</u>
Specific conductance (umhos/cm)	00095		
Dissolved Oxygen	00300		F
Coliform bacteria (per 100 ml)	31501	<u>120</u>	S <u>X 2</u>
<u>1</u> ml <u>2</u> colonies			
<u>50</u> ml <u>60</u> colonies			
<u>100</u> ml <u>36</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>15</u>	
<u>1</u> ml <u>1</u> colonies ✓			
<u>50</u> ml <u>7</u> colonies ✓			
<u>100</u> ml <u>15</u> colonies ✓			
_____ ml _____ colonies			

Other

✓ 17M LK

Observations and Remarks

Appearance of surface: Clean MTD Stream

Appearance of bottom: CLEAR

Weather conditions: OVERCAST AND RAIN, COOL

General biologic conditions: AQUATIC growth on rocks - stream bed

Nature of streamflow: LOW BASE FLOW - NO ICE ON EITHER SHORE

Any unusual conditions: _____

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3348.00

Date: 1-23-73 Time: 1500 Collected by: J.R. Knapton

Station Name: Blackfoot R at Dalton Mt Road Br nr Lincoln Mont

Parameter	Code	Result	
Discharge (cfs)	00060	_____	
Air Temperature (°C)	00020	_____	
Water Temperature (°C)	00010	<u>5.0°</u>	
pH	00400	_____	
Alkalinity	00410	_____	F _____
Specific conductance (umhos/cm)	00095	_____	S _____ X <u>820</u> ml samp.
Dissolved Oxygen	00300	_____	F _____
Coliform bacteria (per 100 ml)	31501	<u>2</u>	S _____ X 2 *
<u>1</u> ml <u>0</u> colonies			
<u>4</u> ml <u>0</u> colonies			
<u>50</u> ml <u>1</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1</u> ml <u>0</u> colonies			
<u>4</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: clean, mostly open water some shore ice
 Appearance of bottom: some debris near bridge, gravel
 Weather conditions: partly cloudy, slight breeze - 2°C
 General biologic conditions: little moss
 Nature of streamflow: even 2-4 ft/sec
 Any unusual conditions: none

FIELD REPORT

Water-quality measurements

Type: 3

Date: 27 DEC 1972 Time: 1040

Station ID: 12334800

Collected by: L.C. FLADLAND, & M.H. ICASIK

Station Name: BLACKFOOT R. @ DALTON MHA. BRIDGE ROAD W. LINCOLN

Parameter	Code	Result	
Discharge (cfs) <u>G.H. 0.83</u>	00060		
Air Temperature (°C)	00020	<u>+ 5.5</u>	
Water Temperature (°C)	00010	<u>+ 4.5</u>	
pH	00400		
Alkalinity	00410		
Specific conductance (umhos/cm)	00095		F _____ X <u>82</u>
Dissolved Oxygen	00300		S _____ X ml sam
Coliform bacteria (per 100 ml)	31501	<u>23</u>	F _____ X 2 =
<u>1.0</u> ml <u>0</u> colonies <u>5.0</u> ml <u>8</u> colonies <u>100</u> ml <u>23</u> colonies _____ ml _____ colonies			
fecal coliform bacteria (per 100 ml) 31616 <u>1.0</u> ml <u>0</u> colonies <u>5.0</u> ml <u>3</u> colonies * <u>water in all places</u> <u>100</u> ml <u>6</u> colonies _____ ml _____ colonies		<u>6</u>	

er

Observations and Remarks

appearance of surface: clean - River open - no floating ice or debris
 appearance of bottom: slight aquatic growth on rocks on stream bed
 water conditions: overcast, cool, calm
 general biologic conditions: no signs of stock in area - very clean river
 direction of streamflow: 100% open - low winter flow
 unusual conditions: 50% bare ground along river bottom. 10-12" in main banks. High daytime temps. during last week however
in the mid. 40°

Reported value based on non-ideal count of colonies

FIELD REPORT

Water-quality measurements

Type: 3

Date: 28 NOV 72

Time: 1015

Station ID: 12334800

Collected by: L.S. FLADLAND, M.L. KASMAI

Station Name: BLACKFOOT R @ DALTONS MND. ROAD BRIDGE IN LINDSEY, MT

Parameter	Code	Result	
Discharge (cfs) <u>G.H. 0.81</u>	00060		
Air Temperature (°C)	00020	<u>-12.0</u>	
Water Temperature (°C)	00010	<u>+1.5</u>	
pH	00400		
Alkalinity	00410		
Specific conductance (umhos/cm)	00095		F _____
Dissolved Oxygen	00300		S _____ X $\frac{820}{\text{ml sample}}$
Coliform bacteria (per 100 ml)	31501	<u>49</u>	F _____
<u>50</u> ml <u>16</u> colonies			S _____ X 2
<u>100</u> ml <u>49</u> colonies			
_____ ml _____ colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml) 31616		<u>3</u>	
<u>100</u> ml <u>0</u> colonies * (most on plate)			
_____ ml _____ colonies			
_____ ml _____ colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: clean, stream rising

Appearance of bottom: some leaves settled on bottom

Weather conditions: partly cloudy - cool - calm

General biologic conditions: little aquatic growth on rocks on streambed

Nature of streamflow: low base flow

Any unusual conditions: 6-8" stream area, no ice on stream, a few, no signs of stock along to sampling site (either watering or crossing)

FIELD REPORT

New F-G site -

Water-quality measurements

Type: 3

Date: Oct. 26, 1972

Time: 0900

Station ID: 12334800

Collected by: M.L. Kasman & L. Flodde

Station Name: Basket R. at Dalton Mt. road bridge nr. Lincoln, Va.

Parameter	Code	Result
Discharge (cfs) <u>G.H. 0.93</u>	00060	
Air Temperature (°C)	00020	
Water Temperature (°C)	00010	<u>+0.5°C</u>
pH	00400	<u>5.5</u>
Alkalinity	00410	
Specific conductance (umhos/cm)	00095	
Dissolved Oxygen	00300	
Coliform bacteria (per 100 ml)	31501	
<u>1</u> ml <u>0</u> colonies		
<u>5</u> ml <u>1</u> colonies		
<u>50</u> ml <u>21</u> colonies		
<u>100</u> ml <u>27</u> colonies		
Fecal coliform bacteria (per 100 ml)	31616	
<u>1</u> ml <u>0</u> colonies		
<u>5</u> ml <u>0</u> colonies		
<u>50</u> ml <u>1</u> colonies		
<u>100</u> ml <u>2</u> colonies		

F _____ X 820
 S _____ X ml sampl
 F _____
 S _____ X 2

Other

BOD's taken

Observations and Remarks

0.93 - 1.10 = -0.17

- Appearance of surface: clean
- Appearance of bottom: slight aquatic growth
- Weather conditions: snow showers - overcast - calm
- General biologic conditions: no birds or streambed - a few clean river
- Direction of streamflow: down
- Any unusual conditions: None swimming & wading across river in this

Blackfoot River At Dalton Mtn. Road Bridge

①

BOD DETERMINATION

STATION NAME Blackfoot R @ Dalton Mtn Road Br.

STATION I.D.

SAMPLING DATE 2-2-72

SAMPLING TIME 0945

(Water Temp 0°C - subsurface sample in open water with slush ice floating and some anchor ice L. Spence)

BOD 1.3 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R. at Dalton Mtn. Road Bridge, nr. Lincoln, MT

STATION I.D. Mont. F-G site

SAMPLING DATE Mar 23, 1972

SAMPLING TIME 0945

BOD 1.6 mg/l

FIELD D.O. L. Spence
Q about 150 cfs.Water rising - mostly clear
Water 5.0°C
C.H. 1.18BOD DETERMINATION

STATION NAME Blackfoot River at Dalton Mtn. Road Bridge

STATION I.D.

SAMPLING DATE 4-14-72

SAMPLING TIME 0935

BOD 1.3 mg/l

water high - muddy staff ght 4-15 water temp 0.3°C
cloudy, cool, windy, sampled from shoreBOD DETERMINATION

STATION NAME Blackfoot River at Dalton Mtn road bridge, Mont

STATION I.D.

SAMPLING DATE 5-19-72

SAMPLING TIME 0945

BOD 1.8 mg/l

Blackfoot River At Dalton Mtn. Road Bridge

(2)

Water temp. 51°F. Staff gage ± 1.46. Water low & clear. Rain showers last night & early morning. Mostly cloudy, cool windy.

A. Spencer

BOD DETERMINATION

STATION NAME Blackfoot R @ Dalton Mtn. road bridge

STATION I.D.

SAMPLING DATE 8-2-72

SAMPLING TIME 0935 BOD 1.3 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R @ DALTON Mtn BRIDGE

STATION I.D.

SAMPLING DATE 9/8/72

SAMPLING TIME 0945 BOD 2.0 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R at Dalton Mtn. Rd. Bridge near Lincoln, Montana

STATION I.D.

SAMPLING DATE 26 October 1972

SAMPLING TIME 0900 BOD 1.4 mg/l

FIELD NO.

BOD DETERMINATION

STATION NAME Blackfoot R @ Dalton Mtn BRG. Rd. n. Lincoln, Mt.

STATION I.D.

SAMPLING DATE 28 Nov. 1972

SAMPLING TIME 1015 BOD 1.9 mg/l

Blackfoot River At Dalton Mtn. Road Bridge

BOD DETERMINATION

STATION NAME BLACKFOOT R @ DALTON Mtn BRDG RD

STATION I.D. 12-3348.00

SAMPLING DATE 27 DEC. 1972

SAMPLING TIME 1040

BOD 1.6 mg/l

January Dalton
BOD test not
valid
error in adding
chemicals

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ DALTON Mtn BRIDGE in LINCOLN Mt.

STATION I.D. 12-3348.00

SAMPLING DATE 27 FEB. 1973

SAMPLING TIME 0900

BOD 1.6 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ DALTON Mtn BRIDGE in LINCOLN

STATION I.D. 12334800

SAMPLING DATE 28 MARCH 1973

SAMPLING TIME 0900

BOD Determinations - by USGS, Helena
Blackfoot River At Dalton Mtn. Road Bridge

(4)

PROVISIONAL

BOD DETERMINATION

STATION NAME BLACKFOOT R @ DALTON Mtn BRDG ROAD m. LINCOLN,
STATION I.D. 12 334800 MT.
SAMPLING DATE 25 April 1973
SAMPLING TIME 1000 BOD 0.8 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ DALTON Mtn. BRDG. Rd. m. LINCOLN,
STATION I.D. 12 334800 Mont.
SAMPLING DATE 21 MAY 1973
SAMPLING TIME 1120 BOD 1.2 mg/l pu

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ DALTON Mtn BRDG ROAD m. LINCOLN
STATION I.D. 12 334800 MT.
SAMPLING DATE JUNE 18, 1973
SAMPLING TIME 1040 BOD 2.0 mg/l ml/c

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ DALTON Mtn. BRIDGE
STATION I.D. 12 334800
SAMPLING DATE 16 JULY 1973
SAMPLING TIME 1000 BOD 1.4 mg/l

STATION NAME Blackfoot River at Dalton Mtn. Bridge
STATION I.D. 12 3348 00
SAMPLING DATE Sept 11th, 1973
SAMPLING TIME 1040 BOD 0.6 mg/l

11

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

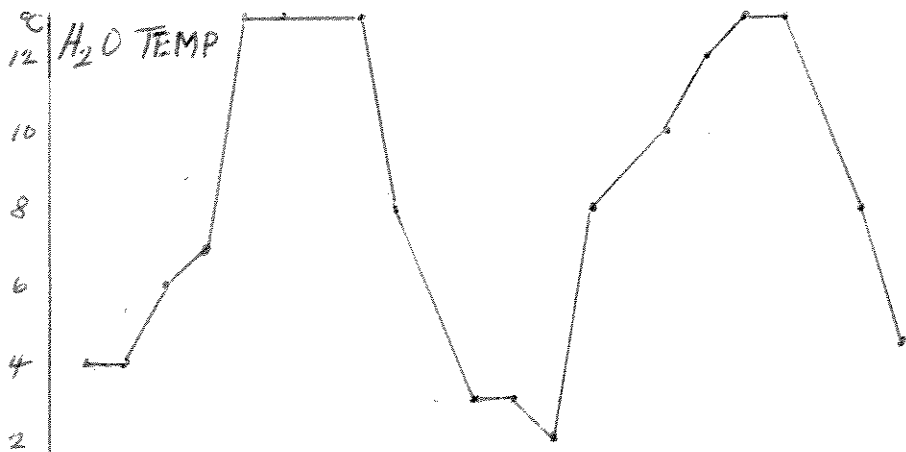
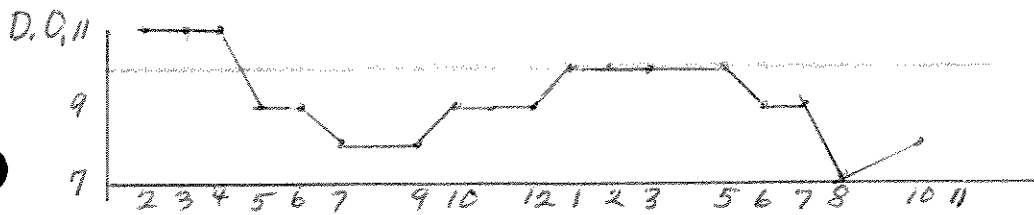
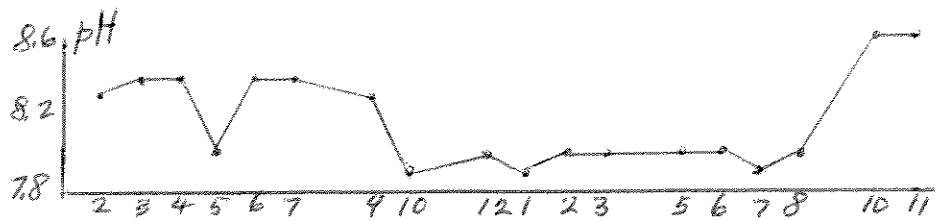
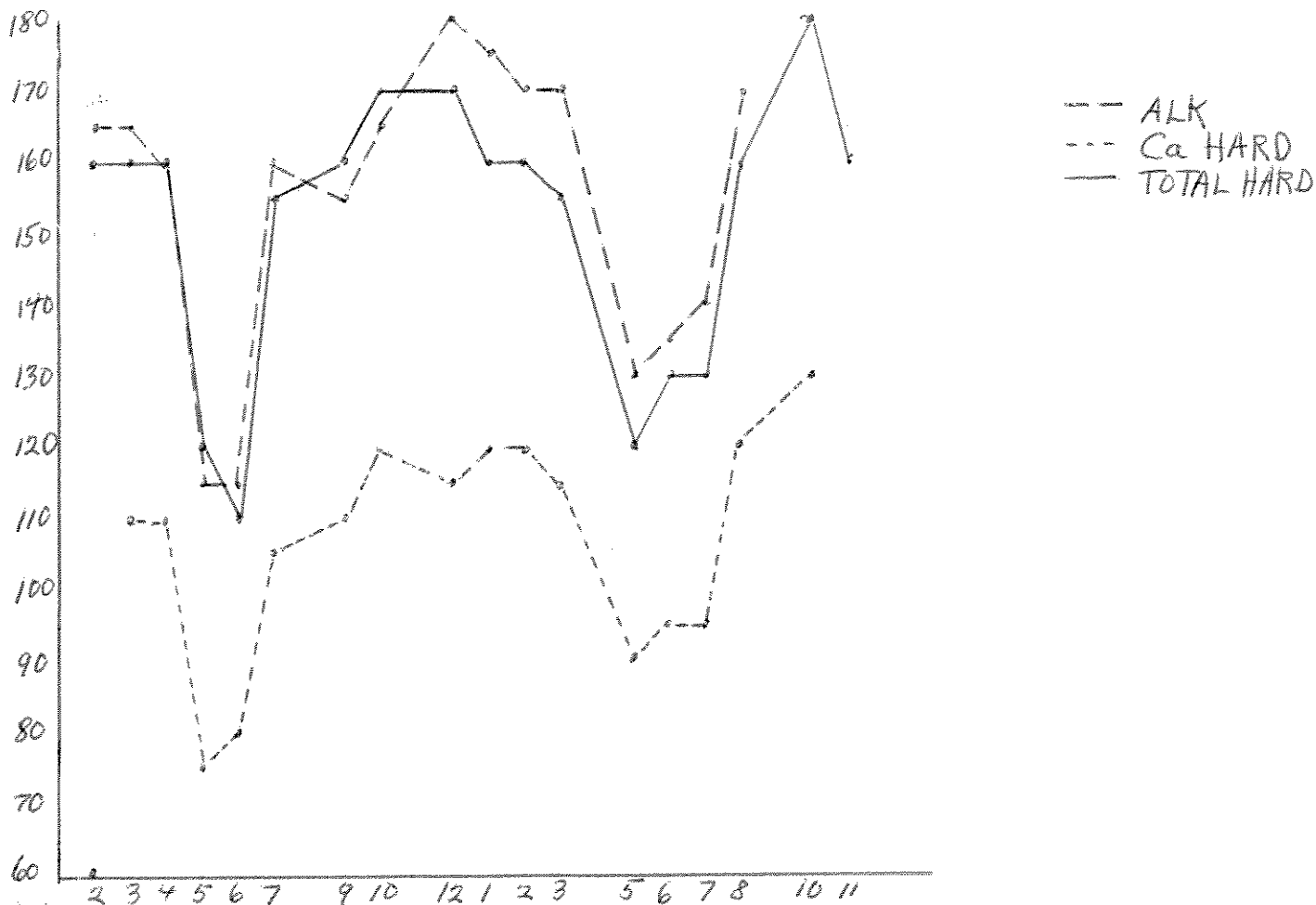
Stream Blackfoot RiverStation Dalton Mtn BridgeSampling Method ^{1/} Integrated
w/ DH-48 SamplerAnalytical Instrument Used Hach
Model 2100 A meterCollector: L. Spence

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
3-1-72	.65	.68	.70	.68	.70	clear	low + clear all open water
3-19-72	2.0	1.5	2.0	1.8	1.8	slightly greenish-brown	water rising slightly thawing weather
4-29-72	7.0	7.0	7.2	7.1	7.1	greenish	g.h. 1.98. Can't see stream bottom in deep water.
5-8-72	2.5	2.4	2.8	2.6	2.6	colorless to slightly greenish	g.h. ± 1.98. water fairly clear
5-17-72	100	100	100	100	100	muddy brown	g.h. ± 4.20. floating debris
6-3-72	165	165	175	168	170	muddy - brown	g.h. ± 4.65. flooding. Silt + colloidal matter, very little detritus
6-5-72	150	150	150	150	150	muddy - brown	g.h. ± 4.50. flooding. mostly colloidal. Some silt + detritus
6-7-72	125	120	115	120	120	muddy - brown	g.h. ± 4.35. flooding. colloidal silt + detritus in sample
6-9-72	130	125	125	127	130	muddy - brown	g.h. ± 4.35. flooding. colloidal silt + detritus in sample
6-13-72	59	60	60	60	60	muddy grayish brown	g.h. ± 3.66. falling. Silt with the last 2 days. Colloidal, silt + detritus
6-16-72	35	36	34	35	35	light brown	g.h. ± 3.20. not flooding. Silt colloidal + detritus in sample
6-27-72	6.1	6.3	7.0	6.5	6.5	milky - green	g.h. ± 2.38. Clear in shallow.
7-10-72	2.6	2.4	2.6	2.5	2.5	slightly milky- green	g.h. ± 2.00. Clear in shallow.
2-14-73	.75	1.20	.95	.97	1.0	colorless	very clear + low. g.h. .70. open water, low + snow along banks.
5-19-73	42	40	45	42	40	lite brown	g.h. ± 2.42. fairly high + not too fast.
5-22-73	17	15	14	15	15	clearish gray- green	g.h. ± 2.26. not too high
5-31-73	4.0	3.9	4.2	4.0	4.0	greenish- clear	g.h. ± 1.80. not very high
6-4-73	2.5	2.5	2.2	2.4	2.4	greenish- clear	g.h. ± 1.76. clear.
5-28-74	45	43	48	45	45	lite brown	g.h. ± 3.10
6-17-74	72	70	71	71	70	muddy brown	g.h. ± 4.00 high + muddy

^{1/} Surface Grab, Integrated, Other^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971,
pg. 352

SITE #18 BLACKFOOTR. FIELD DATA



SITE #18 BLACKFOOT R.
AT DALTON MTN. RD. BRIDGE

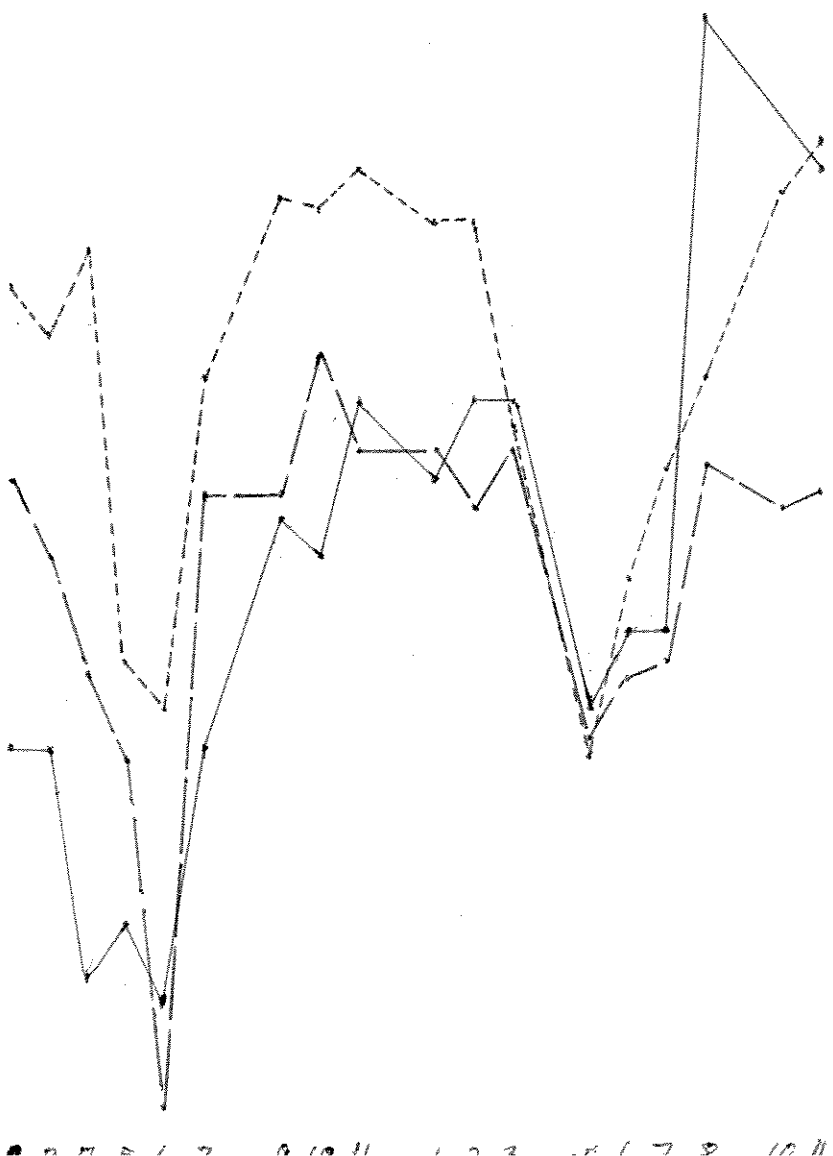
LAB ANALYSES

page 1

mg/l

--- TDS
- - - HCO₃
— HARD

340
320
310
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90



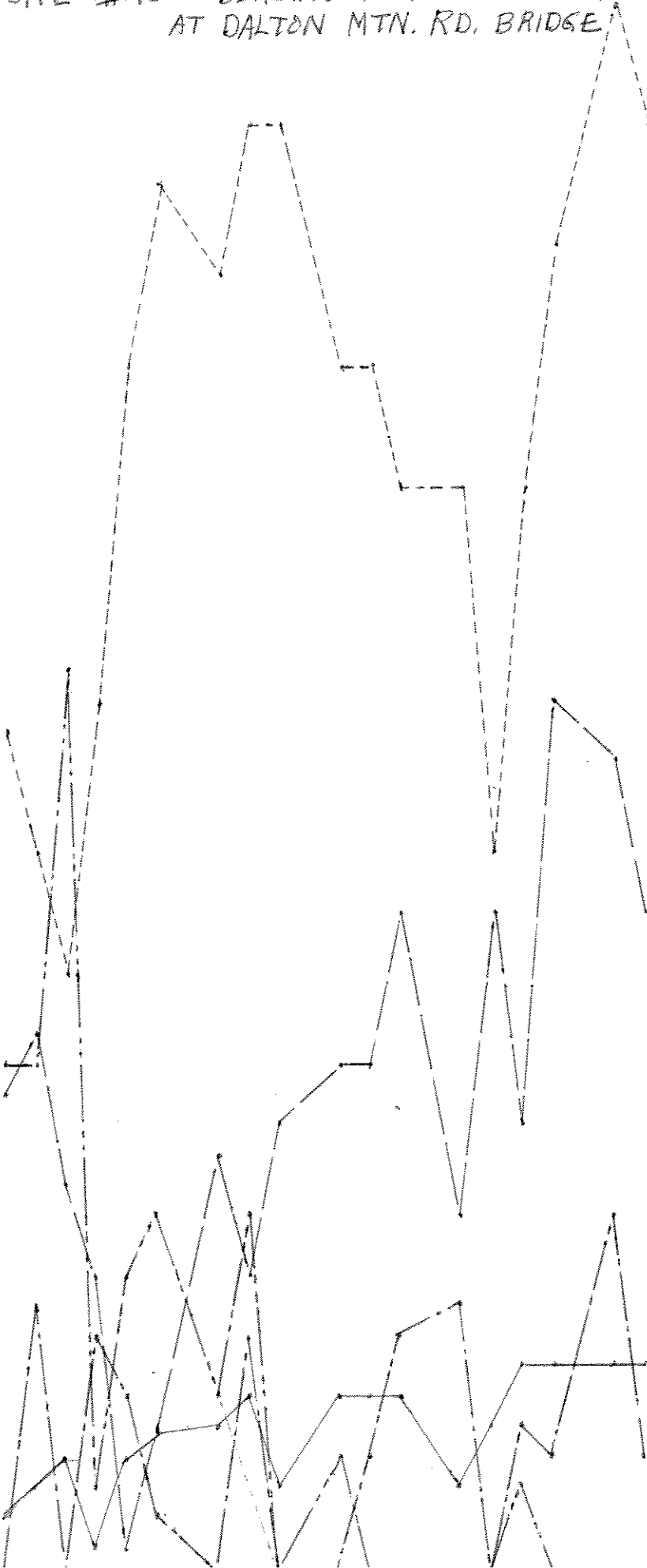
SITE #18 BLACKFOOT R.
AT DALTON MTN. RD. BRIDGE

LAB ANALYSES

page 2

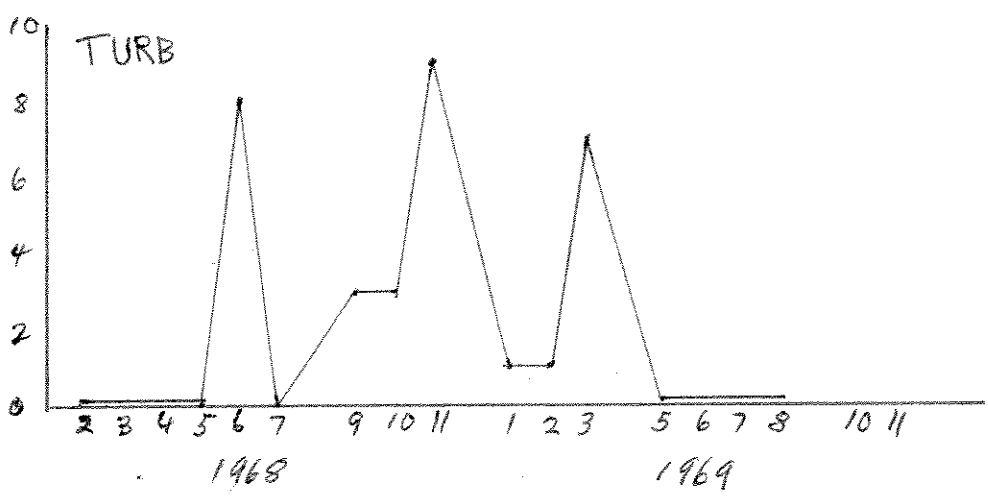
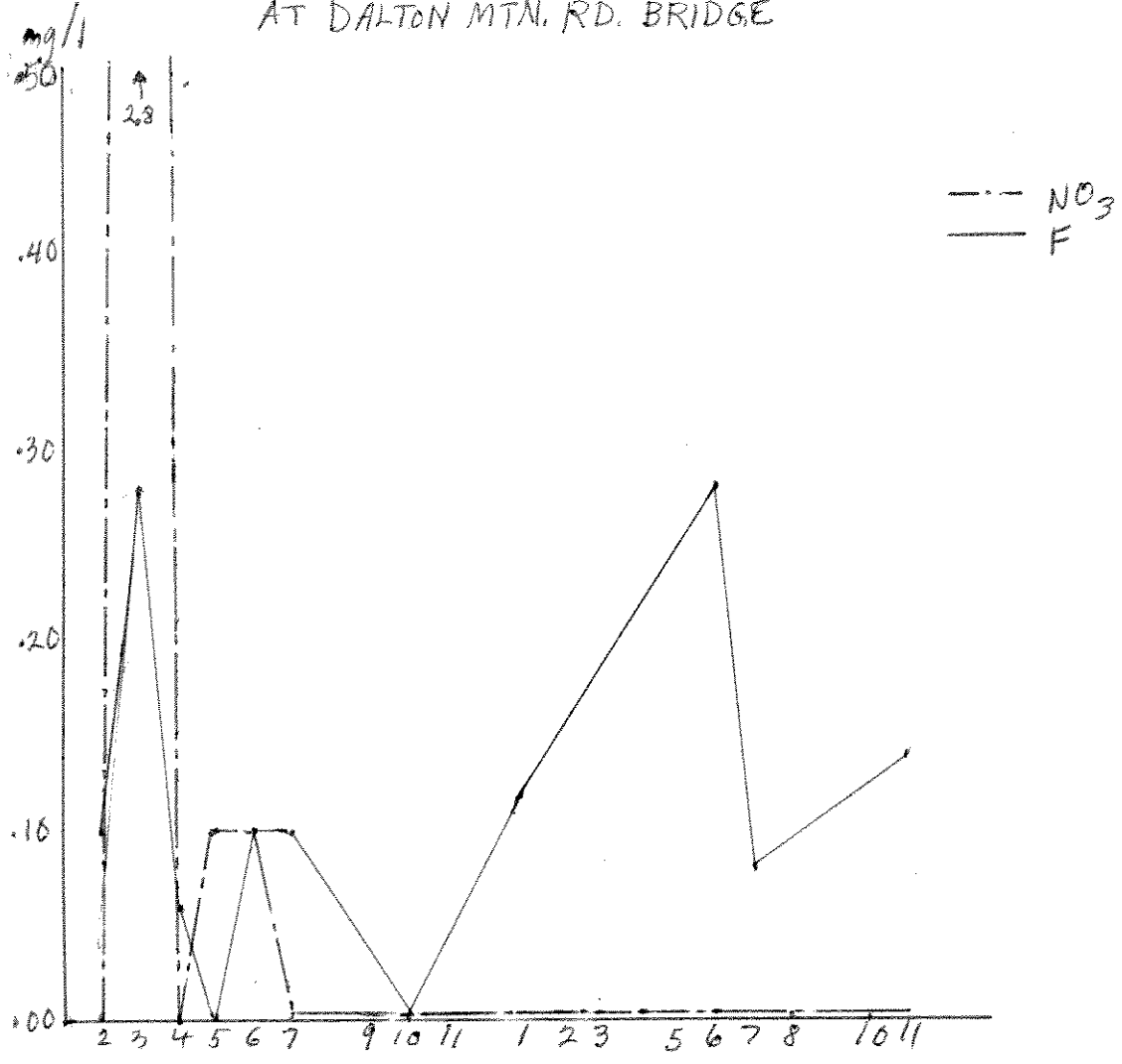
mg/l
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2

--- SO₄
--- Cl
--- Ca
--- Mg
--- Na+K



SITE # 18 BLACKFOOT R.
AT DALTON MTN. RD. BRIDGE

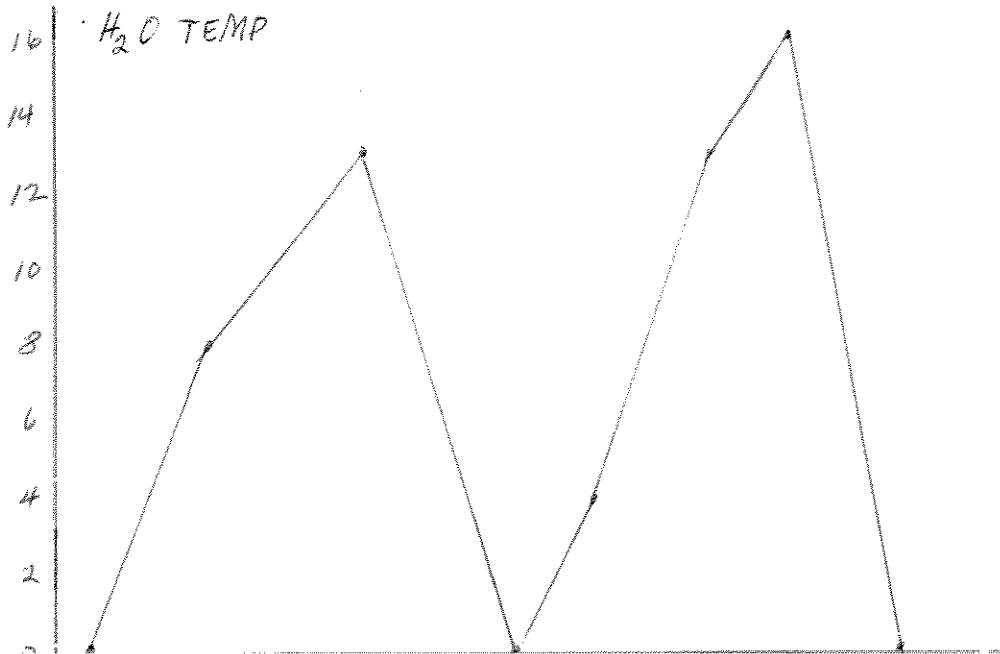
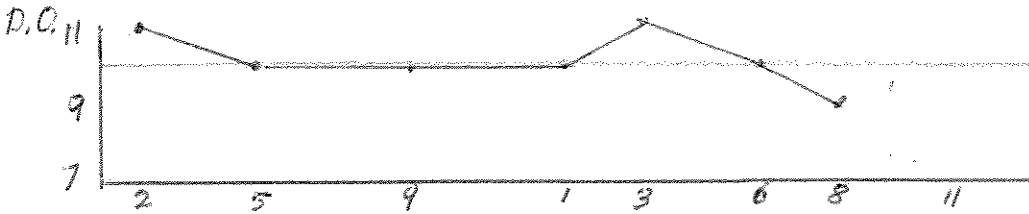
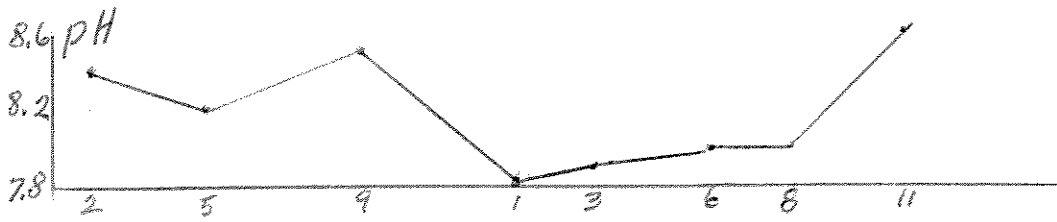
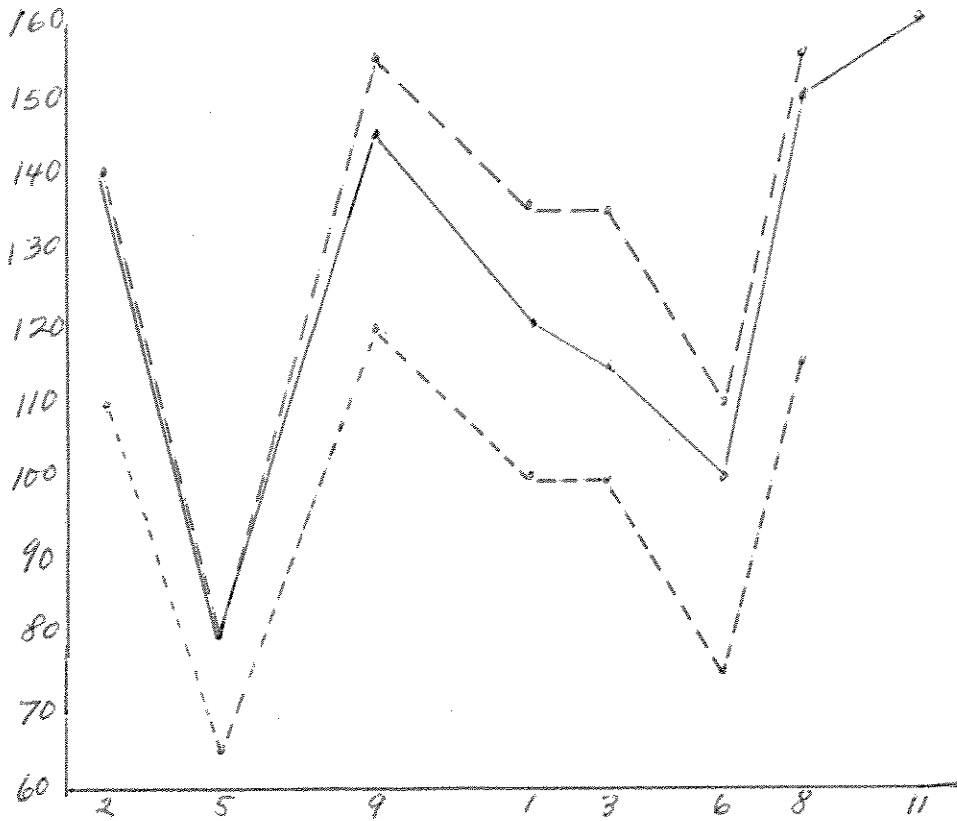
LAB ANALYSES page 3

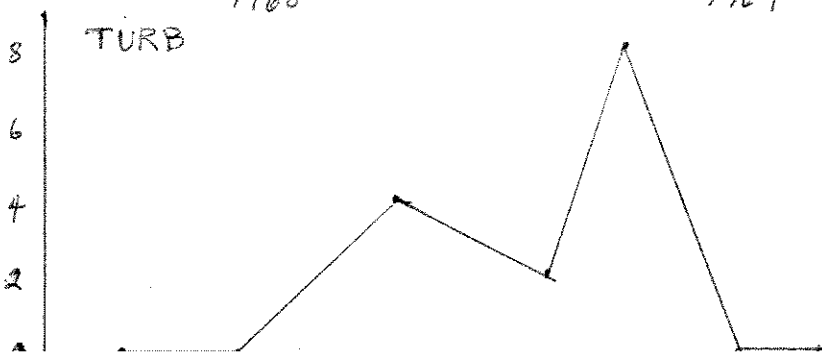
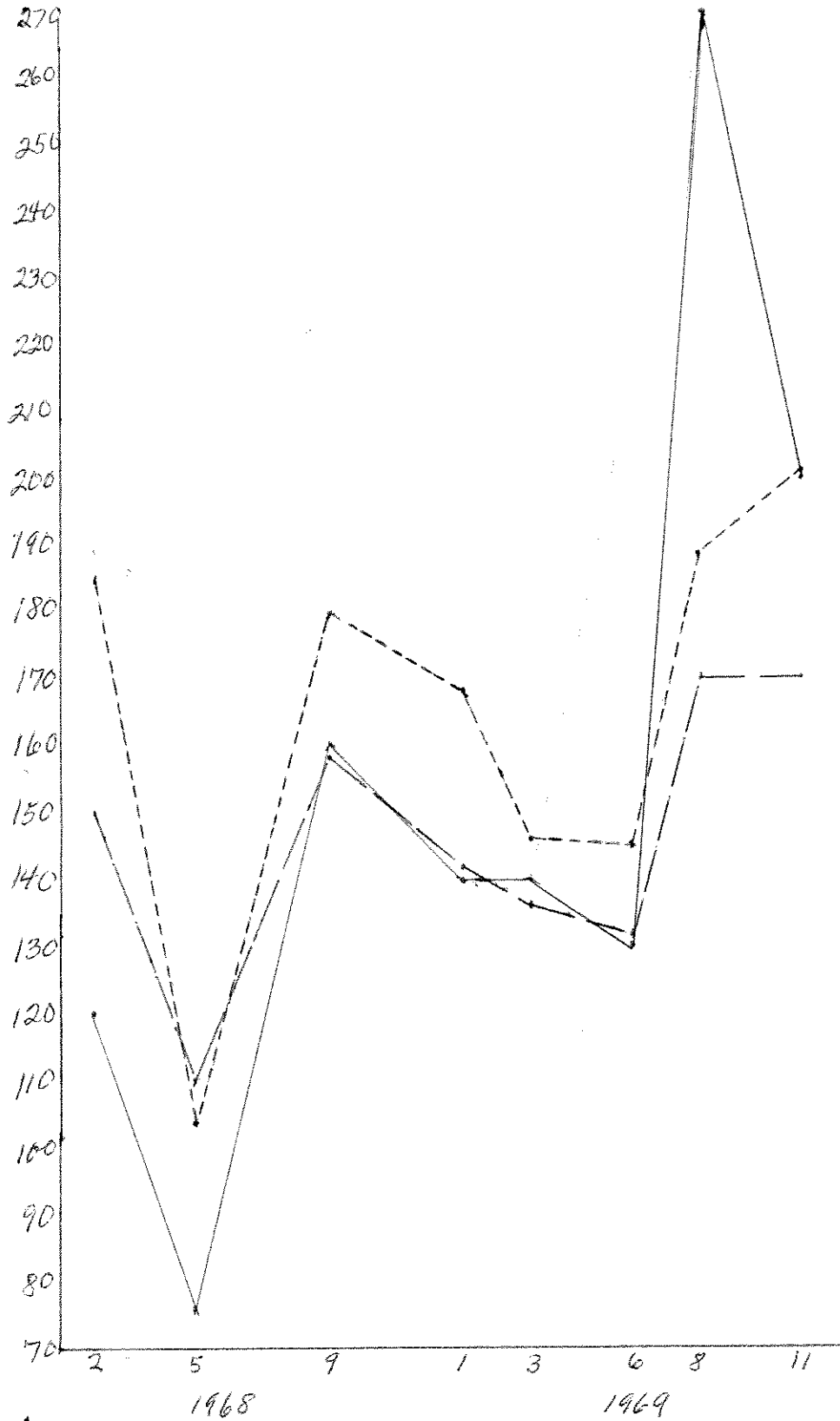


SITE #17 BEAVER CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
2-18-68	1100	0	2	8.1	11	140	110	110	0	2	rain	B.D
5-25-68	1130	8	8	8.2	10	80	65	80	8	2	rain	"
9- 9-68	1500	13	21	8.5	10	155	120	145	0	2	clear	"
1- 2-69	1100	0	-2	7.8	10	130	100	120	0	2	cloudy	"
3-28-69	1120	4	9	7.9	11	130	100	115	0	2	p.c.	"
6-16-69	1515	13	23	8.0	10	110	75	100	0	2	clear	"
8-26-69	1705	16	28	8.0	9	155	115	150	0	2	clear	"
11-30-69	1120	0	0.5	8.6				160			clear	L.S.
Σ		54			71	900	685	1010				
n		8		8	7	7	7	8				
x̄		7			10	128	98	126				
Range L		0		7.8	9	80	65	80				
H		16		8.6	11	155	120	160				

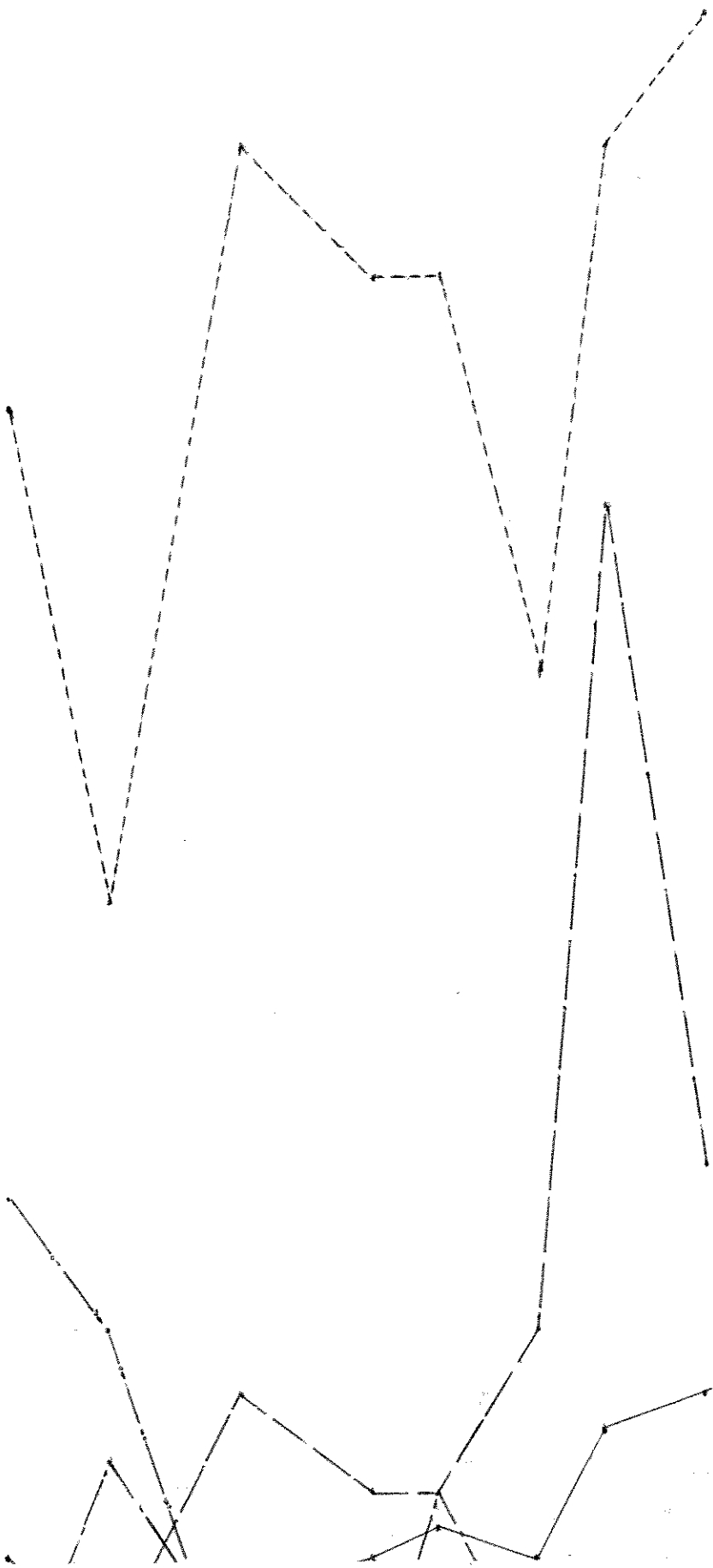
SITE #17 BEAVER CR. FIELD DATA



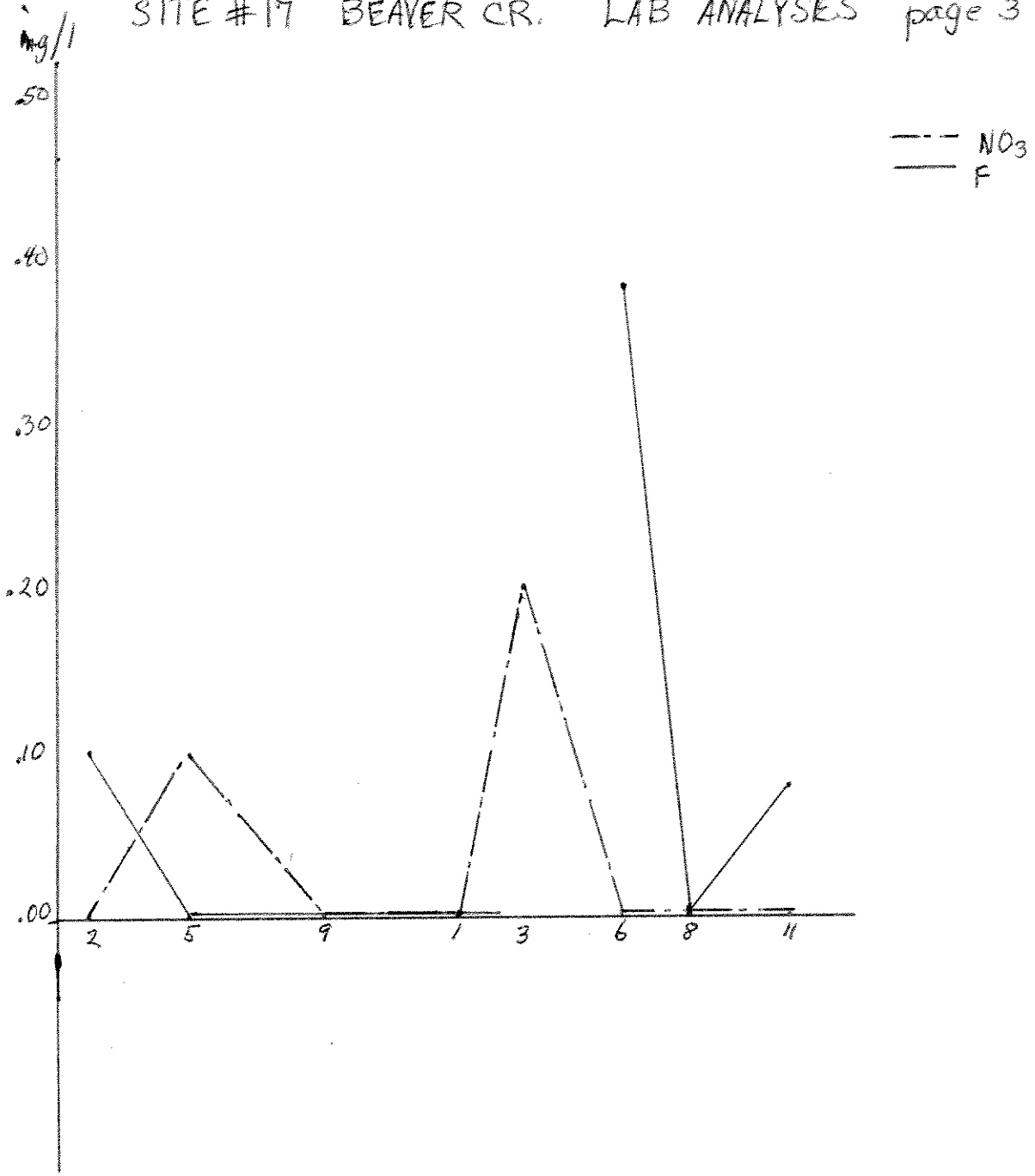


mg/l
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6

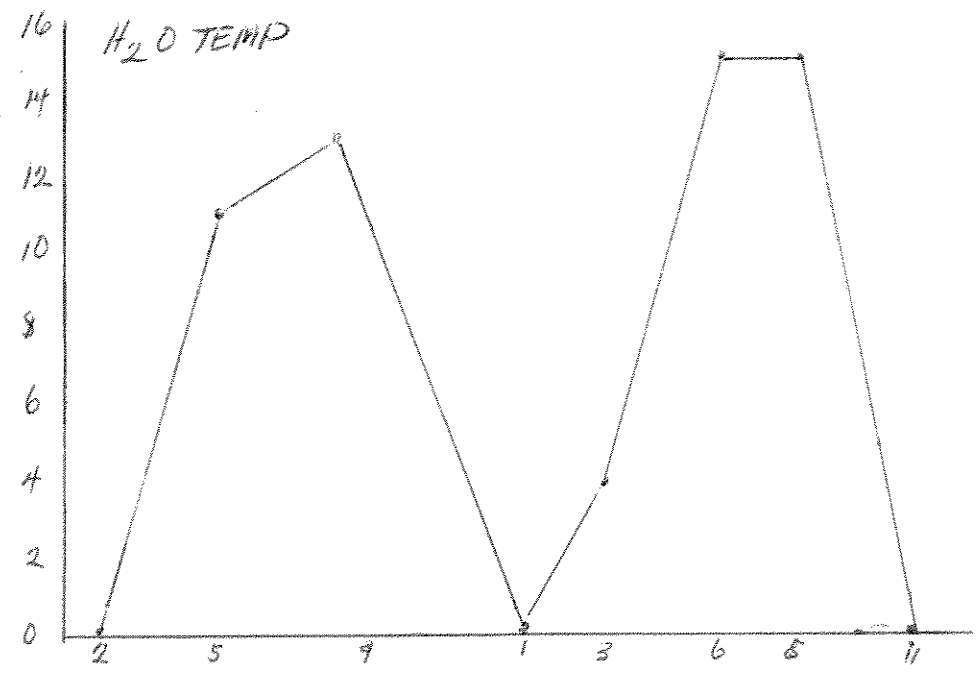
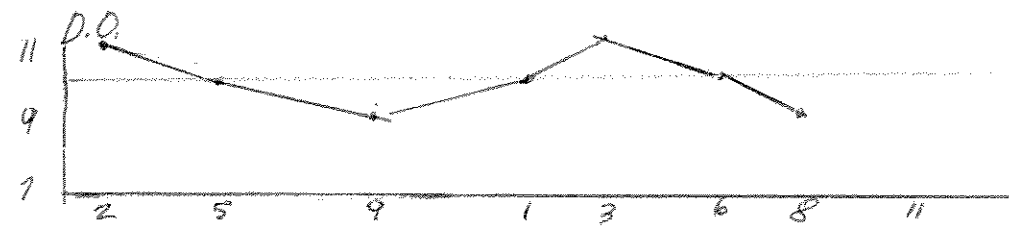
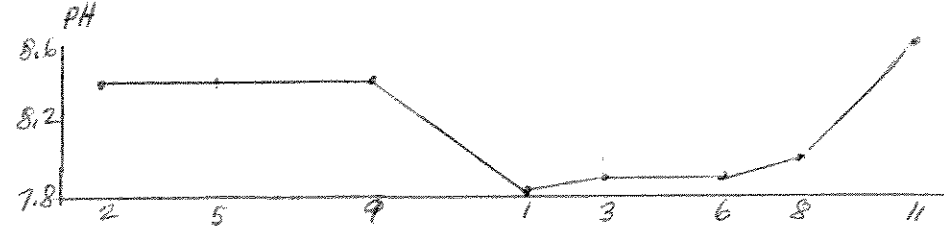
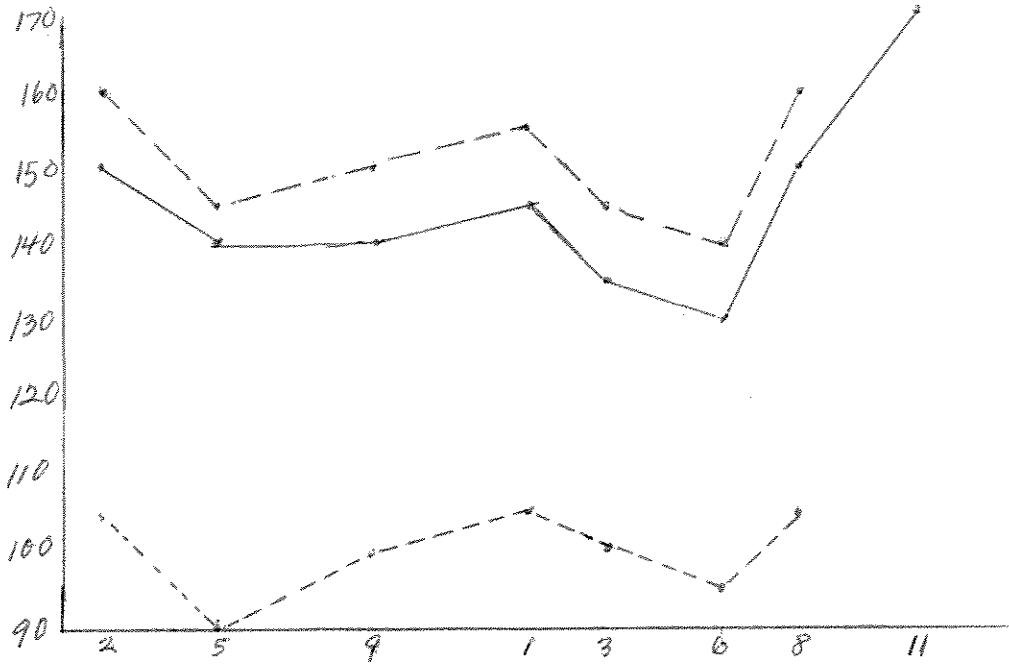
--- SO₄
— Cl
--- Ca
--- Mg
--- Na+K

