

ANALYSIS OF DATA

A. CHEMICAL CHARACTERISTICS OF DATA

Two laboratories were used to analyze water quality data during the study period. Gwin, Dobson, Foreman of Altoona, Pennsylvania. Services were utilized during initial sampling program until October 1, 1973, then B-H Laboratories, York, Pennsylvania, until the sampling program terminated in May, 1974.

Procedures and Specifications. All of the standard tests were performed in accordance with the procedures as outlined in the 13th Edition of Standard Methods for the Examination of Water and Wastewater, as published by the American Public Health Association and others. The specific methods employed were as follows:

pH - glass electrode method (both labs).

Acid - titration phenolphthalein (hot) method, measured as CaCO₃ (both labs).

Alkalinity - titration phenolphthalein (hot) method to pH 8.3 (Gwin, Dobson, Foreman) to pH 4.5 (B-H Laboratories)

Total Iron - atomic absorption (both labs)

Ferrous Iron - Phenanthroline method (both labs)

Sulfates - ion exchange method (Gwin, Dobson, Foreman) - turbidimetric method (B-H Laboratories)

Source Loading Data. Each source or stream sample taken also included a measure of the discharge observed. Three methods of discharge measurement were used during the study and selection of the type was basically determined by the volume of water involved, for example: grab samples; 0 to 100 gpm, weirs; 50 to 1500 gpm, and gauging stations; 1000 gpm or higher.

Grab samples are based in the time for a source discharge to fill a vessel of known dimensions.

Weirs used were either 90° V-notch, or a rectangular type varying up to 30-inch width. A total of 64 weirs were constructed.

Gauging stations were surveyed to determine accurate cross sections relative to the depth of flow and permanent bench marks for stage measurements were established. Stream velocities were measured with either a "General Oceanic" digital flow meter or a "Price Type" pygmy flow meter.

All flow measurements and their respective acid/iron/sulfate characteristics were compared and a spot calculation made to determine pounds per 24-hour loading (lbs/day).

To evaluate the acid mine discharge for each source or station, an averaging method over the sampling period was used. Each spot loading was assumed to be constant for the time interval between sampling dates and the sum total of loading-days were then divided by the total number of days to yield average loadings.

Average loadings were calculated for each source discharge, acid, alkalinity, total iron, and sulfates.

Sampling Period. Sampling was performed for a six month period - July, 1973 through December, 1973. Because of low flow conditions and inconclusive data in some cases it was determined jointly with the Department to extend the sampling to pick up spring flows in the months of April and May, 1974. Additional data on Bennett Branch was taken, at various times until September, 1974, to establish an acid "profile" on the watershed between Penfield and Driftwood.

Frequency of Sampling. During the course of the study period there were approximately 140 Sampling Stations which consisted of known sources of AMD discharging into the study area and important stream confluences. Each station was sampled semi-monthly through the sampling period. Special circumstances such as storms or supplemental source data requirements occasionally modified the schedule when it became necessary to obtain pertinent information.

Special Measurements and Tests. During the course of the project a number of special flow measurements, water quality tests and other data were gathered on the watershed. Special flow measurements and samples were taken at various times to record water discharge and quality during periods of precipitation or unusually high discharge.

A systematic series of spoil and refuse samples was taken throughout the study area as an additional aid in monitoring the relative acid production from the very large number of abandoned strippings and lesser number of refuse banks. A modification of the Mellon Institute of Industrial Research test (Braley, 1960) was used in which the samples were soaked in 250 ml of distilled water for 24 hours, filtered, and the filtrate analyzed for pH, acidity, etc. It

is recognized that there are limitations to the method but the results do appear to give an additional profile on the relative reaction properties of the spoils/refuse in the study area.

As discussed previously, all streams draining subwatersheds which have been disturbed by strip or deep mines, exhibit acid characteristics and influences in Bennett Branch to varying degrees of intensity. Sampling Station BB-136 below Mt. Pleasant Church Run, which is below all major sources except Dents Run, indicates an average contribution of 58,500 lbs/day of acid; 7300 lbs/day of iron and 230,000 lbs/day of sulfates.

The iron content found at this station shows that at low flow periods the concentration is generally less than one part per million; but when above average flow commences, iron concentration rises to as much as four parts per million. This would seem to indicate that some residual iron is flushed from the stream beds and sources at these times.

It must be emphasized that the total acid load of individual sources in any area may not be equal to what is metered and measured at downstream sites. The natural buffering capacity of the stream and the natural alkalinity of other streams in the watershed may reduce the acidity. Conversely, the acidity may be increased by exposed croplines, outcrops of strippings, and natural decomposition processes.