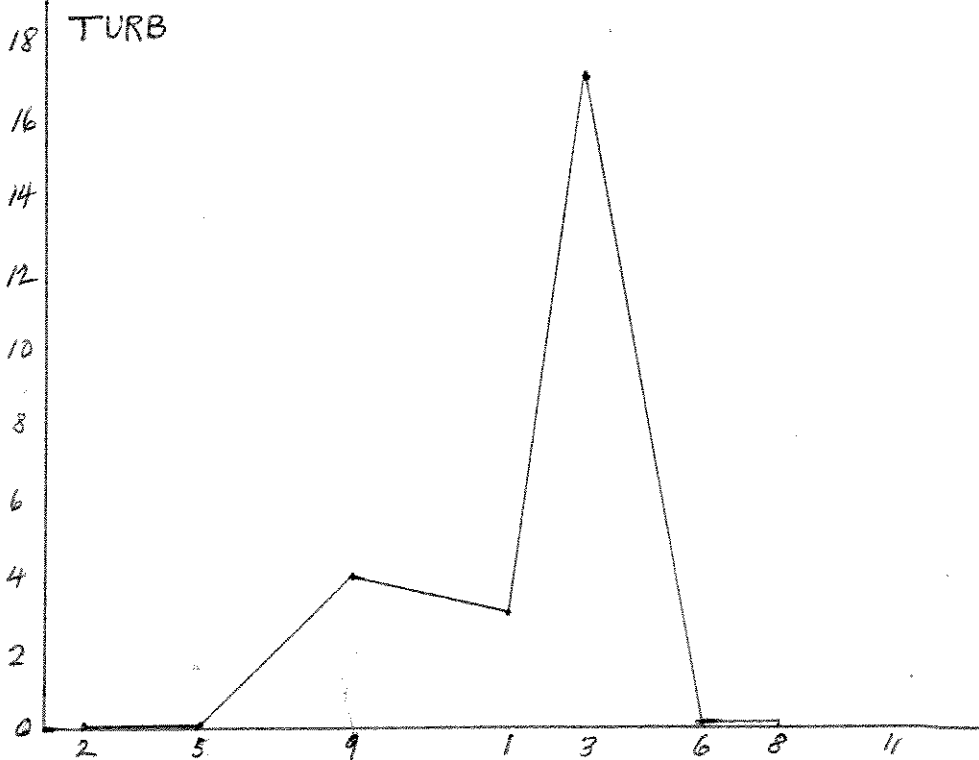
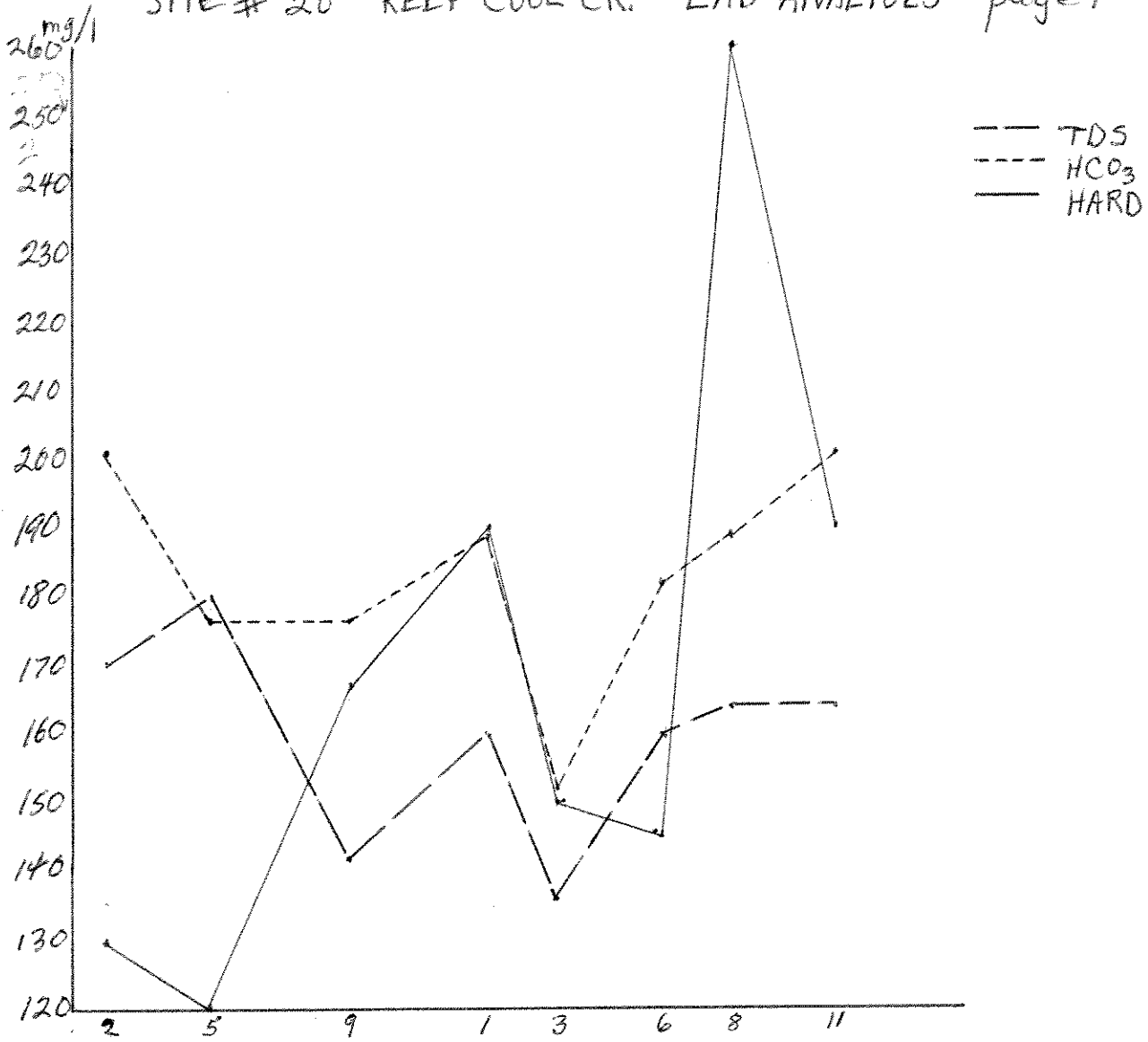


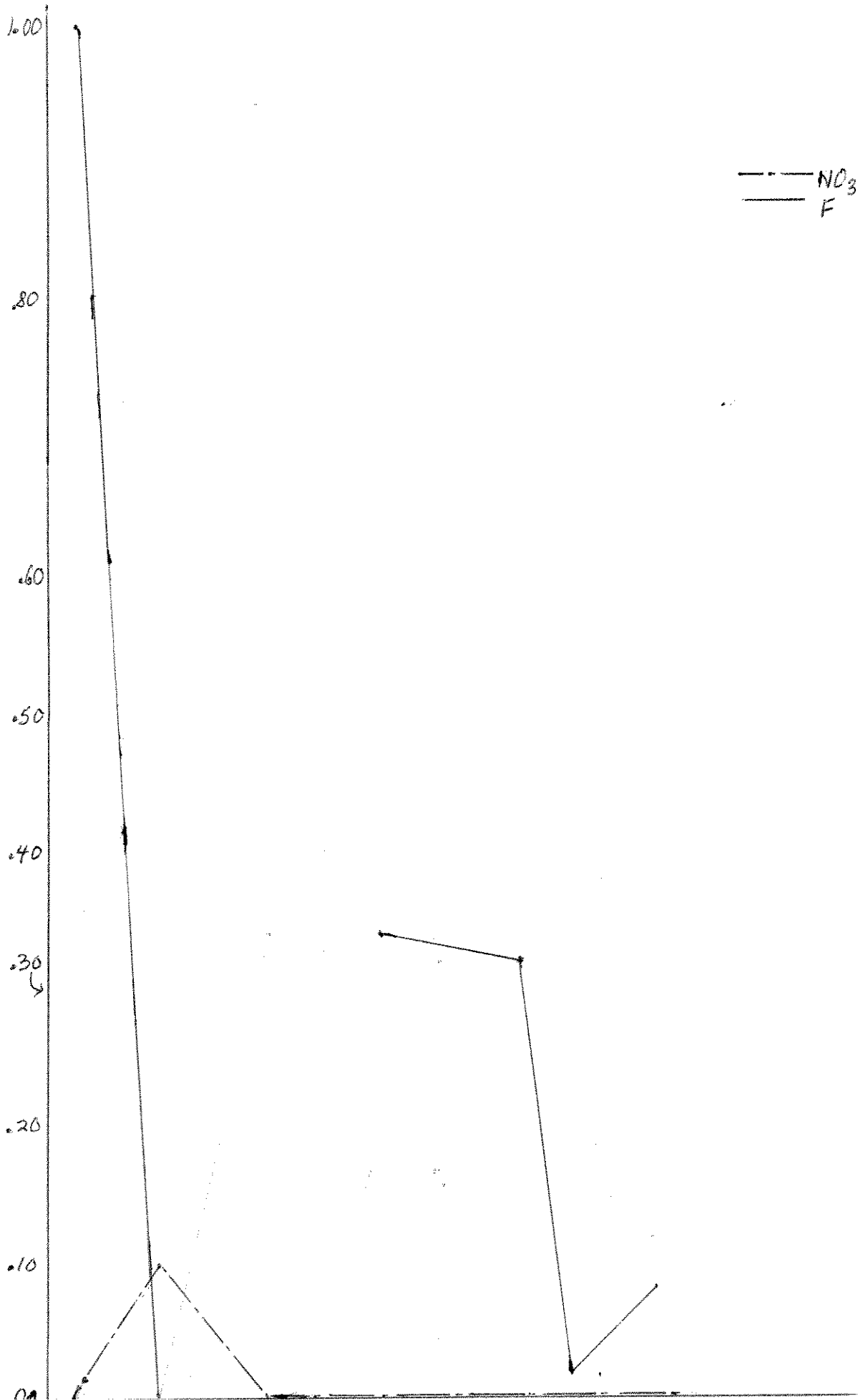
SITE #17 BEAVER CR. LAB ANALYSES page 3



SITE # 20 KEEP COOL CR. FIELD DATA.





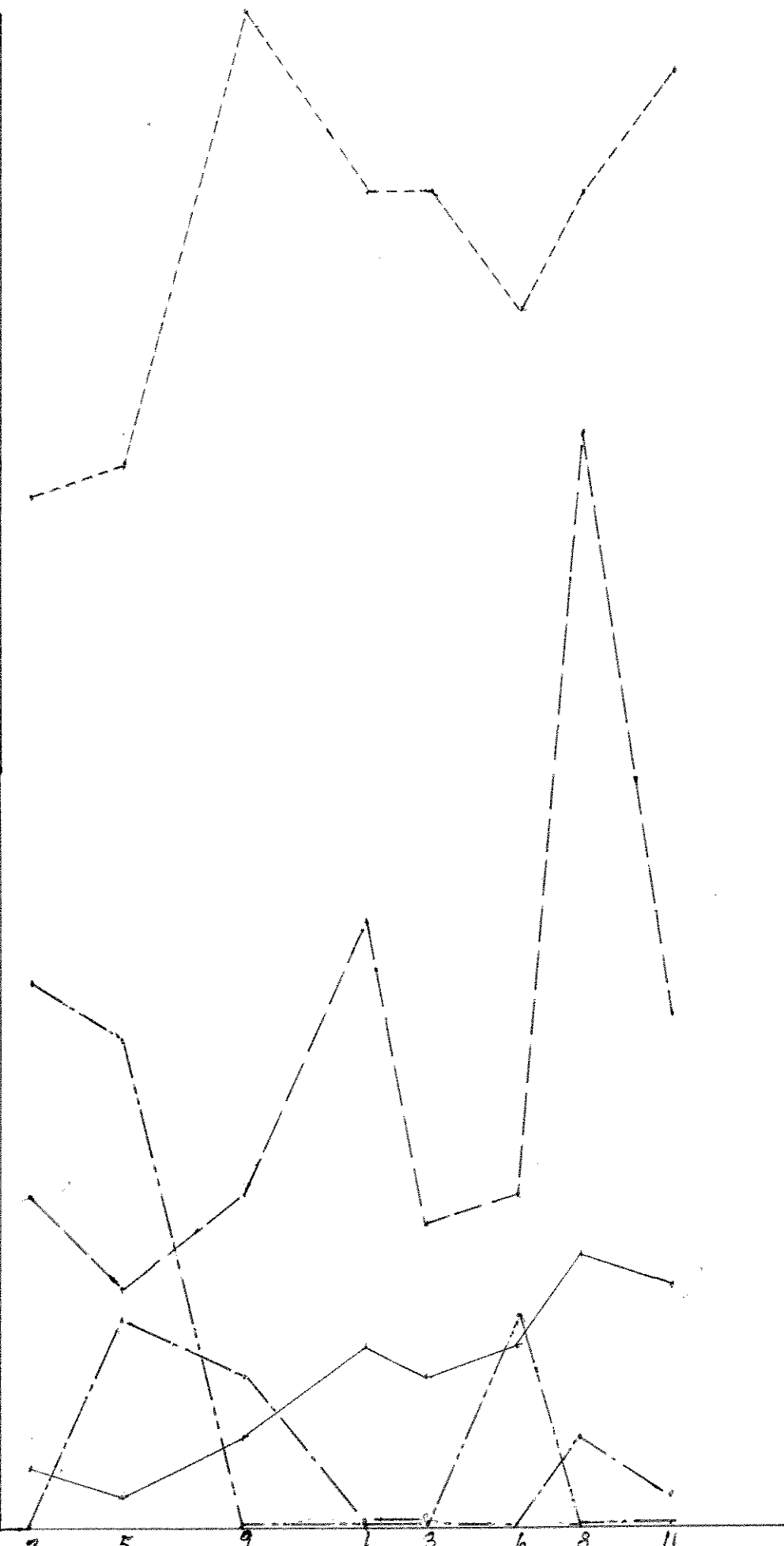


mg/l

SITE # 20 KEEP COOL CR. LAB ANALYSES

50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0

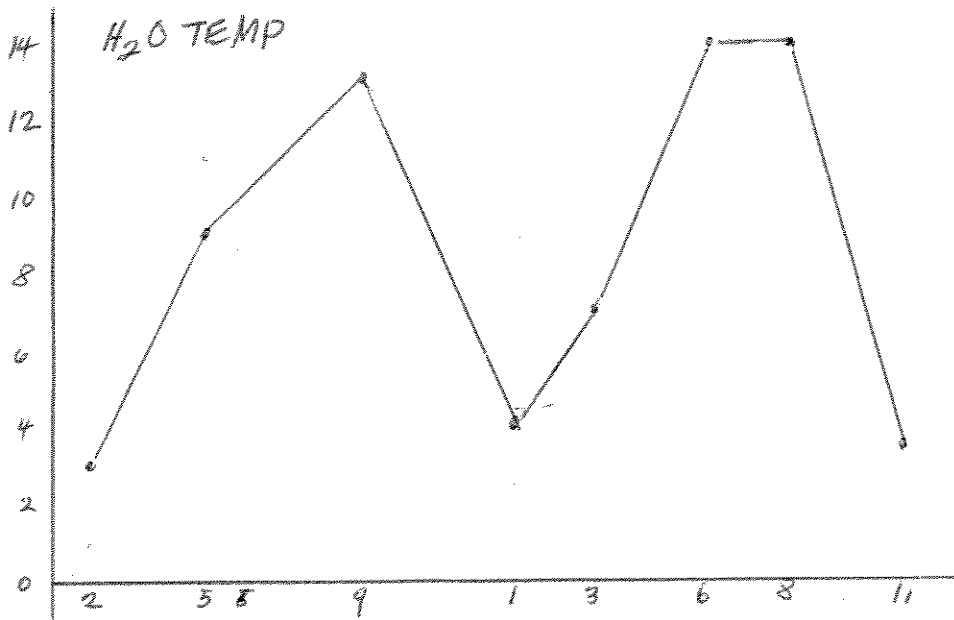
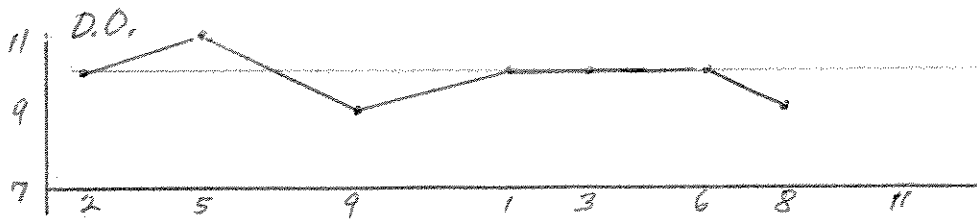
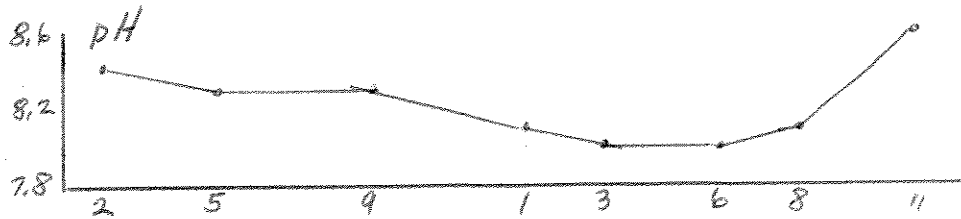
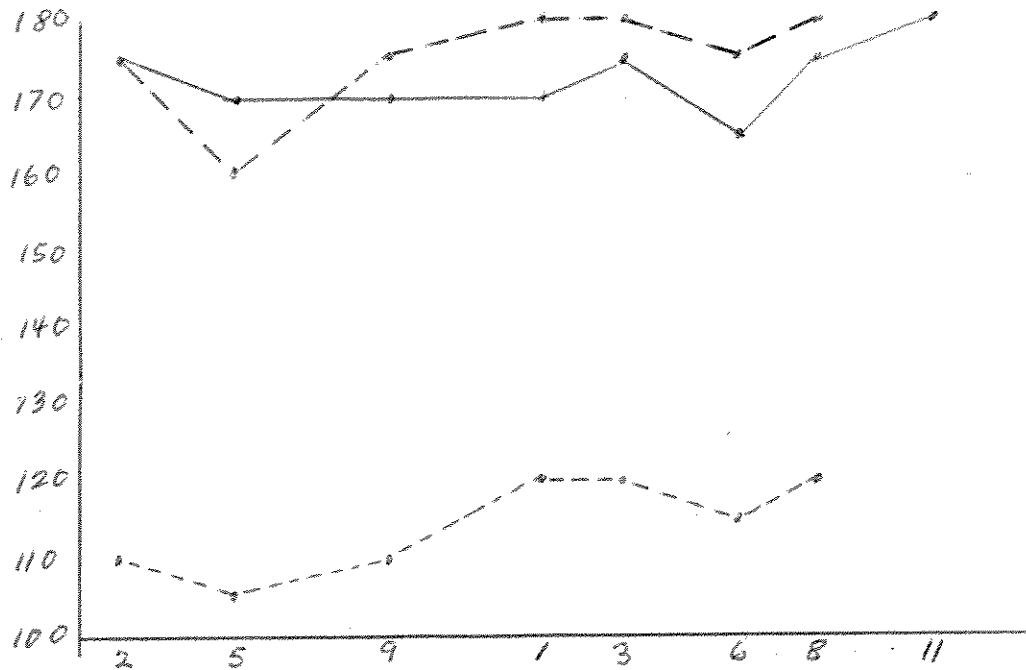
--- SO₄
--- Cl
--- Ca
--- Mg
--- Na+K



(a)
 SITE #21 SPRING CREEK FIELD DATA

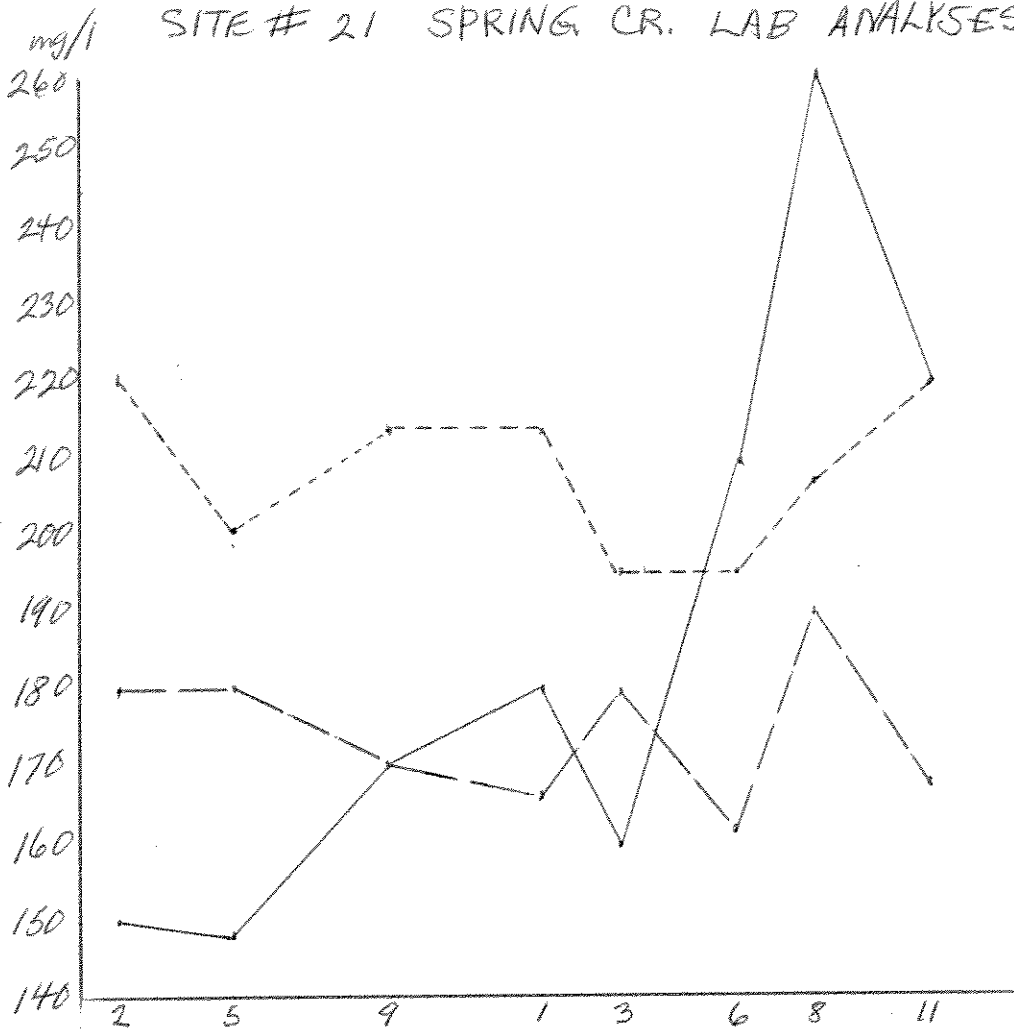
DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL
2-18-68	0900	3	1	8.1	10	175	110	175	0	2	snow	B.D
5-25-68	1615	9	11	8.3	11	160	105	170	0	2	cloudy	"
9- 9-68	1650	13	24	8.3	9	175	110	170	0	2	p.c.	"
1- 2-69	1530	4	0	8.1	10	180	120	170	0	2	cloudy	"
3-28-69	1315	7	9	8.0	10	180	120	175	0	2	p.c.	"
6-16-69	1650	14	20	8.0	10	175	115	165	0	2	clear	"
8-26-69	1540	14	29	8.1	9	180	120	170	0	2	clear	"
11-30-69	1035	3.5	1.5	8.6				180			clear	A.S.
E		68			69	1225	800	1375				
n		8		8	7	7	7	8				
x		8			10	175	114	172				
Range L		3		8.0	9	160	105	165				
H		14		8.6	11	180	120	180				

SITE #21 SPRING CR. FIELD DATA

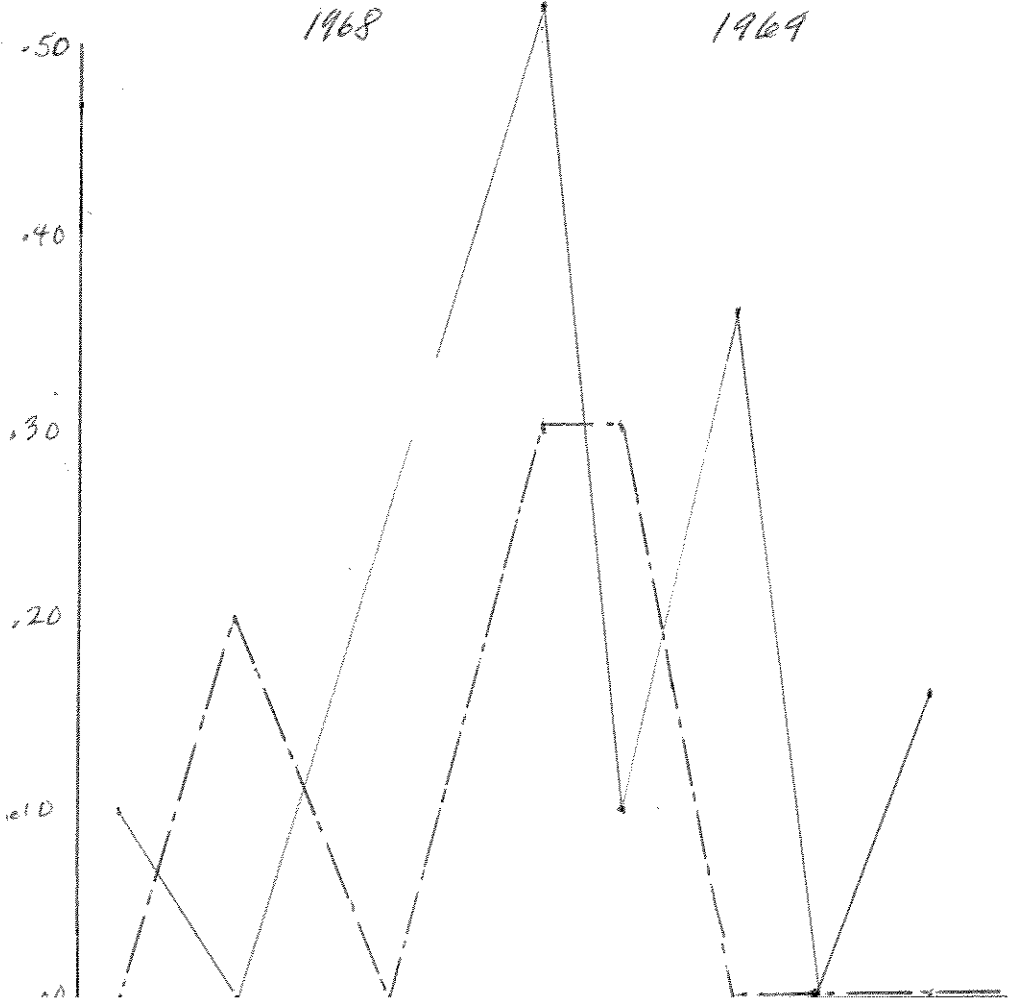


SITE # 21 SPRING CR. LAB ANALYSES

page 1



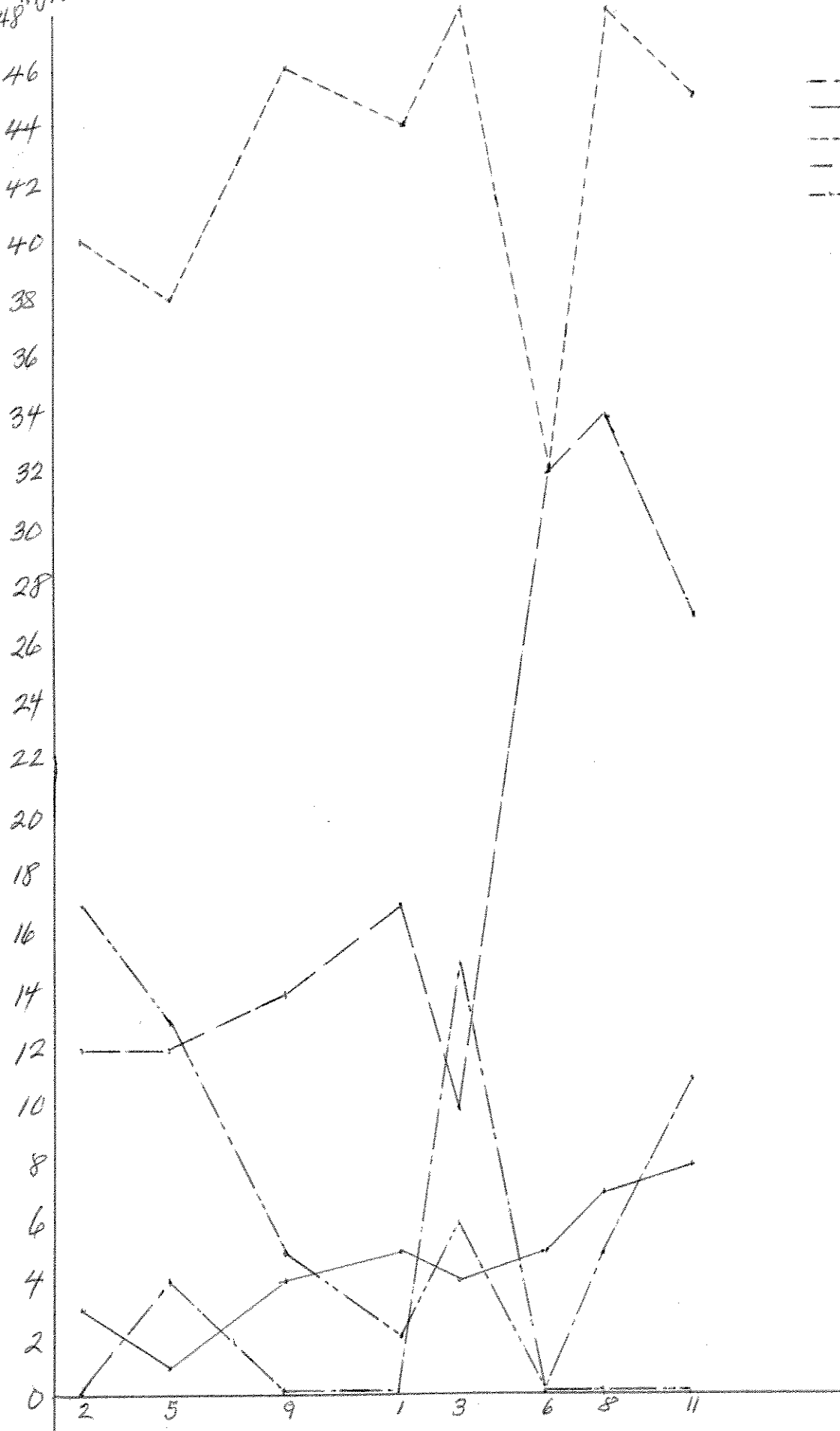
--- TDS
 -.- HCO₃
 — HARD

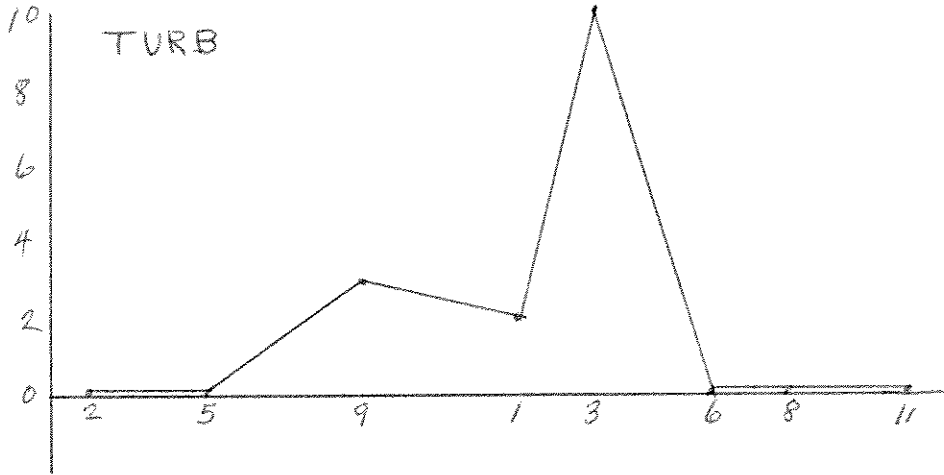


-.- NO₃
 — F

mg/l

- SO₄
- Cl
- Ca
- Mg
- Na+K





POORMAN CREEK

Field Notes

August 1, 1973. Poorman Cr. has some turbidity - apparently due to a rain.
Could see spots on Stemple road where washing into stream had occurred.

SITE #22 POORMAN CREEK FIELD DATA

DATA	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
2-18-68	0745	2	1	8.1	11	120	85	125	0	2	snow	"
5-25-68	1215	6	12	8.3	10	95	75	105	18	2	pc.	"
9-9-68	1820	11	23	8.4	9	125	90	125	0	2	p.c.	"
1-2-69	1700	3	0	8.1	10	130	90	130	0	2	p.c.	"
3-28-69	1715	7	7	8.3	10	120	90	120	0	2	p.c.	"
6-16-69	1735	13	20	8.0	10	120	90	110	0	2	clear	"
8-27-69	1320	13	26	8.1	9	130	100	125	0	2	clear	"
11-29-69	1400	5	7.5	8.7				130			clear	"
12-69 No Data from this date through January 1971												
1-71												
2-2-71												
4-27-71	1330	4.0										
5-21-71	1650	5.5										
6-23-71	1525	13.0										
7-71	No Data Collected											
8-23-71		10										
9-21-71	1515	10										
10-71	1105	4.0	No Data Collected									
11-22-71	1105	4.0										
12-21-71	1235	4.0										
E		63			69	840	620	970				
n		8		8	7	7	7	8				
\bar{x}		8			10	120	88	121				
Range L		2		8.0	9	95	75	105				
H		14		8.7	11	130	100	130				

T= Total Recoverable
D= Dissolved

~~(P, Zn, Cu only)~~

	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu			
2-17-68	30	5	19	0.00		0.00		0.00			
5-25-68	28	6	9	0	0	0	NES	0			
9-9-68	40	10	0	0.0		0.01 ND		ND	0	ND = not detectable	
1-2-69	36	15	0	0		0.0		0.0			
3-28-69	44	10	0	0	-	0	-	0			
6-16-69	40	11	0	0	-	0	-	0			
8-27-69	60	20	0	0	0	0	-	0			
11-29-69	44	15	0	0	-	0.00	-	0.00			
No data from this date through January 1971											
2-2-71	36	17	1.9	0.0		0.04		0.0			
2-24-71	No data										
3-26-71	40	2	1.3	0.0		0.02		0.0			
4-27-71	36	5	1	0.2		0.22		0.02			
5-21-71	32	7	2	0.14		0.32		0.03			
6-23-71	36	8	1.3	0.0		0.15		0.0			
7- 71	No Data Collected										
8-23-71	37	9	2	0		0.01		0.00			
9-21-71	36	9	2.1	0		<0.01		0.02	T		
				0		<0.01		<0.01	D		
10- 71	No Data Collected										
11-22-71	35	8.8	1.8	0		<0.01	0.00	<0.01	D		
				0.03	0.0	<0.01	0.00	.02	T		
12-21-71	35	9.2	1.8	0		<0.01	0	.01	D		
				0		<0.01	0	.01	T		
1- 72	No data collected										
2- 72	No data Collected										
3-23-72				.06	.000	<0.01	0	.01	D		
				.13	.000	<0.01	.00	.01	T		
4-20-72	31	8.5	1.7	.05	.000	<0.01	0	.02	T		
				.02		<0.01	0	.02	D		
5-22-72	24	5.9	1.2	.37	<.005	<0.01	0	.01	T		
				0		<0.01	0	0	D		
6-20-72	31	7.2	0.9	.03	.001	.01	.02	.01	T		
				0		<0.01	.01	.01	D		
*NES Not enough sample											

SITE #22

FOORMAN CREEK

LAB ANALYSES - METALS

ND = Not Done

T= Total Recoverable
D= Dissolved

	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu			
7-19-72	34	8.4	1.3	.06	.002	.02	.01	.01	T		
				0		<.01	.01	.01	D		
8-31-72	38	8.4	1.6	ND	.002	.03	<.01	<.01	T		
				/		.01	<.01	<.01	D		
9-26-72	20	6.4	1.7	ND	.002	<.01	0	<.01	T		
				/		<.01	0	<.01	D		
10-31-72	37	7.2	2.0	0	.001	<.01	<.01	<.01	T		
				0		<.01	<.01	<.01	D		

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Poolman Creek

Station Circle City - Stemple
road crossing

Sampling Method 1/ Integrated w/
DH-48 Sampler

Analytical Instrument Used HACH Model 2100 A meter

Collector: L. Spence

Turbidity (JTU)

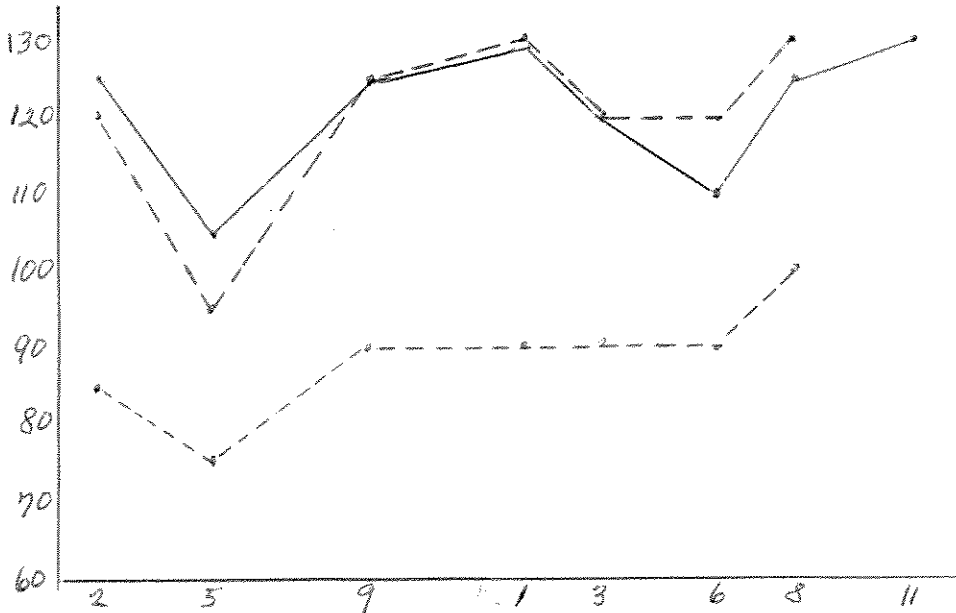
Date	Reading*			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
2-14-72	.85	1.0	.75	.87	.85	colorless	Partial ice cover ^{slieve} station
3-1-72	.65	.62	1.10	.79	.80	colorless	low + clear
3-15-72	1.6	1.6	1.7	1.6	1.6	colorless	slightly rising
5-8-72	2.7	2.9	3.0	2.9	2.9	slight milky green	water clean, rising g.h. 1.06
5-17-72	31	30	31	31	31	grayish- brown	g.h. ± 2.05. Very high - within ± 1 ft. of Stemple road on upstream s.
6-3-72 ¹²³⁰	23	24	25	24	24	gray-brown	morning, g.h. ± 2.00. Both colloidal + fine sediment. Sample
6-7-72 ¹⁹³⁰	7.8	7.5	9.0	8.8	8.8	greenish- gray	clearing, g.h. ± 1.75. Colloidal settled + 11 minutes in sample.
6-13-72 ¹⁰²⁰	8	9	11	9.3	9.3	grayish- green	g.h. ± 1.42. Milky-clear in Shelburn. Cool weather
							last 2 days Colloidal, sett + detritus. Quite a destruction on meter 10 x 100 scales.
6-16-72 ¹³⁵⁰	4.6	5.0	5.3	5.0	5.0	light- greenish	g.h. 1.35. Clearing. Very little sediment. Mostly detritus + colloidal matter.
6-20-72	3.3	3.6	3.5	3.5	3.5	milky- clear	Clear: g.h. 1.22. Very little sediment mostly Colloidal.
2-14-73	.34	.42	.55	.44	.45	colorless clear	Clear. g.h. .06 (after channel comparisons). Ice cover on spots
5-17-73	1.7	2.0	2.1	1.9	1.9	colorless	g.h. .78** low + clear
5-22-73	2.7	2.4	3.3	2.8	2.8	colorless	g.h. .99** low + nearly clear.
5-31-73	.9	1.2	.9	1.0	1.0	colorless	g.h. .87. clear + low.
6-4-73	.75	.95	.90	.87	.90	colorless	g.h. .81 clear + low Flow meas. taken.

* Integrated sample placed into 3 separate vials = readings 1, 2 + 3.

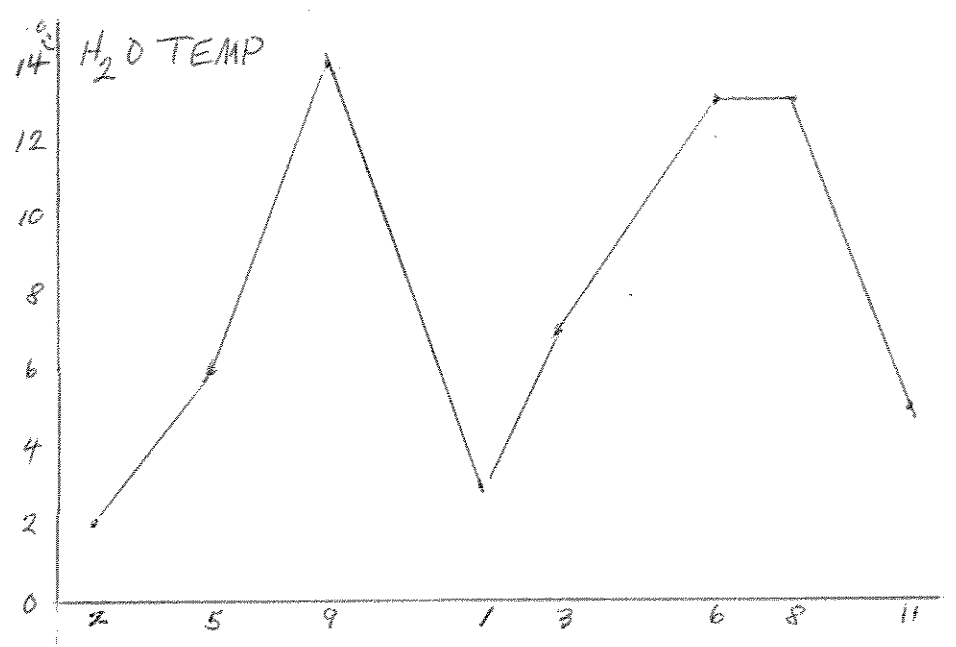
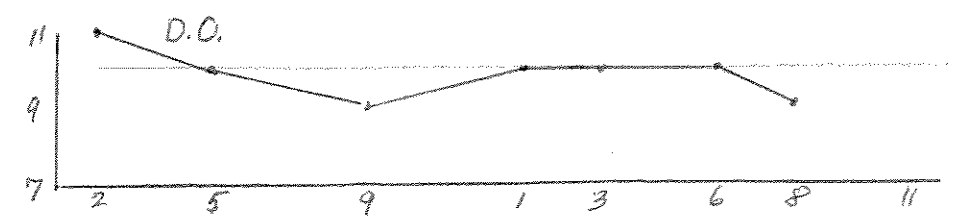
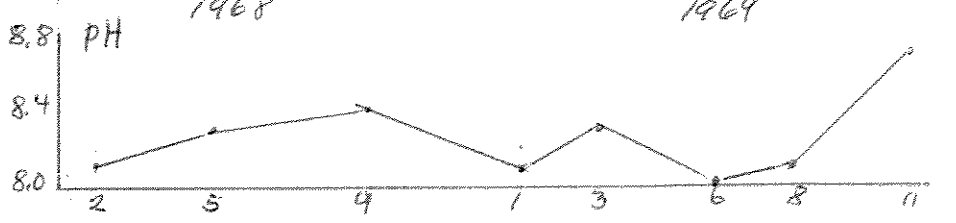
1/ Surface Grab, Integrated, Other

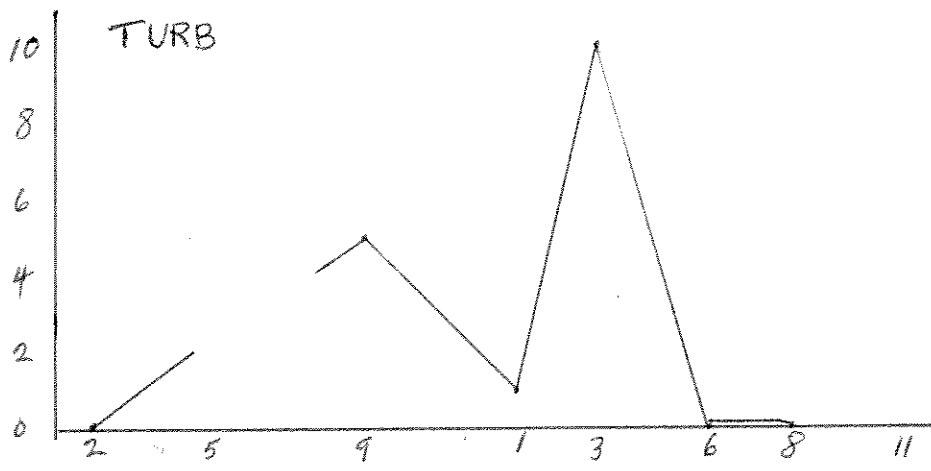
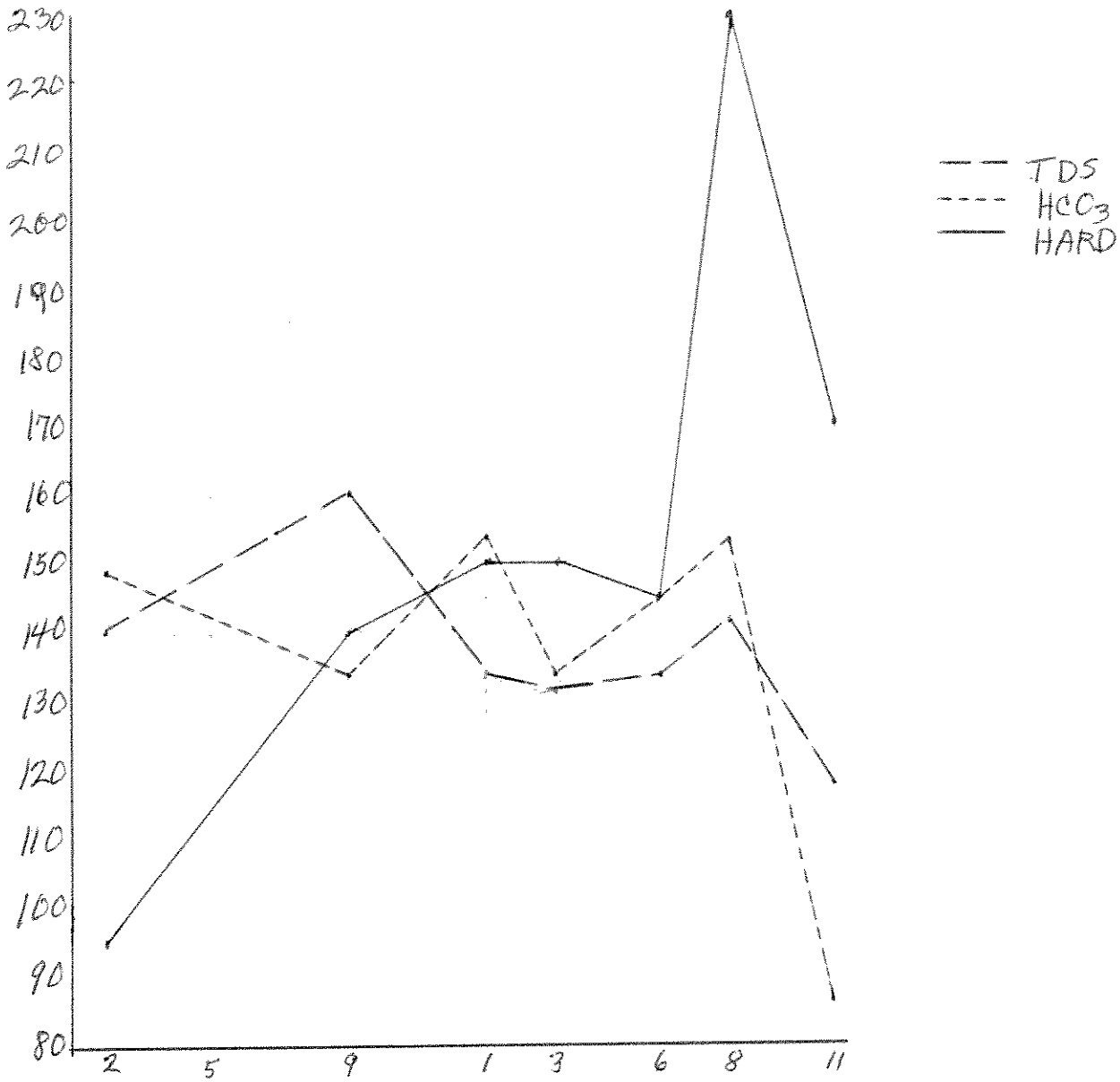
2/ According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971,

SITE #22 POORMAN CR. FIELD DATA



--- ALK
 - - - Ca HARD
 — TOTAL HARD

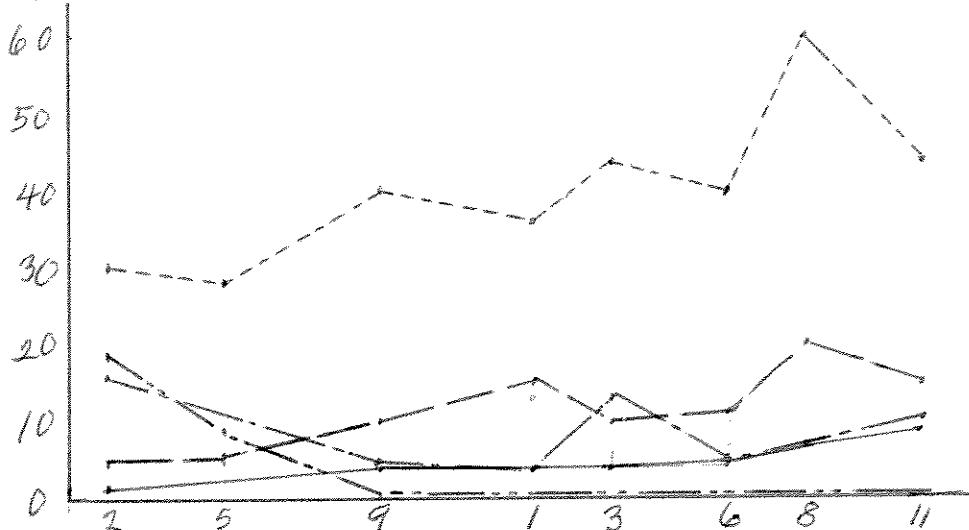




SITE # 22 POORMAN CR. LAB ANALYSES

page 2

mg/l



- Mg
- .- Ca
- Cl
- ... SO4
- Na+K

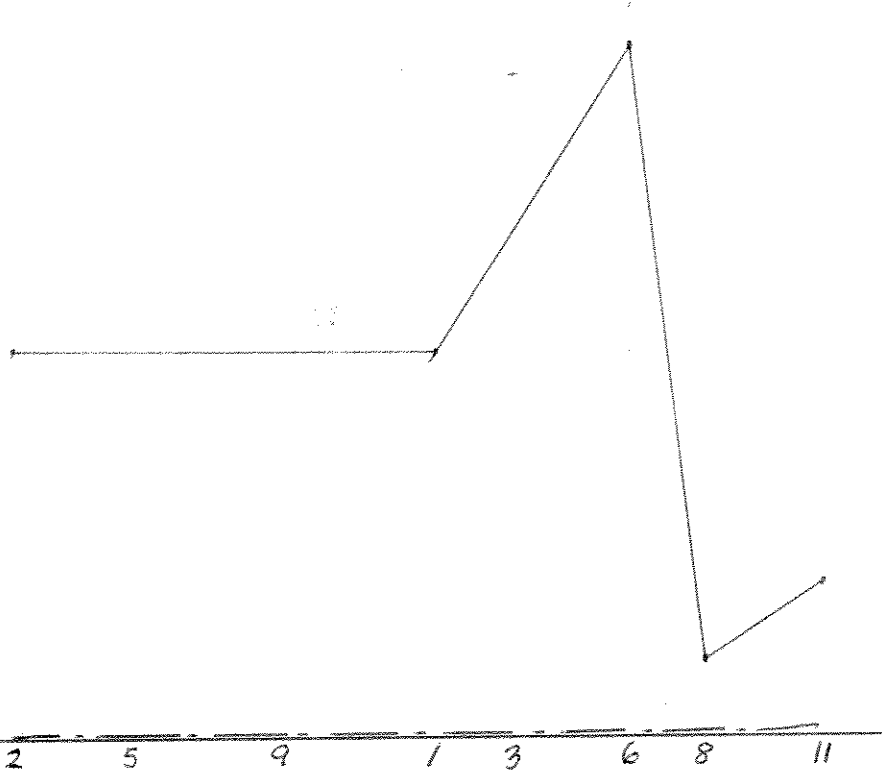
.36

.30

.20

.10

.00



- NO3
- F

FIELD REPORT

Water-quality measurements

Part sample at this site - Station description as of 10/1/64.

Type: 3

Station ID: 12301790

Date: Sept. 11, 1964 Time: 1230 Collected by: M.L. Korman

Station Name: Blanchard River below 7-up Pet. Creek on Lumber, Wt.

Parameter	Code	Result	
Discharge (cfs) <u>16 gage</u>	00060	<u>abt. 12.0 cfs</u>	
Air Temperature (°C)	00020	<u>74.0</u>	
Water Temperature (°C)	00010	<u>11.0</u>	
pH	00400		
Alkalinity	00410		F <u>820</u>
Specific conductance (umhos/cm)	00095		S <u>X ml sample</u>
Dissolved Oxygen	00300		F
Coliform bacteria (per 100 ml)	31501	<u>150</u>	S <u>X 2 "</u>
<u>1 ml</u> <u>36</u> colonies			
<u>0.1 ml</u> <u>86</u> colonies			
<u>0.01 ml</u> <u>140</u> colonies			
<u>1 ml</u> <u>*</u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>5</u>	
<u>1 ml</u> <u>0</u> colonies			
<u>0.1 ml</u> <u>0</u> colonies			
<u>0.01 ml</u> <u>0</u> colonies			
<u>100 ml</u> <u>2</u> colonies			
Other <u>* 500 ml fecal coliform bacteria count</u>			

PROVISIONAL

Observations and Remarks

Appearance of surface: clear & clean

Appearance of bottom: very slight aquatic growth on staked

Weather conditions: partly clear, light breeze

General biologic conditions: No algal or weed at sampling point of sharp absence

Nature of streamflow: 1-2 m/sec, slight turbulence, fine silt & silt suspended

Any unusual conditions: No forest in area, no forest, forest not burning.

Water very clear - no sediment apparent

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3347.00

Date: Aug 13, 1973 Time: 1145 Collected by: h.C. FLADLAND

Station Name: Bhacicut R. bel Seven-Up Pete Creek

Parameter	Code	Result	
Discharge (cfs)	00060	<u> </u>	
Air Temperature (°C)	00020	<u>25.5</u>	
Water Temperature (°C)	00010	<u>17.0</u>	
pH	00400	<u> </u>	
Alkalinity	00410	<u> </u>	F <u> </u> S <u> </u> X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095	<u> </u>	
Dissolved Oxygen	00300	<u> </u>	F <u> </u> S <u> </u>
Coliform bacteria (per 100 ml)	31501	<u>75</u>	X 2 =
<u>5</u> ml <u>5</u> colonies			
<u>50</u> ml <u>40</u> colonies			
<u>100</u> ml <u>65</u> colonies			
<u> </u> ml <u> </u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>6</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>2</u> colonies			
<u>100</u> ml <u>6</u> colonies			
<u> </u> ml <u> </u> colonies			

Other

Observations and Remarks

Appearance of surface: clear & clean

Appearance of bottom: clear (large boulders, gravel & sand) some tree stumps

Weather conditions: partly cloudy & warm

General biologic conditions: little aquatic growth on rocks & logs of

Nature of streamflow: very low, riffles (4/10 deep in center bridge)

Any unusual conditions: of stream for about 6 ft, riffles on both sides of channel, stream about 20 ft across

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334700

Date: 16 JULY 73

Time: 1115

Collected by: H. C. FLADLAND

Station Name: BLACKFOOT R. bel. Seven-Up Ditch Cr. W. LINCOLN

Parameter	Code	Result	F	S
Discharge (cfs)	00060	<u>no gage</u>		
Air Temperature (°C)	00020	<u>24.0</u>		
Water Temperature (°C)	00010	<u>11.5</u>		
pH	00400			
Alkalinity	00410			
Specific conductance (umhos/cm)	00095			
Dissolved Oxygen	00300			
Coliform bacteria (per 100 ml)	31501	<u>20</u>		
<u>5</u> ml <u>0</u> colonies <u>50</u> ml <u>5</u> colonies <u>100</u> ml <u>14</u> colonies _____ ml _____ colonies				F _____ S _____ X <u>820</u> ml sample F _____ S _____ X 2 =
Fecal coliform bacteria (per 100 ml)	31616	<u>1</u>		
<u>5</u> ml <u>0</u> colonies <u>50</u> ml <u>0</u> colonies <u>100</u> ml <u>1</u> colonies _____ ml _____ colonies				

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN

Appearance of bottom: CLEAN (LARGE BOULDERS, GRAVEL & SAND)

Weather conditions: CLEAR AND WARM

General biologic conditions: Very little aquatic growth on rocks

Nature of streamflow: very low, only 3 to 4 tenths deep, alot of sandbars

Any unusual conditions: samples taken from log bridge (about 200 ft down stream from old sampling site.)

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12 384 700

Date: 12/15/78 Time: 1200

Collected by: L. E. FRADY, JR. & M. J. BROWN

Station Name: Blackfoot R. below (???)

Parameter	Code	Result	
Discharge (cfs)	00060	<u>264</u> <u>ast.</u>	
Air Temperature (°C)	00020	<u>9.5</u>	
Water Temperature (°C)	00010	<u>5.5</u>	
pH	00400		
Alkalinity	00410		
Specific conductance (umhos/cm)	00095		F
Dissolved Oxygen	00300		S
Coliform bacteria (per 100 ml)	31501	<u>10</u>	F
<u> </u> ml <u> </u> colonies			S
<u> </u> ml <u> </u> colonies			
<u> </u> ml <u> </u> colonies			
<u> </u> ml <u> </u> colonies			
Fecal coliform bacteria, (per 100 ml)	31616	<u>2</u>	
<u> </u> ml <u> </u> colonies			
<u> </u> ml <u> </u> colonies			
<u> </u> ml <u> </u> colonies			
<u> </u> ml <u> </u> colonies			

X 820 ml samp.

X 2 =

PROVISIONAL

Observations and Remarks

Appearance of surface: Clear & calm

Appearance of bottom: Clear, some aquatic life, some rocks

Weather conditions: no floating debris, overcast, moderate, light rain, mild

General biologic conditions: little aquatic life

Temperature of streamflow: normal

Any unusual conditions: low water, some algae in stream

normal tree cover

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Date: MAY 21, 1973

Time: 1300

Station ID: 12334900

Collected by: L. C. FLADLAND & M. KASMAN

Station Name: BLACKFOOT R. bet Seven Up Drive Cr. in Lincoln

Parameter	Code	Result
Discharge (cfs) <u>No gage</u>	00060	<u>est. 500 cfs</u>
Air Temperature (°C)	00020	<u>11.0</u>
Water Temperature (°C)	00010	<u>7.0</u>
pH	00400	
Alkalinity	00410	
Specific conductance (umhos/cm)	00095	
Dissolved Oxygen	00300	
Coliform bacteria (per 100 ml)	31501	<u>13</u>
<u>5</u> ml <u>0</u> colonies		
<u>50</u> ml <u>6</u> colonies		
<u>100</u> ml <u>13</u> colonies		
_____ ml _____ colonies		
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>
<u>5</u> ml <u>0</u> colonies		
<u>50</u> ml <u>0</u> colonies		
<u>100</u> ml <u>0</u> colonies		
_____ ml _____ colonies		

F _____ X 820
 S _____ X ml sampl
 F _____
 S _____ X 2 =

PROVISIONAL

Observations and Remarks

Appearance of surface: clear

Appearance of bottom: water milky

Weather conditions: clear, cool, windy

General biologic conditions: no floating debris, some algae at station

Temperature of streamflow: medium flow - well within banks

Any unusual conditions: baraging bridge being built 200' downstream
sampling site.

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334700

Date: 25 April 73 Time: 1100 Collected by: H.C. FLADLAND

Station Name: BLACK FOOT R. bel. SEVEN-UP Pete Cr. ju. Lincoln

Parameter	Code	Result	F	S
Discharge (cfs)	00060	_____		
Air Temperature (°C)	00020	<u>7.5°C</u>		
Water Temperature (°C)	00010	<u>5.0°C</u>		
pH	00400	_____		
Alkalinity	00410	_____		
Specific conductance (umhos/cm)	00095	_____		
Dissolved Oxygen	00300	_____		
Coliform bacteria (per 100 ml)	31501	<u>12</u>		
				<u>820</u> X ml sample
<u>5</u> ml <u>0</u> colonies				
<u>50</u> ml <u>1</u> colonies				
<u>100</u> ml <u>12</u> colonies				
_____ ml _____ colonies				
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>		
<u>5</u> ml <u>0</u> colonies				
<u>50</u> ml <u>0</u> colonies				
<u>100</u> ml <u>0</u> colonies				
_____ ml _____ colonies				

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN

Appearance of bottom: CLEAR, NO SIGNIFICANT GROWTH

Weather conditions: OVERCAST - WINDY, CLEAR

General biologic conditions: _____

Nature of streamflow: MODERATE, SLOW

Any unusual conditions: NO UNUSUAL CONDITIONS OBSERVED

UPPER RECKS IN SHADING AREA DOWN STREAM - BRUCKS BRIDGE
BRIDGE OVER BRUCKS BRIDGE

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3347.00

Date: 28 MARCH 73 Time: 0935 Collected by: L.C. FLADLAND

Station Name: BLACKFOOT R. 1/2 MI. UP PETE CR. W. LINCOLN

Parameter	Code	Result	
Discharge (cfs)	00060		
Air Temperature (°C)	00020	<u>+35°</u>	
Water Temperature (°C)	00010	<u>+0.5°</u>	
pH	00400		
Alkalinity	00410		F _____ X <u>820</u> S _____ ml sample
Specific conductance (umhos/cm)	00095		
Dissolved Oxygen	00300		F _____ S _____
Coliform bacteria (per 100 ml)	31501	<u>2</u>	S _____ X 2 =
<u>5</u> ml <u>0</u> colonies			
<u>10</u> ml <u>0</u> colonies			
<u>10</u> ml <u>2</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>5</u> ml <u>0</u> colonies			
<u>10</u> ml <u>0</u> colonies			
<u>10</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

PROVISIONAL

Other

Observations and Remarks

Appearance of surface: clear & clean

Appearance of bottom: clear - no aquatic growth

Weather conditions: cool & partly cloudy

General biologic conditions: clean water stream

Nature of streamflow: low spring flow

Any unusual conditions: Truck still foraging river
below sampling site

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Date: 27 FEB. 73

Time: 1010

Station ID: 12-3347.00

Collected by: L.C. PLADLAND

Station Name: BLACKFOOT R. bel SEVEN-UP PETE CR.

Parameter	Code	Result	
Discharge (cfs) <u>No gage</u>	00060		
Air Temperature (°C)	00020	<u>+5.5</u>	
Water Temperature (°C)	00010	<u>+3.0</u>	
pH	00400		
Alkalinity	00410		
Specific conductance (umhos/cm)	00095		F _____
Dissolved Oxygen	00300		S _____
Coliform bacteria (per 100 ml)	31501	<u>6</u>	F _____
<u>1</u> ml <u>0</u> colonies ✓			S _____
<u>50</u> ml <u>3</u> colonies ✓			
<u>100</u> ml <u>0</u> colonies ✓			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>4</u>	
<u>1</u> ml <u>0</u> colonies ✓			
<u>50</u> ml <u>2</u> colonies ✓			
<u>100</u> ml <u>0</u> colonies ✓			
_____ ml _____ colonies			

820
X ml sample

X 2 =

Observations and Remarks

Appearance of surface: CLEAN

Appearance of bottom: CLEAN, Very little Aquatic growth on rock, almost clean bed.

leather conditions: Dirtly overcoat - with dizzeling rain

eneral biologic conditions: Basic Low Flow (complete ice cover about 200 Ft. above & below sampling site)

ature of streamflow: _____

y unusual conditions: TRUCKS FORDING RIVER just below sampling site, also a cat was used to open river for loading.

Some rocks have been pushed towards the bank.

* Reported value based on non-ideal count of colonies.

L. Pladland

FIELD REPORT

Water-quality measurements

Type: 3 Station ID: 12-3347.00
 Date: 1-23-72 Time: 1615 Collected by: J.R. Knapp

Station Name: Blackfoot R bl Secor-up Pete C n - Lincoln

Parameter	Code	Result	
Discharge (cfs)	00060		
Air Temperature (°C)	00020		
Water Temperature (°C)	00010	<u>1.0°C</u>	
pH	00400		
Alkalinity	00410		F <u>820</u> X ml samp
Specific conductance (umhos/cm)	00095		S
Dissolved Oxygen	00300		F
Coliform bacteria (per 100 ml)	31501	<u>2</u>	S X 2 =
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>2</u> colonies			
ml colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
ml colonies			

Other

Observations and Remarks

Appearance of surface: mostly ice covered about 10% open water
 Appearance of bottom: rounded gravel
 Weather conditions: partly cloudy
 General biologic conditions: none observed
 Nature of streamflow: even velocity 2-4 ft/sec
 Any unusual conditions: none

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334700

Date: Dec. 27, 72 Time: 1140 Collected by: L.C. FLADLAND, A.H.L. KASMAN

Station Name: BLACKFOOT R. BEH. SEVEN-UP PETE CR. LINCOLN

Parameter	Code	Result	
Discharge (cfs) <i>No gage</i>	00060	<u>est. @ 35 cfs</u>	
Air Temperature (°C)	00020	<u>+ 4.5</u>	
Water Temperature (°C)	00010	<u>+ 3.0</u>	
pH	00400		
Alkalinity	00410		F _____ X <u>82</u> S _____ ml sam
Specific conductance (umhos/cm)	00095		S _____
Dissolved Oxygen	00300		F _____ S _____
Coliform bacteria (per 100 ml)	31501	<u>0</u>	X 2 =
<u>1.0</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1.0</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: clean - no floating - no debris

Appearance of bottom: very clean

Weather conditions: overcast, cool, calm

General biologic conditions: very slight aquatic growth

Nature of streamflow: laminar flow

Any unusual conditions: 50-60 cm ground in sampling area, 50-90% open at sampling site. Complete ice cover above & below. 70% - was in the air temps have been in mid. 3

FIELD REPORT

Water-quality measurements

Type: 3

Date: 28 NOV 72 Time: 1115

Station ID: 12334700

Collected by: H.C. FLADLAND & M.L. KASPER

Station Name: BLACK FOOT R. bed SEVEN-DO PETS Cr mi LINCOLN, MT

Parameter	Code	Result	
Discharge (cfs) <i>No gage</i>	00060	<u>55</u> <u>55 ft. 72 c.f.s.</u>	
Air Temperature (°C)	00020	<u>-4.5°</u>	
Water Temperature (°C)	00010	<u>0.0°</u>	
pH	00400		
Alkalinity	00410		
Specific conductance (umhos/cm)	00095		F _____
Dissolved Oxygen	00300		S _____ X ml samp
Coliform bacteria (per 100 ml)	31501	<u>10</u>	F _____
<u>50</u> ml <u>5</u> colonies			S _____ X 2 =
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>1</u>	
<u>1</u> ml <u>0</u> colonies			
<u>100</u> ml <u>1</u> colonies			
_____ ml _____ colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: clear, some floating slush ice

Appearance of bottom: clear, some anchor ice present

Weather conditions: partly cloudy, cool, calm

General biologic conditions: very slight aquatic growth on rocks on str. bed

Temperature of streamflow: low base flow

Any unusual conditions: some slush ice flowing - 5-6 ft. thin ice on both banks - Stream 95% open - 6" snow in area

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334670

Date: Oct. 26, 1972 Time: 1010 Collected by: M. L. Kasman & L. Fladland

Station Name: Blackfoot R. below ^{Ferry-up Ditch Creek} and ~~near~~ Fork nr. Lincoln, MT.

Parameter	Code	Result	
Discharge (cfs) <u>100000</u>	00060	<u>no float, est. 60 cfs</u>	
Air Temperature (°C)	00020	<u>2.0</u>	
Water Temperature (°C)	00010	<u>3.5</u>	
pH	00400	<u> </u>	
Alkalinity	00410	<u> </u>	F <u> </u> S <u> </u> X <u>820</u> ml sample
Specific conductance (umhos/cm)	00095	<u> </u>	
Dissolved Oxygen	00300	<u> </u>	F <u> </u> S <u> </u>
Coliform bacteria (per 100 ml)	31501	<u>12</u>	X 2 *
<u>1</u> ml <u>0</u> colonies			
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>12</u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1</u> ml <u>0</u> colonies			
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			

Other

BOD's taken

Observations and Remarks

Appearance of surface: Clear & green

Appearance of bottom: rocky / silt

Weather conditions: overcast, light rain, snow showers

General biologic conditions: no algae, no plants on stream bed

Nature of streamflow: slow

Any unusual conditions: no

sampling point: 50 ft upstream from 7th gully

Blackfoot River below Landers Fork (Between Landers Fork and Lincoln) 1
@ 7-up Pete Cr.

1st sample at
this station

BOD DETERMINATION

STATION NAME BLACKFOOT R. BL. LANDERS FORK in Lincoln,
STATION I.D. Montana
SAMPLING DATE 10/26/72
SAMPLING TIME 1010 BOD 1.0 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. @ SEVEN-UP PETE CR. in LINCOLN,
STATION I.D. MONTANA
SAMPLING DATE 28 NOV. 1972
SAMPLING TIME 1115 BOD 2.5 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. BEL SEVEN-UP PETE CR. in LINCOLN
STATION I.D. 12-3347.00
SAMPLING DATE 27 DEC. 1972
SAMPLING TIME 1140 BOD 1.4 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. BEL SEVEN-UP PETE CR. in LINCOLN
STATION I.D. 12-334700
SAMPLING DATE 1/23/1973
1115

@ 7-up Pete Cr.

2

BOD DETERMINATION

STATION NAME Blackfoot R. bel Seven-Up Pete Cr. nr. Lincoln Mt.
STATION I.D. 12-3347-00
SAMPLING DATE 27 Feb 73
SAMPLING TIME 1010
BOD 0.8 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. Bel. 7-UP Pete Cr. nr LINCOLN
STATION I.D. 12 334700
SAMPLING DATE 28 MARCH 1973
SAMPLING TIME 0935
BOD 1.1 mg/l

PROVISIONAL

BOD DETERMINATION

STATION NAME BLACKFOOT R. bel Seven-Up Pete Cr. nr LINCOLN, MT.
STATION I.D. 12 334700
SAMPLING DATE 25 APRIL 1973
SAMPLING TIME 1100
BOD 1.5 mg/l

PROVISIONAL

BOD DETERMINATION

STATION NAME BLACKFOOT R. bel. Seven-Up Pete Cr. nr. LINCOLN, MT.
STATION I.D. 12 334700
SAMPLING DATE 21 MAY 1973
SAMPLING TIME 1300
BOD 0.8 mg/l

Blackfoot River below Landers Fork (Between Landers Fork and Lincoln)

@ 7-up Pete Cr.

3

PROVISIONAL

BOD DETERMINATION

STATION NAME Blackfoot R. bel Seven-Up Pete Cr M. LINCOLN, MT
 STATION I.D. 12334100
 SAMPLING DATE JUNE 18, 1973
 SAMPLING TIME 1200 BOD 2.0 mg/l *CMK*

BOD DETERMINATION

STATION NAME Blackfoot R. bel Seven-Up Pete Cr.
 STATION I.D. 12334100
 SAMPLING DATE 16 July 1973
 SAMPLING TIME 1115 BOD 1.8 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R bel 7up Pete Cr
 STATION I.D. 12334700
 SAMPLING DATE Sept 11, 1973
 SAMPLING TIME 1230 BOD 0.5 mg/l

FWP

SITE #23 LANDER'S FORK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL
2-17-68	1545	4	0	8.4	10	110	85	110	6	2	snow	B.D
5-26-68	0815	4	8	8.3	10	110	75	110	5	2	cloud	"
9-10-68	1110	10	25	8.2	10	115	90	135	0	2	clear	"
1-2-69	1150	4	-2	8.1	10	115	90	110	0	2	p.c.	"
3-28-69	1555	6	5	8.0	10	110	90	135	0	2	p.c.	"
6-17-69	1250	9	21	7.9	10	115	80	100	0	2	clear	"
8-27-69	1105	9	19	7.9	8	115	95	115	0	2	clear	"
11-30-69	0930	3	-1.5	8.6				110			clear	*/S
2-2-71												
E		48			68	940	605	1045				
n		8		8	7	7	7	8				
X		6			10	134	86	131				
Range L		3		7.9	8	110	80	100				
H		10		8.6	10	145	95	145				

LANDERS FORK

Field Notes

August 1, 1973. Grosfield ditch taking about half the flow in the Blackfoot River below Landers Fork (about 1/8 mile). Low streamflow above ditch and less below.

	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
2-17-68	36	9	12	0.00		0.00		0.00				
5-25-68	22	10	6	0	0	0		0				
9-9-68	42	12	0	0.0		ND-0		ND-0	ND = not detectable			
1-2-69	36	15	0	0		0.0		0.0				u
3-28-69	36	15	0	0	-	0	-	0				
6-16-69	28	15	0	0	-	.46	-	0				
8-27-69	36	39	0	0	0	0	-	0				
11-29-69	40	22	0	0.22	-	0.00	-	0.00				
2-24-71	36	15	1.0	0.0		0.03		0.0				

MONTANA FISH AND GAME DEPARTMENT

pg 1

TURBIDITY RECORD

Stream Lander's Fork

Station Highway 200 bridge

Sampling Method ^{1/} Integrated
w/ DH-48 Sampler

Analytical Instrument Used Hach 2100A water

set in 5 minutes before reading

collector: L. Spence

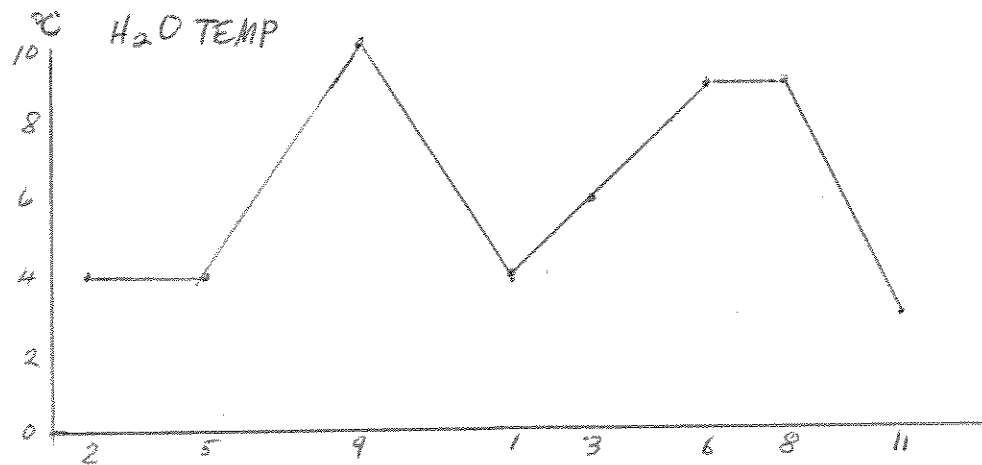
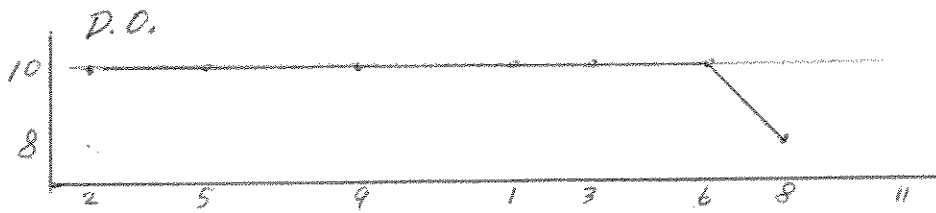
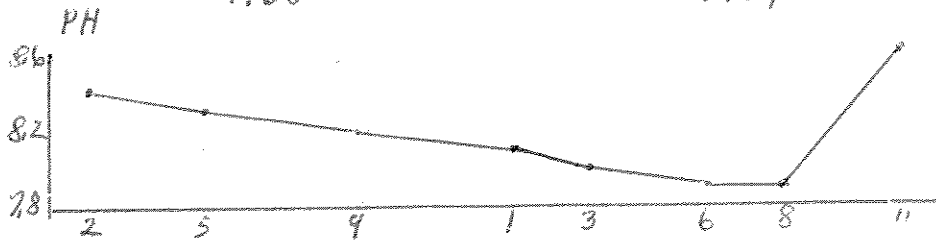
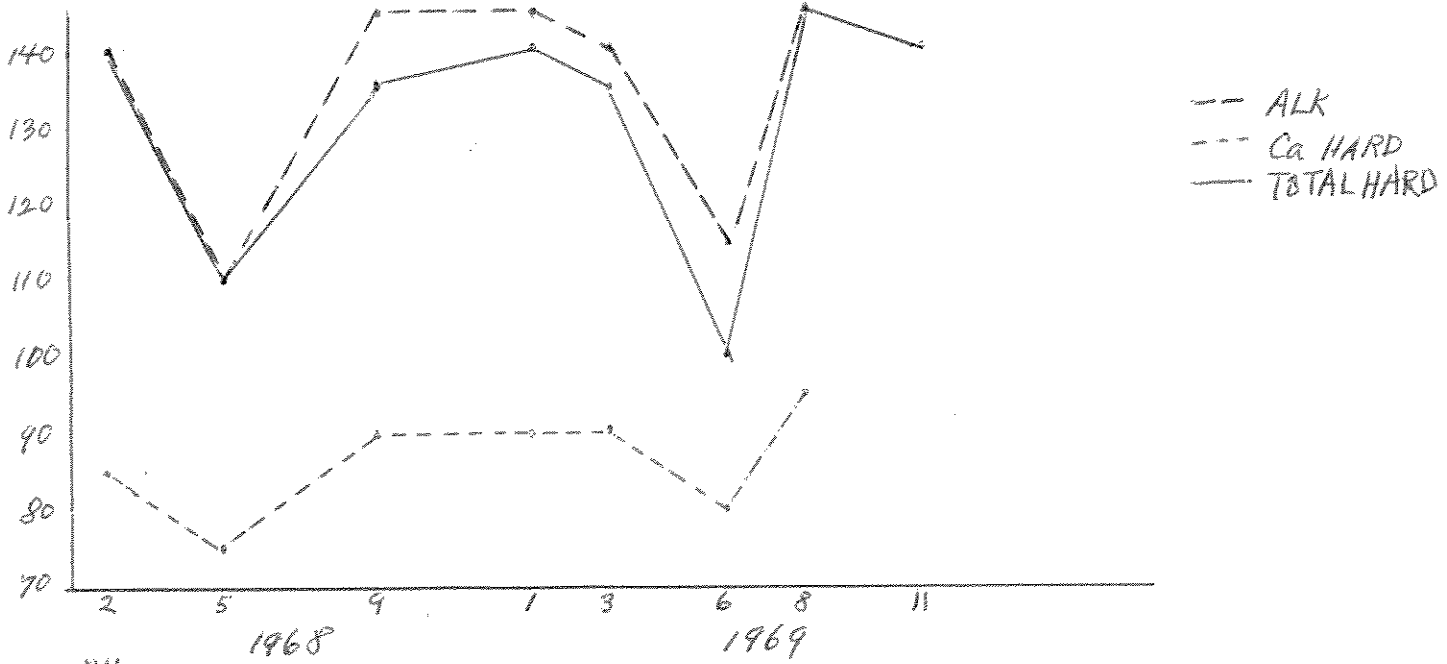
Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
3-1-72	.36	.28	.27	.30	.30	colorless	low + clear
3-17-72	.18 .25	.21 .40	.55 1.0	.55	.55	colorless	Thawing Logother. Low + clear
5-17-72	52	54	51	52	50	light brown	q.h. 13.69 not too high. wet. too deep to wade.
5-24-72	8.2	6.7	6.5	7.1	7.1	milky-grey	q.h. 13.81. Not too high. Colloidal + fine silt.
5-31-72	121	119	122	121	120	muddy-brown	q.h. 13.16. Mostly colloidal. Some heavy silt + detritus.
6-3-72	1045 220	220	230	223	220	muddy-brown	q.h. 13.44. High colloidal matter silt + very little detritus.
6-5-72	1200 150	150	145	148	150	muddy-brown	q.h. 13.12. Mostly colloidal w/ some silt + detritus.
6-7-72	0945 130	130	120	127	130	muddy-brown	q.h. 12.84. Moderate detritus in flow. Some floating debris.
6-9-72	115	120	115	117	120	muddy-brown	q.h. 12.29. Detritus + debris in flow. Large silt particles.
6-13-72	1115 66	50	51	51	50	light brown	q.h. 12.69. Lots of debris above + below bridge. Cool weather last 2 days. Colloidal large + fine silt + detritus.
<p>Out! - contaminated by dirt in lid of bottle. other 2 rinsed off.</p>							
6-16-72	27	27	25	26	26	brownish gray	q.h. 12.96. Clearing. Colloidal silt + detritus.
6-20-72	12	12	13	12	12	milky-green	q.h. 13.11. Can see bottom in shallows. Colloidal + detritus.
6-27-72	4.2	4.3	4.9	4.5	4.5	greenish clear	q.h. 13.42 water clear.
7-10-72	1.7	2.0	2.2	2.0	2.0	colorless	q.h. 13.60. clear water.
11-22-72	.35	.40	.53	.43	.40	colorless	no q.h. taken due to changed channel. low + clear.
2-22-73	.5	.9	.5	.63	.65	colorless	q.h. 15.02 @ new RP. low + clear algae on bottom. a few bits of silt in flowing by.
5-16-73	14	16	14	15	15	like milky-brown	rising NO GOOD! ENABT to use cell vice,
5-17-73	45	41	42	43	45	like gray brown	not too high.

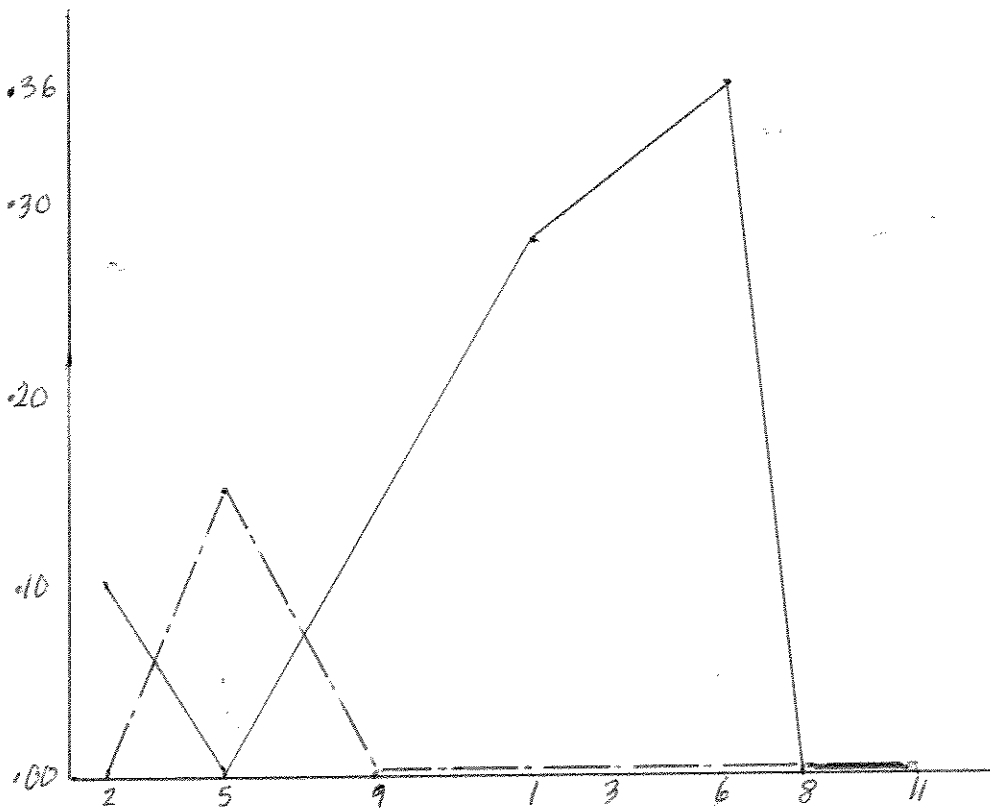
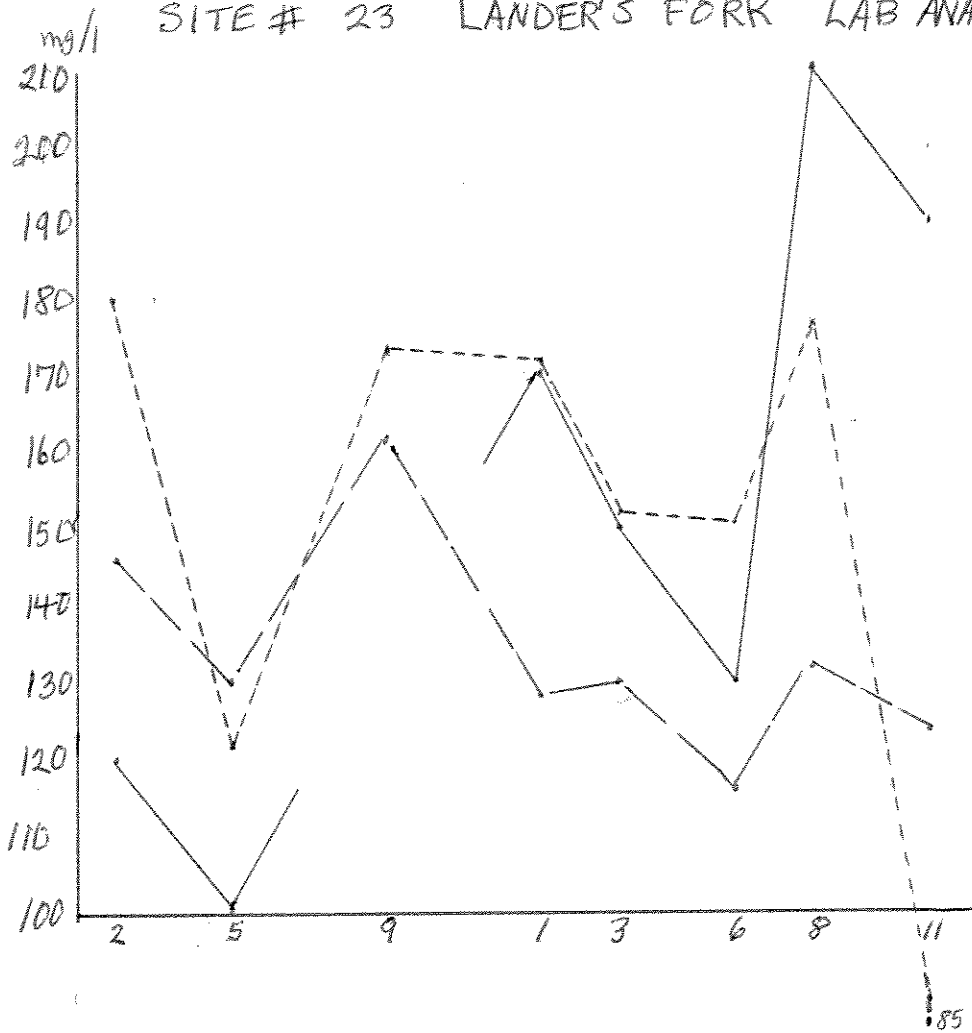
^{1/} Surface Grab, Integrated, Other

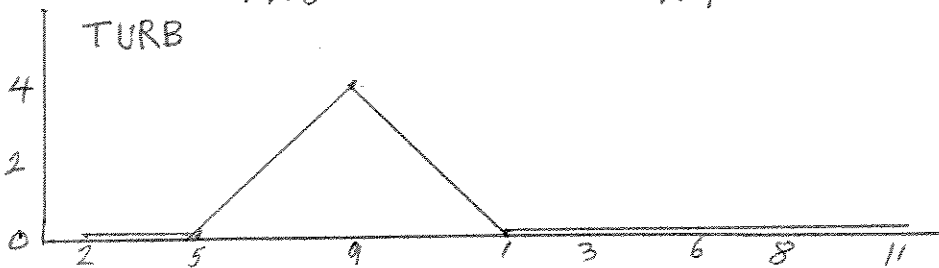
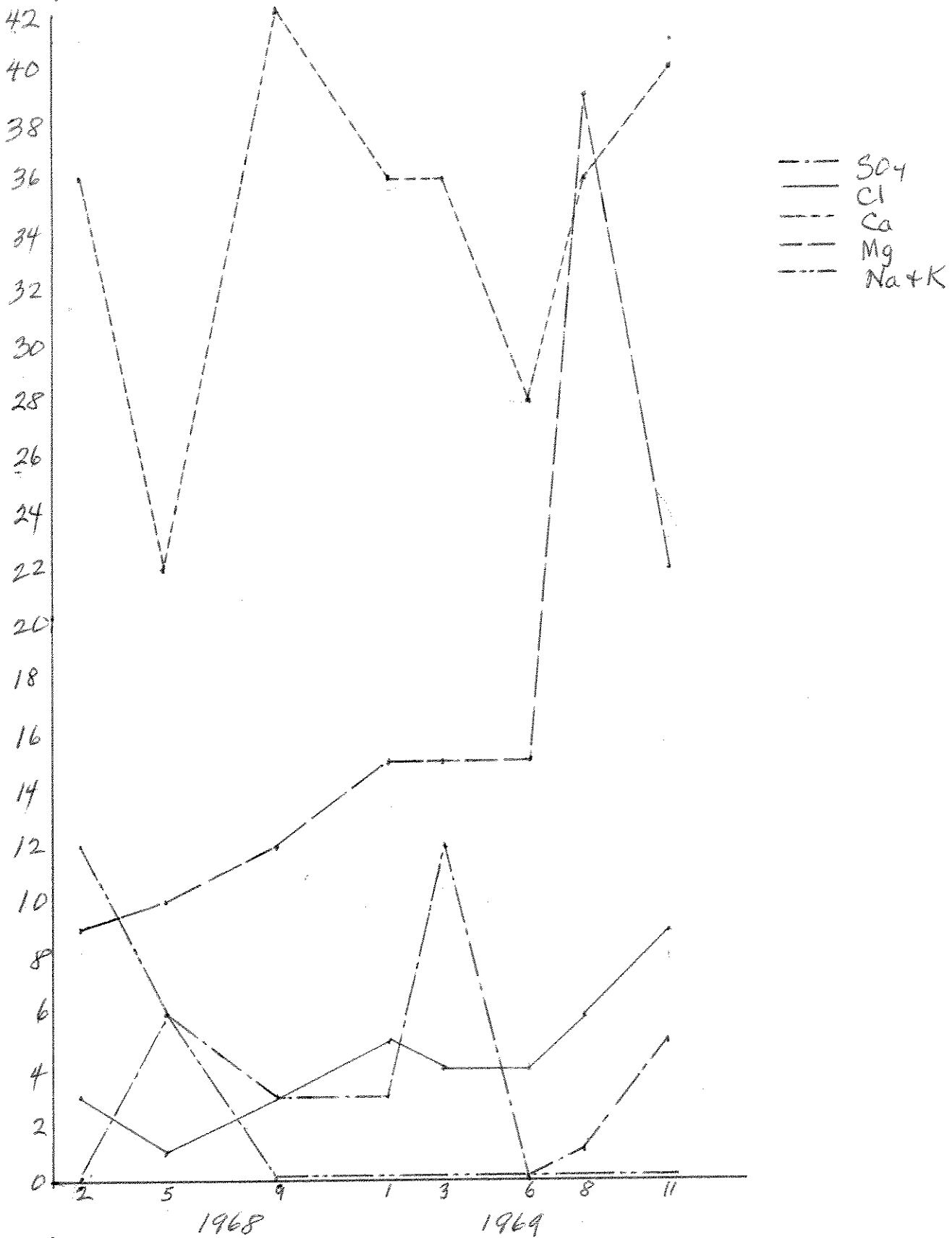
^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971, pg. 352

SITE #23 LANDER'S FORK FIELD DATA



SITE # 23 LANDER'S FORK LAB ANALYSES page 1





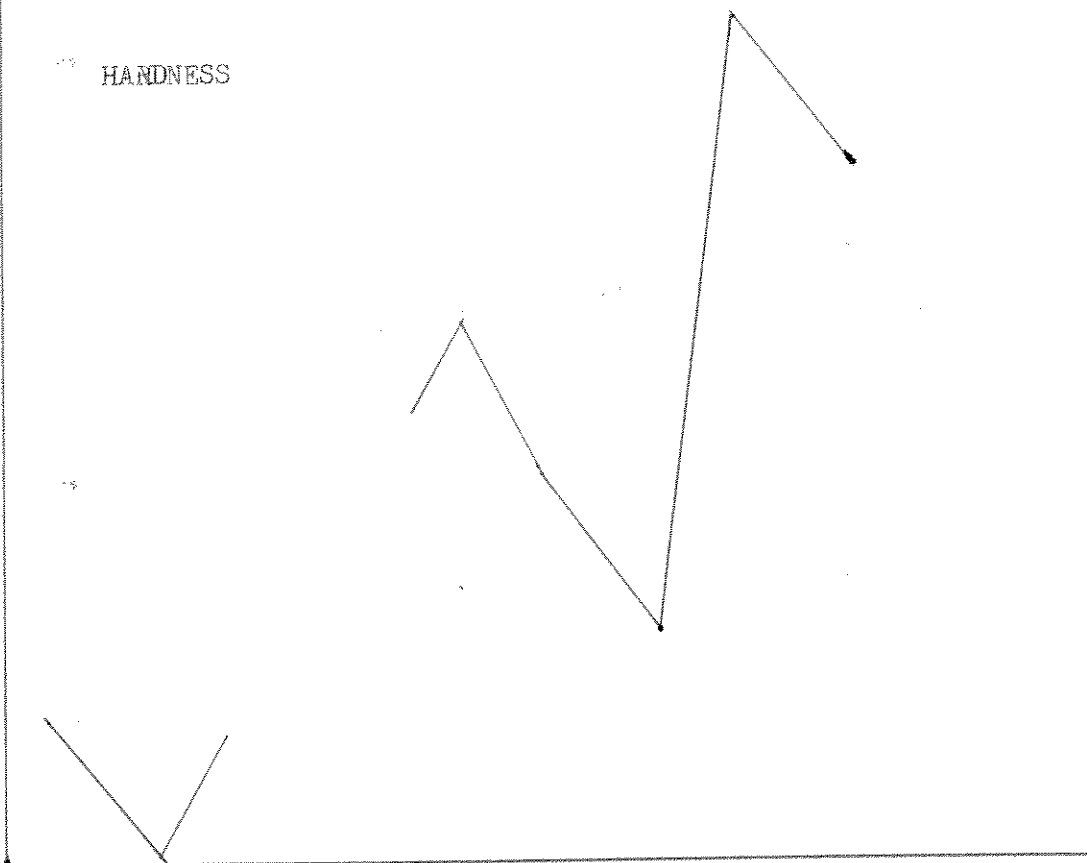
COMPARISON BETWEEN HARDNESS (LAB) AND ZINC AT SITE #23 LANDER'S FORK

mg/l

260
180
160
140
120
100

HARDNESS

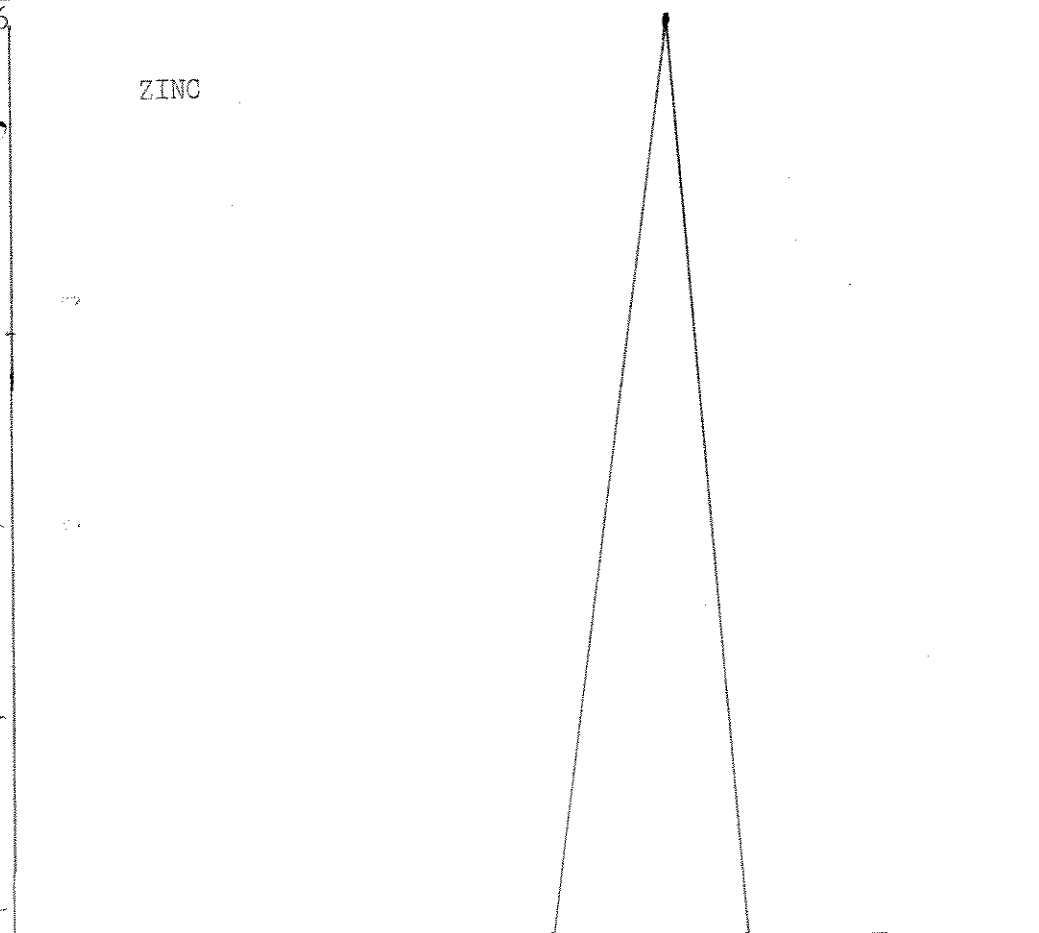
2 3 4 5 6 7 8 9 10 11 1 2 3 4 5 6 7 8 9 10
1968 1969



mg/l
.46
.40

ZINC

2 3 4 5 6 7 8 9 10 11 1 2 3 4 5 6 7 8 9 10 11 12



BLACKFOOT RIVER

Field Notes - Hogum Section

November 14, 1972

(1) Walked entire section which was shocked this summer looking for spawning activity. Saw several schools of whitefish. Saw no trout spawning and no obvious redds. Substrate is semi-anchored even though ~~ix~~ it consists of only large gravel and perhaps very small rubble. No disturbance to the stream bed was seen which would indicate redd - building. There were a few very recent gravel deposition areas with suitable-sized gravel but no fish or activity were seen. Beaver were working hard since we shocked the section. There was a new dam where one had not been before and several large cottonwood trees were chewed on which will probably be in the stream before long.