Plates No.39 through No.47 give a numerical listing of sampling stations, the method of measurement, type of discharge source, and source location. The basic water sample identification system utilized letter prefixes as follows: letter prefix MO - Moose Run; M - Mill Run; T - Tyler Run; TR - Tyler Reservoir Run; SC - Scattertown Area; C - Cherry Run; K - Kersey Run; ST - Spring Run; CA - Caledonia Area; TT - Trout Run; CH - Chase Hollow; W - Whiskey Run; BB - Bennett Branch; BH - Bell Hollow. In addition, prefix UN identified abandoned deep mine discharges flowing directly into Bennett Branch near the Village of Force.

Plate No.49 is a numerical plot or "profile" of the average acid load in Bennett Branch between Penfield and Driftwood based on data collected during the study.

Plate Nos.50 through 52 graphically depict the average acid, iron, and sulfate loadings, respectively, in the subwatersheds and Bennett Branch, beginning at the upstream limits of the project, at Station BB-1 and proceeding to BB-136 which is located below all major sources except Dents Run. These plates show how each subwatershed has its effect on Bennett Branch. A sampling station was set up on Bennett Branch below each confluence for this purpose.

Plate Nos.53 through 61 are field and laboratory test summaries by sampling station listing the pH, acid, total iron, and sulfate ranges, along with the maximum, minimum, and average loading for acid, total iron and sulfates.

Plate Nos.82 through 98 in the Appendix include individual plots of water quality data for Bennett Branch at selected intervals and the mouth of all acidic tributaries.

In the Appendix of the Report are listed the actual field and laboratory test results by sampling station and date sample/flow data was taken in the field are listed.

TABULATION OF SAMPLING STATION LOCATIONS

Source No.	Source Type	Measure Type	Location
BB1	Stream	Gauge	Bennett Branch Above Moose Run
MO2	Stream	Gauge	Moose Run at Bennett Branch
MO3	Mine	V-Weir	Penfield Coal & Coke - #3 Mine
MO4	Mine	V-Weir	Penfield Coal & Coke - #3 Mine
MO5	Tributary	V-Weir	Stream Adjacent to Stott #1 Mine
MO6	Mine	V-Weir	Stott #1 Active Mine - After Treating and Settlement Operations
MO7	Mine	V-Weir	Gobblers Knob #1 Mine
MO8	Mine	Grab	Moose Run Mine
BB11	Stream	Gauge	Bennett Branch Downstream from Moose Run
M12	Stream	Gauge	Mill Run at Bennett Branch
M13	Mine	V-Weir	Proctor #2 Mine, No.7 Drift
M14	Mine	V-Weir	Sarnoski Mine
M15	Mine	V-Weir	Proctor #2 at Borehole Water Course
M16	Stream	V-Weir	Mill Run at East Fork
M17	Stream	V-Weir	Mill Run Below East Fork
M18	Refuse	Grab	Refuse Proctor #2, No.7 Drift
BB20	Stream	Gauge	Bennett Branch Below Mill Run
BB21	Mine	2-Ft. Weir	Tyler #14 Water Course
P22	Mine	V-Weir	Proctor #2 Mine, No.1 Drift

See Plates C1 and C2 for location.
 Grab Samples measured by using pipes, buckets, drums, etc.

Source No.	Source Type	Measure Type	Location
P22A	Mine	2-Ft. Weir	Proctor #2 at Treatment Plant Pumping Station
T23	Stream	Gauge	Tyler Run at Bennett Branch
T24	Stream	V-Weir	Tyler Run at Commonwealth Experimental Treatment Facility
T26	Stream	V-Weir	Proctors #1 and #2 Refuse Along Cropline at Stream Crossing, Tyler Run
T27	Stream	V-Weir	Tyler Run Above Cropline
T28	Mine	Grab	Proctor #1 Mine, No.4 Drift
T29	Mine	V-Weir	Five Points Mine
T30	Mine	V-Weir	Five Points Mine
P32	Mine	V-Weir	Proctor #1, No.3 Drift
P33	Mine	V-Weir	Proctor #1 Water Course
P34	Mine	2-Ft. Weir	Proctor #1 at Commonwealth Experimental Treatment Facility
TR35	Mine	Grab	Tyler Mines Water Course
TR36	Stream	Gauge	Tyler Reservoir at Bennett Branch
TR37	Mine	V-Weir	Tyler Mines Nos. 1 and 2 Drifts
TR38	Mine	V-Weir	Tyler Mines No.6 Drift
TR39	Mine	V-Weir	Tyler Mines No.5 Drift
TR40	Mine	Grab	Tyler Mine
TR41	Mine	V-Weir	Tyler Mines No.4 Drift
TR42	Mine & Pond	V-Weir	Tyler Mines No.8 Drift
TR43	Mine	Grab	Tyler Mines No.11 Drift
TR44	Mine	Grab	Tyler Mines No.7 Drift