SITE #21

BLACKFOOT RIVER

at Hoquiam Co. road bridge

FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COL
2-17-68	1500	1	3	8.3	12	110	75	115	5	2	cloud	B.D
3-17-68	1015	2	1	8.6	11	95	65	105	0	2	snow	"
4-21-68	0715	2	0	8.1	10	85	60	95	0	2	snow	"
5-26-68	0915	7	9	8.2	11	60	45	70	5	2	cloud	"
6-21-68	0815	10	11	8.3	11	80	60	80	2	2	p.c.	"
7-22-68	1745	17	18	8.4	9	105	65	105	0	2	p.c.	"
9-12-68	1325	13	25	8.3	9	110	70	105	0	2	clear	"
10-20-68	0830	3	0	7.9	11	110	70	110	0	2	p.c.	"
12- 1-68	1130	0	-7	8.0	11	120	75	120	0	2	p.c.	"
1- 3-69	1130	0	-8	7.8	10	115	70	110	0	2	p.c.	"
2- 9-69	road closed by snow											
3-29-69	1005	0	-2	8.0	11	110	65	110	0	2	p.c.	"
5- 1-69	1015	5	6	7.9	10	80	50	80	0	2	cloudy	"
6-17-69	1120	11	20	8.0	10	90	60	90	0	2	clear	"
7-17-69	1110	13	23	7.9	9	90	55	90	0	2	clear	"
8-27-69	1150	13	25	8.0	9	120	70	120	0	2	clear	"
10- 8-69	1030	6	7	8.6	9		80	110			p.c.	L.S
11-29-69	1630	2.5	-0.5	8.6	12			120			clear	L.S
1-20-70	1700	-0.5	0	8.6	11.0						Snow	"
<hr/>												
4-27-71	1040	1.5										
5-21-71	1320	5.0										
6-23-71	1445	17.5										
7- 71		No Data Collected										
8-23-71		14										
9-21-71	1300	7.5										
10- 71		No Data Collected										
11-22-71	1235	4.0										
12-21-71	1140	1.0										
E		105			186	1480	1035	1765				
n		18		18	18	15	16	17				
X		6			10	99	65	104				
Range L		0		7.8	9	60	45	70				
H		17		8.6	12	120	80	140				

	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc. alk.	
2-17-68	0	130	105	0	140	0	2	0.0	0.1	115	
3-17-68	0	130	80	0	122	17	2	5.3	0.28	100	
4-21-68		130	90	0	116	20	3	0.00	0.00	95	
5-25-68	0	100	76	0	79	14	1	.1	0	65	
6-20-68	2	106	77	0	98	14	2.5	0.30	0.14	80	
7-22-68	0	128	80	0	119	5	6	0	0.00	98	
9-9-68	3	132	130	0	143	11	4	0	-	117	
10-19-68	0	118	125	0	152	14	4	0	-	125	
11-30-68	6	132	130	0	147	8	4	0	-	120	
1-2-69	3	134	130	0	137	2	5	0	0.3	112	65 60
2-8-69	No data										125
3-28-69	9	126	130	0	122	12	6	0	-	100	60
5-3-69	5	96	110	0	85	8	2	0	-	70	
6-16-69	0	110	110	0	123	3	5	0	0.36	101	Range
7-16-69	0	108	130	0	116	9	6	0	0.08	95	
8-27-69	0	128	230	0	134	7	7	0	0	110	
10-7-69	-	128	210	0	143	19	8	0	0	117	
11-29-69	-	140	170	0	146	7	6	0	0.16	120	
12 -69	No Data										
1-20-70	0	125	125	0	150	8	3	0	0.15	123	2793 26
2 -70	No Data										
3-27-70	4	142	110	0	145	7	3	0	0.3	119	2793 26
4-21-70	-	142	130	0	150	2	0.5	0.1	0.08	123	
4-27-70	-	130	150	0	150	7	1	0.2	0.2	123	
5-22-70	-	100	80	0	120	10	1	0.2	0.2	98	
6-16-70	-	110	120	0	120	4	0	0	0.2	98	
7-21-70	-	140	140	0	150	5	0	0	0.3	123	
8-20-70	-	130	180	0	150	9	0	0	0.2	123	
9-22-70	-	130	180	0	150	10	0	0	0.1	123	
10-21-70	-	140	190	0	150	13	0	0	0.1	123	
11- 70	No Data										
12-17-70	-	130	190	0	140	10	0	0.04	0.1	115	
1-15-71		140	200	0	150	9	0	0.0	0.1	123	
2-2-71		110	120	0.0	120	7.0	0.0	0.04	0.2	98	
2-24-71		140	130	0.0	130	6.0	0.0	0.0	0.3	107	
3-26-71	-	130	120	0.0	140	13	0.0	0.05	0.3	115	
4-27-71		90	70	0	85	13	1	0.3	0.1	70	

SITE #24 BLACKFOOT RIVER AT HOGUM CR. BRIDGE

LAB ANALYSES

Date	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc. Alk.
5-21-71		70	75	0	90	10	0	0.17	0.1	74
6-23-71		120	89	0.0	150	4.1	0.0	0.06	0.3	123
7- 71		130	110	0	160	41	0	0.2	0.2	
8-23-71		130	110	0	160	4.1	0	0.2	0.2	131
9-21-71		120	110	0	150	12	0	0.2	0.2	123
10- 71		No Data Collected								
11-22-71		130	108	0	140	14	0	0	0.2	115
12-21-71		120	110	0	140	8.6	0	0.13	0.1	115
End of "Complete" Analyses.										

	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
2-17-68	28	9	6	0.00		0.00		0.00				
3-17-68	28	2	21	0.00	0.00	0.00	0.00	0.00				
4-21-68	24	8	13	0.00	0.00	0.00	0.00	0.00				
5-25-68	16	9	2	0	0	0	NES	0				
6-20-68	27	2	10	0.14	0.00	0.03		0.00				
7-22-68	32	18	13	0.2	0.00	0.00		0.00				
9-9-68	33	12	2	0.0		ND ^{<.01}		ND ^{<.01}	ND = not detectable	4		
10-19-68	28	13	3	0.0		.01		0	= <.01			
11-30-68	28	15	3	0		0		0				
1-2-69	32	12	0	0.6		0.0		0.0				
2-8-69	No data											
3-28-69	28	15	0	0	-	0	-	0				
5-3-69	24	12	0	0.2	0	0		0				
6-16-69	24	12	1	0	-	0	-	0				
7-16-69	28	15	0	0	-	0.02	-	0.04				
8-27-69	28	39	0	0	0	0	-	0				
10-7-69	32	32	0	0	-	0.0	-	0.0				
11-29-69	28	24	0	0.08	-	0.00	-	0.02				
12-69	No Data											
1-20-70	30	10	10	0.10	-	0	-	0				
2-70	No Data											
3-27-70	26	11	10	0	-	0	-	0				
4-21-70	30	15	10	0.0	-	0.005 ^{<.01}	-	0				
4-27-70	30	20	0	0	-	0.01	-	0				
5-22-70	14	11	15	0.5	-	0	-	<0.01				
6-16-70	24	15	0	0	-	not Analyzed	-	not Analyzed				
7-21-70	24	20	0	0	-	0.03	-	0.06				
8-20-70	28	27	0	0	-	0	-	0.03				
9-22-70	32	24	0	0	-	0.02	-	0	USGS	began		
10-21-70	32	27	0	0.06	-	0.05	-	0.0				
12-17-70	32	27	0	0.1	-	0.06	-	0.0				
1-13-71	28	32	0	0.0		0.03		0.0				
2-2-71	28	10	2.1	0.08		0.03		0.0				
2-24-71	32	15	2.0	0.0		0.02		0.0				
3-26-71	32	12	2.0	0.0		0.03		0.0				
4-27-71	20	5	1	0.3		1.4 ⁰		0				
5-21-71	18	7	2	0.11		0.37		0.06				

SITE # 24 BLACKFOOT RIVER AT HOGUM CR. BRIDGE

LAB ANALYSES - METALS

T= Total Recoverable
D= Dissolved (Fe, Zn, Cu only)

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu			
6-23-71	22	8.3	1.6	0.0		0.13		0.0			
7- 71	No Data Collected										
8-23-71	28	11	2	0		0.01		0.00			
9-21-71	27	10	2.1	0.42		0.19		0.04	T		
				0		0.12		0.01	D		
10- 71	No Data Collected										
11-22-71	26	10	2.3	0.01	0.00	.02	0.00	.01	D		
				0.02		.03		.02	T		
12-21-71	28	11	2.4	0		6.01	0	6.01	D		
				0		.01	0	.01	T		

Water Sampling Discontinued at this station. USGS to continue their own Sampling

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: W-241150

Date: 7/2/57 Time: 1:00 Collected by: M. J. ...

Station Name: Wabash River, near ...

Parameter	Code	Result
Discharge (cfs) <u>11.37</u>	00060	<u>11.37</u>
Air Temperature (°C)	00020	<u>22</u>
Water Temperature (°C)	00010	<u>15.5</u>
pH	00400	<u>7.8</u>
Alkalinity	00410	<u>10</u>
Specific conductance (umhos/cm)	00095	<u>970</u>
Dissolved Oxygen	00300	<u>4.1</u>
Coliform bacteria (per 100 ml)	31501	<u>100</u>

F 100 X 820
 S 100 ml sample
 F 100
 S 100 X 2 *

100 ml 100 colonies
200 ml 100 colonies
100 ml 100 colonies
100 ml 100 colonies

Fecal coliform bacteria (per 100 ml) 31616
100 ml 100 colonies
100 ml 100 colonies
100 ml 100 colonies
100 ml 100 colonies

Other

Wabash River, near ...

Observations and Remarks

Appearance of surface: clear
 Appearance of bottom: fine sand, silt, and shells
 Weather conditions: partly cloudy
 General biologic conditions: algae, diatoms, etc.
 Nature of streamflow: fast
 Any unusual conditions: none

PROVISIONAL

* Reported value based on nonideal count of colonies

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-334650

Date: AUG 13, 1973 Time: 1500 Collected by: H.C. FLADLAND

Station Name: BLACKFOOT R. bd Alice Cr. (Hogum Cr bridge)

Parameter	Code	Result	
Discharge (cfs)	00060	<u>6.55</u>	
Air Temperature (°C)	00020	<u>30.5</u>	
Water Temperature (°C)	00010	<u>15.5</u>	
pH	00400	<u>8.0</u>	
Alkalinity	00410	<u>115</u>	F 45.5
Specific conductance (umhos/cm)	00095	<u>265</u>	S <u>34.0</u> X ml sample
Dissolved Oxygen	00300	<u>8.0</u>	F 18.0
Coliform bacteria (per 100 ml)	31501		S <u>14.0</u>
			4.0 x 2 = 8.0

<u>5</u> ml	<u>1</u> colonies
<u>50</u> ml	<u>12</u> colonies
<u>100</u> ml	<u>28</u> colonies
_____ ml	_____ colonies

Fecal coliform bacteria (per 100 ml)	31616	<u>11</u>
<u>5</u> ml	<u>0</u> colonies	
<u>50</u> ml	<u>5</u> colonies	
<u>100</u> ml	<u>11</u> colonies	
_____ ml	_____ colonies	

Other
95% D.O. Saturation

Observations and Remarks

Appearance of surface: CLEAR & CLEAN (Good Mtn Stream)

Appearance of bottom: clear (gravel & sand)

Weather conditions: partly cloudy, hot, slight breeze

General biologic conditions: very little aquatic growth on rocks of stream bed

Nature of streamflow: riffles, good mixing

Any unusual conditions: Cottonwood, few pine along both banks
lots of sagebrush (one live fish in cross section)

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334650

Date: JULY 16, 1973 Time: 1200 Collected by: H. C. FLADLAND

Station Name: BLACKFOOT R. bet. ALICE CR. W. LINCOLN

Parameter	Code	Result	
Discharge (cfs) gage height 4.37	00060	<u>12.6</u>	
Air Temperature (°C)	00020	<u>25.5</u>	
Water Temperature (°C)	00010	<u>15.0</u>	
pH	00400	<u>8.3</u>	
Alkalinity	00410	<u>105</u>	F <u>445</u> X $\frac{820}{34.0}$ ml sample
Specific conductance (umhos/cm)	00095	<u>244</u>	S <u>10.5</u>
Dissolved Oxygen	00300	<u>8.4</u>	F <u>17.2</u>
Coliform bacteria (per 100 ml)	31501	<u>136</u>	S <u>13.0</u> 4.2 X 2 =

<u>5</u> ml	<u>5</u> colonies
<u>50</u> ml	<u>49</u> colonies
<u>100</u> ml	<u>136</u> colonies
_____ ml	_____ colonies

Fecal coliform bacteria (per 100 ml)	Code	Result
<u>5</u> ml	31616	<u>0</u> colonies
<u>50</u> ml		<u>0</u> colonies
<u>100</u> ml		<u>0</u> colonies
_____ ml		_____ colonies

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN (GOOD MIN STREAM)

Appearance of bottom: CLEAR

Weather conditions: CLEAR & WARM

General biologic conditions: VERY LITTLE AQUATIC GROWTH

Nature of streamflow: NORMAL

Any unusual conditions: SEDSAM IN ONE CHANNEL ABOVE AND BELOW GAGE POOL (DEAD FISH @ CROSS SECTION)

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3 Station ID: 12334650

Date: 18 JUNE 1973 Time: 1030 Collected by: L.C. FLADLAND & M.L. KASMAN

Station Name: BLACKFOOT RIVER BEL. ALICE CREEK NR. LINCOLN, MONTANA

Parameter	Code	Result	
Discharge (cfs)	00060	46.0	
Air Temperature (°C)	00020	11.0°C	
Water Temperature (°C)	00010	9.0°C	
pH	00400	8.0	
Alkalinity	00410	21	F 820 X ml samp
Specific conductance (umhos/cm)	00095	180	S 21
Dissolved Oxygen	00300	1.2	F 12.0
Coliform bacteria (per 100 ml)	31501	12	S 12.0 X 2 = 24

5 ml 0 colonies
 50 ml 6 colonies
 100 ml 12 colonies
 ml colonies

Fecal coliform bacteria, (per 100 ml) 31616

5 ml 0 colonies
 50 ml 0 colonies
 100 ml 0 colonies * 100%
 ml colonies

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: CLEAR & CLEAN (NO DEBRIS OR LEAVES)

Appearance of bottom: GRAVEL, SAND, CLEAN, MUD, SILT

Weather conditions: OVERCAST (STRATOCUMULUS - FEW TWIGS IN OVERCAST)

General biologic conditions: LITTLE ALGAL GROWTH

Nature of streamflow: MODERATE, STEADY

Any unusual conditions: SWEET SMELL IN AIR, PHOSPHORIC ACID

BELOW PAGE, CONTINUATION OF FIELD REPORT

* Reported value based on non-serial count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12334650

Date: MAY 21, 1973 Time: 1800 Collected by: L.R. FLAGLAND & M.H. KASMA

Station Name: BLACKFOOT R. bel ALICE Cr. in LINCOLN, MT.

Parameter	Code	Result	
Discharge (cfs)	00060	<u>204</u>	
Air Temperature (°C)	00020	<u>14.0</u>	
Water Temperature (°C)	00010	<u>11.0</u>	
pH	00400	<u>6.1</u>	
Alkalinity	00410	<u>63.0</u>	F <u>40.3</u> $\frac{820}{\text{ml samp}}$
Specific conductance (umhos/cm)	00095	<u>160.0</u>	S <u>34.0</u> <u>6.3</u>
Dissolved Oxygen	00300	<u>9.0</u>	F <u>17.5</u>
Coliform bacteria (per 100 ml)	31501	<u>28</u>	S <u>13.0</u> <u>7.5</u> x 2 = <u>15.0</u>
<u>5</u> ml <u>1</u> colonies			
<u>50</u> ml <u>13</u> colonies			
<u>100</u> ml <u>28</u> colonies			
_____ ml _____ colonies			

Fecal coliform bacteria (per 100 ml) 31616

<u>5</u> ml <u>0</u> colonies	
<u>50</u> ml <u>1</u> colonies	
<u>100</u> ml <u>xx</u> colonies	water in plate (no count)
_____ ml _____ colonies	

Other

PROVISIONAL

Observations and Remarks

Appearance of surface: clear & clean

Appearance of bottom: clean

Weather conditions: cool, Partly cloudy & WINDY

General biologic conditions: no floating debris, spring run off start

Nature of streamflow: normal spring flow

Any unusual conditions: _____

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12 334650

Date: 25 April 73 Time: 1400 Collected by: L.C. FLADLAND

Station Name: BLACKFOOT R. bel ALICE Cr. on Lincoln, Mt.

Parameter	Code	Result	
Discharge (cfs)	00060	<u>735</u>	
Air Temperature (°C)	00020	<u>75°C</u>	
Water Temperature (°C)	00010	<u>55°C</u>	
pH	00400	<u>8.1</u>	
Alkalinity	00410	<u>76</u>	F <u>10.6</u> S <u>83.6</u> X <u>820</u> ml sampl
Specific conductance (umhos/cm)	00095	<u>800</u>	<u>9.6</u>
Dissolved Oxygen	00300	<u>11.4</u>	F <u>18.5</u> S <u>13.1</u>
Coliform bacteria (per 100 ml)	31501	<u>0</u>	<u>2.7</u> X 2 = <u>11.4</u>
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

PROVISIONAL

Other

Observations and Remarks

Appearance of surface: CLEAR & CLEAN

Appearance of bottom: CLEAR & CLEAN - SOME AQUATIC ALGAE

Weather conditions: CLEAR SKY, WINDY

General biologic conditions: GOOD RISE, NO STRENGTH

Nature of streamflow: NORMAL

Any unusual conditions: STREAM FLOW SEEMS MORE THAN NORMAL

NOISE FROM WINDY BANKS

_____ = ideal count of colonies

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3346.50

Date: 28 MARCH 73 Time: 1130 Collected by: L.C. FLADLAND

Station Name: BLACKFOOT R. Bd ALICE Cr. W. LINCOLN

<u>Parameter</u>	<u>Code</u>	<u>Result</u>	
Discharge (cfs)	00060	<u>8.88</u>	
Air Temperature (°C)	00020	<u>4.0</u>	
Water Temperature (°C)	00010	<u>3.5</u>	
pH	00400	<u>8.6</u>	
Alkalinity	00410	<u>119</u>	F <u>44.8</u> X <u>820</u> S <u>33.0</u> ml sample <u>11.7</u>
Specific conductance (umhos/cm)	00095	<u>240</u>	
Dissolved Oxygen	00300	<u>10.6</u>	F <u>19.3</u> S <u>14.0</u> <u>5.3</u> X 2 = <u>10.6</u>
Coliform bacteria (per 100 ml)	31501	<u>0</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>5</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

PROVISIONAL

Other

Observations and Remarks

Appearance of surface: clear & clean

Appearance of bottom: covered with aquatic growth on rocks

Weather conditions: cool, partly cloudy - windy

General biologic conditions: good clear water stream

Nature of streamflow: low spring flow

Any unusual conditions: complete ice cover below gage pool, ice on both banks

* Reported value based on non-ideal count of colonies.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-334650

Date: 27 FEB 73 Time: 1330 Collected by: L.C. FLADLAND

Station Name: BLACKFOOT R. bel. ALICE Cr. NW LINCOLN, MT.

<u>Parameter</u>	<u>Code</u>	<u>Result</u>	
Discharge (cfs)	00060	<u>6.3</u>	
Air Temperature (°C)	00020	<u>+8.0</u>	
Water Temperature (°C)	00010	<u>+2.5</u>	
pH	00400	<u>8.4</u>	
Alkalinity	00410	<u>115</u>	F <u>44.5</u>
Specific conductance (umhos/cm)	00095	<u>240</u>	S <u>33.0</u> X $\frac{820}{100 \text{ MG}}$
Dissolved Oxygen	00300	<u>11.6</u>	F <u>18.6</u>
Coliform bacteria (per 100 ml)	31501	<u>0</u>	S <u>13.0</u>
			<u>5.8</u> X 2 = <u>11.6</u>
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
<u> </u> ml <u> </u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
<u> </u> ml <u> </u> colonies			

Other

Observations and Remarks

Appearance of surface: CLEAN & CLEAR

Appearance of bottom: MOSTLY CLEAN - FEW LEAVES - SOME AQUATIC GROWTH

Weather conditions: MOSTLY OVERCAST - COOL - AND WINDY

General biologic conditions: SLIGHT AQUATIC GROWTH ON STREAM BED

Nature of streamflow: LOW BASE FLOW

Any unusual conditions: 75% ICE COVERED

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 12-3346 50

Date: 1-23-73 Time: 1130 Collected by: J.R. Knopon

Station Name: Blackfoot R. bl Alice C nr Lincoln

Parameter	Code	Result	
Discharge (cfs)	00060	<u>13.8</u>	
Air Temperature (°C)	00020	<u>-5°</u>	
Water Temperature (°C)	00010	<u>0.0</u>	
pH	00400	<u>7.5</u>	
Alkalinity	00410	<u>120</u>	F 49.1 320
Specific conductance (umhos/cm)	00095	<u>240</u>	S <u>37.1</u> X ml sample 12.0
Dissolved Oxygen	00300	<u>12.0</u>	F 19.8
Coliform bacteria (per 100 ml)	31501	<u>1</u>	S <u>13.8</u> 6.0 X 2 = 12.0
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>1</u> colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	
<u>1</u> ml <u>0</u> colonies			
<u>50</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: Surface mostly ice covered some open water

Appearance of bottom: Fully clean, some moss and insects

Weather conditions: Partly cloudy slight wind

General biologic conditions: _____ moss, some insect larvae attached to rocks

Nature of streamflow: low flow

Any unusual conditions: None

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 123346.50

Date: Dec. 27, 72 Time: 1550 Collected by: L.C. FLADLAND & M.L. KASMAN

Station Name: BLACKFOOT R. BEL. ALICE CR. 3 MI. LINDOLEN, MT

Parameter	Code	Result	
Discharge (cfs)	00060	<u> // </u>	
Air Temperature (°C)	00020	<u> 5.5° </u>	
Water Temperature (°C)	00010	<u> 1.5° </u>	
pH	00400	<u> 8.0 </u>	
Alkalinity	00410	<u> 116 </u>	F 44.6
Specific conductance (umhos/cm)	00095	<u> 220 </u>	S 33.0 X ml samp 116 100 ml
Dissolved Oxygen	00300	<u> 10.6 </u>	F 20.3
Coliform bacteria (per 100 ml)	31501	<u> 7 </u>	S 15.0 5.3 X 2 = 10.6
<u> 1.0 </u> ml <u> 0 </u> colonies			
<u> 50 </u> ml <u> 0 </u> colonies			
<u> 100 </u> ml <u> 7 </u> colonies			
<u> </u> ml <u> </u> colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u> 0 </u>	
<u> 1.0 </u> ml <u> 0 </u> colonies			
<u> 50 </u> ml <u> 0 </u> colonies			* water in all plates
<u> 100 </u> ml <u> 0 </u> colonies			
<u> </u> ml <u> </u> colonies			
Other			

Observations and Remarks

Appearance of surface: Clean - No floating ice or debris

Appearance of bottom: many bars & little aquatic growth

Weather conditions: overcast, calm, cool

General biologic conditions: stream 90% open - 14" thick snow ice - only in animals in area now.

Nature of streamflow: low water flow

Any unusual conditions: observed 2 dead fish (3 & 6") & 1 live fish. 30% ground in area.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 123346.50

Date: 28 NOV 72 Time: 1500 Collected by: LC FLADLAND & M.L. KASTNER

Station Name: BLAIRC FOOT R. BI LUCE CR. J.M. LINCOLN, IA

<u>Parameter</u>	<u>Code</u>	<u>Result</u>	
Discharge (cfs)	00060	<u>22.0</u>	
Air Temperature (°C)	00020	<u>-1.5°</u>	
Water Temperature (°C)	00010	<u>0.0°</u>	
pH	00400	<u>8.2</u>	
Alkalinity	00410	<u>119.0</u>	F 45.9
Specific conductance (umhos/cm)	00095	<u>245</u>	S <u>34.0</u> X ml sampl (100 ml) 11.9
Dissolved Oxygen	00300	<u>10.4</u>	F 25.0
Coliform bacteria (per 100 ml)	31501	<u>6</u>	S <u>20.0</u> 5.0 x 2 = 10.0
<u>50</u> ml <u>3</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			
_____ ml _____ colonies			
Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>	20.2 20.0 _____ .2 x 2 = 4
<u>100</u> ml <u>0</u> colonies			
<u>100</u> ml <u>0</u> colonies			
_____ ml _____ colonies			
_____ ml _____ colonies			

Other

Observations and Remarks

Appearance of surface: 75% ice covered - open water clean

Appearance of bottom: fine gravel - slight aquatic growth on str. bed.

Weather conditions: partly cloudy, cold, light breeze

General biologic conditions: Algae mound in stream

Nature of streamflow: low - base flow

Any unusual conditions: 6 swan mounds - some anchor ice & floating slash ice. No sloop in this area.

FIELD REPORT

Water-quality measurements

Type: 3

Station ID: 17334650

Date: Oct. 25, 1972 Time: 1130 Collected by: M.L. Kasumari & L. Flodland

Station Name: Blackfoot R. below Alice Creek on Lincoln, Mont.

Parameter	Code	Result	
Discharge (cfs)	00060	<u>18.7</u>	
Air Temperature (°C)	00020	<u>10.5</u>	
Water Temperature (°C)	00010	<u>3.5</u>	
pH	00400	<u>8.1</u>	
Alkalinity	00410	<u>125</u>	F <u>125</u> X <u>820</u> S <u>100</u> ml sample <u>6.8</u>
Specific conductance (umhos/cm)	00095	<u>205</u>	
Dissolved Oxygen	00300	<u>.6</u>	F <u>100</u> S <u>15.5</u>
Coliform bacteria (per 100 ml)	31501	<u>1</u>	X 2 = <u>.6</u>

<u>1</u> ml	<u>0</u>	colonies
<u>5</u> ml	<u>0</u>	colonies
<u>10</u> ml	<u>0</u>	colonies
<u>100</u> ml	<u>1</u>	colonies

Fecal coliform bacteria (per 100 ml)	31616	<u>0</u>
<u>1</u> ml	<u>0</u>	colonies
<u>5</u> ml	<u>0</u>	colonies
<u>10</u> ml	<u>0</u>	colonies
<u>100</u> ml	<u>0</u>	colonies

Other

BOD's taken (New F-G procedure - BOD's & Total coliforms added - 7910)

Observations and Remarks

Appearance of surface: CLEAR

Appearance of bottom: FEW LEAVES & LITTLE ROCKS BUT NOT MUCH

Weather conditions: FERTLY CLOUDY & COOL

General biologic conditions: GOOD WATER NO WEED

Nature of streamflow: NORMAL LOW FLOW

Any unusual conditions: NO: 3

* Reported value based on non-ideal count of colonies.

NOV 7 1972

Blackfoot River below Alice Cr. near Lincoln (Hogum Cr. road bridge)

①

BOD DETERMINATION

STATION NAME Blackfoot R. bel Alice Cr nr Lincoln (Hogum Br)
 STATION I.D. water temp 0.0°C No open water
 sample taken through ice ± 3 ft thick
 L. Spence
 SAMPLING DATE 2-2-72
 SAMPLING TIME 1330 BOD 1.8 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R. at Hogum Creek Road Bridge nr Lincoln, MT.
 STATION I.D. Mont. F-G site
 SAMPLING DATE Mar. 23, 1972
 SAMPLING TIME 1200 BOD 1.1 mg/l
 FIELD D.O. L. Spence water rising + slightly turbid
 G 137 c.f.s. water temp 2.5°C

Liter - I overlooked these slips and had them filed with another water. Al

BOD DETERMINATION

STATION NAME Blackfoot R. at Hogum Cr road bridge (bel Alice Cr nr Lincoln)
 STATION I.D. USGS 12354650
 SAMPLING DATE Apr. 14, 1972
 SAMPLING TIME 1010 BOD 1.2 mg/l

Blackfoot River below Alice Cr. near Lincoln (Hogum Cr. road bridge)

(2)

water high + turbid inside g h 6.79. water temp 5.0 c
 weather cool, cloudy, windy
 sampled by wading

BOD DETERMINATION

STATION NAME Blackfoot River at Hogum Cr road bridge, Mont
 STATION I.D.
 SAMPLING DATE 5-19-72
 SAMPLING TIME 1050 BOD 1.8 mg/l

water temp. 54°F. Inside gage height 4.83. water
 low + clear. Rain showers in am. Mostly
 cloudy, windy, cool. L. Spencer

BOD DETERMINATION

STATION NAME Blackfoot R. @ Hogum Bridge (bet Alice Cr. nr. Lincoln)
 STATION I.D.
 SAMPLING DATE 8-2-72
 SAMPLING TIME 1020 BOD 1.1 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R @ HOGUM A. ROAD BRIDGE
 STATION I.D.
 SAMPLING DATE 9/8/72
 SAMPLING TIME 1010 BOD 3.0 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R. below Alice Creek nr. Lincoln, Montana
 STATION I.D. 12334650
 SAMPLING DATE 25 October 1972
 SAMPLING TIME 1130 BOD 1.3 mg/l

Blackfoot River below Alice Cr. near Lincoln (Hogum Cr. road bridge)

③

BOD DETERMINATION

STATION NAME BLACKFOOT R. bel ALICE Cr. near LINCOLN, MT

STATION I.D.

SAMPLING DATE 28 Nov. 1972

SAMPLING TIME 1500 BOD 2.3 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. Bel. ALICE CR. near LINCOLN, MT

STATION I.D. 12-3346.50

SAMPLING DATE 27 DEC. 1972

SAMPLING TIME 1330 BOD 1.1 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. Bel ALICE Cr. near LINCOLN, MT

STATION I.D. 12-3346.50

SAMPLING DATE 1/23/73

SAMPLING TIME BOD .6 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R. bel. Alice Cr. near Lincoln, MT

STATION I.D. 12334650

SAMPLING DATE 27 Feb 1973

SAMPLING TIME 1330 BOD 1.2 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. Bel. ALICE Cr. near LINCOLN

STATION I.D. 123346.50

SAMPLING DATE 28 MARCH 1973

SAMPLING TIME 1330 BOD 0.6 mg/l

Blackfoot River below Alice Cr. near Lincoln (Hogum Cr. road bridge)

④ 4

PROVISIONALBOD DETERMINATION

STATION NAME BLACKFOOT R. bel. ALICE Cr. m. LINCOLN, Mt.
 STATION I.D. 12334650
 SAMPLING DATE 25 April 1973
 SAMPLING TIME 1400 BOD 1.4 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. bel. ALICE Cr. m. LINCOLN, Mt.
 STATION I.D. 12334650
 SAMPLING DATE 21 MAY 1973
 SAMPLING TIME 1800 BOD 0.9 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. bel. ALICE Cr. m. LINCOLN, Mt.
 STATION I.D. 12334650
 SAMPLING DATE 18 JUNE 1973
 SAMPLING TIME 1620 BOD 2.5 mg/l

BOD DETERMINATION

STATION NAME BLACKFOOT R. bel. ALICE Cr. m. LINCOLN
 STATION I.D. 12334650
 SAMPLING DATE 16 JULY 1973
 SAMPLING TIME 1200 BOD 1.8 mg/l

BOD DETERMINATION

STATION NAME Blackfoot R bel Alice Cr m Lincoln
 STATION I.D. 12334650
 SAMPLING DATE Sept 11
 SAMPLING TIME 1600 BOD 0.6 mg/l

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Blackfoot RiverStation Hogum Cr road bridgeSampling Method ^{1/} Integrated w/
DH-48 samplerAnalytical Instrument Used Nach
Model 2100A meter

S. E. M. A. UNIT

Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
3-17-72 ³⁾	3.7 ^{.25}	3.4 ^{.24}	4.0 ^{.29}	3.7	3.7 ^{.26}	brownish-green	water rising (\pm 55 cfs) Thinning weather
4-28-72	7.0	7.5	7.7	7.4	7.4	greenish-grey	g.h. 5.65. Floating leaves & debris. Bottom not visible in nets.
5-17-72	45	41	40	42	42	light brown	g.h. 7.08 = \pm 900 cfs, high
5-31-72	12	11	11	11	11	clearish-brown	inside g.h. 6.22. Mostly colloids & fine silt. Some larger silt & debris
6-3-72 ¹¹⁰⁰	6.4	6.6	6.3	6.4	6.4	Very light grey-green	inside g.h. 6.07. Both colloidal & fine silt in sample
6-7-72 ¹⁰⁰⁰	3.8	3.5	4.0	3.8	3.8	light greenish	Clear. Inside g.h. 5.70. Colloids silt & debris in sample
6-9-72	3.2	2.9	3.1	3.1	3.1	greenish-clear	Inside g.h. 5.59. Recently dropped. Mostly colloidal & debris
6-13-72 ¹³³⁰	2.2	2.4	2.5	2.4	2.4	colorless	Inside g.h. 5.35. Clear. Mostly colloidal & debris
7-10-72	1.1	1.2	1.4	1.2	1.2	colorless	Inside g.h. 4.91. Clear w/ a slight on rocks in stream
11-22-72	1.0	.70	.80	.83	.80	colorless	Inside g.h. 4.46. Low & clear. Shelf ice.
2-22-73	.70	.80	.85	.78	.80	colorless	Inside g.h. 5.25 (ice affected) w/ a clayey light ice comb. Some chum
5-14-73	3.0	3.5	3.4	3.3	3.3	light-greenish-clear	Inside g.h. 5.38. Clear enough to see bottom in deeper water. High & fast.
5-17-73	20	18	18	19	19	lite clear-brown	Inside g.h. 5.60. High & fast Debris in sample.
5-19-73	4.7	4.8	4.5	4.7	4.7	greenish-yellow-clear	Inside g.h. 5.61. Fairly high & fast
5-22-73	2.5	2.9	2.7	2.7	2.7	lite green	Inside g.h. 5.44. Clear.
5-31-73	1.2	1.1	1.3	1.2	1.2	colorless	Inside g.h. 5.12. Clear.
6-4-73	.85	1.1	1.2	1.05	1.1	colorless	Inside g.h. 5.05. Clear
5-28-74	5.1	5.3	5.2	5.2	5.2	colorless to lite green	Inside g.h. 5.57-5.60 = Ave flow of 382 cfs
6-17-74	1.7	1.7	1.6	1.7	1.7	colorless to greenish-clear	Inside g.h. 5.19 = 189 cfs

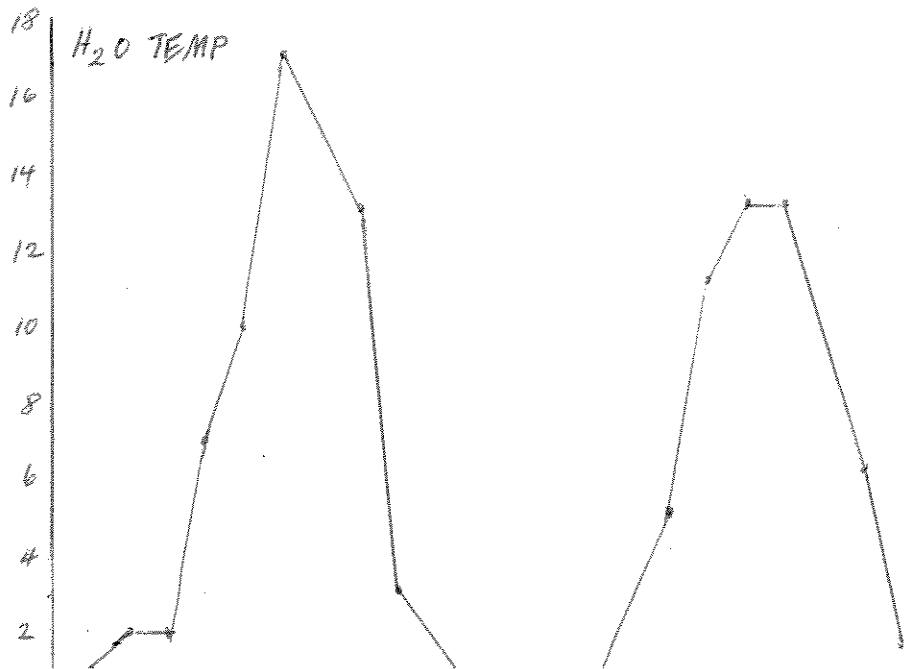
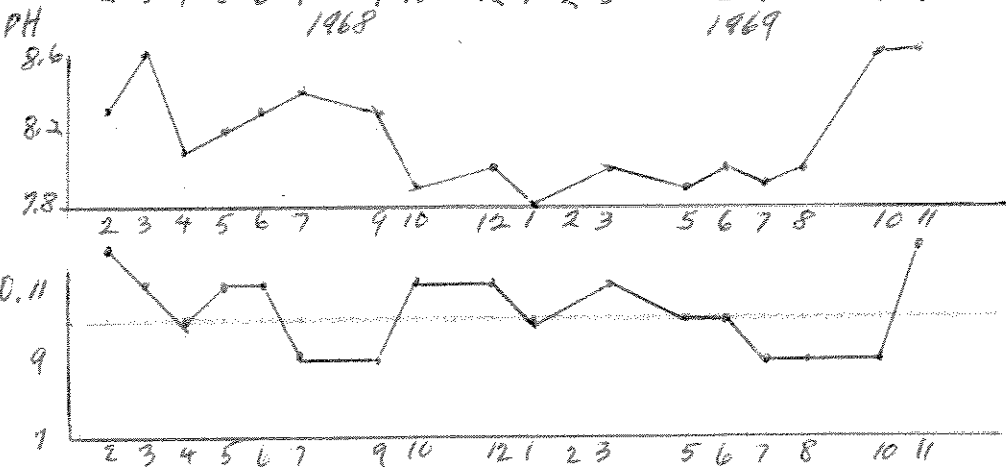
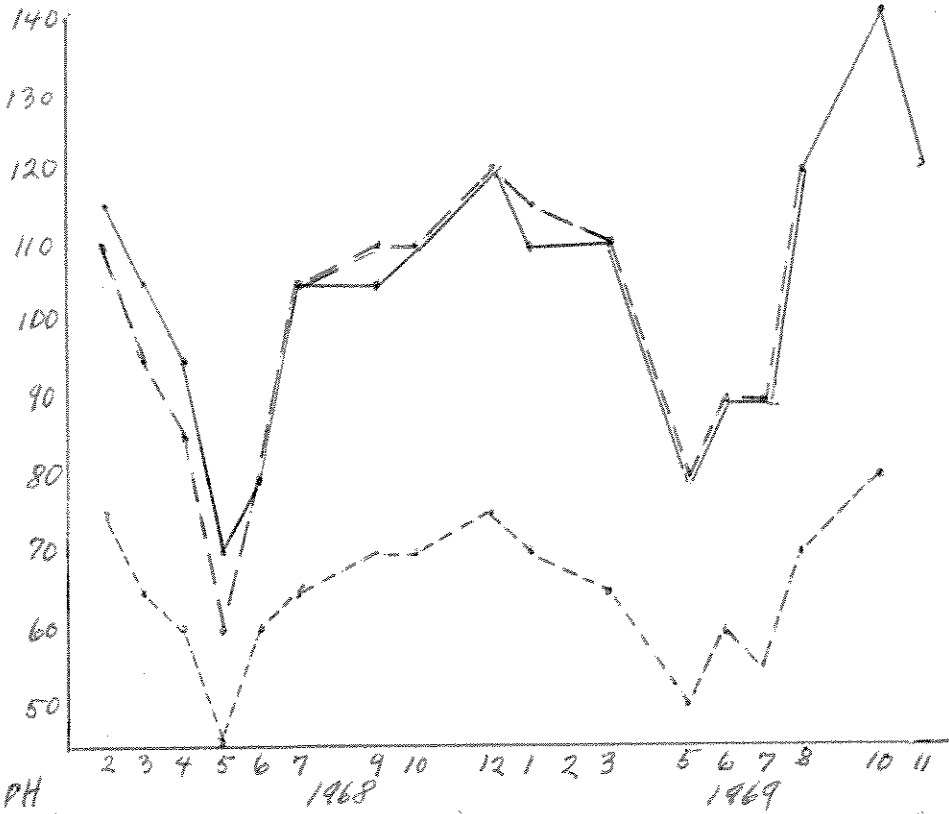
^{1/} Surface Grab, Integrated, Other^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971,
pg. 352

SITE # 24

BLACKFOOT R.

FIELD DATA

HOGUM

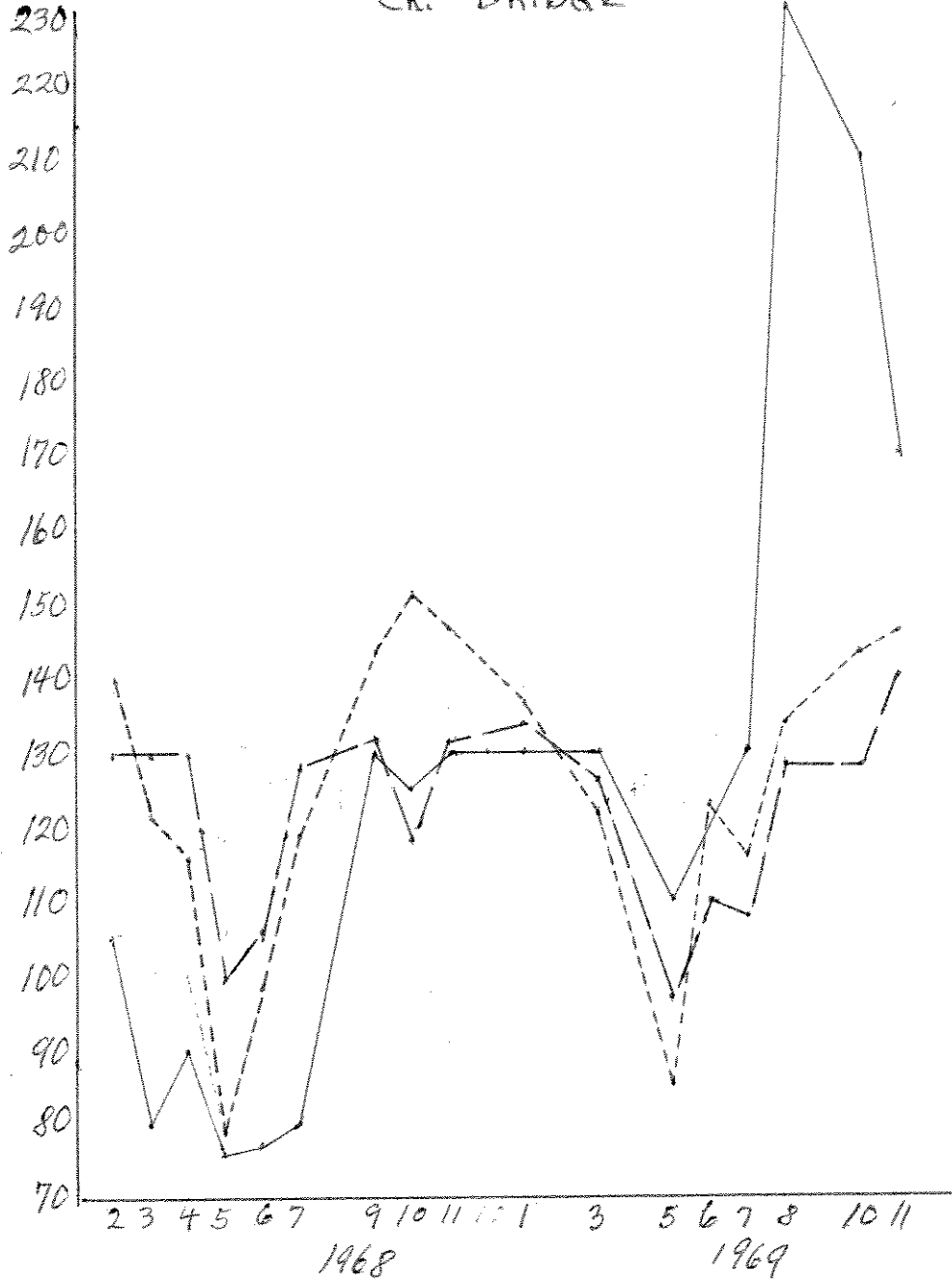


mg/l

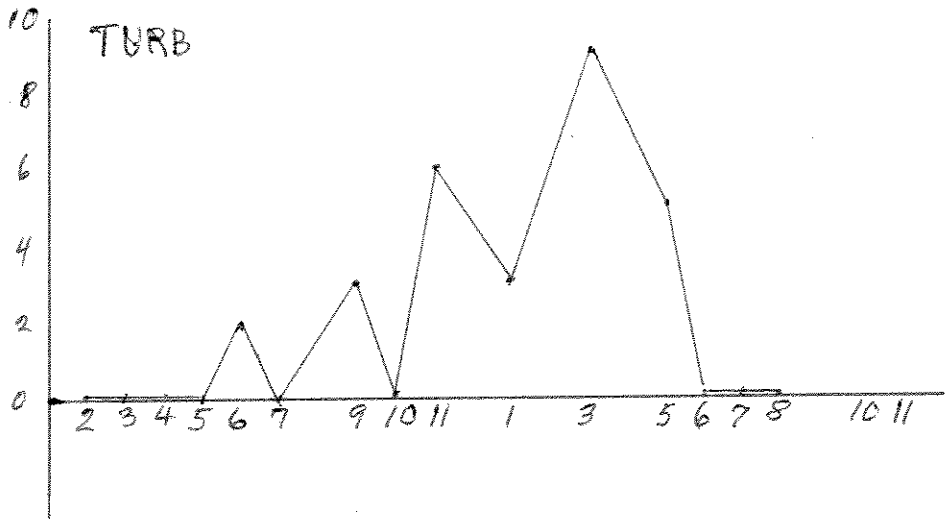
SITE # 24 BLACKFOOT R. AT HOGUM
CR. BRIDGE

LAB ANALYSES

page 1



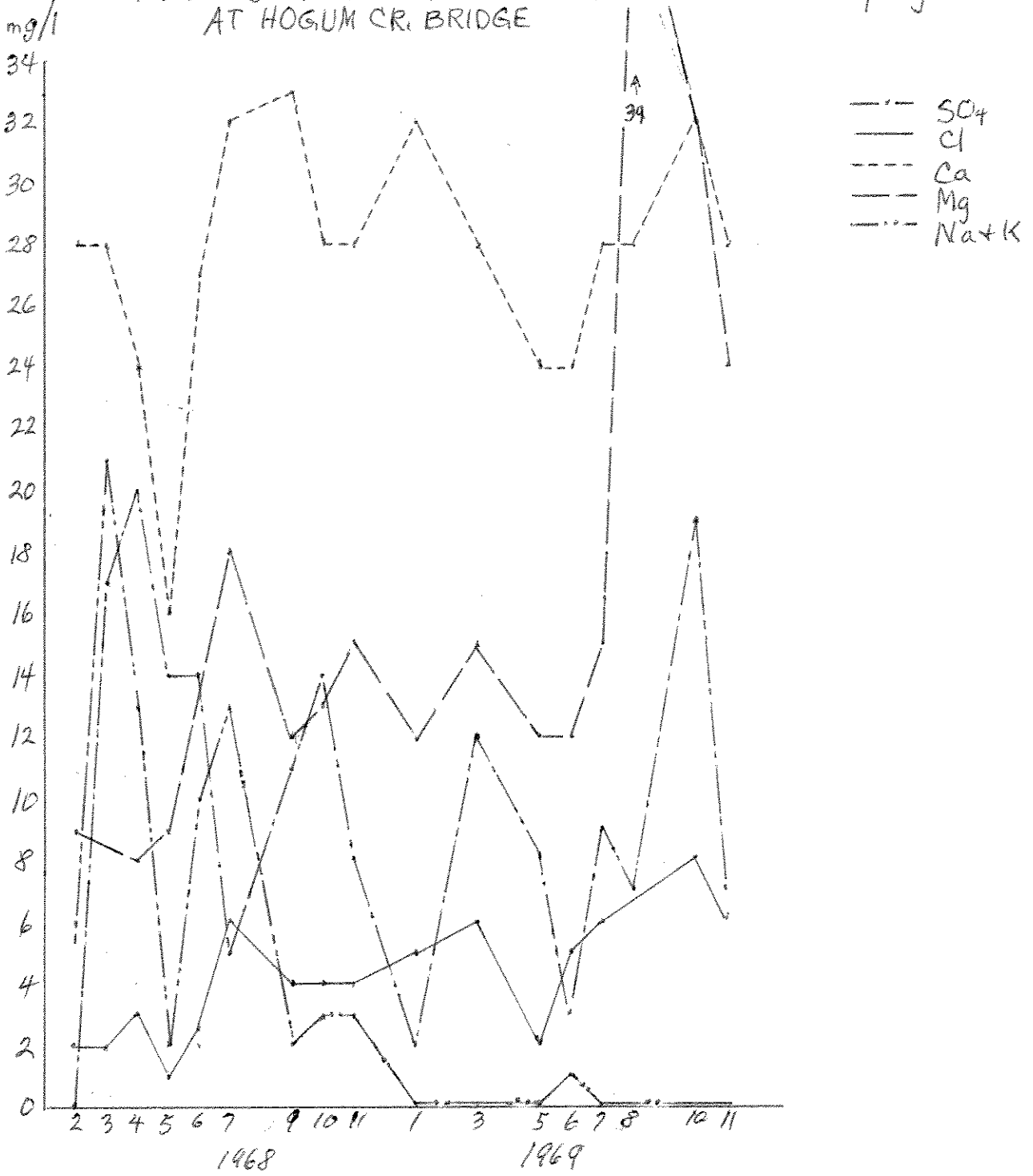
--- TDS
-.- HCO₃
— HARD



SITE #24 BLACKFOOT R.
AT HOGUM CR. BRIDGE

LAB ANALYSES

page 2



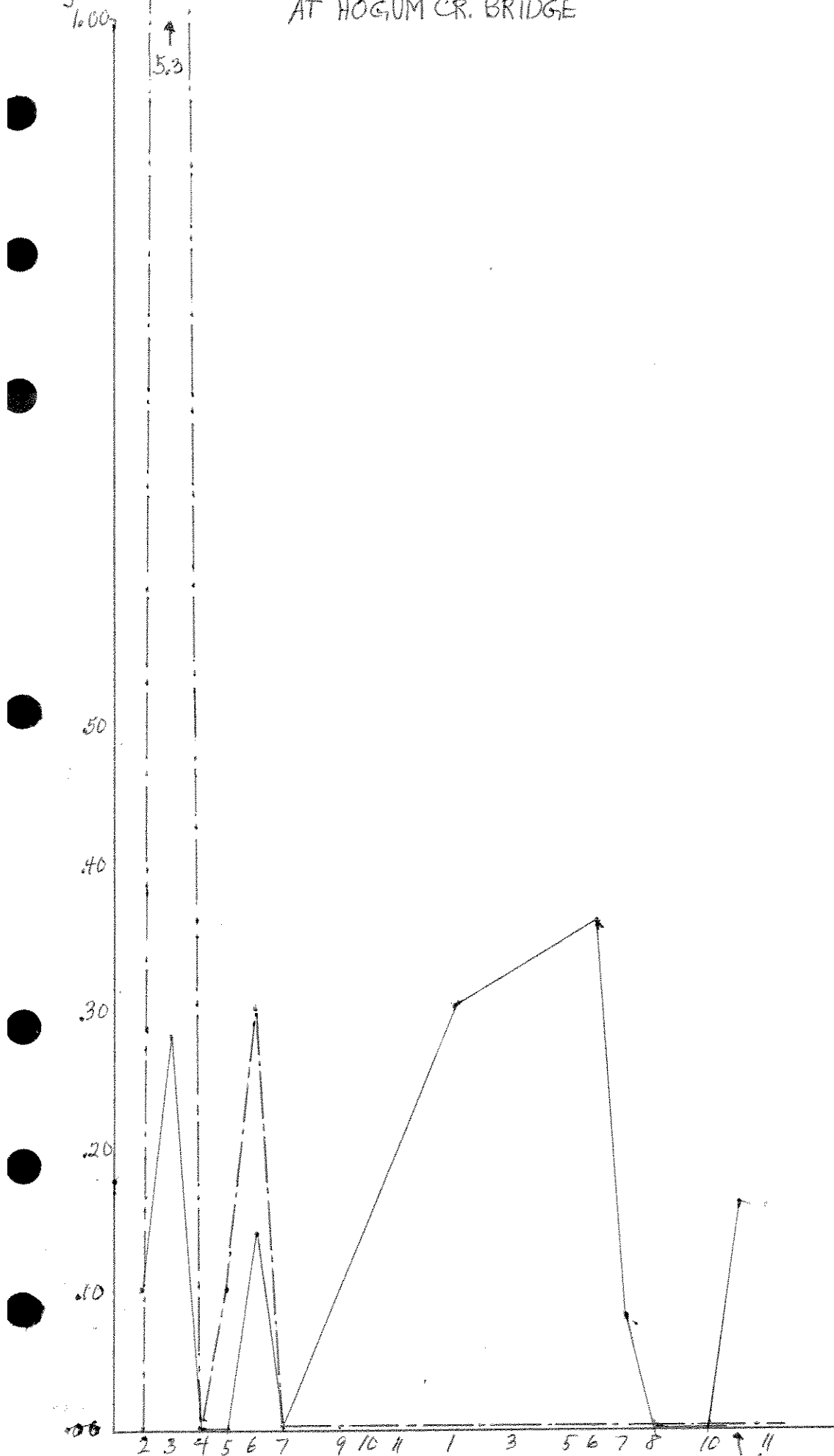
mg/l

SITE # 24 BLACKFOOT R.
AT HOGUM CR. BRIDGE

LAB ANALYSES

page 3

--- NO₃
— F



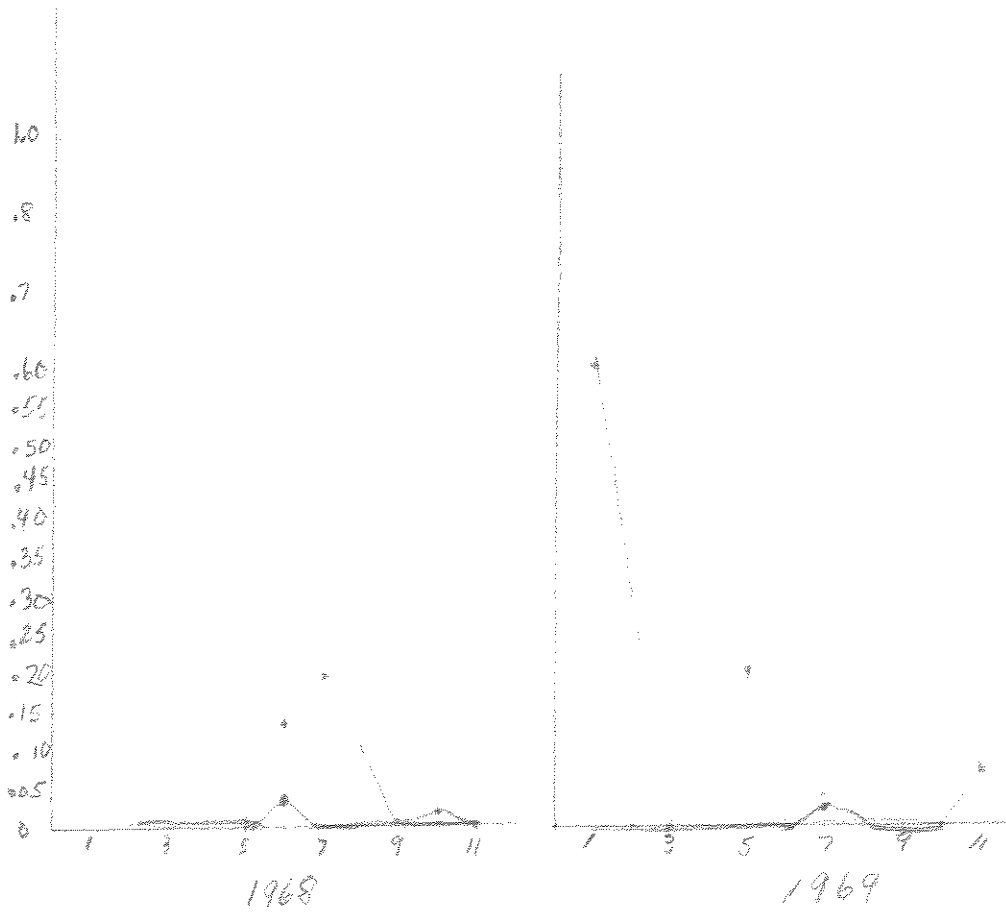
SITE 24

METALS

- Zn

- Fe

Cu

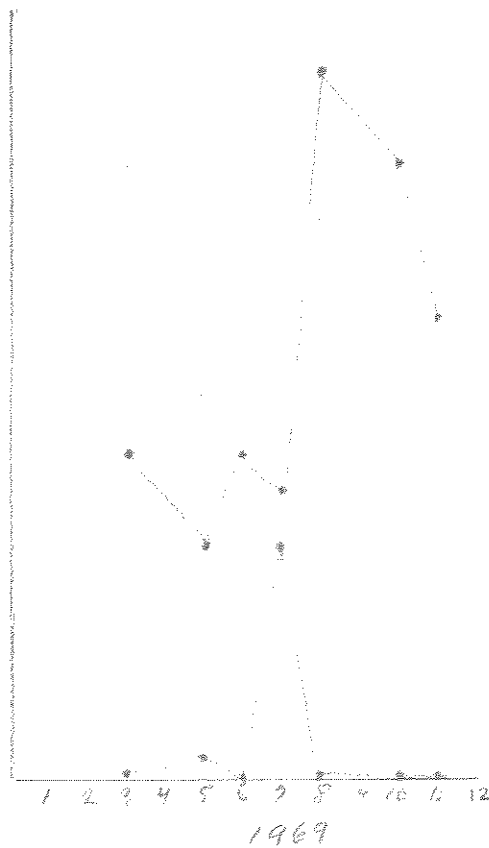
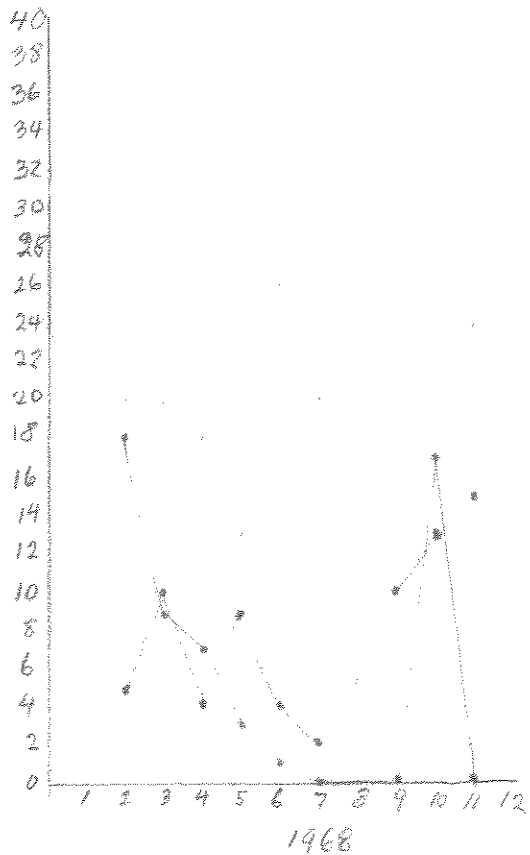


SITE 27

METALS

Ca, Mg, Na+K

Ca
- Mg
= Na+K



Fe, As, Zn, Pb, Cu

	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc alk.
10-7-69	-	132	170	0	131	22	10	0	0.08	107
11										
12	No Data									
1-20-70	0	120	105	0	135	8	2	0	0.20	111
2 -70	No Data									
3 -70	"	"								
4 -70	"	"								
5-22-70	-	60	50	0	80	7	0	0	0.3	66
6-16-70	-	70	80	0	70	2	0	0	0.3	57
7 -70	No Data									
8-20-70	-	120	160	0	120	7	0	0.2	0.3	98
9-22-70	-	110	150	0	120	7	0	0.2	0.1	98
10-21-70	-	120	150	0	110	6	0	0.1	0.2	90
11- 70	No Data									
12-17-70	-	130	160	0	130	8	0	0.06	0.1	107
1-15-71		130	190	0	130	7	0	.04	0.2	107
2-2-71		90	70	0.0	80	7	0.0	0.1	0.3	66
\bar{x}	0	108.2	128.5	0	110.6	8.1	1.2	.10	.208	90.7
σ	1	10	10	10	10	10	10	10	10	10
\bar{x}	0	108.2	128.5		110.6	8.1	1.2	.07	.208	90.7
Range		60-132	70-190		70-135	2-22	2-10	0-.2	0.08-.3	57-111

	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
10-7-69	28	24	0	0.4	-	0.0	-	0.0				
11												
12	NO	Data										
1-20-70	30	5	13	0.20	-	0	-	0				
2	NO	Data										
3	"	"										
4	"	"										
5-22-70	12	5	10	0.2	-	0.0	-	0.0				
6-16-70	20	7	0	0		Not Analyzed		Not Analyzed				
7- 20 -70	NO	Data										
8-20-70	28	22	0	0.5	-	0	-	0.03				
9-22-70	20	24	0	0.1	-	0.07	-	0				
10-21-70	28	20	0	0.16	-	0.06	-	0.0				
11- 70	NO	Data										
12-17-70	32	20	0	0.3		No Data on BOTH Cards		No Data on BOTH Cards				
1-15-71	28	29	0	0.2		0.03		0.0				
2-2-71	20	5	4.1	0.3		0.03		0.0				
2-2-71												
Σ	246	161	27.1	2.36	-	.190		.03				
n	10	10	10	10		8		8				
̄x	24.6	16.1	2.71	.236		.023		.0038				
Range	12-32	5-29	0-13	0-.5		0-.07		0-.03				

HARDSCRABBLE CREEK

D= Dissolved
 T= Total Recoverable
 (Fe,Zn,Cu only)

LAB ANALYSES * METALS

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu			
10-20-71	38	14	4.2	0.02	0.03	<0.01		0.01	D		
				0.03'		<0.01'		0.01'	T		
11- 71		No data collected									
12- 71		"	"	"							
1- 72		"	"	"							
2- 72		"	"	"							
3-23-72	28	9.7	2.8	.16	.000	<0.01	0	<0.01	D		
				.21	.000	<0.01'	.00	<0.01'	T		
4-20-72	28	9.6	2.8	.09'	0	<0.01'	0	.02'	T		
				.07		<0.01	0	.02	D		
5-22-72	22	7.2	2.3	.08'	.000	<0.01'	0	.01'	T		
				.04		<0.01	0	0	D		
6-20-72		No Data Collected									
7-19-72	34	12	3.2	.02'	.002	.01'	.01	.01'	T		
				0		<0.01	.01	.01'	D		
8-31-72		No Data Collected									
9-26-72		"	"	"							

ALICE CREEK

Field Notes - Upper Alice Creek November 2, 1972

- (1) Alice Creek dry beginning about $\frac{1}{2}$ mile below old Alice Cr. ~~Guard~~ Guard Station (USFS). Several cutthroat noted in larger and deeper pools above dry area. Very few trout observed in shallower areas near Guard Station. This is same area shocked last summer. Water lower now than when shocked. Several deer tracks in area. Only an occasional elk track.
- (2) The section of Alice Creek shocked below Wildcat Gulch last summer is now bone dry. Even the main spring feeding the upper end of the shocking section is dry. Another small spring is still flowing but does not reach Alice Creek above ground.
- (3) The shocking section 0.6 ~~miles~~ miles above the National Forest boundary sign has a little flow, with pools containing several cutthroat and brook trout (up to 8-9"). The small stream entering the shocking section from the west has a good flow and seems to contribute ~~to~~ a good portion of the main flow in Alice Creek. Beaver dams being built in the main stream. The upper part of the shocking section (above the campsite) is dry with a few very shallow pools containing no fish. Below the camp in the lower end of the section there is a flow and it seems to continue down to the upper end of the first set of beaver ponds at the National Forest boundary (at mouth of Bear Gulch).

Liter Spence

ALICE CREEK

Field Notes - Lower Alice creek

November 3, 1972

(1) Bartlett Section - November 15, 1972. Walked entire shocking section. Saw four spawning areas with brook trout observed actively spawning. No areas were seen in the main channel. Two areas were seen in the left side channel and two areas were seen in the right side channel. A total of about 25 redds were counted. Brook trout were seen in all but one area in the left channel. Many cutthroat were under log jams at forks of channels. Bartlett Creek itself was dry.

(2) Mouth of Alice Creek - November 3, 1972. Checked lower Alice Creek near its confluence with Blackfoot River for spawning activity. Saw several schools of brook trout over gravel bars in the smaller side channels, below log jams, and along the shoreline of the main channel in one area. Females were building redds. The confluence of Alice Creek and the Blackfoot River is hard to define since the Blackfoot enters through a series of small inlets from a swampy, beaver pond area. There is no definite meeting of the two streams at a single point. Saw a Dolly Varden about 12 inches long schooling with brook trout below a log jam, but I could not determine the degree of spawning activity. (However, on November 14, 1972 I saw two DV in the same area along with some other Eb). All spawning activity was in gravel and sand of smaller size (about $\frac{1}{4}$ - 1"). No activity was seen over gravels of much larger size than that. The gravels were also quite loose compared to the more well-armed and larger gravels. In all cases spawning was in gravel deposition areas with subsequent looser material.. Also saw one whitefish in a school of brook trout.

There were several springs entering Alice Creek near the mouth and in two cases there was rusty colored algae in the bottom, apparently from natural sources. Was this an iron deposit? There were some larger 12" or so brook trout in the spawning schools. Females seemed to be smaller than males (of the ones seen

Alice Creek, November 3, 1972 (Continued)

digging redds and being watched over by what seemed to be male fish. Some females were only about 6" long. I also saw fish in a beaver dam across from the Sieben Ranch campsite at the mouth of Alice Creek. This dam was about 4' high and created a pond about 4' higher than the ~~stream~~ stream below. It was an old dam and silted in above the dam but still had a fairly deep pool. There were also some fish-like activity in another swampy area above this dam but the light reflection was too bright to observe actual source of activity

Liter Spence

ALICE CREEK

Field Notes - Upper Alice Creek

September 26, 1973

Alice Creek dry from below old USFS Guard Station to 1/2 mile above Bear Creek. Saw 12 Ct and Eb in one pool at Guard Station (sizes 5-10 inches with Eb the largest). Several 7-9 inch Ct also. Saw 6-8 Ct in another pool upstream from above but couldn't see well due to poor light. Cattle still in area. Just above mouth of Bear Creek ponding of stream begins again and stream begins to flow slightly. A small spring at this location contributes a good share of flow. Some isolated pools just above spring had trout stranded in them - mostly small (2-5"). The above flow only goes a short distance before ~~stopping~~ drying up again. Good ponding begins again at mouth of Bear Cr. So far all practical purposes the stream has no year-long fishery between Alice Creek G.S. and Bear Cr. Main channel of Alice Cr. runs next to road at Bear Cr. and above. This was dry today too. Some isolated small ponds have water in them just above Bear Cr.

Liter Spence

SITE #26 ALICE CREEK FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
2-17-68	1100	1	3	8.0	11	115	70	115	7	2	p.c.	B.I
5-26-68	1045	7	9	8.3	11	90	60	85	4	2	cloudy	"
9-10-68	1230	10	24	8.3	9	120	75	115	0	2	clear	"
1-3-69	1015	0	-10	7.8	10	120	75	115	0	2	p.c.	"
3-28-69	1630	4	4	7.7	10	115	65	110	0	2	p.c.	"
6-17-69	1055	11	21	7.9	10	105	70	100	0	2	clear	"
8-27-69	1230	14	26	7.9	10	125	90	110	0	2	clear	"
11-30-69	1000	0.5	2	8.4				120			clear	L.S
<hr/>												
4-27-71	1105	1.5										
5-21-71	1400	5.0										
6-23-71	1430	16.5										
7- 71	No Data		Collected									
8-23-71		16										
9-21-71	1335	8.5										
10- 71	No Data		Collected									
11-22-71	1315	2.5										
12-21-71	1040	1.0										
E		47			71	790	505	870				
N		8		8	7	7	7	8				
J		6			10	113	72	109				
Range L		0		7.7	9	90	60	85				
H		14		8.4	11	125	90	120				

1.72

	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc. alt.
2-17-68	0	120	95 115.4	0	153	0	2	0.0	0.1	125
5-25-68	0	90	80	0	104	7	1	.2	0	85
9-9-68	3	132	151	0	149	3	4	0	-	122
1-2-69	0	120	140	0	140	0	5	0	0	115
3-28-69	9	128	130	0	128	11	5	0	-	105
6-16-69	0	126	120	0	145	0	4	0	0.38	119
8-27-69	0	150	240	0	153	1	6	0	0	125
11-29-69	-	118	210	0	74	0	7	0	0	61
12	No Data									
1	"									
2	"									
3	"									
4	"									
5-22-70	-	80	90	0	100	8	0.5	0.2	0.1	82
6 th 72, 1970	No Data									
1-1971	No Data									
2-24-71	-	130 130	130 130	0.0	150	0.0	0.0	0.0	0.3	123
3-26-71	-	130 130	130 130	0.0	150	7.0	0.0	0.05	0.3	123
4-27-71		80	90	0	100	4	0	0.1	0.1	82
5-21-71		80	84	0	120	3	0	0.07	0.1	98
6-23-71		130	103	0.0	160	0.0	0.0	0.08	0.3	131
7- 71	No Data Collected									
8-23-71		130	110	0	160	0	0	0.2	0.1	131
9-21-71		110	110	0	150	2.1	0	0.2	0.3	123
10- 71	No Data									
11-22-71		110	110	0	150	7	0	0.04	0.2	123
12-21-71		100	110	0	150	0	0	0.02	0.1	123
1- 72	No data Collected									
2- 72	"									
3-23-72		80	86	0	110	0	0	.14	0.1	90
4-20-72		100	93	0	140	7.4	0	.27	0.1	115
5-22-72		68	69	0	92	4	0	.36	0.1	75
6-20-72		100	92	0	140	4.5	0	.22	0.1	115
7-19-72		120	100	0	150	4.1	0	.20	0.1	123
8-31-72		110	120	0	140	0	0	0.09 0.09	0.1	115
9-26-72		110	120	0	140	0	0	.09*	0.1	* By calculation from NO3 = 115
10-31-72		110	110	0	140	0	0	.09*	0.1	* " 115

Range 61-131

2859
26

SITE #26

ALICE CREEK

LAB ANALYSES - METALS

T= Total Recoverable
 D= Dissolved
 (FE, Zn, Cu only)

	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu			
2-17-68	44	4	2	0.00		0.00		0.00			
5-25-68	16	10	5	0	0	0		0			
9-9-68	37	14	0	0.0		ND		2.01 ND	ND = not detectable		
1-2-69	24	20	0	0		0.0		0.0	= <.01		
3-28-69	40	7	0	0.1	-	0	-	0			
6-16-69	20	17	2	0	-	0	-	0			
8-27-69	36	37	0	0	0	0	-	0			
11-29-69	36	39	0	0.07	-	0.00	-	0.00			
12-	No Data										
1											
2											
3											
4											
5-22-70	16	11	2	0.4	-	0.0	-	0.0			
6 thru 12, 1970	No Data										
1 - 1971	No Data										
2-24-71	32	17	2.0	0.0		0.02		0.0			
3-26-71	28	15	1.5	0.0		0.03		0.0			
4-27-71	24	7	1	0.2		0.72		0.05			
5-21-71	21	8	2	0.1		0.34		0.06			
6-23-71	26	9.2	1.5	0.0		0.03		0.0			
7- 71	No Data			Collected							
8-23-71	28	10	2	0		0.01		0.00			
9-21-71	28	10	1.7	0		<0.01		<0.01	T		
				0		<0.01		<0.01	D		
10- 71	No Data			Collected							
11-22-71	27	9.9	2.0	0.03	0.00	.02	0.00	<.01	D		
11-22-71	27	9.9		0.90	0.00	.10	0.00	.03	T		
12-21-71	27	10	1.8	0		<.01	0	<.01	D		
				0		<.01	0	.01	T		
1- 72	No data			Collected							
2- 72	"			"							
3-23-72	21	8.2	1.3	.06	0.00	<.01	0	.01	D		
				.13	.000	.02	.00	.01	T		
4-20-72	23	8.8	1.4	.05	.000	<.01	.01	.01	T		
				.02		<.01	0	.01	D		

SITE # 26

ALICE CREEK

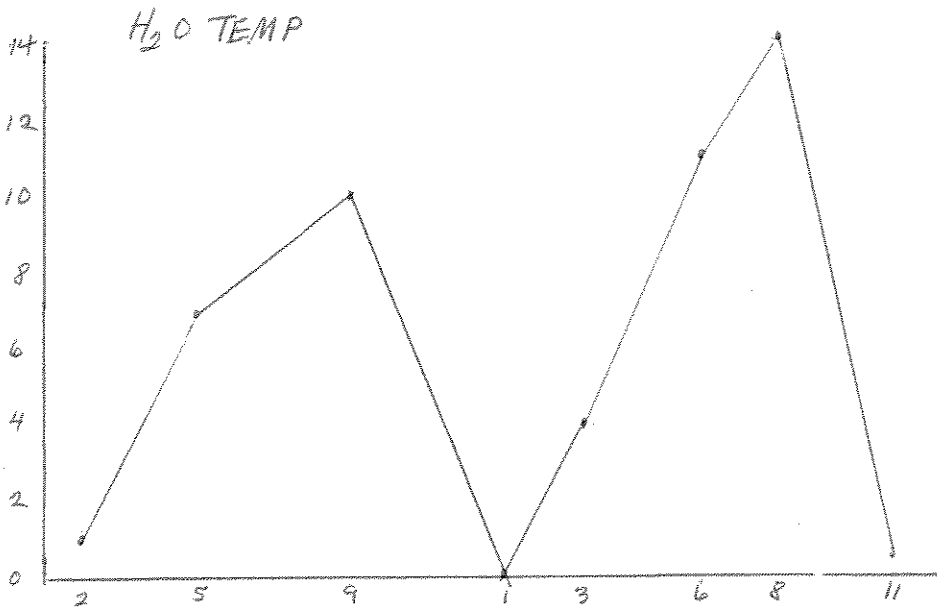
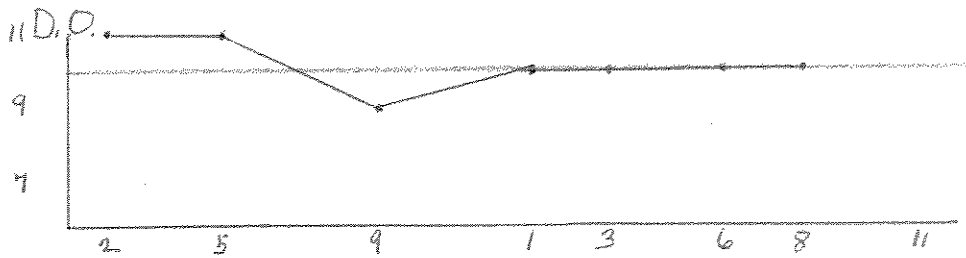
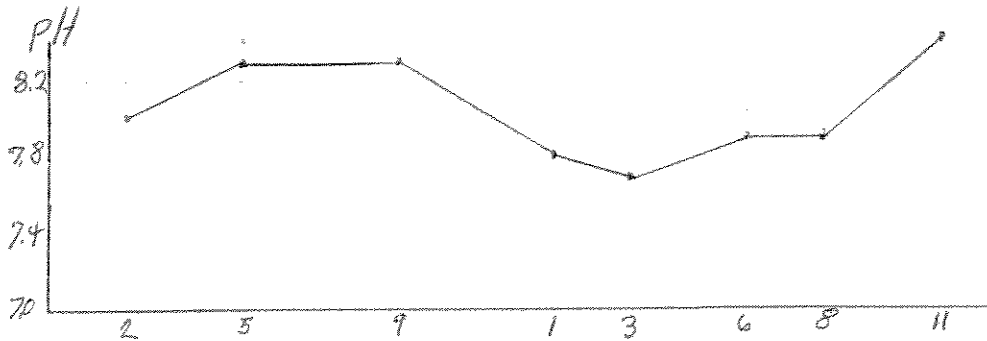
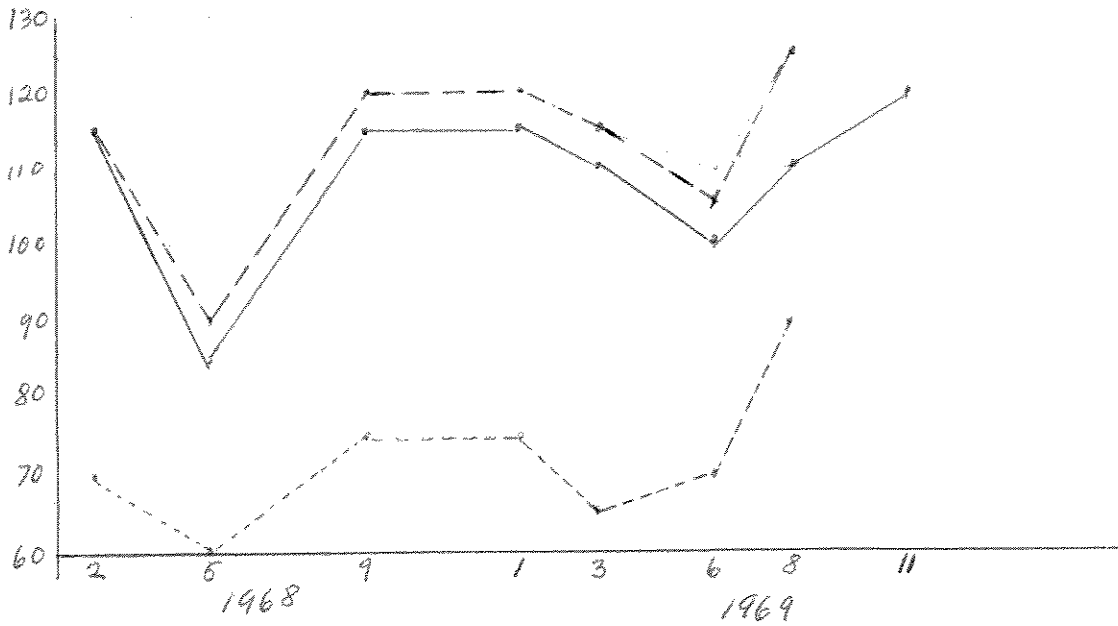
LAB ANALYSES - METALS

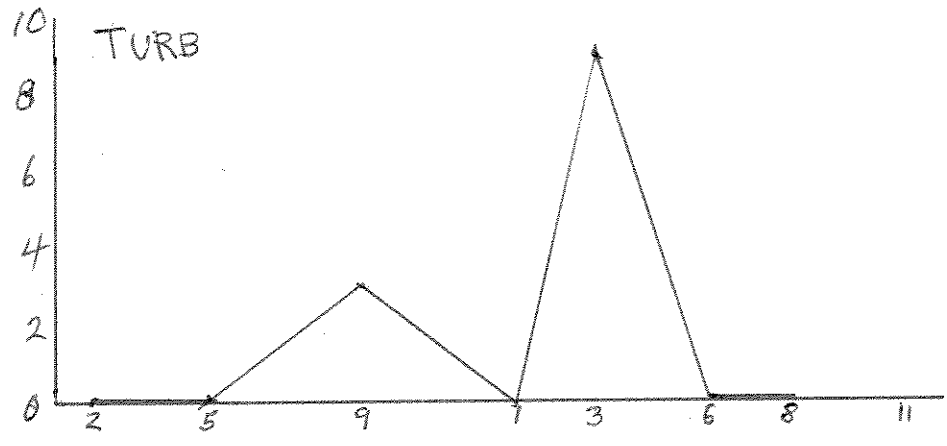
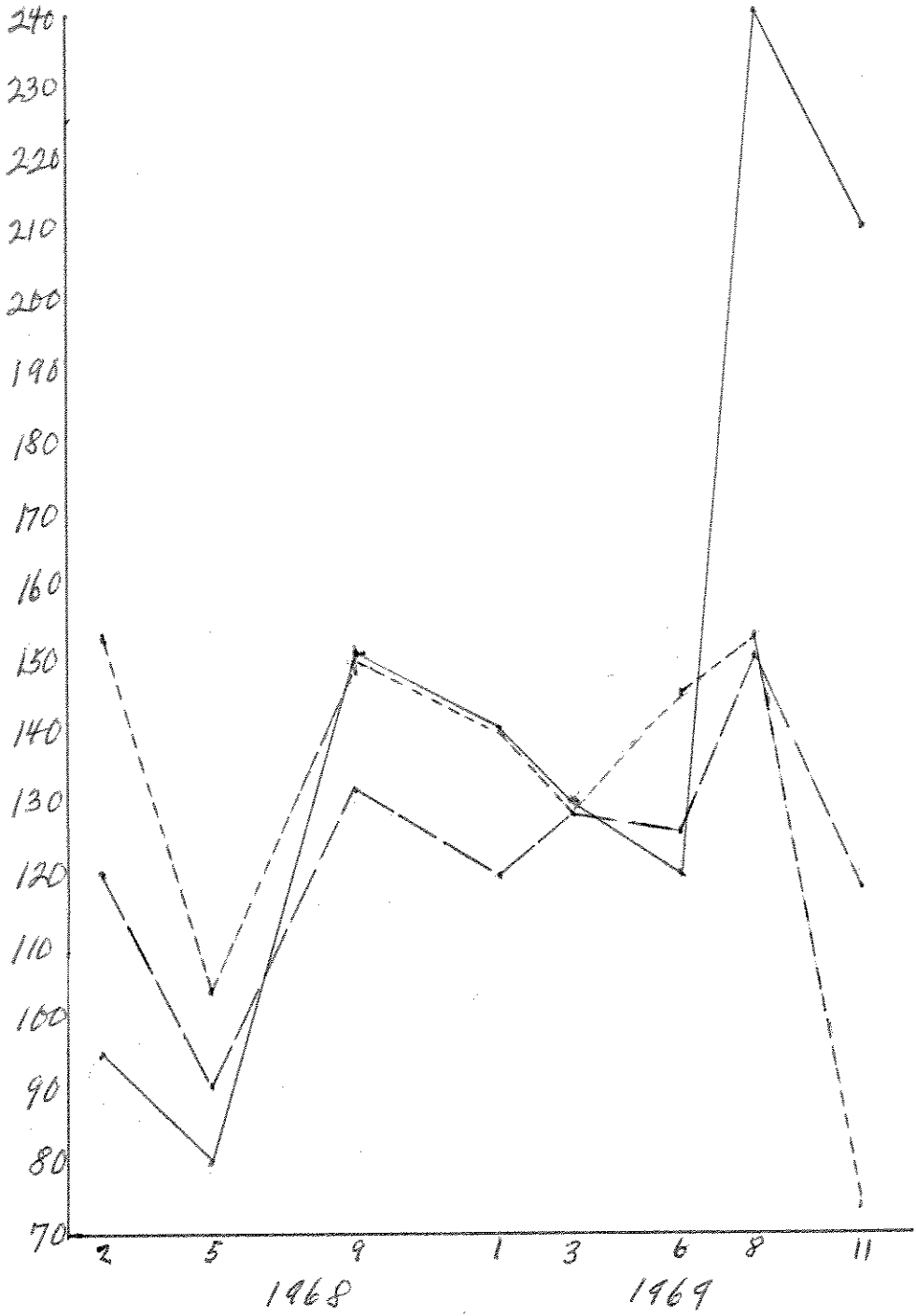
T= Total Recoverable

D= Dissolved

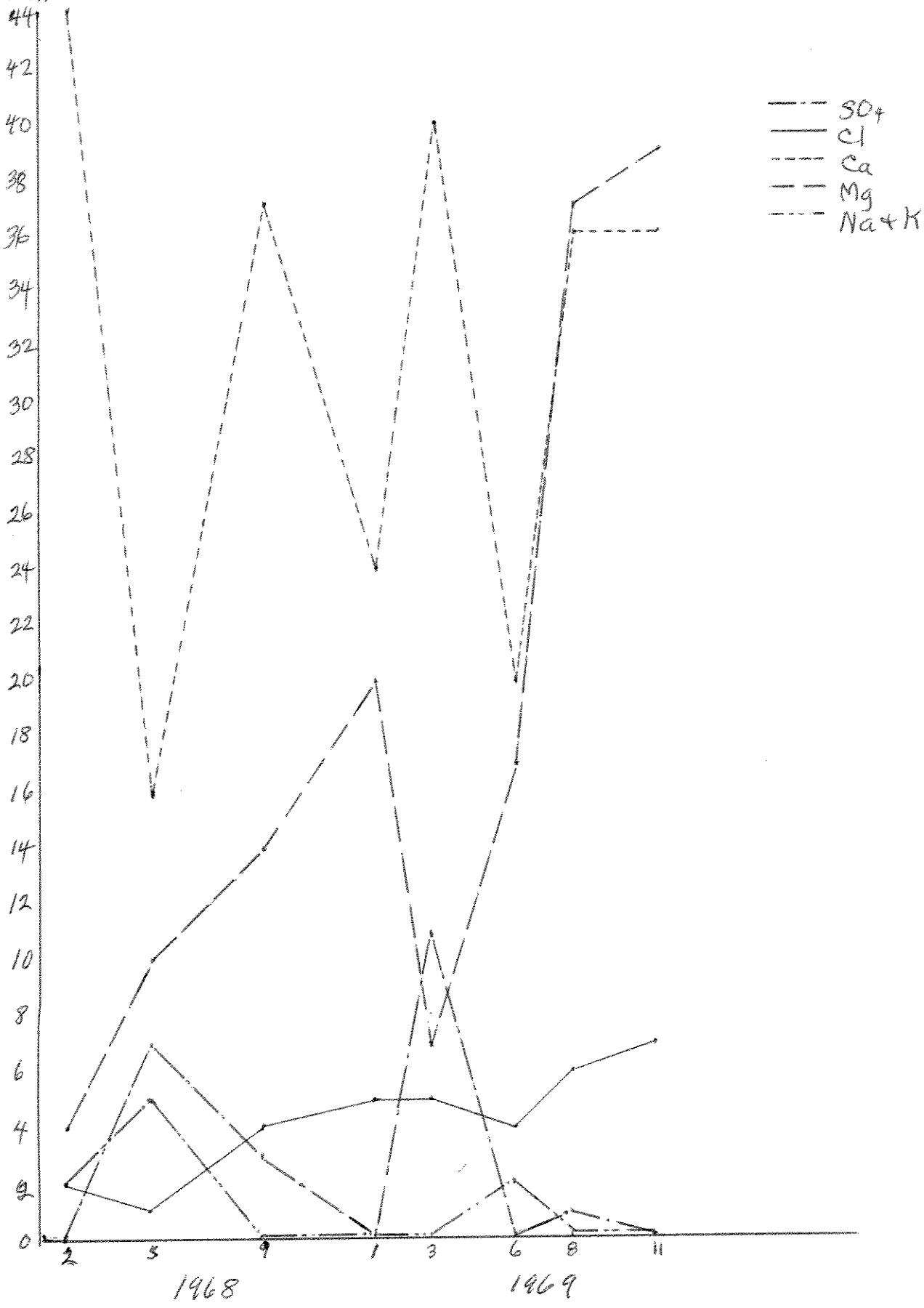
	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
5-22-72	17	6.2	0.9	.15	.000	<.01	0	0	T			
				0		<.01	0	0	D			
6-20-72	23	8.8	1.0	.01	.001	.01	.01	.01	T			
				0		<.01	.01	.01	D			
7-19-72	24	9.6	1.1	.06	.002	.02	.01	.01	T			
				.06		.01	.01	.01	D			
8-31-72	30	10	1.6	ND	.000	.01	<.01	<.01	T			
						<.01	<.01	<.01	D			
9-26-72	20	6.4	1.7	ND	.002	<.01	0	<.01	T			
						<.01	0	<.01	D			
10-31-72	30	8.8	2.0	<.01	.000	<.01	<.01	.01	T			
				0		<.01	<.01	<.01	D			
				<.01		<.01	<.01	<.01				
				0		<.01	<.01	<.01				

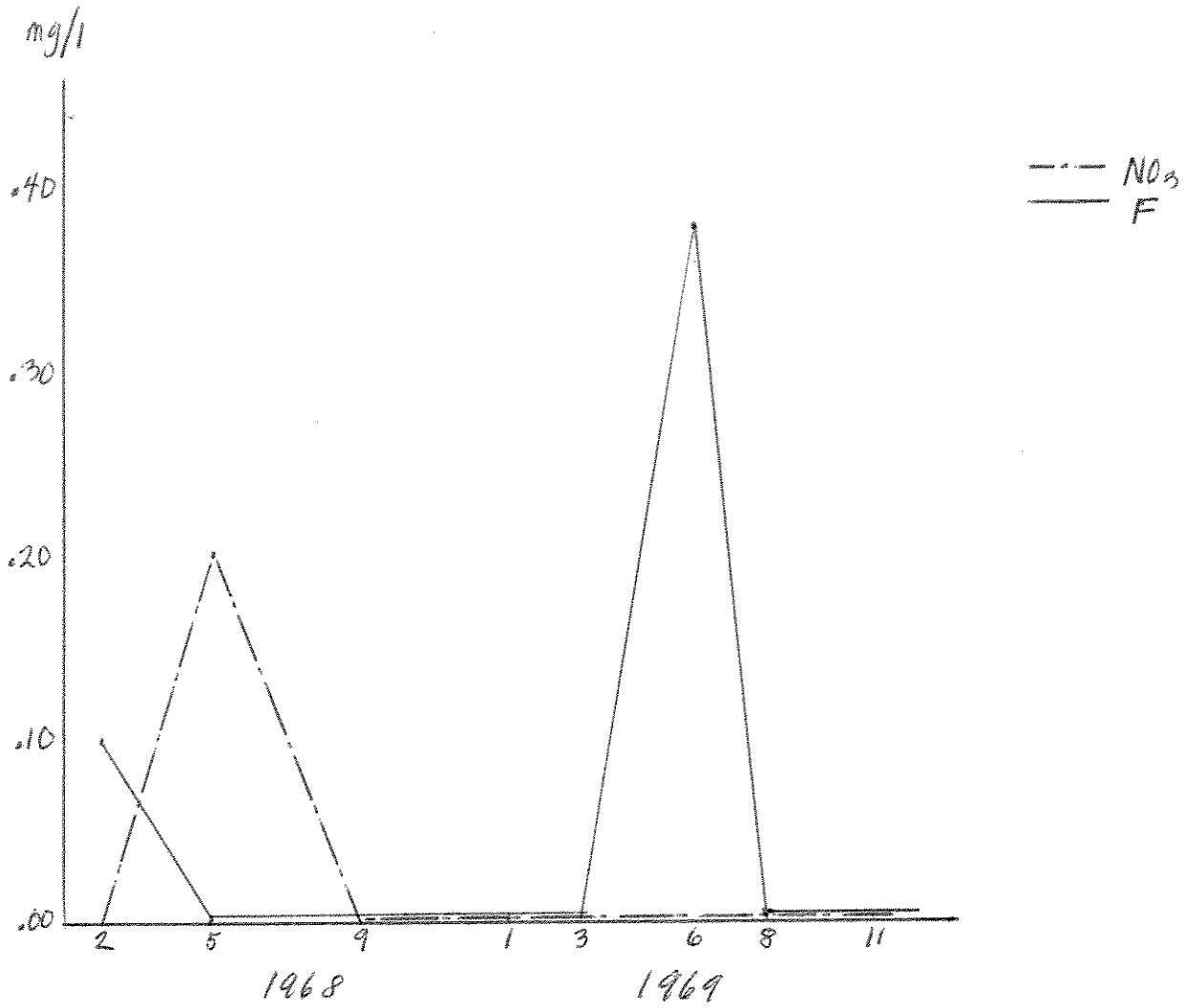
SITE 26 ALICE CR. FIELD DATA





SITE #26 ALICE CR. LAB ANALYSES page 2





ND = Not Done

Site #37 WILLOW CREEK (Flesher)

LAB ANALYSES- METALS

D=Dissolved

T= Total Recoverable
(Fe, ~~Cu~~, Zn, only)

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu			
10-20-71	16	6.8	2.0	0.07		<0.01		0.01	D		
				0.16		<0.01		0.02	T		
11- 71		No Data Collected									
12- 71		"	"	"							
1 -72		"	"	"							
2 -72		"	"	"							
3 -72		"	"	"							
4 -72		"	"	"							
5 -72		"	"	"							
6-20-72	12	5.4	1.1	.27	.002	.01	.01	.01	T		
7		8		.19		.01	.01	.01	D		
7- 72		No Data Collected									
8-31-72	19	6.4	1.8	ND	.000	.01	<.01	<.01	T		
						<.01	<.01	<.01	D		
9-26-72	20	6.4	1.7	ND	.002	<.01	0	<.01	T		
						<.01	0	<.01	D		
10-31-72	28	5.2	2.2	.33	.000	<.01	<.01	<.01	T		
				.18		<.01	<.01	<.01	D		

SITE #27 BLACKFOOT RIVER FIELD DATA

at Flesher road ~~Bridge~~

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
2-17-68	1300	0	3	7.8	11	80	50	95	2	2	p.c.	BD
3-17-68	0915	1	1	8.2	11	55	50	90	0	2	snow	"
4-21-68	0845	1	-1	8.1	11	55	50	85	0	2	snow	"
5-26-68	1145	7	8	8.2	10	55	45	70	0	2	cloud	"
6-21-68	0930	10	11	8.4	10	60	50	80	0	2	p.c.	"
7-22-68	1845	16	17	8.4	9	80	60	100	0	2	p.c.	"
9-10-68	1135	10	24	8.3	9	75	60	100	0	2	clear	"
10-20-68	1015	3	0	7.7	10	70	60	95	0	2	cloud	"
12-1-68	1030	0	-7	7.5	11	75	60	100	0	2	p.c.	"
1-3-69	not taken, snow too deep											
2-9-69	not taken, snow too deep											
3-29-69	0910	0	-2	7.4	11	80	50	85	0	2	p.c.	"
5-4-69	0920	5	6	7.6	9	70	45	75	0	2	cloud	"
6-17-69	1020	10	21	7.9	10	70	50	90	0	2	clear	"
7-17-69	1030	12	22	7.8	8	70	55	85	0	2	clear	"
8-27-69	0955	11	16	7.9	8	85	70	95	0	2	clear	"
10-8-69	0915	4.5	1.5	8.5	10		50	110			p.c.	m.c.
11-29-69	1600	0	0	8.5	12			100			clear	m.c.
1-20-70	1650	-0.5	0.5	8.5	10.0						m.c.	"
<hr/>												
4-27-71	1125	1.0										
5-21-71	1450	4.8										
6-23-71	1420	15										
7-71	NO Data Collected											
8-23-71		17										
9-21-71	1410	5										
10-71	NO Data Collected											
11-22-71	1345	0										
12-21-71	1000	0										
E		90			170	980	805	1455				
n		17		17	17	14	15	16				
\bar{x}		5			10	70	54	91				
Range L		0		7.4	8	55	45	70				
H		16		8.5	12	85	70	110				