Source No.	Source Type	Measure Type	Location
TR45	Mine	Grab	Country Bank Adjacent to Tyler #14 Mine
BB47	Stream	Gauge	Bennett Branch Downstream from Tyler Reservoir Run
BB48	Stream	Gauge	Bennett Branch Downstream from Tyler Run
SC49	Mine	Grab	Smith Mine (Proctor #1)
SC50	Stream	V-Weir	DeLullo Mine (Proctor #1)
SC51	Mine	V-Weir	DeLullo Mine (Proctor #1)
SC52	Mine	V-Weir	DeLullo Mine (Proctor #1)
SC53	Stream	V-Weir	McComber Run
SC54	Mine	V-Weir	DeLullo Mine (Proctor #1)
C55	Stream	Gauge	Cherry Run at Bennett Branch
C56	Mine	2-Ft. Weir	Shawmut #41 No.4 Drift
C57	Refuse	2-Ft. Weir	Shawmut #41 Refuse at Cardiff Ruins
C58	Mine	V-Weir	Shawmut #41, No.6 Drift
C59	Mine	V-Weir	Shawmut #41, No.8 Drift
C60	Stream	2-Ft. Weir	Cardiff Tributary at Cherry Run
C61	Stream	Gauge	Cherry Run Upstream from Cardiff
C61A	Mine	Grab	Country Bank Mine at Mouth of Cardiff Tributary, East
C62	Refuse	V-Weir	Cherry Run at Proctor #1 Refuse
C63	Mine	V-Weir	Proctor #1 (Bootleg Entry)
C64	Mine	Grab	Maple Hill Mine (Proctor #1)

Source No.	Source Type	Measure Type	Location
C65	Stream	V-Weir	Tributary to Cherry Run Downstream from Force Reservoir (Five Points Mines)
BB67	Stream	Gauge	Bennett Branch Downstream from Cherry Run
BR68	Stream	Grab	Browns Run, South Branch
BR69	Stream	Gauge	Browns Run Upstream from Kersey Run
BR70	Stream	2-Ft. Weir	Browns Run, North Branch
BR71	Mine	V-Weir	Shawmut #42 Mine, No.3 Drift
BR72	Mine	Grab	Country Bank Mine South of Browns Run
K74	Stream	Gauge	Kersey Run at Bennett Branch
K75	Stream	Gauge	Kersey Run Upstream of Byrnes Run
K76	Stream	Gauge	Byrnes Run Upstream of Kersey Run
K77	Stream	Gauge	Kersey Run Downstream from Byrnes Run
K78	Stream	V-Weir	Tributary of Kersey Run at Byrnedale
K79	Stream	V-Weir	Kersey Run Tributary Upstream of Byrnedale Near Proctor #4 Portal
K80	Stream	V-Weir	Tributary 0.8 Mile North of Byrnedale, Right
K81	Stream	V-Weir	Tributary North of Byrnedale and Parallel to Pennsylvania Route 255
K82	Mine	V-Weir	Shawmut #31, No.2 Drift at Potash Run
K83	Mine	Grab	Gustafson Mine (Potash Run)
K84	Mine	V-Weir	Gustafson Mine (Potash Run)
K85A	Refuse	Grab	Mine Refuse at Byrnedale Coke Oven Ruins

Source No.	Source Type	Measure Type	Location
K85B	Refuse	Grab	Mine Refuse at Byrnedale Coke Oven Ruins
K87	Refuse	V-Weir	Shawmut #31 Refuse in Potash Run
K88	Stream	2-Ft. Weir	Potash Run at Kersey Run
K90	Mine	V-Weir	Shawmut #31 Mine (Potash Run)
BB95	Stream	Gauge	Bennett Branch Downstream from Kersey Run
CA96	Stream	Gauge	Dixon Run at Bennett Branch
CA97	Mine	V-Weir	Hand Coal #13 Mine
CA98	Mine	V-Weir	Hand Coal #13 Mine
CA99	Mine	V-Weir	Shawmut #31, Caledonia Hollow Tunnel
CA100	Mine	Grab	Shawmut #31, No.33 Mine
CA101	Stream	2.5-Ft. Weir	Dixon Run, Caledonia Hollow
CA102	Stream	2-Ft. Weir	Dixon Run, Shaffer Hollow
CA103	Mine	V-Weir	Shawmut #31, No.1 Shaffer Hollow Mine
CA104	Mine	Grab	Shawmut #31, No.2 Shaffer Hollow Mine
CA105	Mine	V-Weir	Open Auger Holes into Shaffer Hollow Mine
CA107	Mine	V-Weir	Proctor #3, Water Course
CA108	Mine	Grab	Proctor #3 Mine, No.1 Drift
CA109	Mine	V-Weir	Shawmut #31, No.22 Caledonia Hollow
CA110	Mine	Grab	Proctor #3 Mine, No.3 Drift
CA111	Mine	Grab	Shawmut #31, Caledonia Hollow Water Course