8-73

	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc. alk.
2-17-68	0	124	70	0	100	21	3	0.0	0.1	82
3-17-68	0	130	90	0	73	43	2	3.6	0.28	60
4-21-68		110	65	0	67	20	2	0.00	0.10	55
5-25-68	0	100	68	0	67	28	1	.1	0	55
6-20-68	0	100	80	0	85	13	3.5	0.10	0.14	70
7-22-68	0	128	60	0	152	21	6	0	0.00	125
9-9-68	3	130	110	0	91	25	4	0	-	75
10-19-68	0	112	105	0	107	40	5	0	-	88
11-30-68	1	132	120	0	90	36	5	0	-	74
1-2-69	No Data									
2-8-69	No Data									
3-28-69	10	112	150	0	91	21	5	0	-	75
5-3-69	3	104	100	0	85	23	6	0	-	70
6-16-69	0	118	120	0	94	24	5	0	0.34	77
7-16-69	0	130	110	0	92	2	9	0	0.10	75
8-27-69	0	110	220	0	116	21	7	0	0	95
10-7-69	-	124	190	0	104	39	8	0	0.02	85
11-29-69	-	134	170	0	110	28	8	0	0.08	90
12 -69	0	90	90	0	100	3	5	0	0.15	No Data
1-20-70	0	90	90	0	100	3	5	0	0.15	82
2 -70	No Data									
3-27-70	4	120	100	0	110	14	3	0	0.1	90
4-21-70	-	136	100	0	120	24	1.0	0	0.1	98
4-27-70	-	130	140	0	130	24	1.5	0	0.2	107
5-22-70	-	100	80	0	80	21	0.5	0.1	0.1	66
6-16-70	-	80	90	0	90	15	0	0	0.2	74
7-21-70	-	130	130	0	130	15	0	0	0.2	107
8-20-70	-	120	160	0	100	24	0	0.1	0.2	82
9-22-70	-	110	160	0	90	31	0	0	0.1	74
10-21-70	-	130	170	0	98	34	0	0.04	0.2	80
11- 70	No Data									
12-17-70	-	120	160	0	100	25	0	0.04	0.1	82
1-13-71	-	120	170	0	110	22	0	0.2	0.1	90
2-2-71	-	100 ¹¹⁰	110 ¹⁰⁰	0.0	85	16	0	0.1	0.2	70
2-24-71	-	120	120	0.0	98	19	0.0	1.01 ^{1.01}	0.3	80
3-26-71	-	110 ¹⁰⁰	100 ¹¹⁰	0.0	98	27	0.0	0.06	0.3	80
4-27-71		90	60	0	73	23	0	0.3	0.1	60

	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu				
1-73 2-17-68	20	5	18	0.08		0.05		0.00				
3-17-68	20	10	9	0.00	0.00	0.06		0.00				
4-21-68	18	5	7	0.00	0.00	0.08	0.00	0.00				
5-25-68	13	9	3	0	0	.12	NES	0				
6-20-68	26	4	1	0.03	0.00	0.12		0.00				
7-22-68	20	2	1	.4	0.00	0.002		0.00				
9-9-68	28	10	0	0.1		0.05		ND <.01		ND = not detectable		
10-19-68	20	13	17	0.0		.05		0		= <.01		
11-30-68	24	15	0	0.5		0.07		0				
1-2-69	No Data											
2-8-69	No Data											
3-28-69	32	17	0	0.1	-	0	-	0				
5-3-69	20	12	1	0.2	0	0		0				
6-16-69	20	17	0	0	-	-	-	-				
7-16-69	20	15	12	0	-	0.10	-	0.18				
8-27-69	28	37	0	0	0	0	-	0				
10-7-69	24	32	0	0.1	-	0.0	-	0.0				
11-29-69	28	24	0	0.12	-	0.02	-	0.00				
12 -69	25	5	5	0.04	-	0.02	-	0	No Data			
1-20-70	25	5	5	0.04	-	0.02	-	0				
2 -70	No Data											
3-27-70	22	11	10	0	-	0.02	-	0				
4-21-70	22	12	10	0.0	-	0.05	-	0				
4-27-70	30	20	0	0	-	0.04	-	0				
5-22-70	12	12	6	0.1	-	0.04	-	<0.01				
6-16-70	16	12	1	0		not analyzed		not analyzed				
7-21-70	24	17	0	0.38	-	0.09	-	0.06				
8-20-70	28	22	0	0	-	0	-	0				
9-22-70	16	29	0	0	-	0.09	-	0				
10-21-70	28	24	0	0.08	-	0.13	-	0.0				
11- 70	No Data											
12-17-71	28	22	0	0.1	-	0.05	-	0.0				
1-13-71	24	27	0	0.04		0.07		0.0				
2-2-71	20	12	1.6	0.06		0.21		0.0				
2-24-71	28	12	2.0	0.01		0.05		0.0				
* NES = Not enough sample												
3-26-71	24	12	1.4	0.07		0.03		0.0				

SITE #27 BLACKFOOT RIVER AT FLESHER PASS BRIDGE

LAB ANALYSES

Date	Turb	TDS	Hard	CO3	HCO3	SO4	Cl	NO3	F	Calc. ash
5-21-71		100	110	0	130	10	0	0.3	0.1	107
6-23-71		110	87	0.0	130	0.0	0.0	0.1	0.3	107
7-71	No Data Collected									
8-23-71		110	91	0	100	16	0	0.1	0.1	82
9-21-71		80	85	0	79	0	0	0.4	0.2	65
10-71	48 Data Collected 85 37 0 .01 0.2									
11-22-71		110	83	0	85	37	0	.01	0.2	70
12-21-71		100	93	0	98	11	0	0.04	0.01	80
End of "Complete" Analyses.										
										E 3084
										A 38
										X 81
										Range L 55
										H 125

ND = Not done

SITE #27 BLACKFOOT RIVER AT FLESHER PASS BRIDGE

LAB ANALYSES * METALS

T= Total Recoverable

D= Dissolved

(Fe, Zn, Cu only)

Date	Ca	Mg	Na&K	Fe	As	Zn	Pb	Cu	
4-27-71	16	5	1	0.1		0.28		0.01	
5-21-71	12	8	1	0.02		0.27		0	
6-23-71	20	8.6	1.5	0.02		0.94		0.0	
7-71	No	Data	Collected						
8-23-71	21	9	2	0"		0.01		0.00	
9-21-71	20	8.5	1.5	0"		0.08"		0.01"	T
				0"		0.08"		0.01"	D
10-71	No	Data	Collected						
11-22-71	20	8.2	2.0	0.04	0.00	.09	0.00	<.01	D
				0.09"		.12"	0"	.02"	T
12-21-71	21	9.6	1.8	0.02		.08	0"	<.01	D
				0.02"		.10"	0"	.02"	T
1-72	No	data							E
2-72	No	data	End of "complete" analysis						E
3-23-72				.03	.000	.17	.00	.02	D
				.18"	.000	.20"	.00"	.02"	T
4-20-72				.09"	.000	.10"	.00"	.01"	T
				.04"		.10	.00	.01	D
5-22-72				.09"	.000	.11"	0"	.01"	T
				.00"		.10	0"	0"	D
6-20-72				.01"	.001	.15"	.01"	.01"	T
				.01"		.15	.01"	.01	D
7-19-72				.09"	.000	.16"	.01"	.01"	T
				.02"		.14	0"	.01"	D
8-31-72				ND"	.001	.03"	<.01"	<.01"	T
				ND		.03	<.01	<.01	D
9-26-72				ND"	.002	.05"	<.01"	<.01"	T
				ND		.05	<.01"	<.01	D
10-31-72				<.01	.000	<.01	<.01"	.01	T
				<.01		<.01	<.01	.01	D

MONTANA FISH AND GAME DEPARTMENT

TURBIDITY RECORD

Stream Blackfoot RiverStation Fletcher bridgeSampling Method ^{1/} Integrated w/
DH-48 samplerAnalytical Instrument Used HACH
Model 2100 A meterCollector: L. Spence

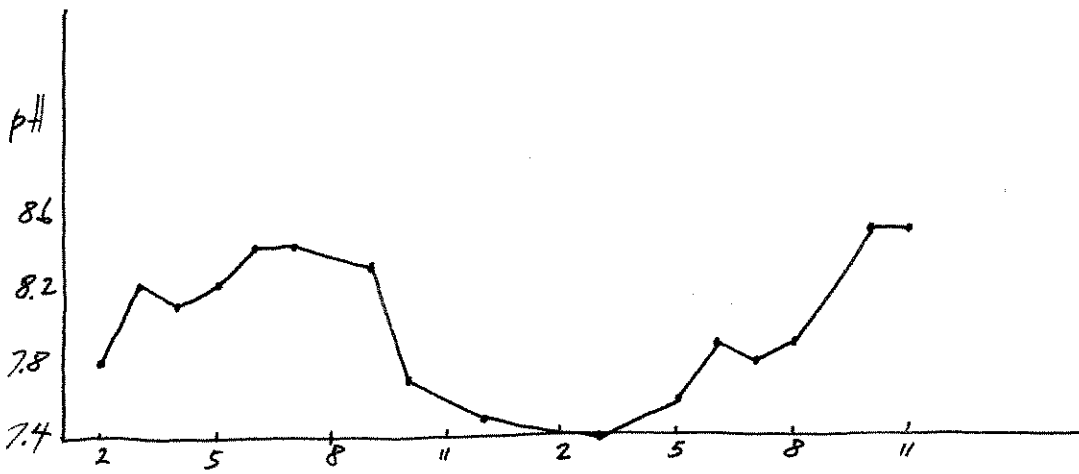
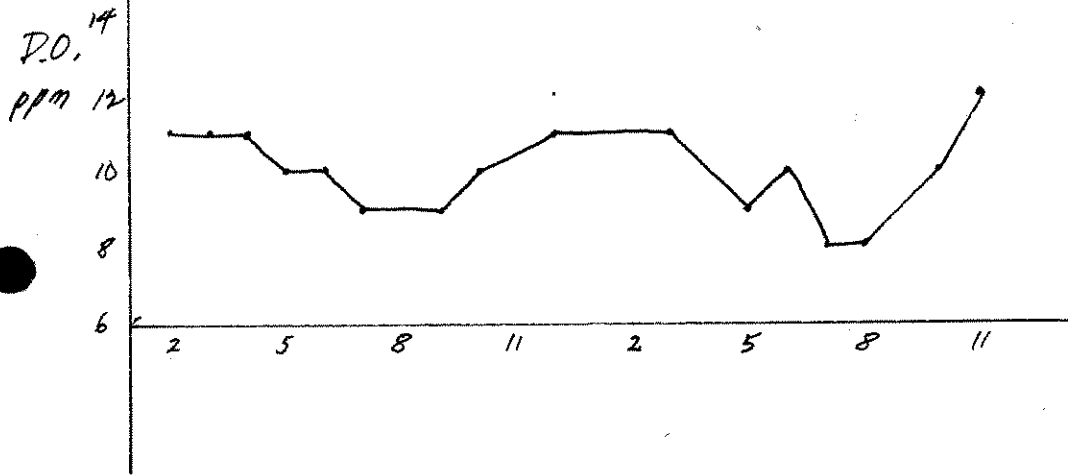
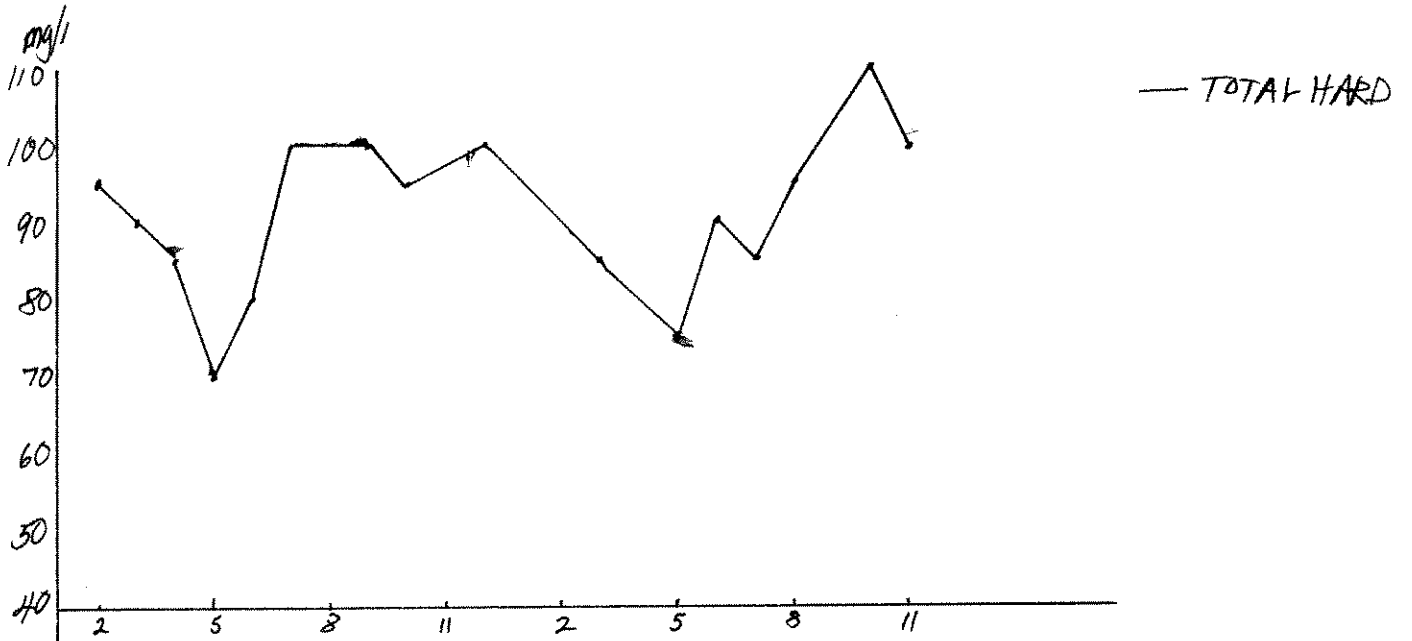
Turbidity (JTU)

Date	Reading			Ave.	Rounded ^{2/}	Water Color	Remarks
	1	2	3				
3-1-72	1.3	1.4	1.3	1.3	1.3	colorless	stream mostly ice-covered. Sample from open water low & clear
4-10-72	1.0	1.1	1.1	1.1	1.1	colorless	open water. G.H. 1.17 = 51% water clear
5-5-72	1.5	1.4	1.5	1.5	1.5	colorless	g.h. ± 1.70. water clear & high (readings made on 5-9-72 to 9:40)
5-17-72	4.5	4.7	4.7	4.6	4.6	light, cleanish green	g.h. ± 2.60. high & fast. clear, can see bottom most places
5-31-72	.23	.22	.22	.22	.25	colorless	g.h. ± 1.96. clear water. very little turbid. Some fine silt & detritus
6-3-72 ^{11:30}	1.2	1.3	1.3	1.3	1.3	colorless to light brownish	g.h. ± 1.78. Both fine silt & detritus in water in sample
6-9-72	.85	.90	.95	.90	.90	colorless	g.h. 1.40 clear. Mostly colloidal & detritus in sample.
6-13-72 ^{11:50}	.92	1.0	1.3	1.1	1.1	colorless	g.h. 1.12. clear. mostly colloidal & detritus in sample.
11-22-72	1.1	1.2	1.3	1.2	1.2	colorless	gauge frozen in. water clear. 2" ice cover at gauge; 2" shell ice, 1/2 open the
2-22-72	.95	.90	1.1	.98	1.0	colorless	gauge frozen solid. water low & clear complete ice cover. Sampled thru ice.
4-24-73	5.0	5.3	5.3	5.2	5.2	grayish-green	g.h. 0.97. water rising from winter low. leaves & detritus in flow
5-14-73	1.0	1.1	1.3	1.1	1.1	colorless	g.h. 1.26. Very clear. not too high but rising.
5-16-73	2.5	2.5	2.7	2.6	2.6	colorless to lite greenish	g.h. ± 1.54. water clear, high & fast.
5-17-73	4.7	4.7	4.3	4.6	4.6	colorless to lite greenish	g.h. ± 1.52. clear, higher fast Forgot about cell rise!
5-19-73	1.6	1.4	1.7	1.6	1.6	lite greenish clear	g.h. ± 1.58. fairly high & fast
5-22-73	1.3	1.1	1.2	1.2	1.2	colorless	g.h. ± 1.26. clear, not too high.
5-31-73	.8	1.3	1.1	1.1	1.1	colorless	g.h. .86. clear.
6-4-73	.75	.95	1.10	.93	.95	colorless	g.h. .79. low & clear

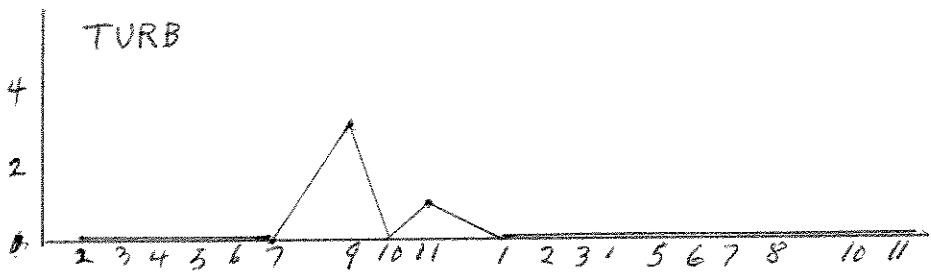
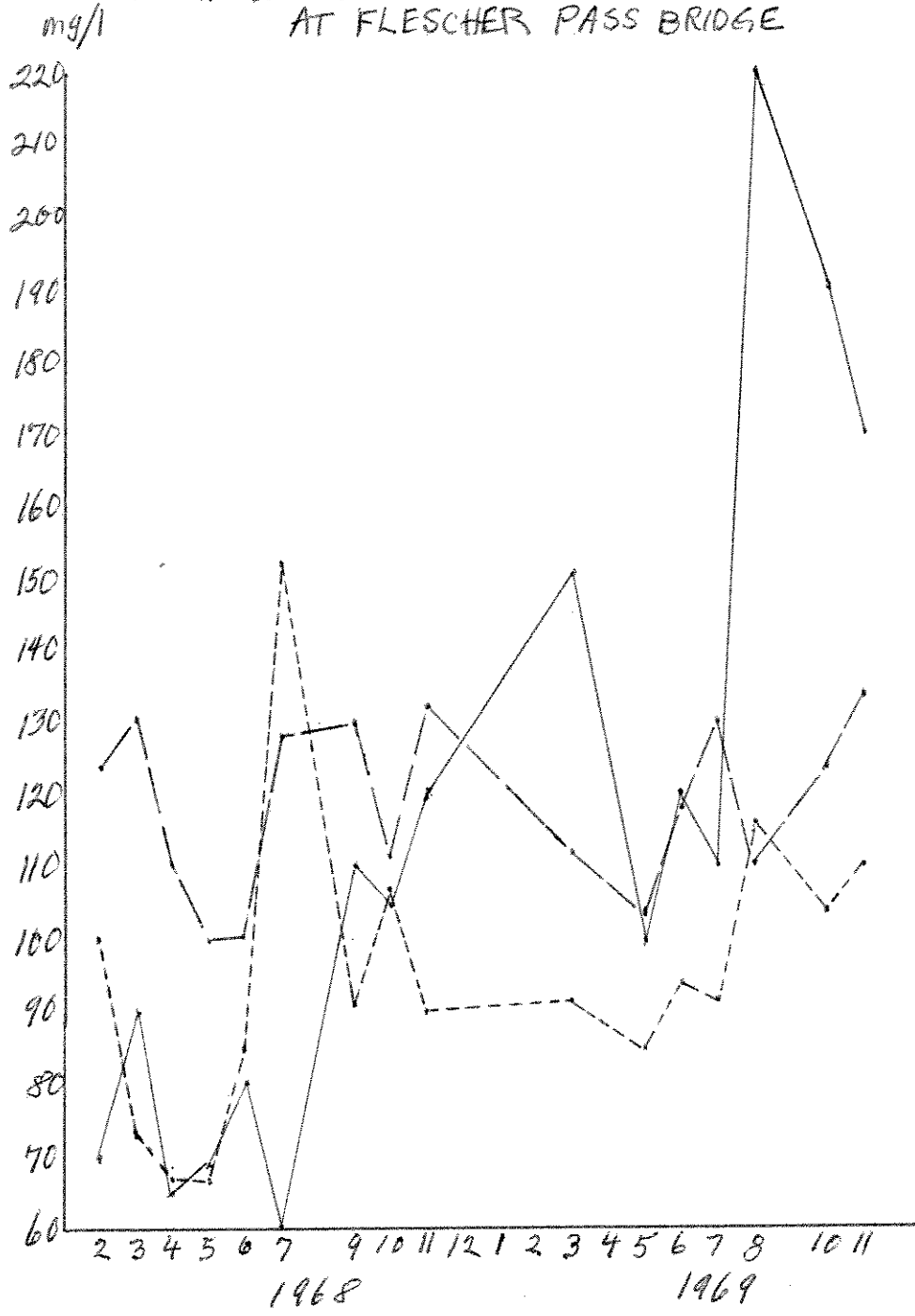
^{1/} Surface Grab, Integrated, Other^{2/} According to Standard Methods for Examination of Water and Wastewater, 13th Ed., 1971,
pg. 352

SITE # 27 BLACK FOOT R. AT FLESHER

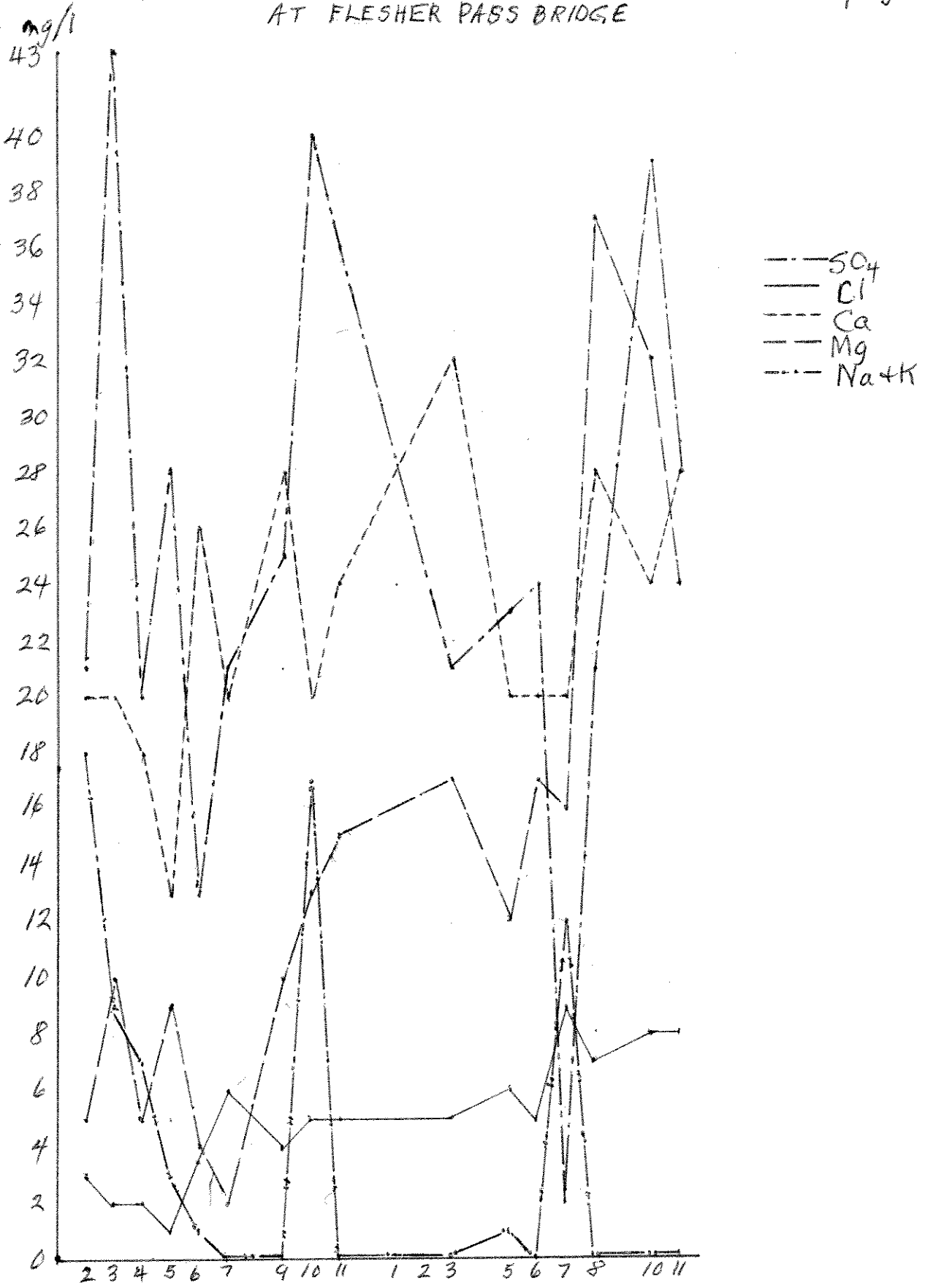
FIELD DATA



SITE # 27 BLACKFOOT R. LAB ANALYSES
 AT FLESCHER PASS BRIDGE



SITE #27 BLACKFOOT R. LAB ANALYSES
AT FLESHER PASS BRIDGE



mg/l
1.00

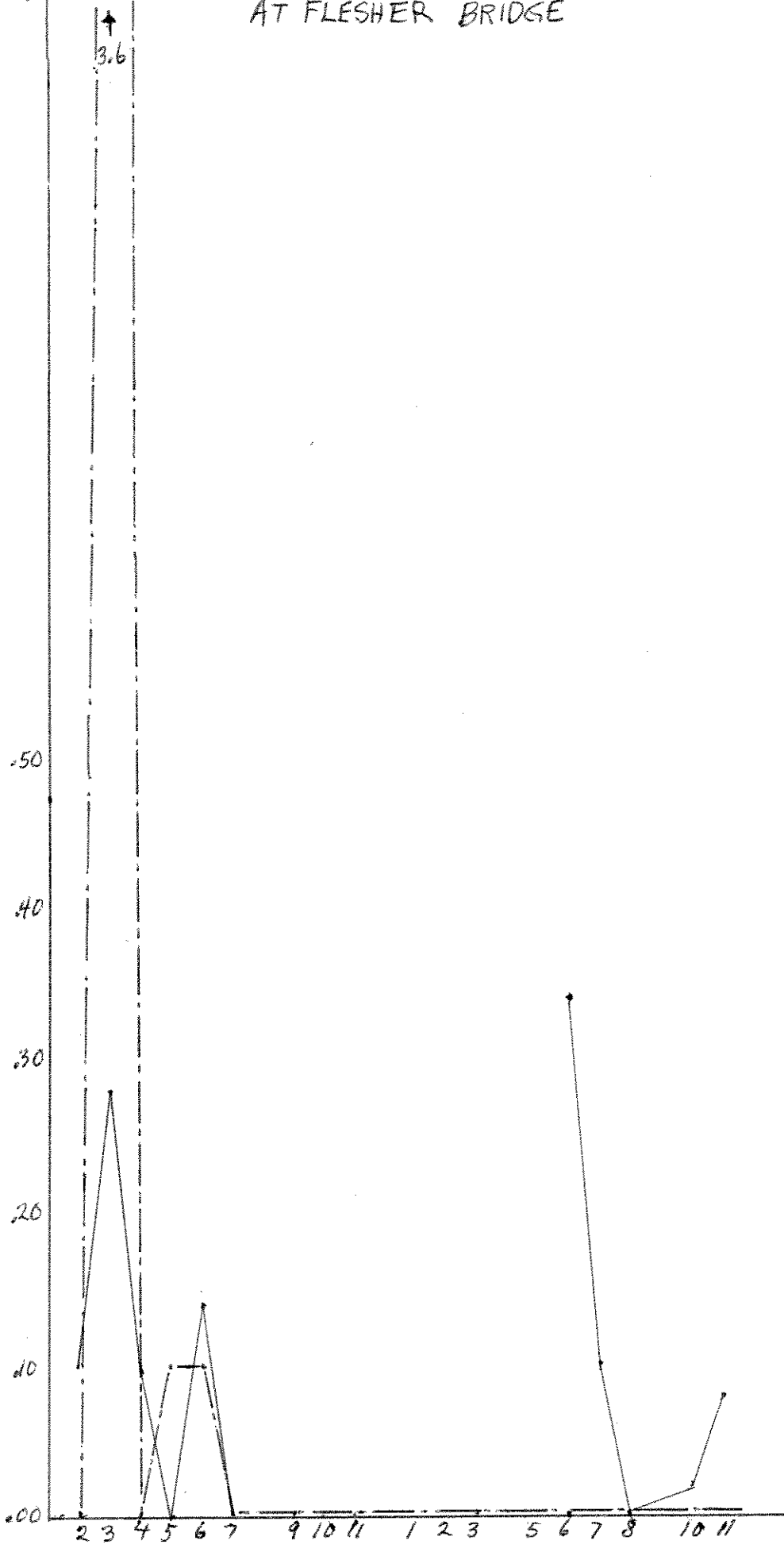
SITE # 27

BLACKFOOT R.
AT FLESHER BRIDGE

LAB ANALYSES

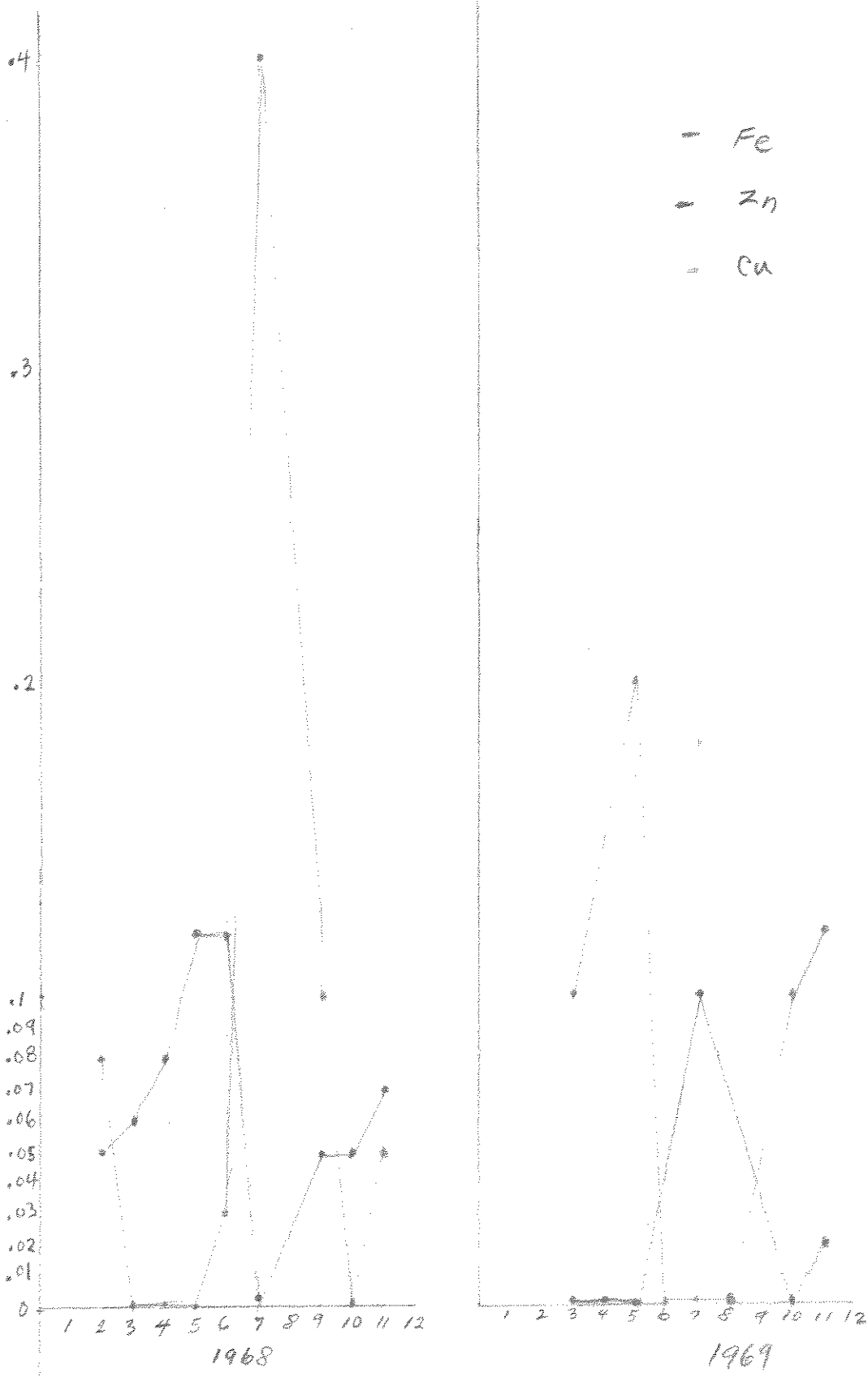
page 3

—•— NO₃
— F



SITE 27

METALS



at Pop's Place

Pop's place

SITE #29 BLACKFOOT RIVER FIELD DATA

DATE	TIME	H ₂ O TEMP	AIR TEMP	pH	D.O.	ALK	Ca HARD	TOTAL HARD	TURB	CO ₂	WEATHER	COI
2-17-68	1130	0	0	6.9	11	40	55	110	2	2	p.c.	B.D
3-17-68	0800	1	1	7.3	12	45	65	105	0	2	snow	"
4-21-68	0930	1	-1	7.6	11	45	25	45	0	2	snow	"
5-26-68	1300	6	7	7.7	9	35	30	60	0	2	cloud	"
6-21-68	1030	8	12	8.1	9	50	40	75	0	2	p.c.	"
7-22-68	1930	13	10	8.2	8	60	55	95	0	2	p.c.	"
9-10-68	1015	10	20	8.0	9	60	50	95	0	2	p.c.	"
10-20-68	no longer sampled this station; contract with USGS											
E		39			69	335	320	585				
n		7		7	7	7	7	7				
\bar{x}		6			10	48	46	84				
Range L		0		6.9	8	35	25	45				
H		13		8.2	12	60	65	110				

LABORATORY ANALYSES
BLACKFOOT RIVER AT POP'S PLACE
USGS

Date	Boron	Fluoride	Conductivity
9-10-68	0.00	0.2	233.89
10-04-68	0.00	0.0	194.06
10-10-68	0.00	0.2	208.96
11-04-68	0.01	0.1	211.05
11-07-68	0.01	0.2	214.46
11-30-68	0.00	0.1	235.46
12-23-68	0.00	0.0	227.21
12-28-68	0.00	0.0	261.67
1-18-69	0.01	0.1	225.91
2-24-69	0.00	0.2	234.21
3-10-69	0.07	0.2	230.09
4-01-69	0.00	0.1	198.59
4-23-69	0.00	0.1	103.76
5-08-69	0.02	0.1	131.18

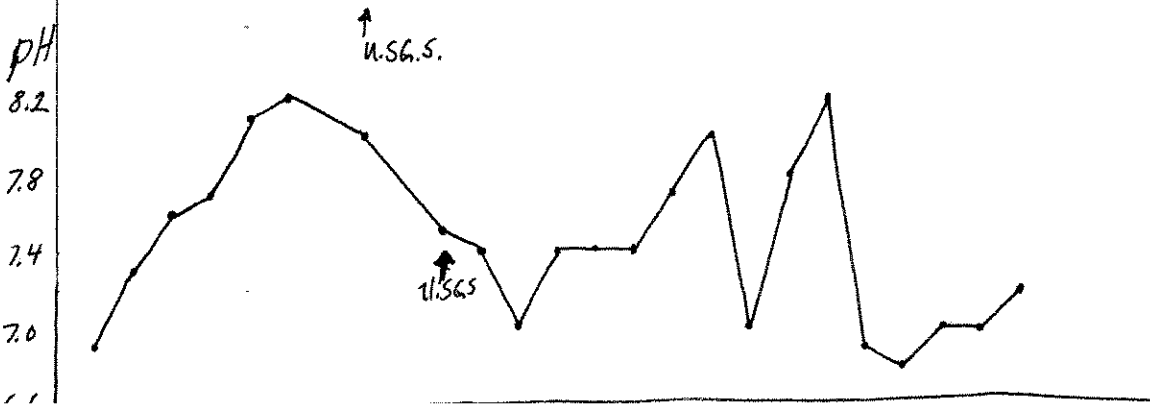
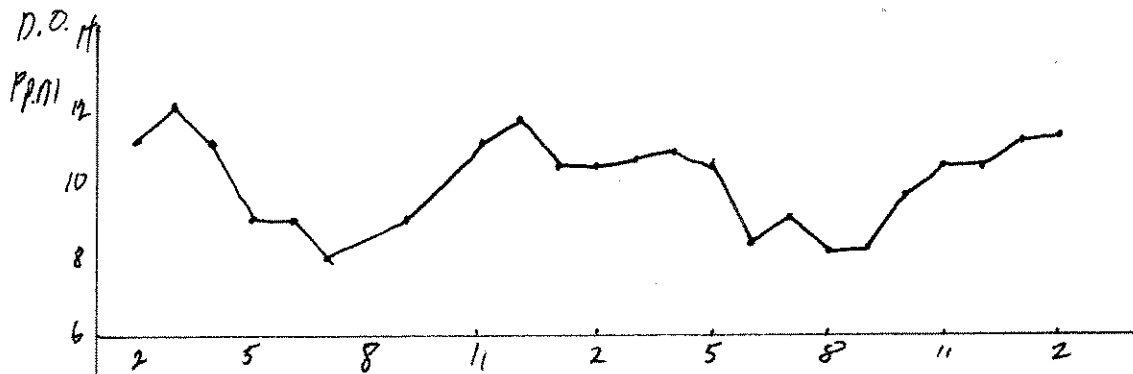
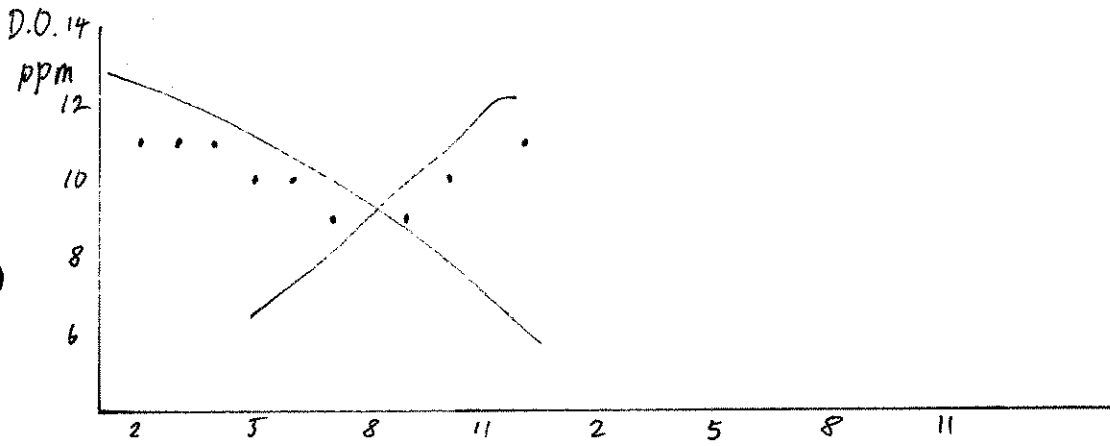
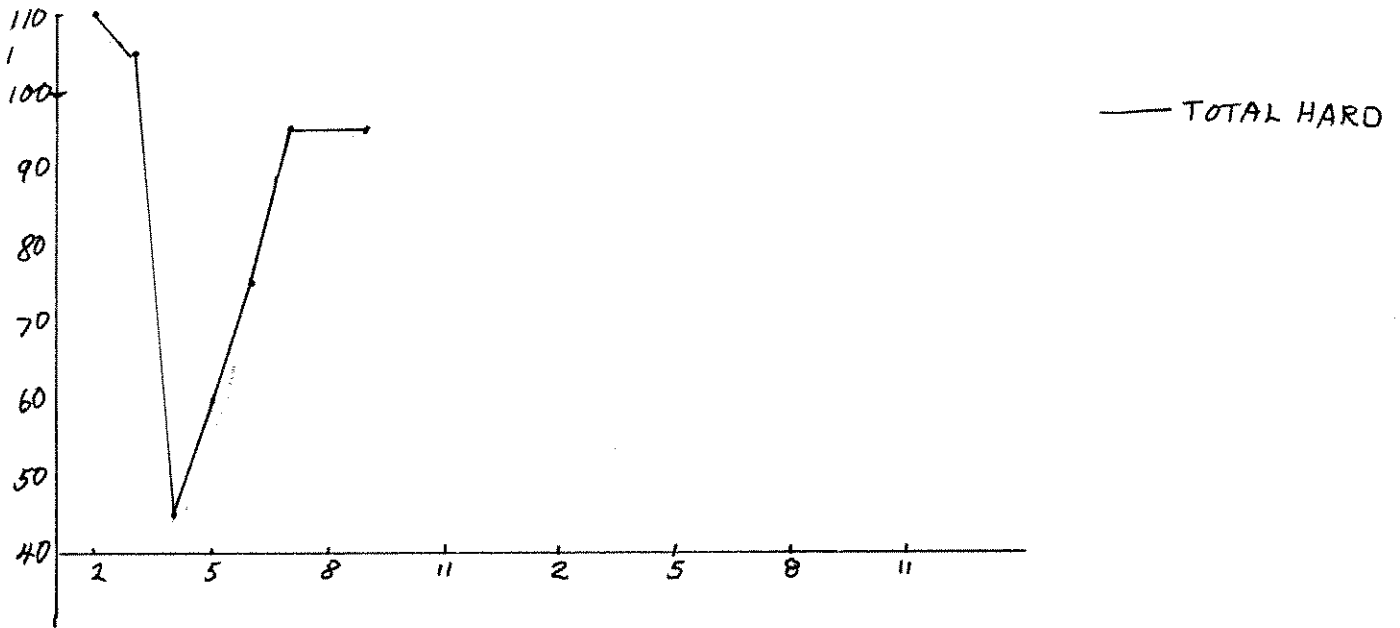
MONTHLY FIELD DETERMINATIONS
BLACKFOOT RIVER AT POP'S PLACE
USGS

DATE	GAGE HT. FT.	DISCHARGE CFS	pH	D.O. mg/l	AIR TEMP °C	WATERTEMP °C
09-10-68						
10-10-68	3.16	5.20			7.0	5.0
11-07-68	3.03	3.09	7.5	11.0	-2.0	2.0
12-04-68	3.16	3.67	7.4	11.6	-7.0	0.0
01-08-69	3.14	5.43	7.0	10.4	-8.0	0.0
02-06-69	3.04	2.61	7.4	10.4	-6.0	0.0
03-11-69	3.01	2.17	7.4	10.6	-10.0	0.0
04-07-69	3.86	47.1	7.4	10.8	5.0	1.0
05-06-69	3.68	39.0	7.7	10.2	7.0	4.0
06-05-69	3.36	21.3	8.0	8.4	19.0	10.0
07-02-69	4.02	72.5	7.0	9.0	22.0	7.0
08-05-69	2.88	8.55	7.8	8.1	17.2	13.3
09-10-69	2.70	3.56	8.2	8.2	22.0	12.5
10-10-69	2.72	3.38	6.9	9.6	2.5	4.5
11-07-69	2.73	3.42	6.8	10.4	2.5	2.5
12-05-69	2.75	3.21	7.0	10.4	-2.5	0.0
01-09-70	2.92 (ice)	2.09	7.0	11.0	-6.5	0.0
02-06-70		2.33	7.2	11.1	0.0	0.0

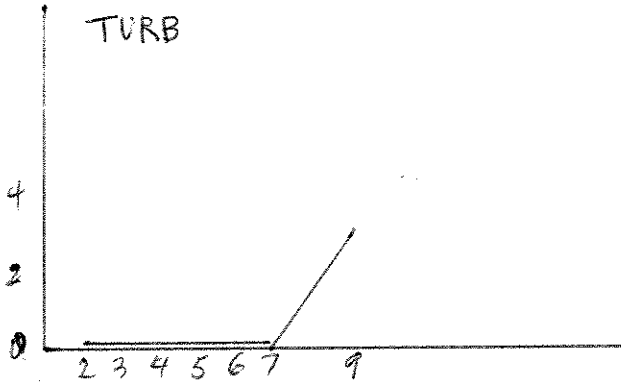
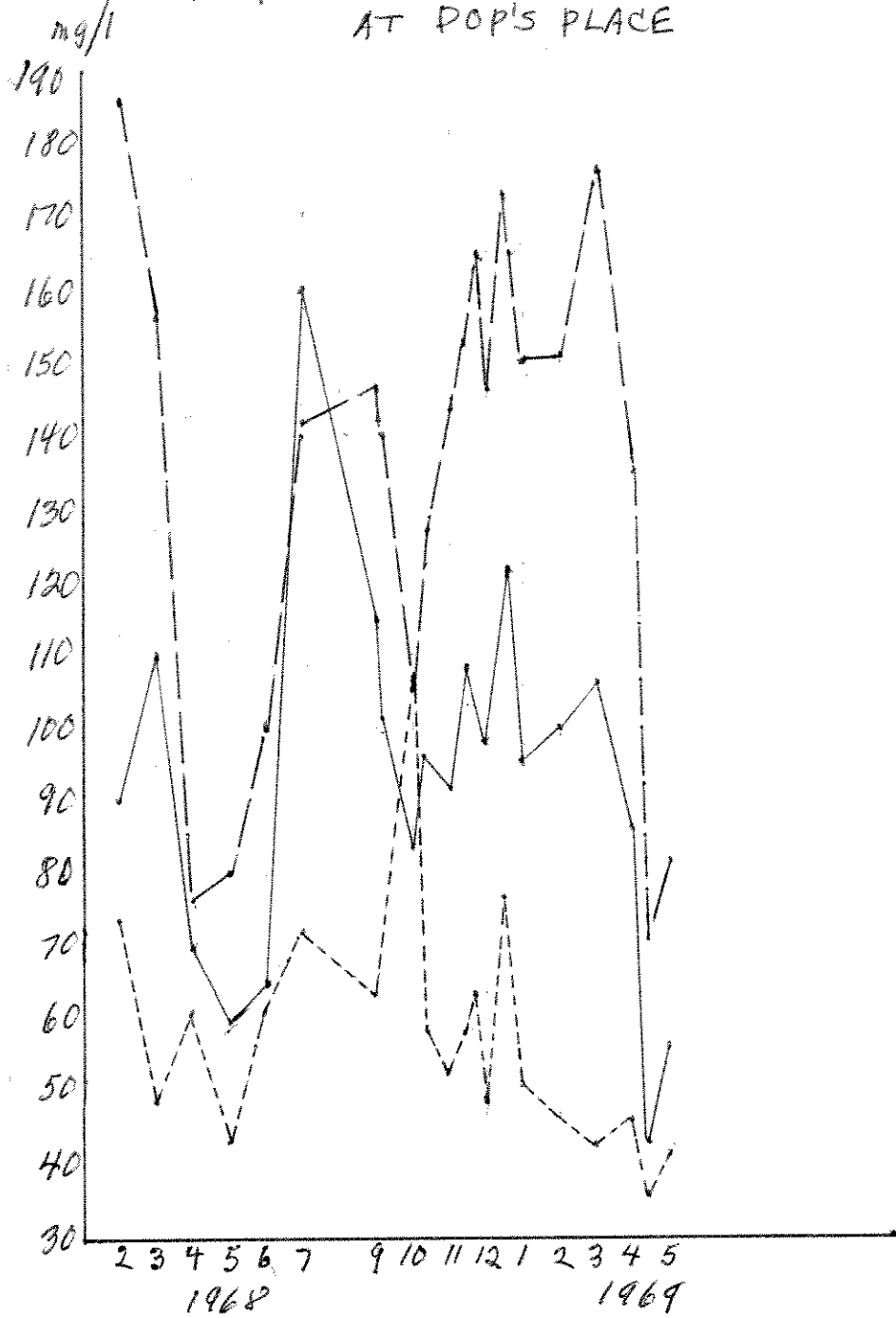
SITE #29