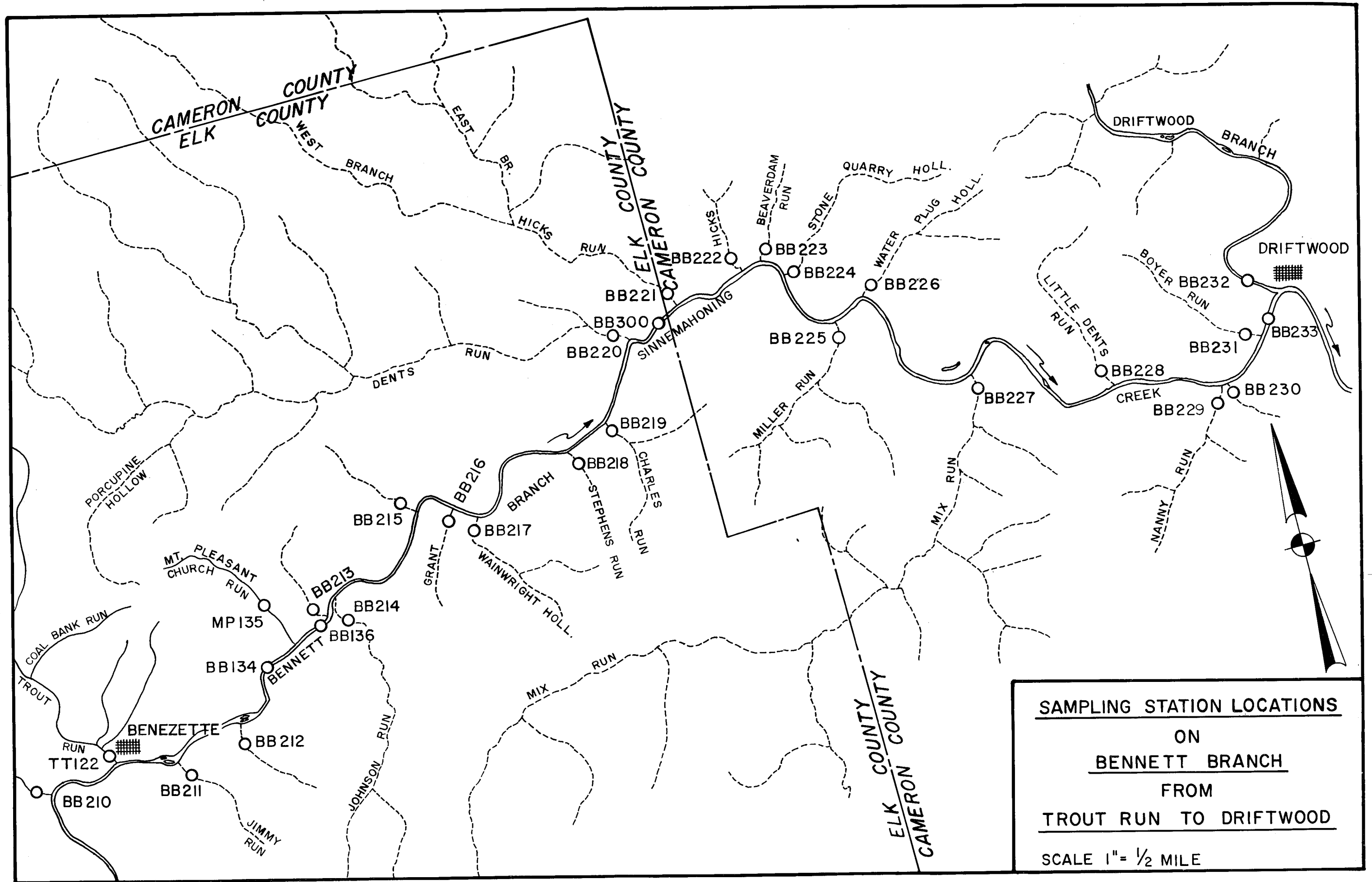
Source No.	Source Type	Measure Type	Location
BB113	Stream	Gauge	Bennett Branch Downstream from Dixon Run
ST114	Mine	Grab	Spring Run Mine
ST115	Strip	V-Weir	Strip Mine, Left
ST116	Mine	Grab	Cool Springs Mine
ST117	Mine	Grab	Cool Springs Mine
ST118	Mine	Grab	Pine Valley Mine
ST119	Stream	Gauge	Spring Run at Trout Run
ST120	Mine	Grab	Spring Run Mine
TT122	Stream	Gauge	Trout Run at Bennett Branch
TT123	Strip	2-Ft. Weir	Coal Bank Run (Strip Mine and Country Bank Discharge)
TT124	Mine	V-Weir	Country Bank (Chase Hollow)
TT125	Mine	Grab	Cummings Mine (Chase Hollow)
TT126	Stream	Gauge	Chase Hollow Run 0.8 Mile Upstream of Trout Run
TT127	Stream	Gauge	Coal Bank Run
TT128	Stream	Gauge	Chase Hollow Run at Trout Run
TT129	Stream	Gauge	Trout Run Below Spring Run
TT130	Stream	Gauge	Trout Run Upstream of Spring Run
TT131	Mine	Grab	Country Bank Mine, 1.0 Mile North of Benezette
TT132	Strip	Grab	Strip Pit, Chase Hollow, West
TT133	Strip	Grab	Strip Pit at Whiskey Hollow Run
TT133A	Strip	Grab	Eph Morey Hollow Run