Pop's

FIELD DATA



SITE # 29 BLACKFOOT R.
AT POP'S PLACE

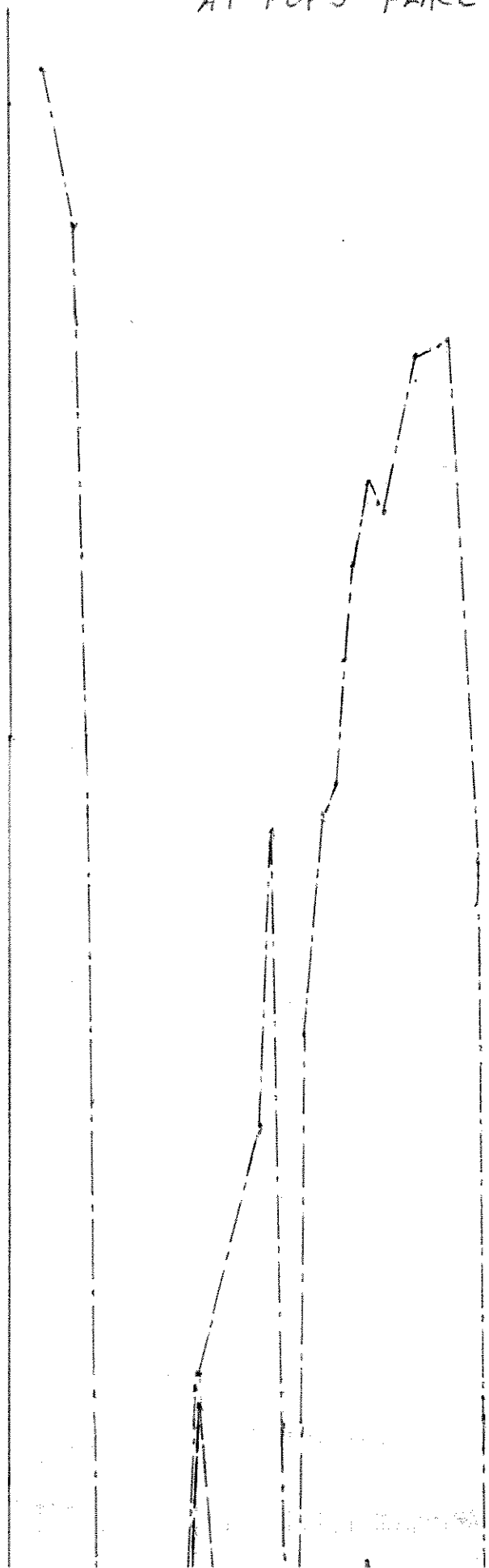


SITE # 29 BLACKFOOT R.
AT POP'S PLACE

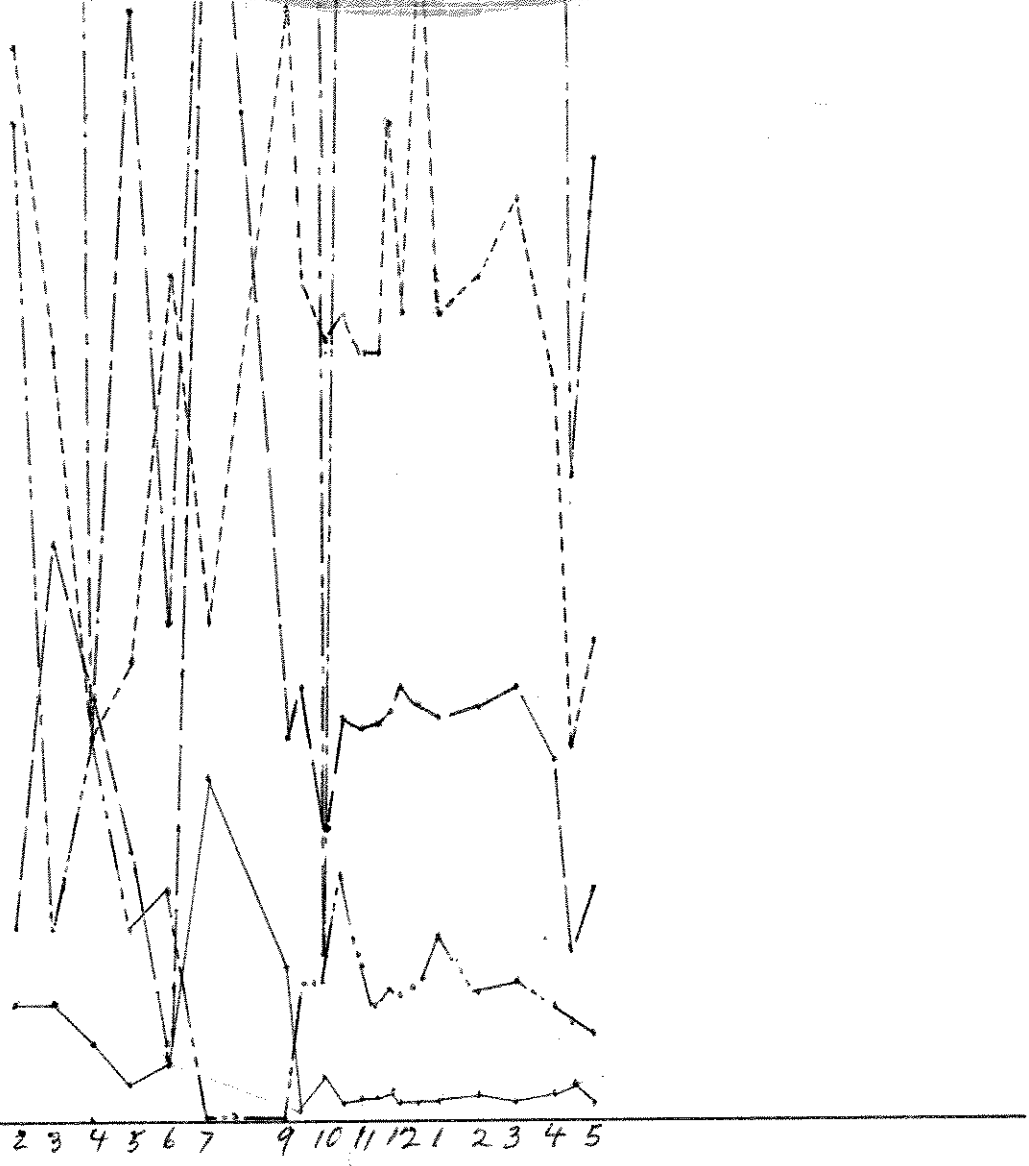
LAB ANALYSES

--- SO₄
— Cl
- - - Ca
- - - Mg
- - - Na+K

80
78
76
74
72
70
68
66
64
62
60
58
56
54
52
50
48
46
44
42
40
38
36
34
32



28
26
24
22
20
18
16
14
12
10
8
6
4
2
0



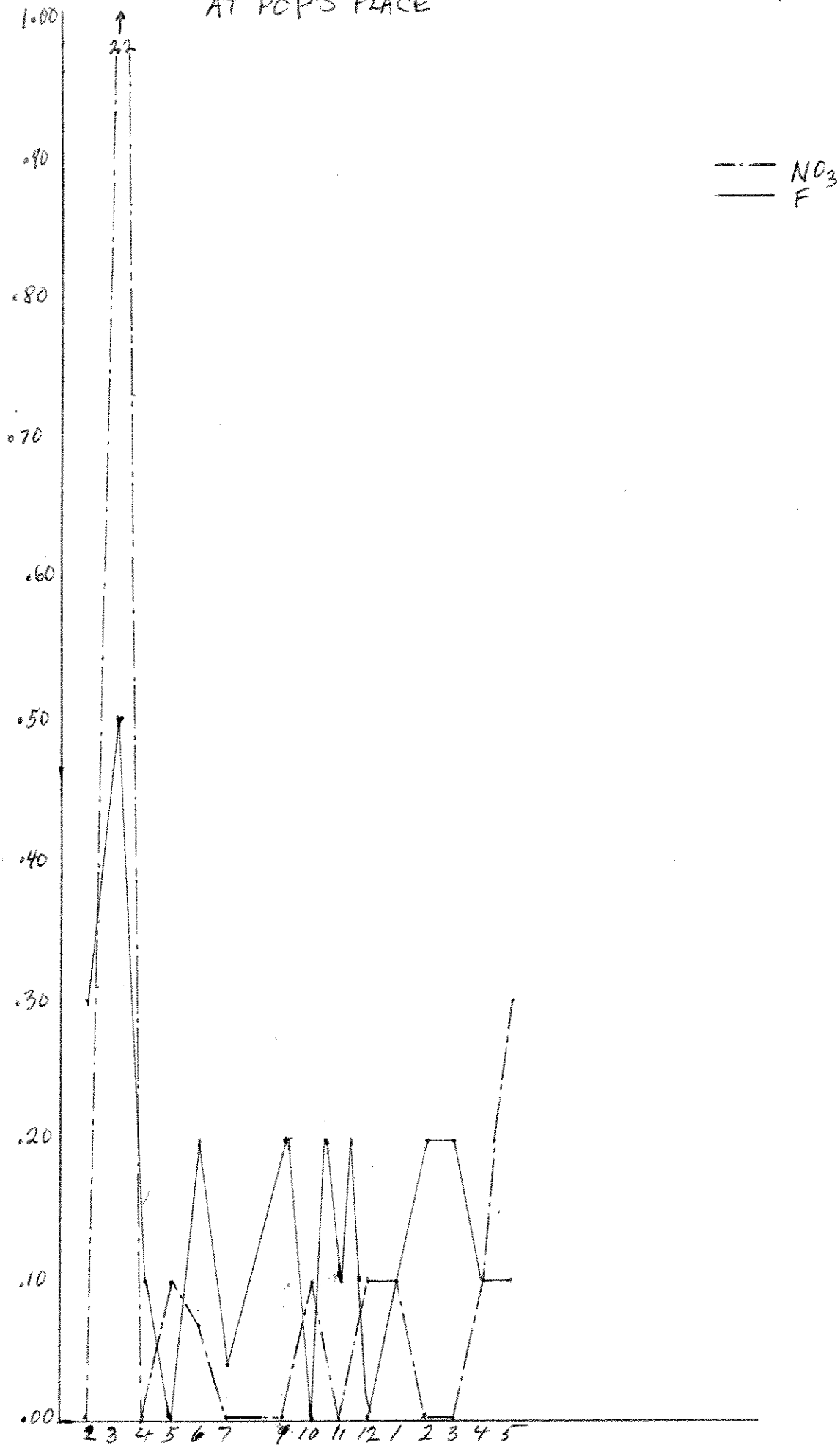
1968

1969

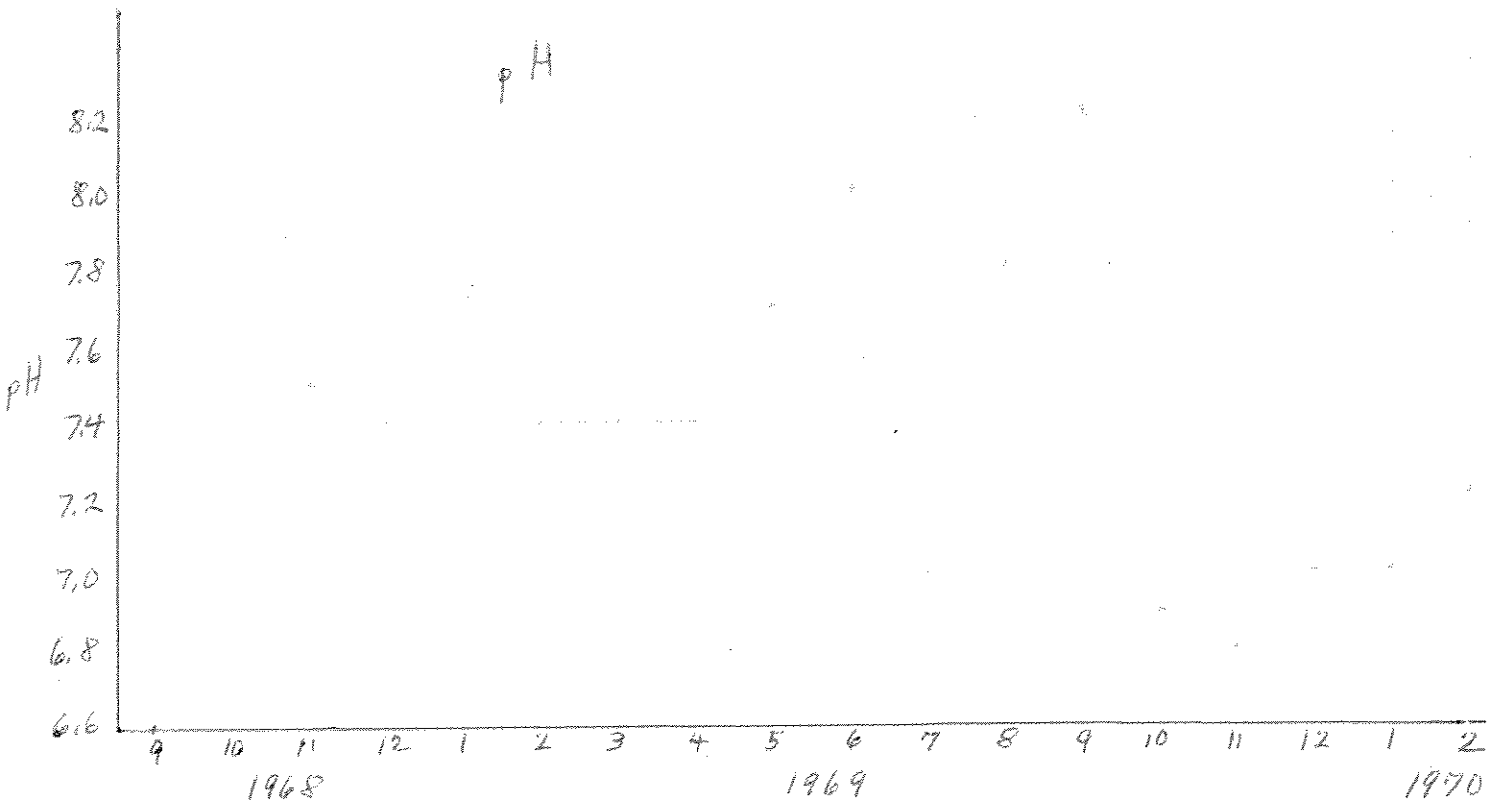
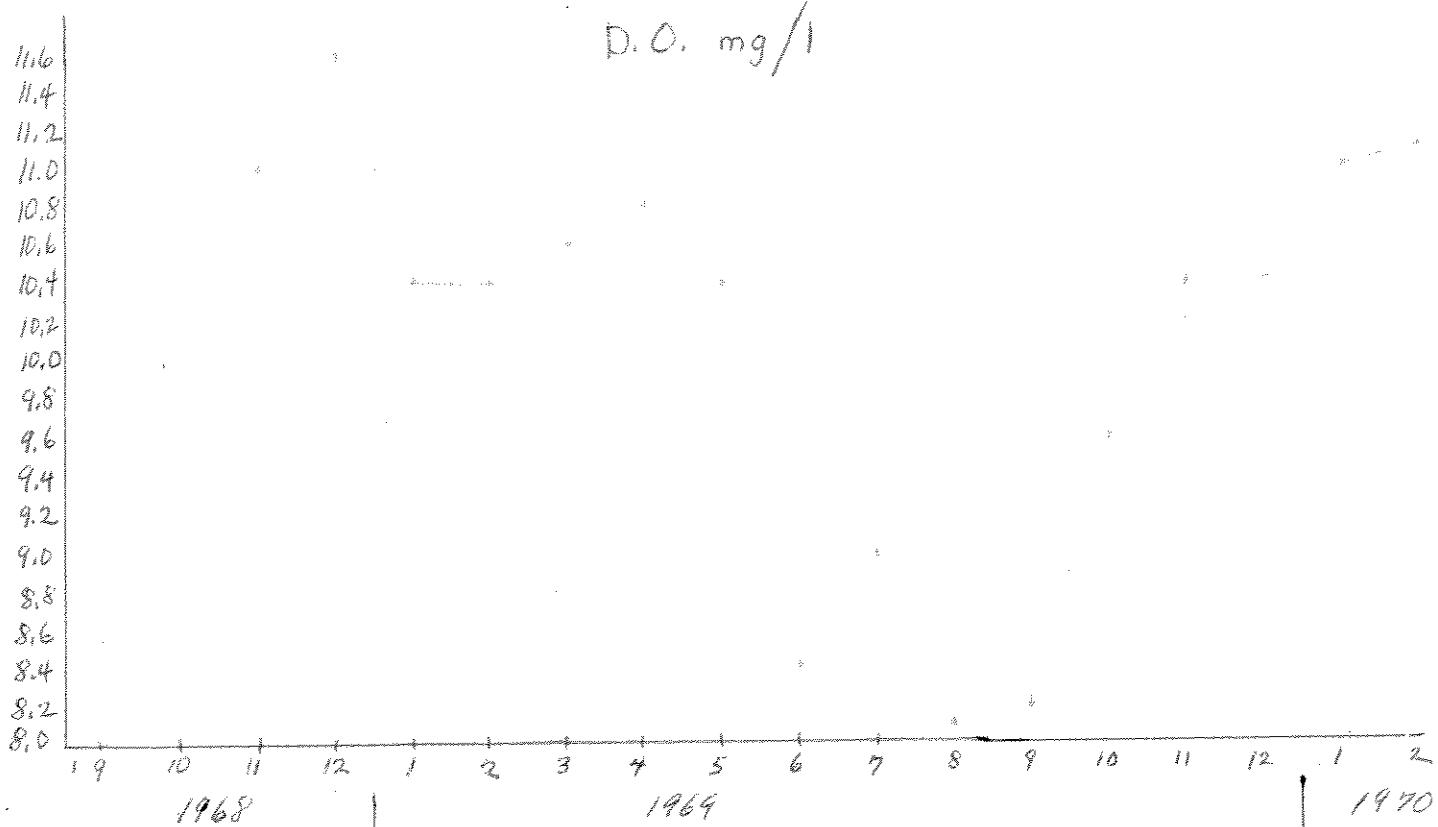
SITE #29 BLACKFOOT R.
AT POP'S PLACE

LAB ANALYSES

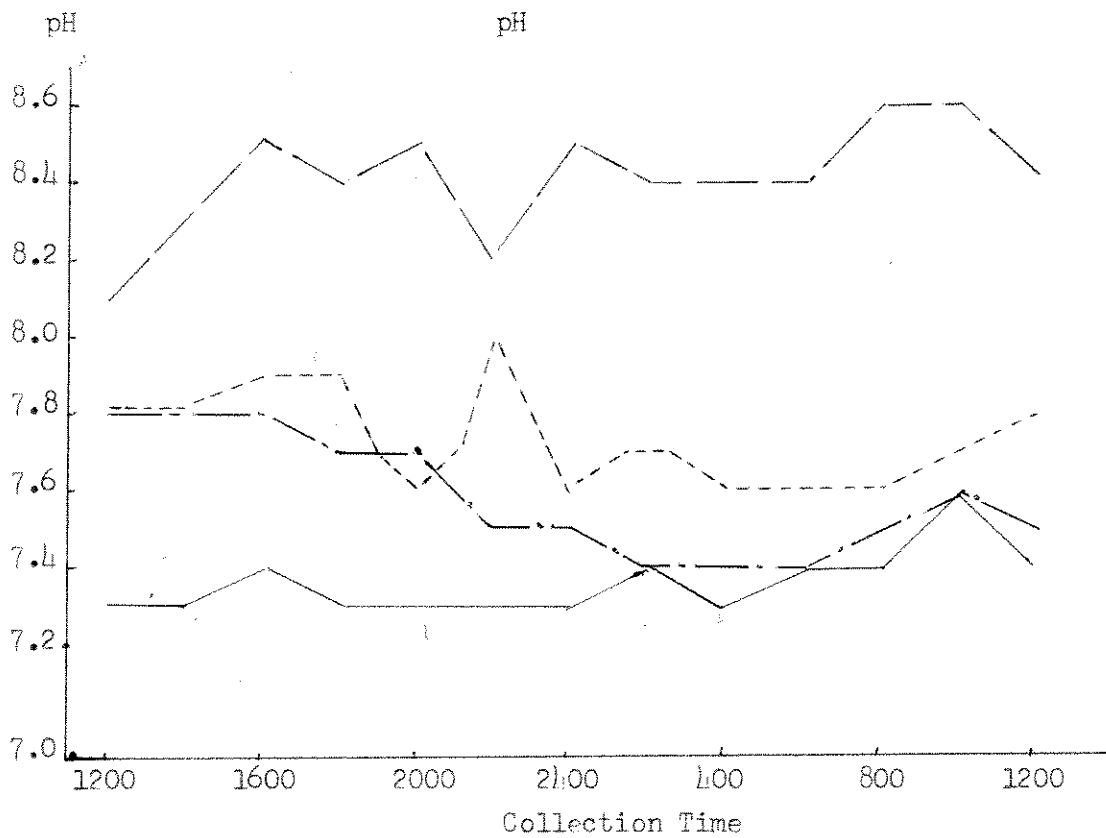
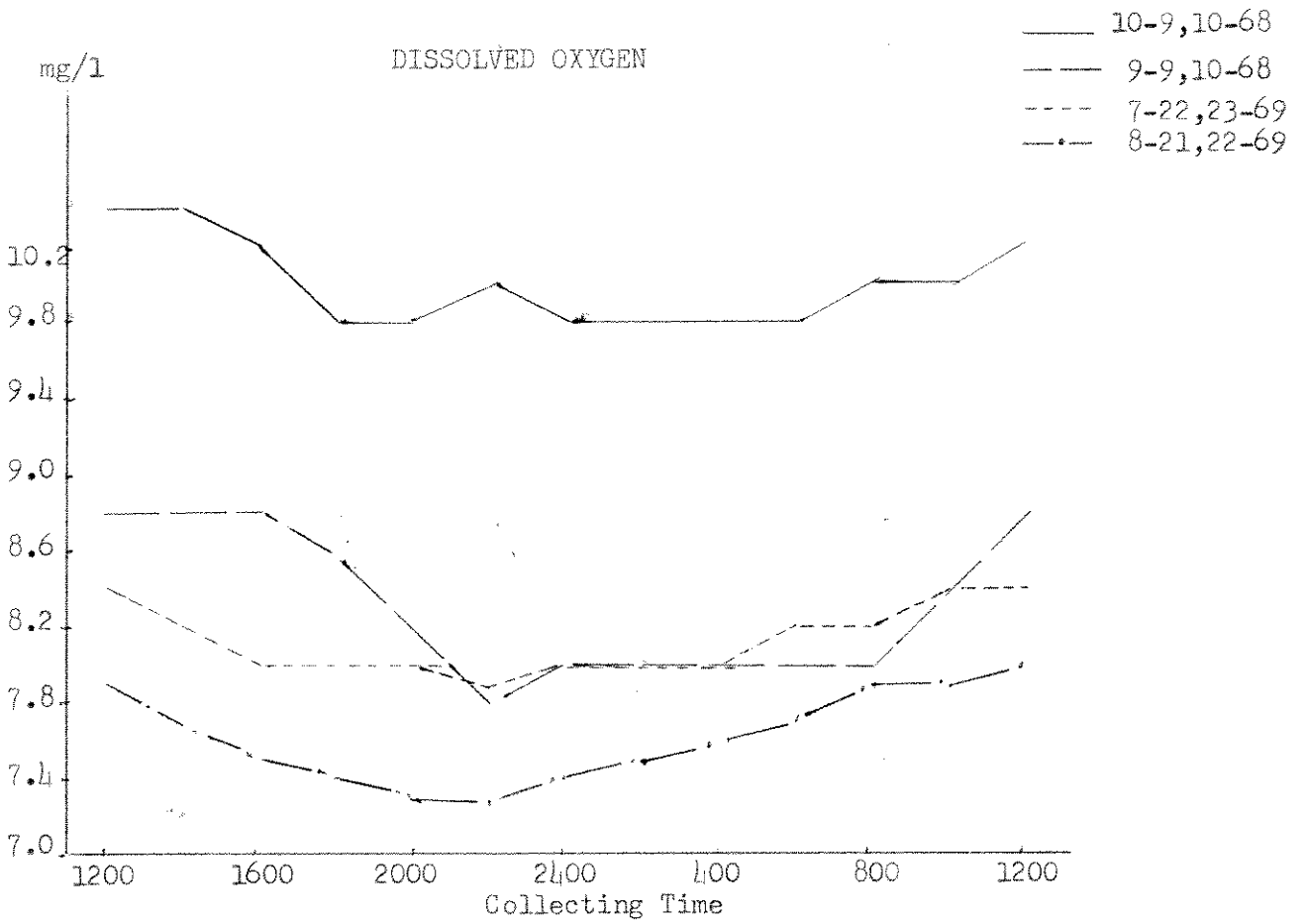
page 3



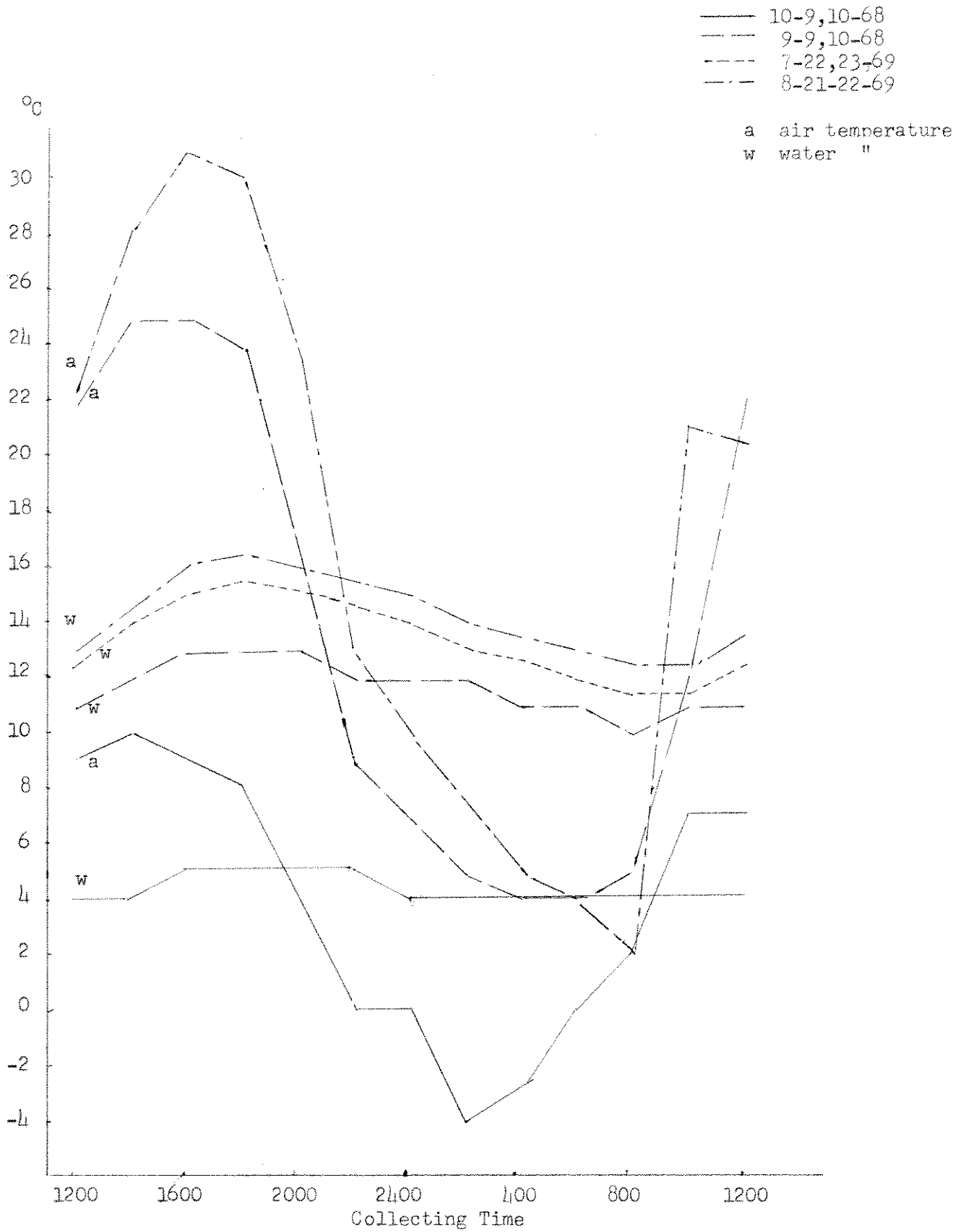
SITE #29 BLACKFOOT RIVER AT POP'S PLACE
MONTHLY VARIATIONS



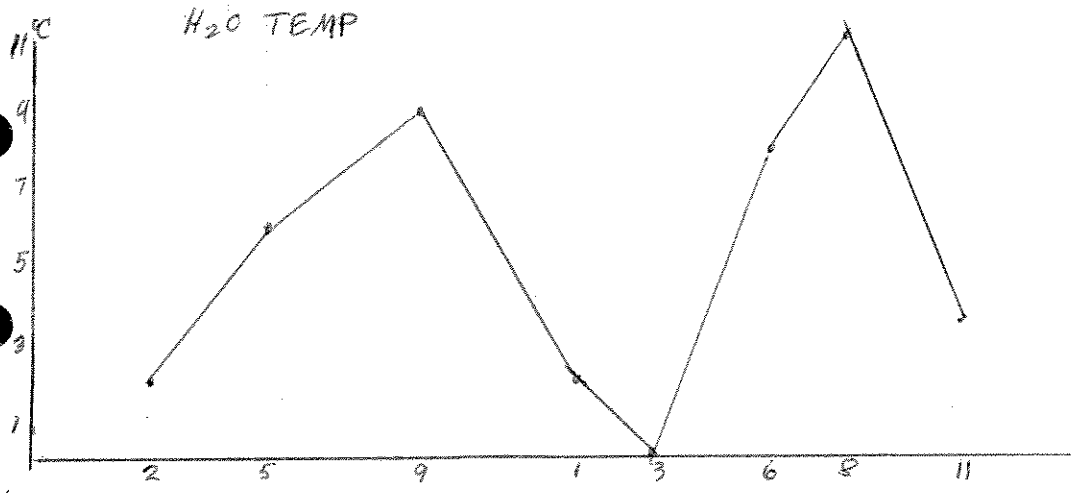
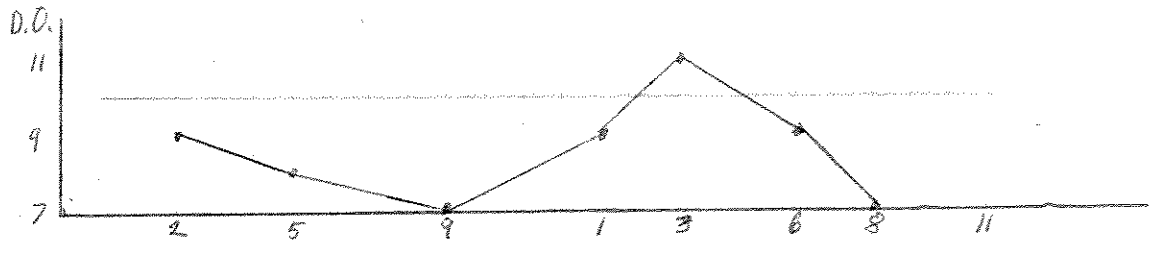
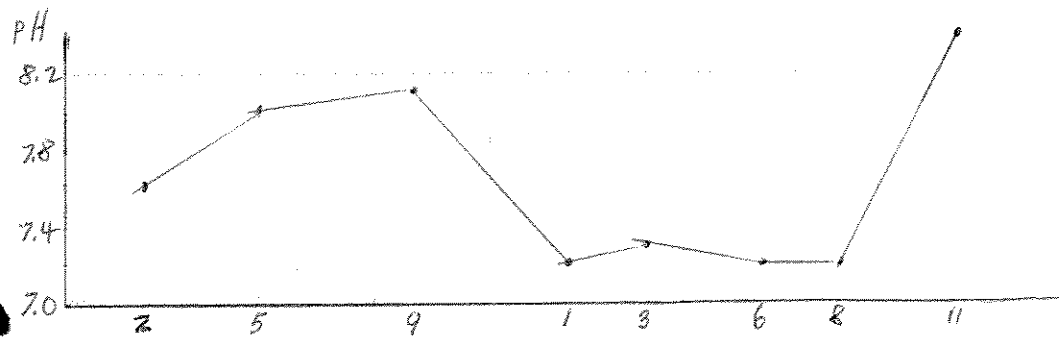
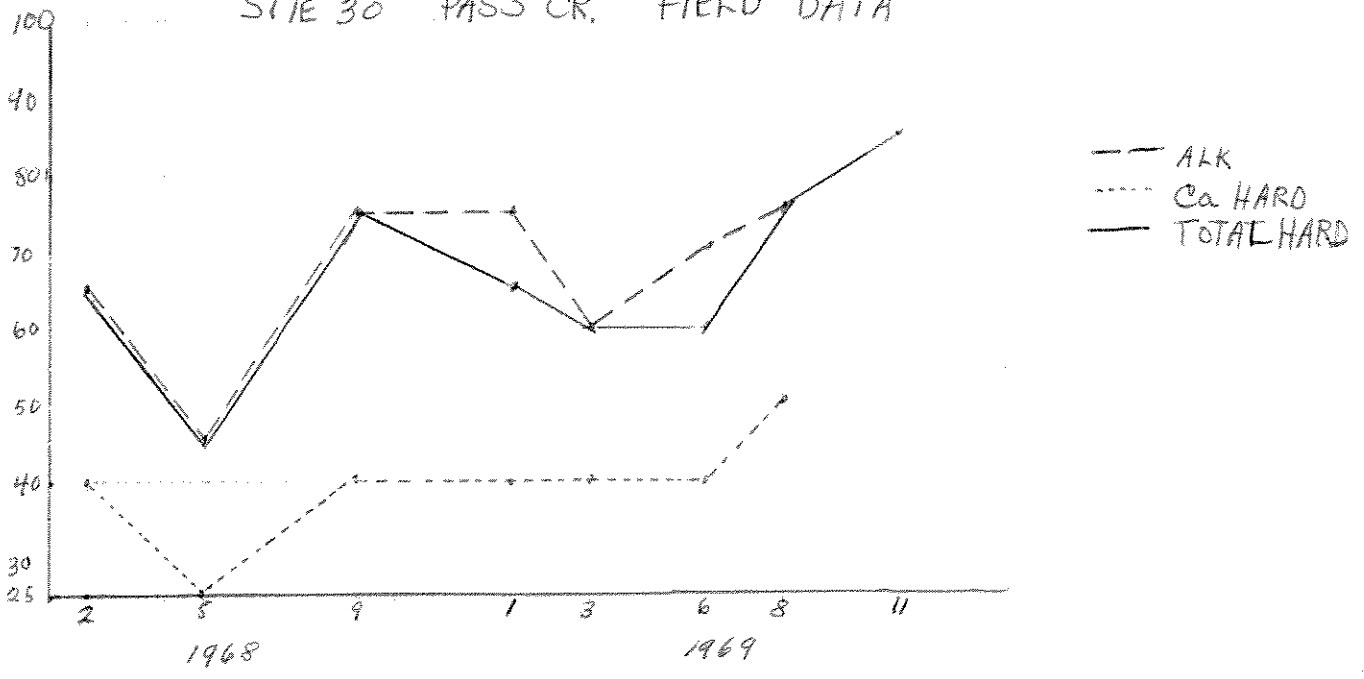
DIURNAL VARIATIONS IN DISSOLVED OXYGEN AND pH
 AT SITE #29 BLACKFOOT R. AT POP'S PLACE

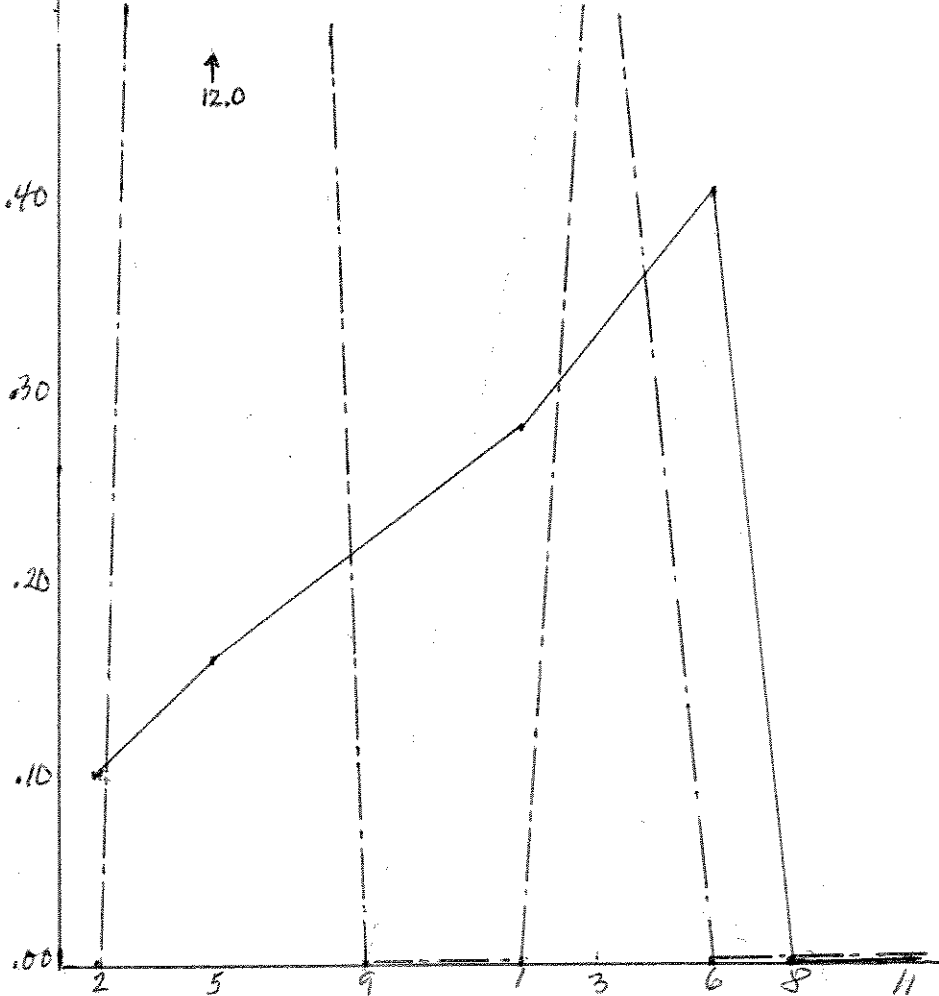
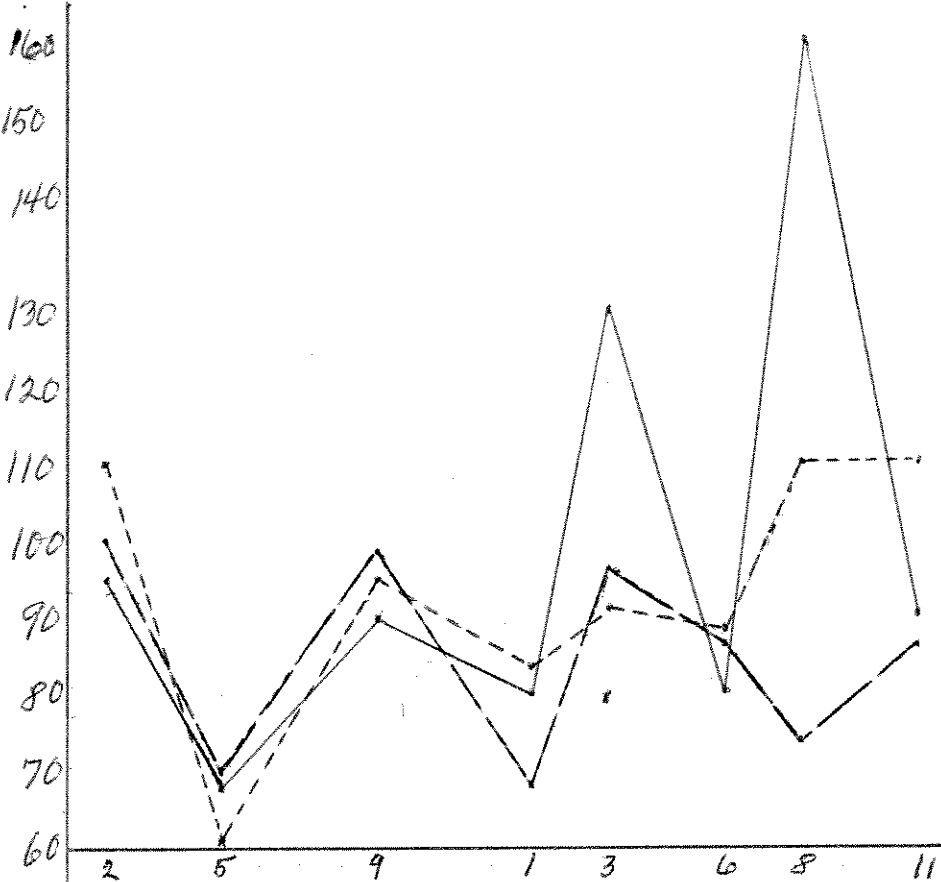


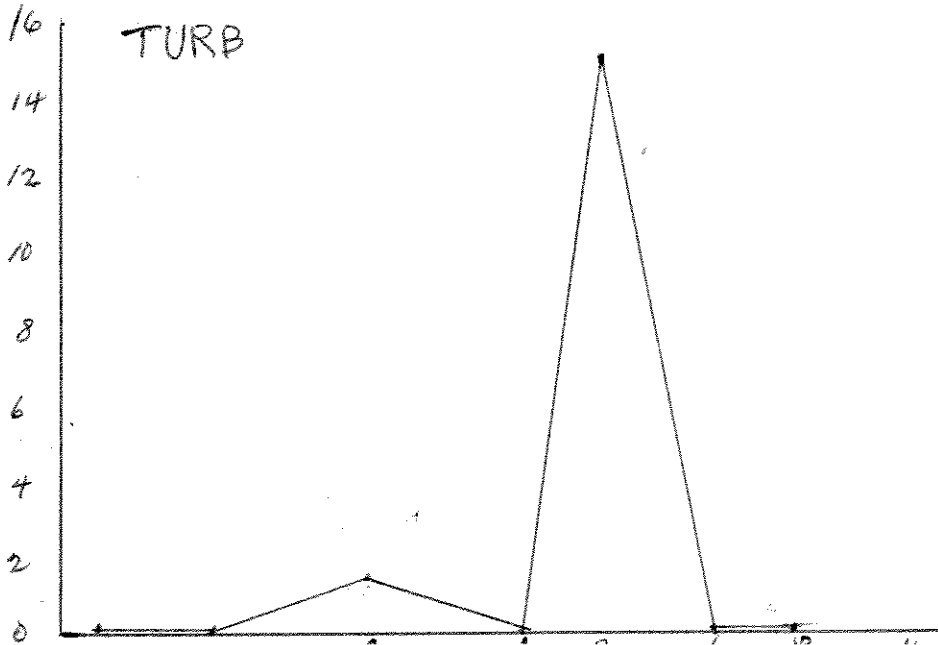
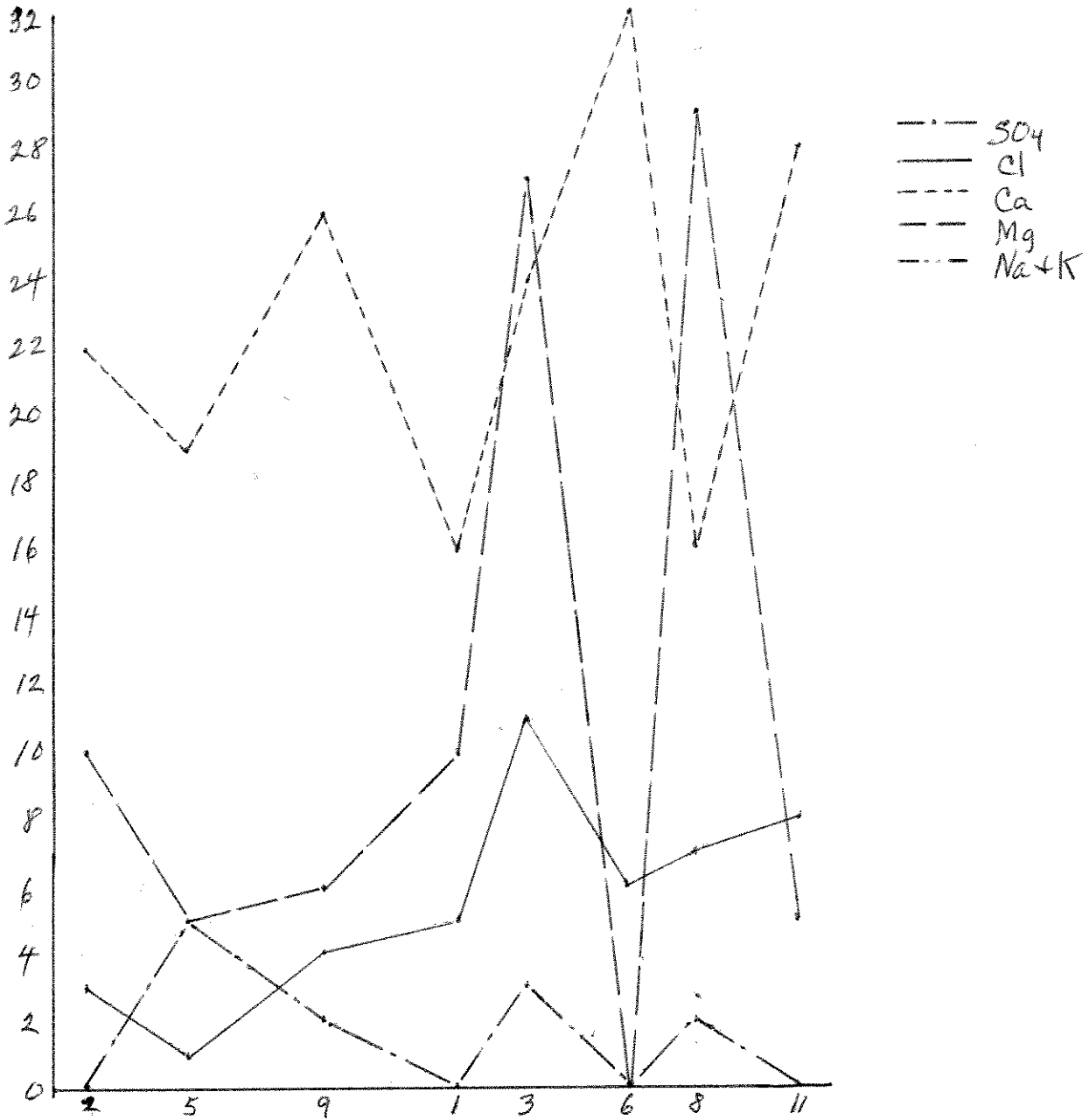
DIURNAL VARIATIONS IN WATER & AIR TEMPERATURES
 AT SITE #29 BLACKFOOT R. AT POP'S PLACE



SITE 30 PASS CR. FIELD DATA



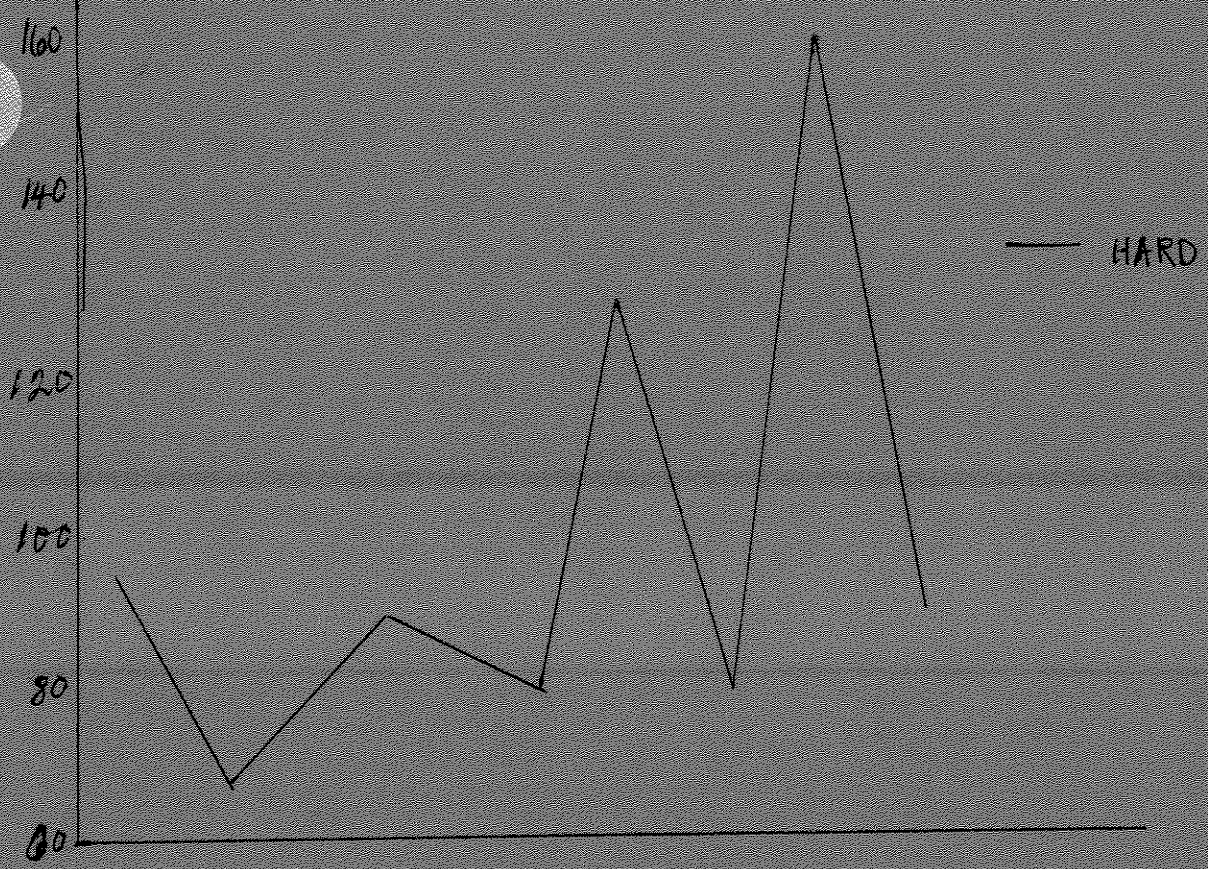




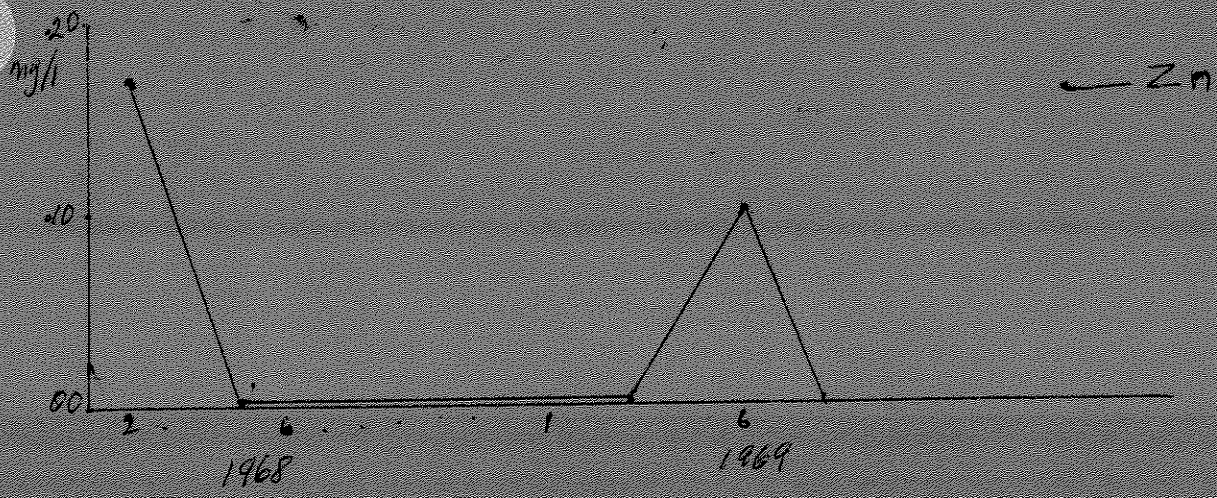
COMPARISON OF HARDNESS AND ZINC

SITE# 30 PASS CREEK

mg/l



mg/l



Blackfoot R. Sampling Stations

W to E.

Site #	1968			1969			1968-1969		
	Total # samples	# > 0	max. conc.	Total # samples	# > 0	max. conc.	Total # samples	# > 0	max. conc.
	9	4	.5	9	6	.8	18	10	.8
	9	4	.6	9	3	.5	18	7	.6
Fe	9	1	.01	9	3	.4	18	4	.4
	9	2	.2	8	3	.6	17	5	.6
	9	5	.5	7	4	.2	16	9	.5
	10	9	.2	3	3	128	13	12	.28
	5	0	0	2	1	.008	7	1	.008
	5	0	0	2	1	.001	7	1	.001
As	5	0	0	2	0	0	7	0	0
	5	0	0	2	0	0	7	0	0
	5	0	0	2	0	0	7	0	0
	5	0	0	0	0	0	5	0	0
	9	1	.06	8	3	.05	17	4	.06
	9	1	.002	8	3	.1	17	4	.1
	9	1	.02	8	3	.06	17	4	.06
Zn	9	1	.03	8	1	.02	17	2	.03
	9	9	.12	6	1	.1	15	10	.12
	10	10	.55	1	1	.45	11	11	.55
	2	0	0	0	0	0	2	0	0
	2	0	0	0	0	0	2	0	0
Pb	2	0	0	0	0	0	2	0	0
	2	0	0	0	0	0	2	0	0
	1	0	0	0	0	0	1	0	0
	4	3	2.003	1	1	2.003	5	4	2.003
	9	0	0	8	1	.02	17	1	.02
	9	0	0	8	2	.03	17	2	.03
Cu	9	0	0	8	1	.02	17	1	.02
	9	0	0	5	2	.04	17	2	.04
	9	0	0	6	1	.18	15	1	.18
	10	3	.009	1	1	.006	11	4	.009

Tributaries to Blackfoot R. Zn

1968

1969

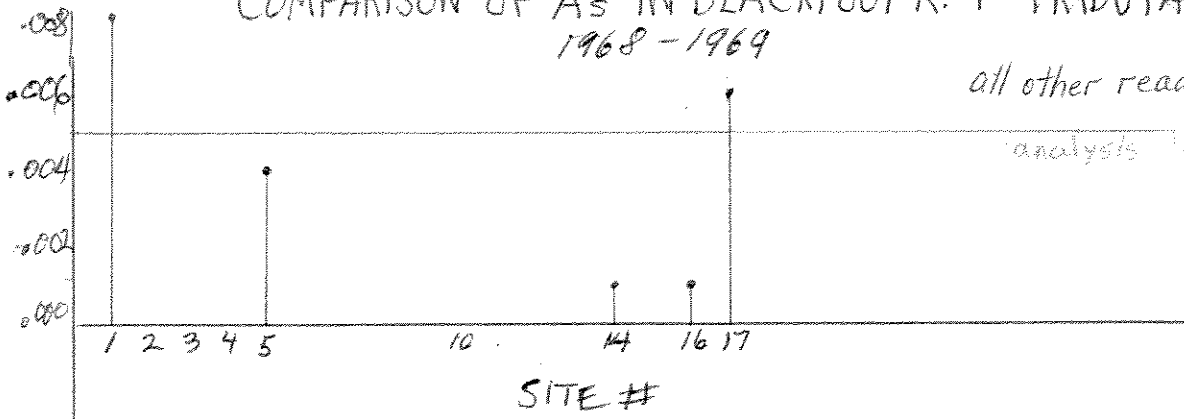
1968-69

Site #	Total # Samples	# > 0	Max. Conc.	Total # Samples	# > 0	Max. Conc.	Total # Samples	# > 0	Max. Conc.
2	3	0	0				3	0	0
3	3	1	.01				3	1	.01
4	3	0	0				3	0	0
5	3	0	0	5	1	.06	5	1	.06
6	3	0	0				3	0	0
7	3	0	0	3	2	.2	6	2	.2
8	3	1	.03				3	1	.03
9	3	1	.02	4	1	.01	7	2	.02
10	3	1	.002	3	1	.02	6	2	.02
11	3	0	0	4	1	.01	7	1	.01
12	3	0	0				3	0	0
13	3	1	.001	3	1	.01	6	2	.01
14	3	0	0	4	1	.02	7	1	.02
15	3	0	0	4	1	.01	7	1	.01
17	3	0	0	5	1	.01	8	1	.01
19	3	0	0	4	2	.02	7	2	.02
20	3	0	0	5	1	.02	5	1	.02
21	3	0	0	5	0	0	8	0	0
22	3	0	0	5	0	0	8	0	0
23	3	0	0	5	1	.46	5	1	.46
25				1	0	0	1	0	0
26	3	0	0	5	0	0	8	0	0
28				1	1	.01	1	1	.01
30	3	1	.17	5	1	.1	8	2	.17

COMPARISON OF A_s IN BLACKFOOT R. & TRIBUTARIES 1968-1969

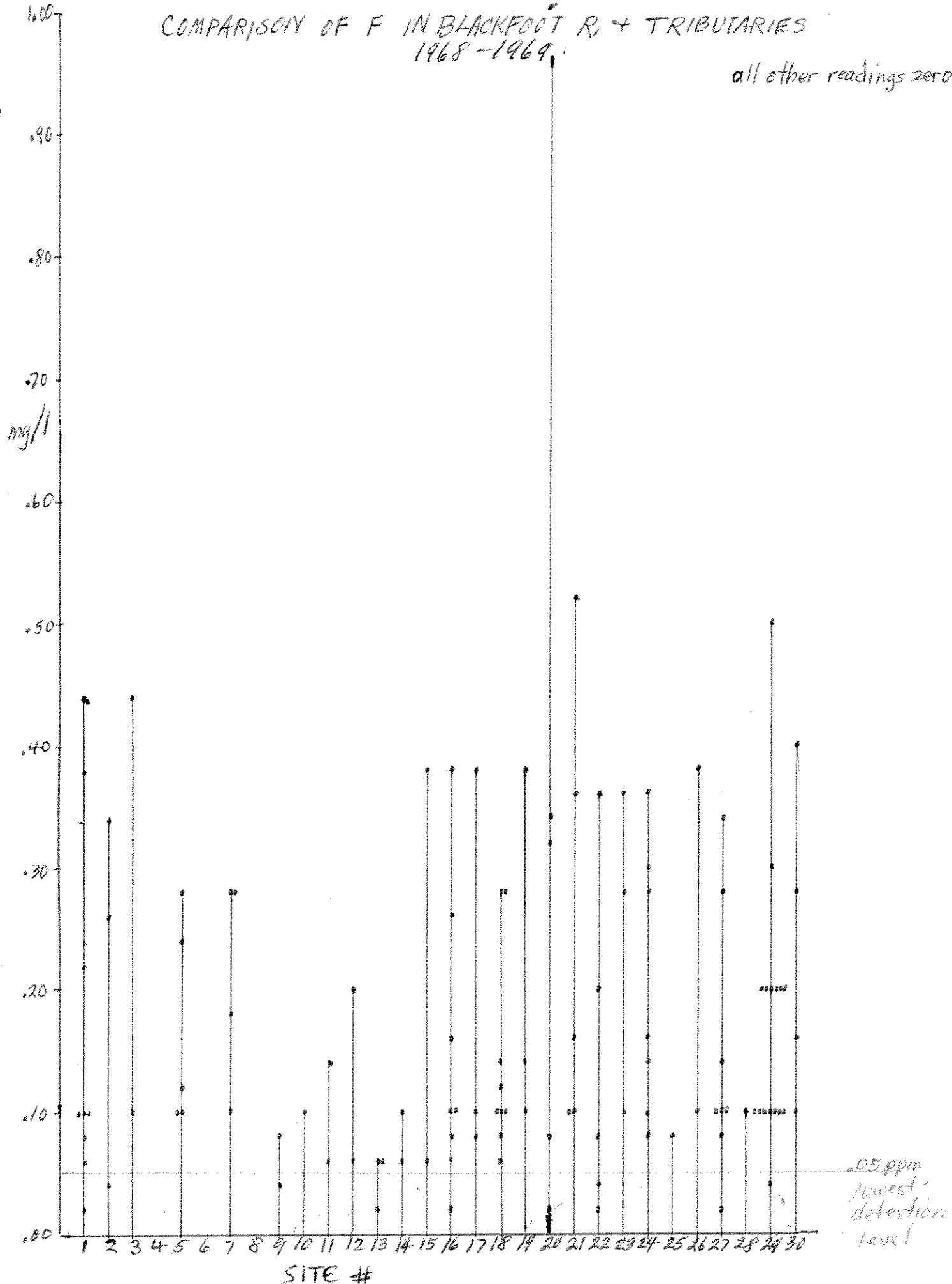
all other readings zero

analysis limit = 0.05 ppm



COMPARISON OF F IN BLACKFOOT R. + TRIBUTARIES
1968-1969

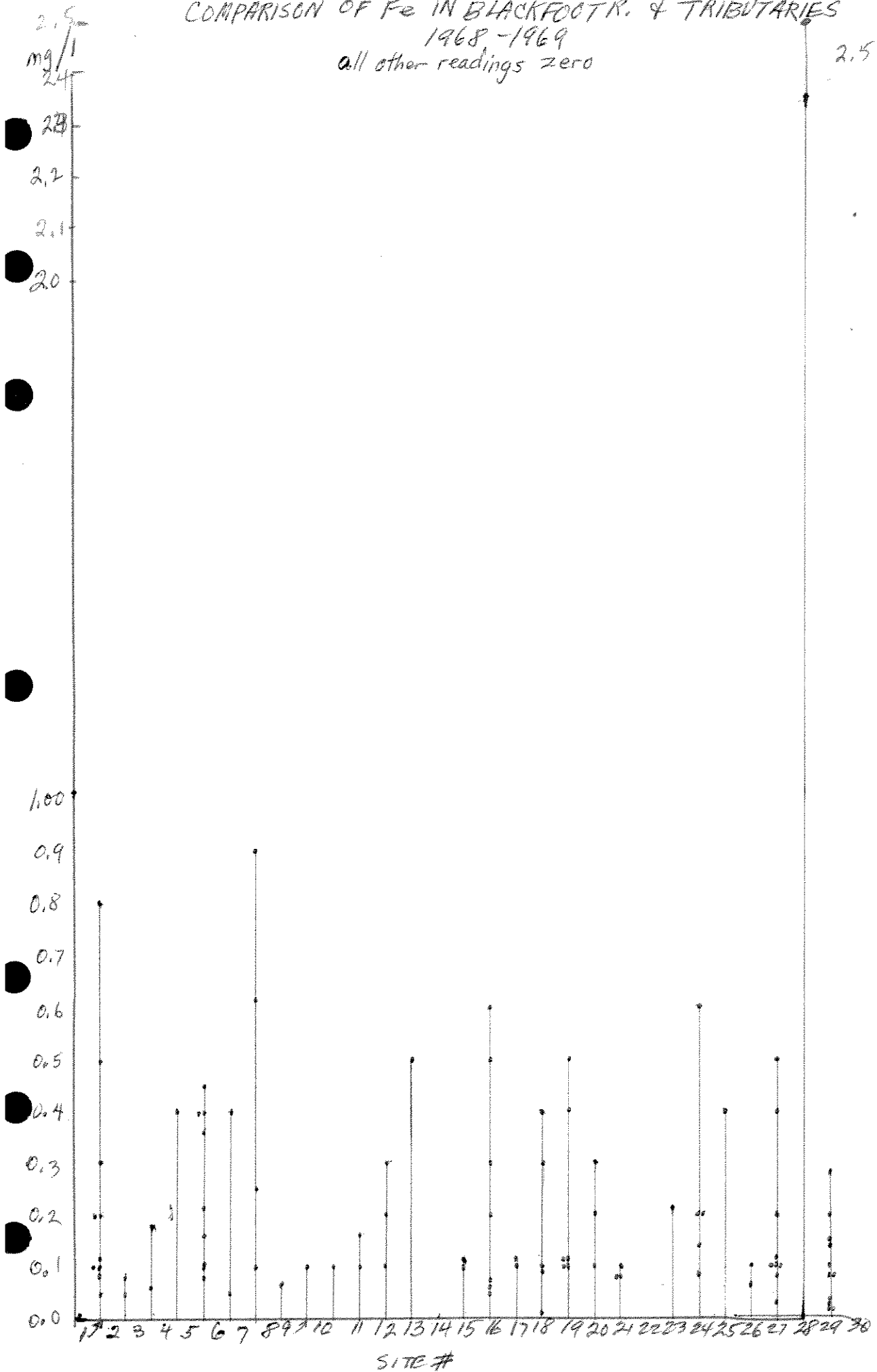
all other readings zero



COMPARISON OF Fe IN BLACKFOOT R. & TRIBUTARIES

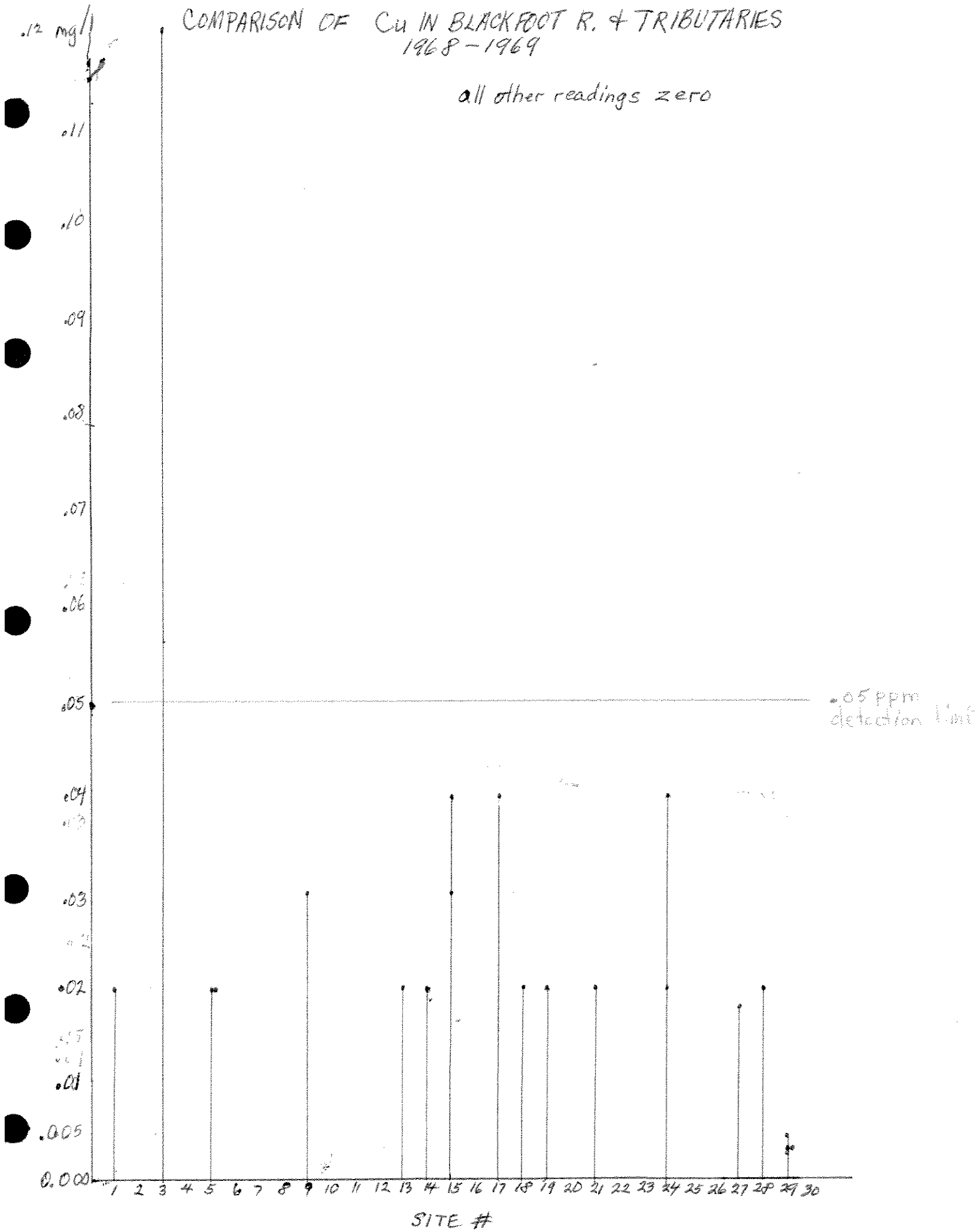
1968-1969

all other readings zero



COMPARISON OF Cu IN BLACKFOOT R. & TRIBUTARIES 1968-1969

all other readings zero



COMPARISON OF Zn IN BLACKFOOT R. & TRIBUTARIES
 1968-1969
 all other readings zero

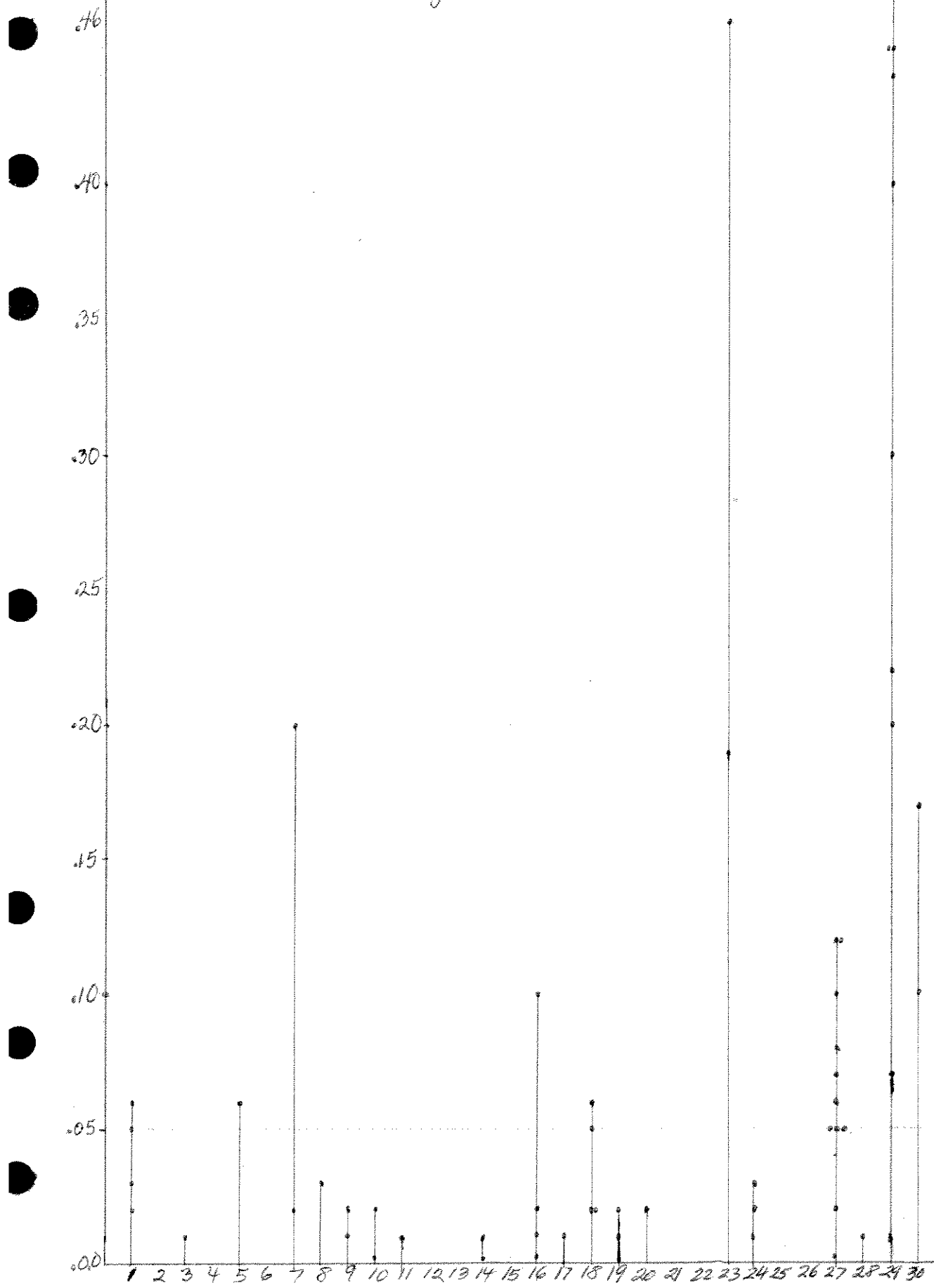
↑
 .56

mg/l

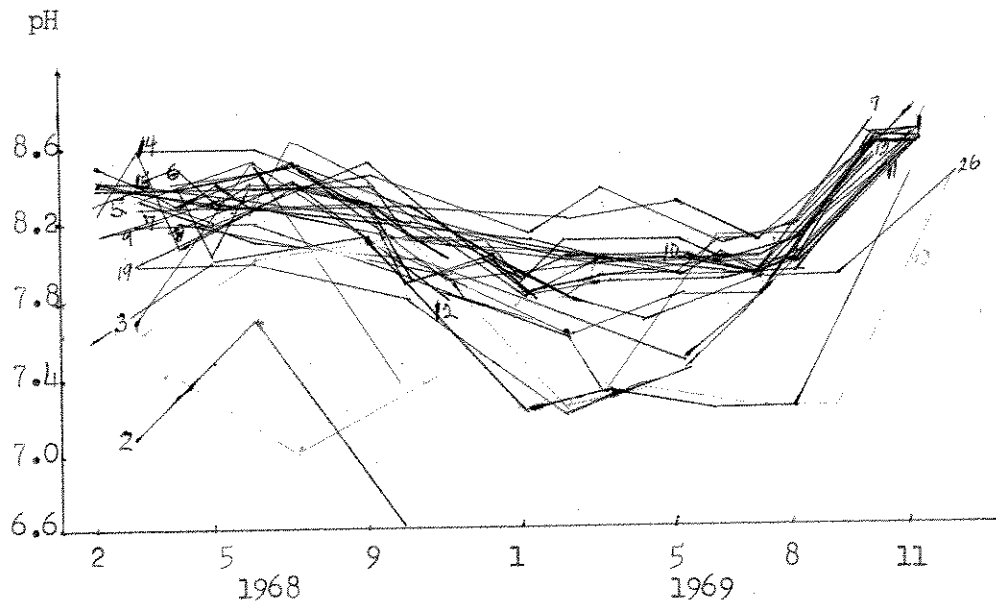
0.6
 0.40
 0.35
 0.30
 0.25
 0.20
 0.15
 0.10
 0.05
 0.00

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

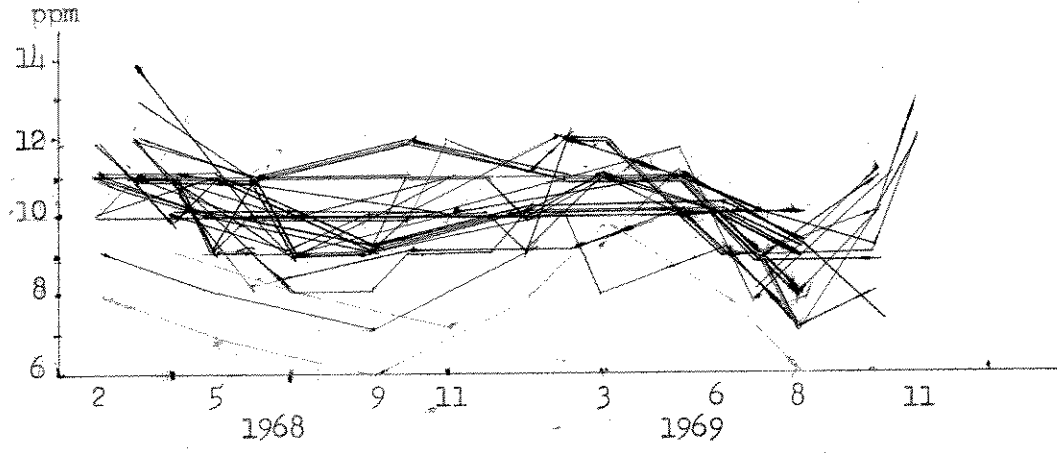
0.05 PPM
 detection limit



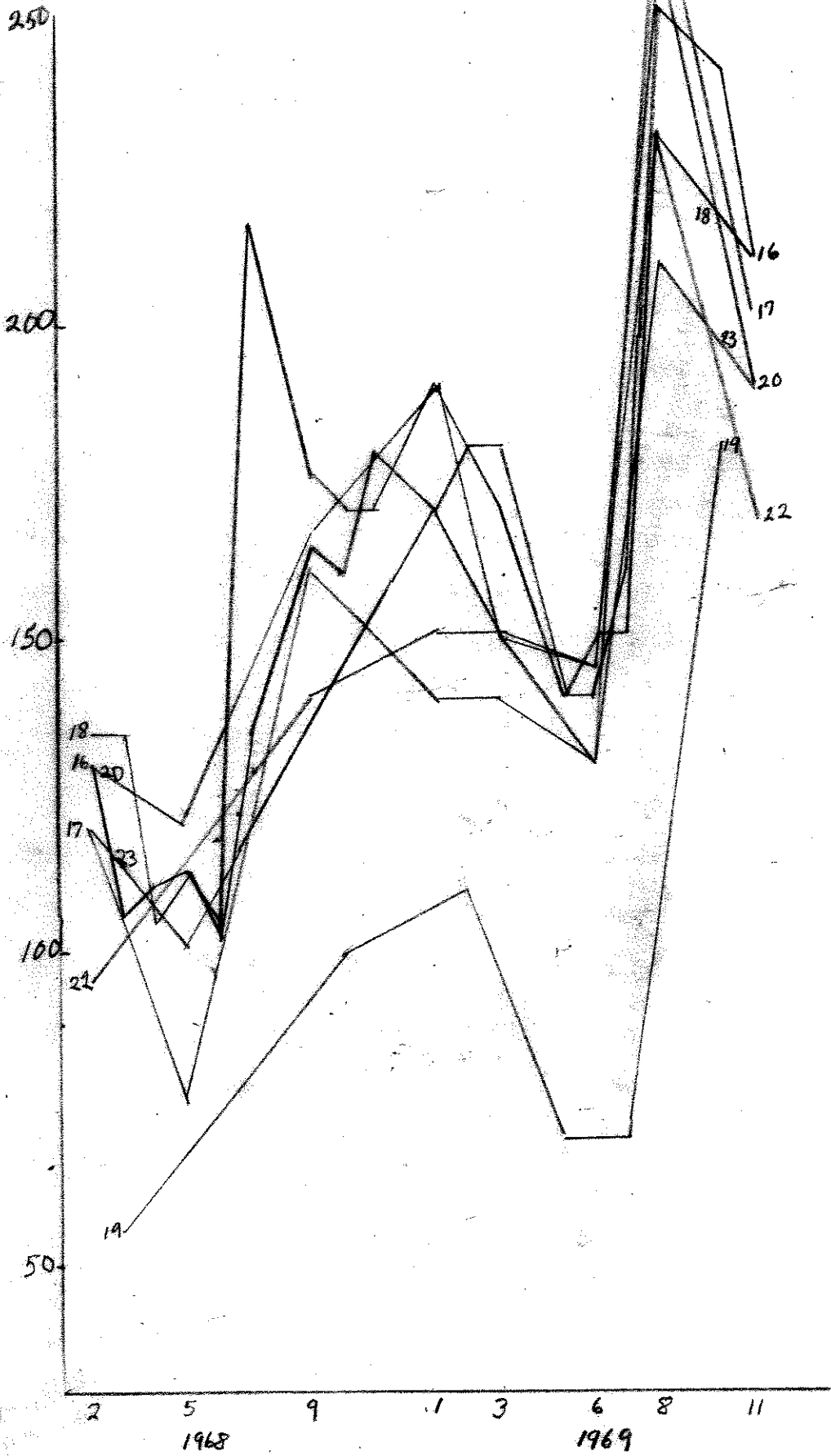
RANGES IN pH IN BLACKFOOT RIVER AND ITS TRIBUTARIES



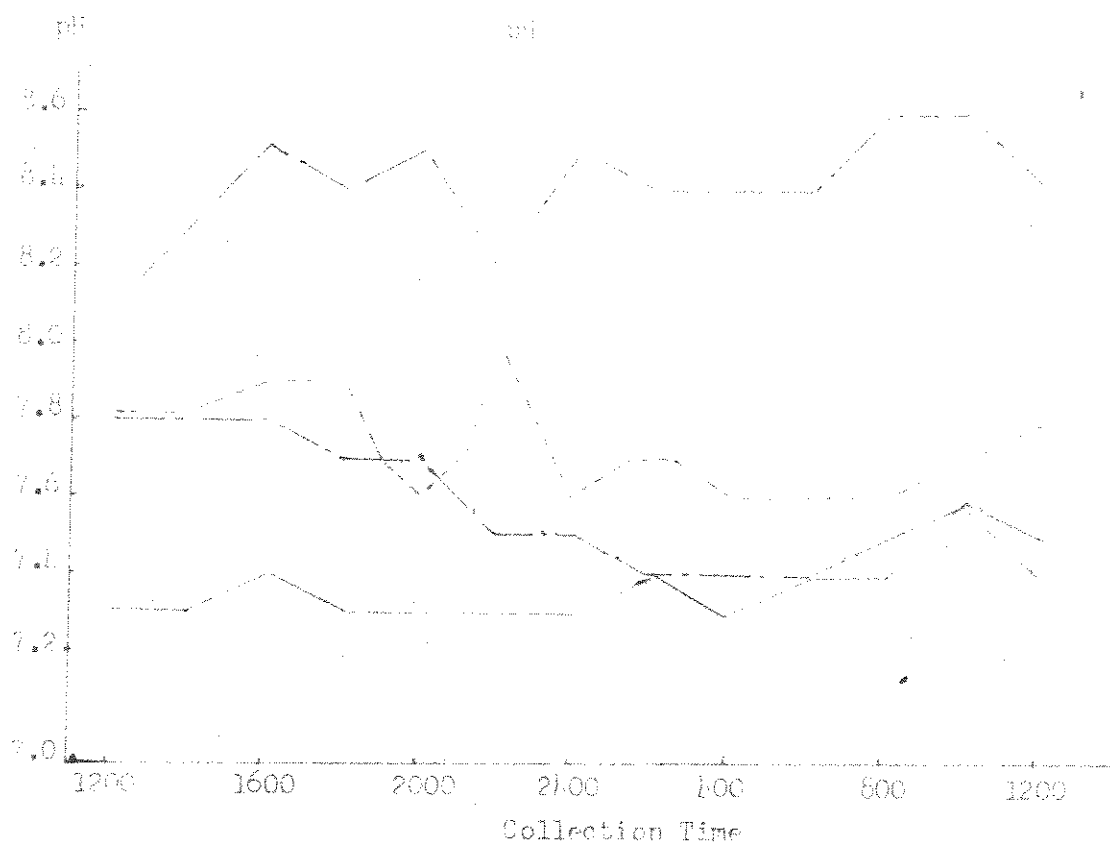
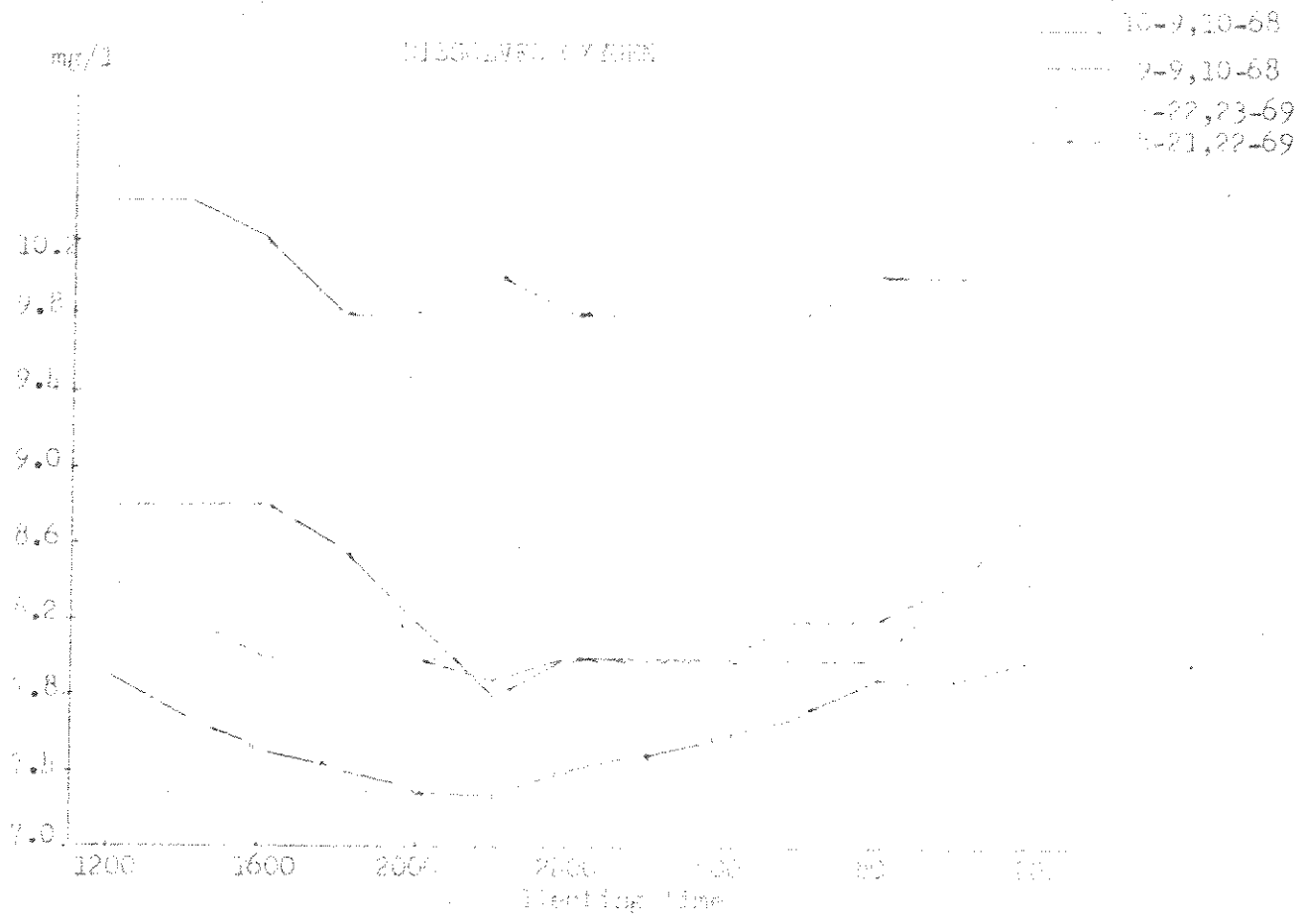
RANGES IN DISSOLVED OXYGEN IN THE BLACKFOOT R. AND ITS TRIBUTARIES



mg/l



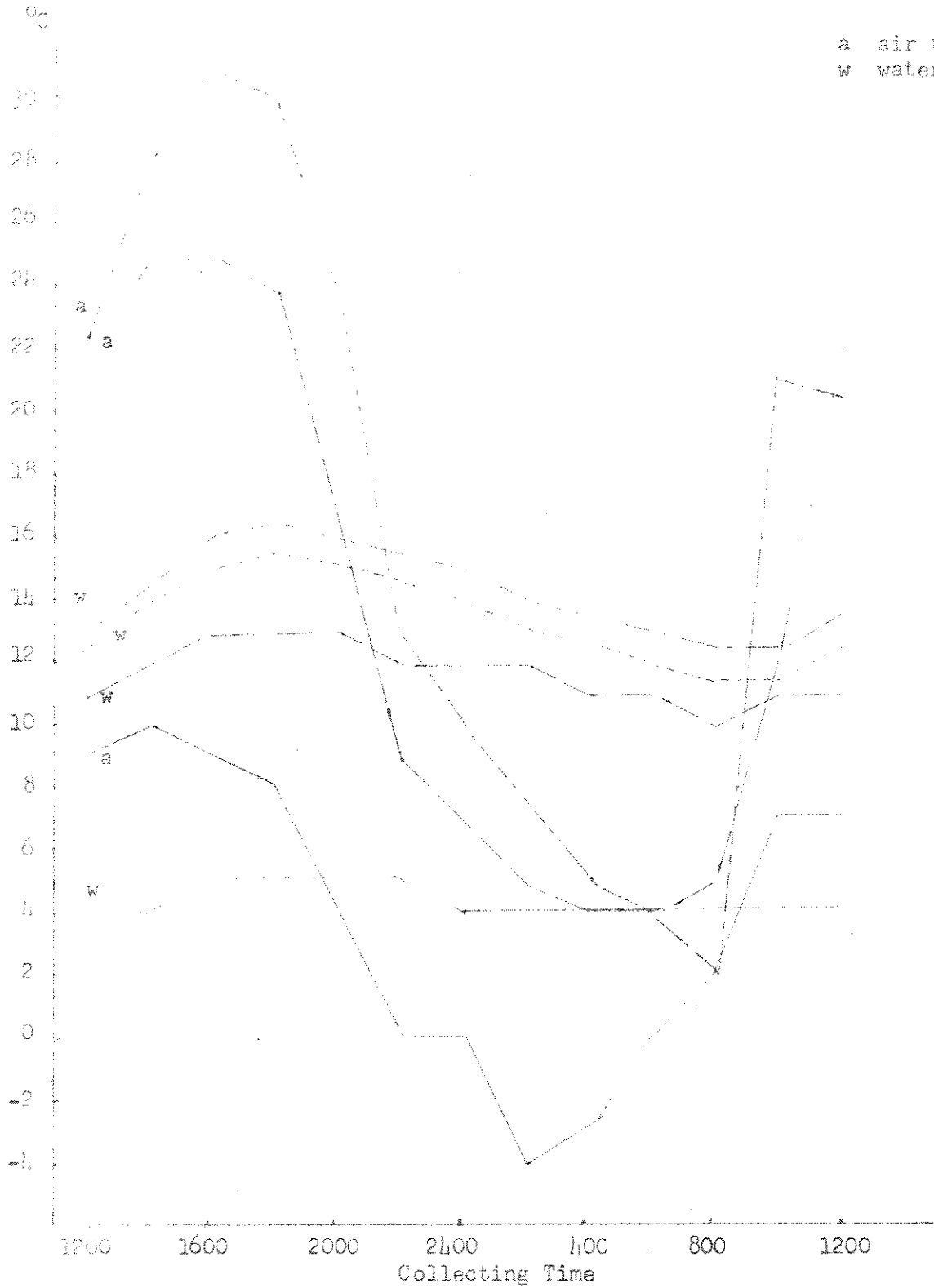
DIURNAL VARIATIONS IN DISSOLVED OXYGEN AND pH
 AT SITE #79 BLACKFOOT R. AT PUBLIC PLAZA



DIURNAL VARIATIONS IN WATER & AIR TEMPERATURES
 AT SITE #29 SLACKFOOT R. AT POP'S PLACE

----- 10-9,10-68
 - - - - 9-9,10-68
 - - - - 1-22,23-69
 - - - - 8-21-22-69

a air temperature
 w water "



COMPARISON OF SO_2 FROM SIX BLACKFOOT R. SITES

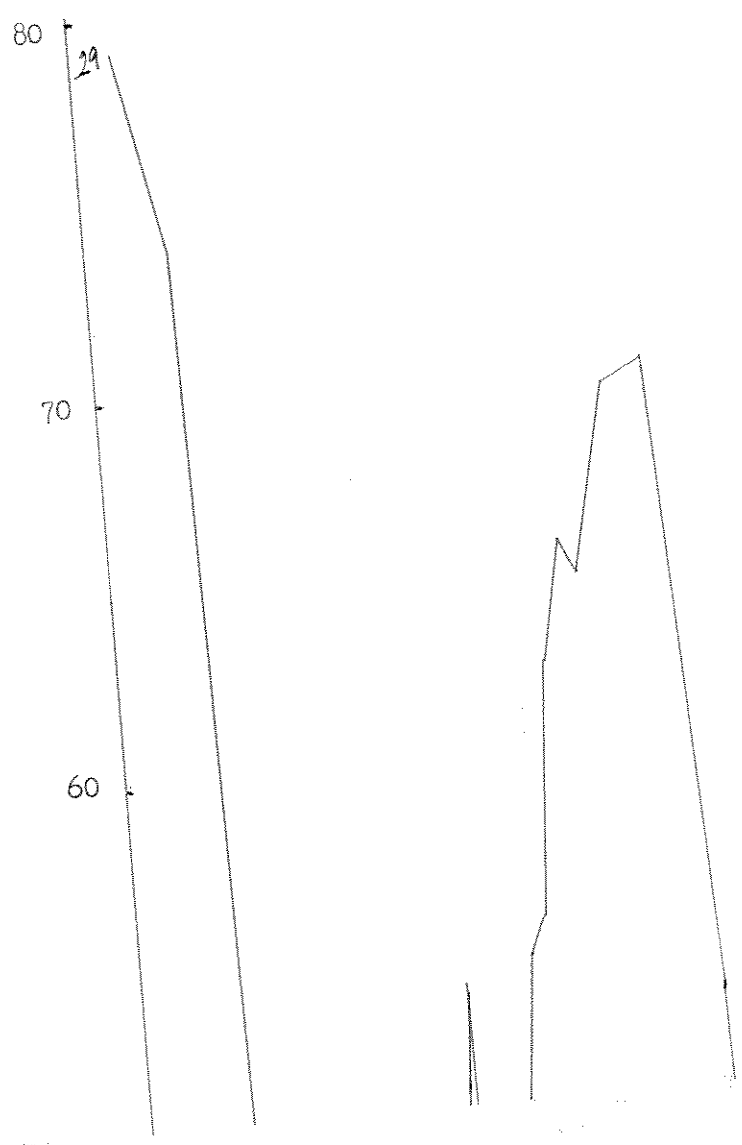
mg/l

80

70

60

24



50

40

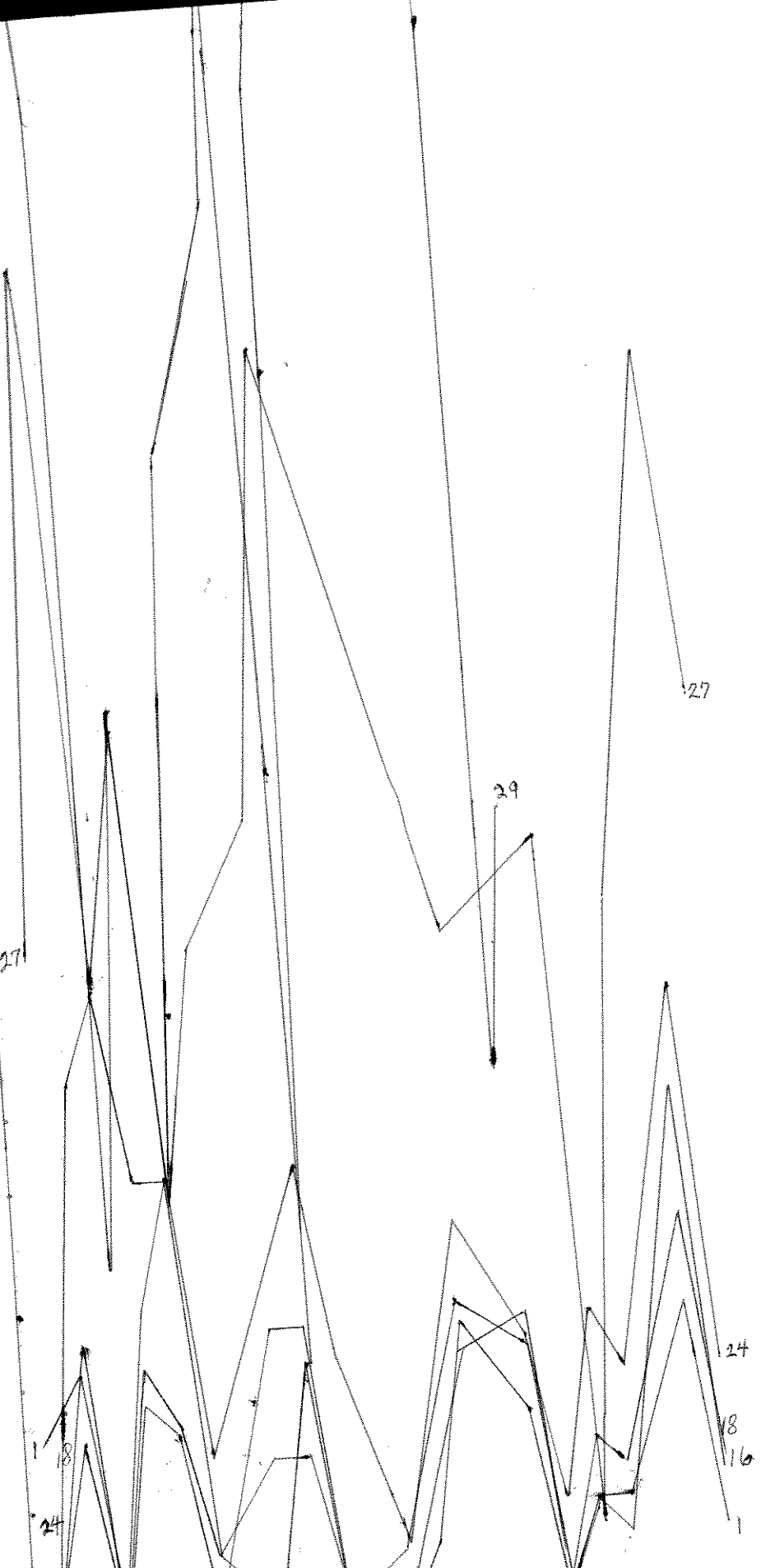
30

20

10

0

1968 2 7 11 2 1969 7 11



Office Memorandum •

MONTANA STATE DEPARTMENT OF HEALTH

TO : Ralph Boland

DATE: April 22, 1970

FROM : Ed Champa *LC*

SUBJECT : Information requested by Arlene Dale concerning method of analysis and sensitivity of each test on the Blackfoot Frainage samples.

The total dissolved solids, chlorides, alkalinity, hardness, nitrate, fluoride, Ca, Mg, iron and sulfate, arsenic and lead are analyzed according to directions in the Standard Methods of Water Analysis, 12th Edition.

Sodium and potassium are determined by calculation. The sensitivity or reproducibility of results are likewise indicated in the Standard Methods.

The arsenic and lead determination is made on 250 ml samples and evaporated and with this amount of sample we can determine .005 ppm.

Copper and zinc are analyzed by atomic absorption. A 100 ml sample with 1% HNO₃ is used and .05 ppm of each can be determined.

Turbidity tests are made by comparing with known turbidity standards in a spectrophotometer and we can determine turbidity down to 1 ppm.



State of Montana

State Department of Health

JOHN S. ANDERSON, M.D.
EXECUTIVE OFFICER

HELENA, MONTANA

May 12, 1970

Mrs. Arlene Dale
Hiway 93 South
Missoula, Montana 59801

Dear Mrs. Dale:

I have listed below additional information as requested in your letter. I do hope that this information will enable you to complete your evaluation.

Total Dissolved Solids:

Page 244-245 Standard Methods of Water Analysis. We have modified this method somewhat. We use 2" x 1/4" stainless steel planchets and 50 ml. of water. The accuracy of this method is the same as for Standard Methods of Water Analysis.

Fluorine, Spad's Method, page 144-145. The color is determined by a Beckman DBG spectrophotometer. Our precision and accuracy should equal that shown on these pages as we follow this method to a T. We do not make a distillation because we do not have sufficient interferences to warrant the use of distillation.

Chloride Argentometric Method, page 86-87. Precision and accuracy as shown.

Hardness - EDTA Titrimetric Method, page 147 to 152. Precision and accuracy as shown.

Iron - Phenanthroline Method, page 156-159. Precision and accuracy as shown.

Lead - Single extraction mixed color dithizone method. Page 163-165. This method is somewhat modified. We use the mixed color single extraction method and Standard Methods of Water Analysis uses the mixed color double extraction procedure. The color evaluation is done with a model DBG Spectrophotometer. 2 ug. of Pb can be detected and reproduced within 5%.

The above procedure is patterned after the method recommended by the American Conference of Governmental Industrial Hygienists.

Carbonate and Bicarbonate or Alkalinity are determined by indicator and titration method as described on pages 50 and 51 of the Standard Methods for Water Analysis. The precision and accuracy is as described on page 52.

May 12, 1970

Magnesium.

~~Calcium~~ is determined taking the difference of calcium and hardness as the hardness test contains both the calcium and magnesium. The precision and accuracy for this test should be the same as for calcium.

Sulfate is determined by the Gravimetric Method with drying of residue as described on page 290-291. The method will reproduce results within 5 mg/liter.

Turbidity is done Spectrophotometrically with prepared standards of turbidity from 0 to 100 ppm and the precision and accuracy is better than that with the use of the Jackson turbidimeter.

Sodium and Potassium combined are determined by calculation. I have no actual figure as to precision and accuracy but am sure it is within reasonable limits as our calculated total dissolved solids are based on this figure and they usually check within 5% of the actual determined total dissolved solids.

Copper and Zinc are determined by atomic absorption in 1% nitric acid. On a 100 ml. sample of water. The detection limit for copper is .025 ppm but some are found to contain as low as .01 ppm with less accuracy. Zinc can be detected at .01 ppm.

Sincerely,



Ludwig S. Champa, Chief Chemist
Division of Disease Control

LSC:cs

PS

Calcium is determined by the EDTA Titrimetric method using Murexide (Ammonium Purpurate) as the indicator. This method is shown on pages 74-76. Precision and accuracy as shown.

Arsenic was analyzed using the silver diethyl dithio carbamate method shown on pages 56-58. Precision and accuracy as shown. 250 ml. size sample is used and evaporated with Sodium Carbonate to a volume of about 35 ml. The arsine is then liberated in our design arsine generator into silver diethyl dithio carbamate and measured photometrically. All of our color measurements are made with a Beckman Model DBG spectrophotometer.

APPENDIX A

COMPARISON OF DATA FROM MONTANA FISH AND GAME DEPARTMENT
AND THE ANACONDA COMPANY AT FIVE COMPARABLE SITES AUGUST 1969

	Pass Cr.		Blackfoot R. at Pop's P.		Sandbar Cr.		Alice Cr.		Blackfoot R. above Lincoln	
	FG	ACM	FG	ACM	FG	ACM	FG	ACM	FG	ACM
Fe	0	.698	.024		2.5	3.40	0	.153	0	.053
As	0						0		0	
Zn	0	.006	.450		0.01	.03	0	.004	0	.032
Pb		.01	.003			.025		.038		.013
Cu	0	.002	.006		0.02	.01	0	.003	0	.004
H ₂ O Temp	11	50*			14	58*	14	53*	13	
pH	7.2	8.12		7.21	6.9	7.65	7.9	7.65	8.0	7.74
Turb	0	8			27		0	5	0	
Ca Hard	50	38			25	30	90	70	70	80
Total Hardl	75	71			15	45	110	100	120	95
Alk., Total	75	58			40	34	125	67	120	58
SO ₄	2	7			11		1	3	7	
NO ₃	0	NF			0		0		0	
		*10°C					*14.5°C	*12.5°C		

DISCREPANCIES BETWEEN FISH AND GAME DATA AND ANACONDA CO. DATA
AT POP'S PLACE

Fish and Game (USGS)

Anaconda Co.

Zn	550 ug 'l (11/68) = .55 ppm	.871 ppm (11/67)
Fe	13 = .013	.874
Cu	7 = .007	.07
Pb	< 2 = < .002	.045

AT ALICE CREEK

Zn	0 (8/69)	.004 (8/69)
Fe	0	.153
Cu	0	.003
Pb	-	.038

AT PASS CREEK

Zn	0 (8/69)	.006 (8/69)
Fe	0	.698
Cu	0	.002
Pb	-	.01

AT SANDBAR CREEK

Zn	0.01	.03 (8/69)
Fe	2.5	3.40
Cu	0.02	.01
Pb	-	.025