Source No.	Source Type	Measure Type	Location
BB134	Stream	Gauge	Bennett Branch Downstream from Trout Run
MP135	Strip	V-Weir	Mt. Pleasant Church Run at Bennett Branch, Strip & Deep Mine Discharge
BB136	Stream	Gauge	Bennett Branch Below Mt. Pleasant Church Run
BH137	Stream	V-Weir	Tributary of Bell Hollow
BH138	Mine	Grab	Tyler Mines Haulageway
BH139	Mine	Grab	Tyler Mines #10 Drift
BH140	Mine	Grab	Tyler Mines #16 Drift
BH141	Stream	Gauge	Bell Hollow at Laurel Run
BA160	Stream	Gauge	Bakemans Run at Bennett Branch
BA161	Mine	Grab	Hand Coal #6 Mine
BA162	Stream	Gauge	Bakemans Run Near Active Stripping
UN180	Mine	Grab	Tyler Mines #9 Drift
UN181	Mine	Grab	Tyler Mines
UN182	Mine	Grab	Tyler Mines
UN183	Mine	Grab	Penfield Coal and Coke #2 Drift
UN184	Mine	Grab	D. B. Betta Mine
CH189	Strip	Grab	Chase Hollow, East Side
CH190	Mine	Grab	Country Bank (Chase Hollow)
CH191	Strip	Grab	Chase Hollow, East Side
CH192	Strip	Grab	Chase Hollow, East Side
CH193	Mine	Grab	Winslow #2 Mine

Source No.	Source Type	Measure Type	Location
W195	Stream	Gauge	Tributary 0.8 Mile North of Benezette and West of Trout Run Ford
W196	Stream	Gauge	Whiskey Hollow Run
BB200	Stream	Grab	Wilson Run
BB201	Stream	Grab	Lamb Hollow
BB202	Stream	Grab	Horning Run
BB203	Stream	Grab	Crooked Bridge Hollow
BB204	Stream	Grab	Laurel Run
BB205	Stream	Grab	Unnamed (E. Bakemans Run)
BB206	Stream	Grab	Rocky Hill Road
BB207	Stream	Grab	Medix Run
BB208	Stream	Grab	Silver Hill Hollow
BB209	Stream	Grab	Unnamed (E. Silver Mill)
BB210	Stream	Grab	Unnamed (W. Trout Run)
BB211	Stream	Grab	Jimmy Run
BB212	Stream	Grab	Unnamed (E. Jimmy Run)
BB213	Stream	Grab	Unnamed (E. Mt. Pleasant)
BB214	Stream	Grab	Johnson Run
BB215	Stream	Grab	Unnamed (W. Dents Run)
BB216	Stream	Grab	Unnamed (E. Johnson Run)
BB217	Stream	Grab	Wainwright Run
BB218	Stream	Grab	Stephens Run
BB219	Stream	Grab	Charlies Run

See Plate No.48 for location.

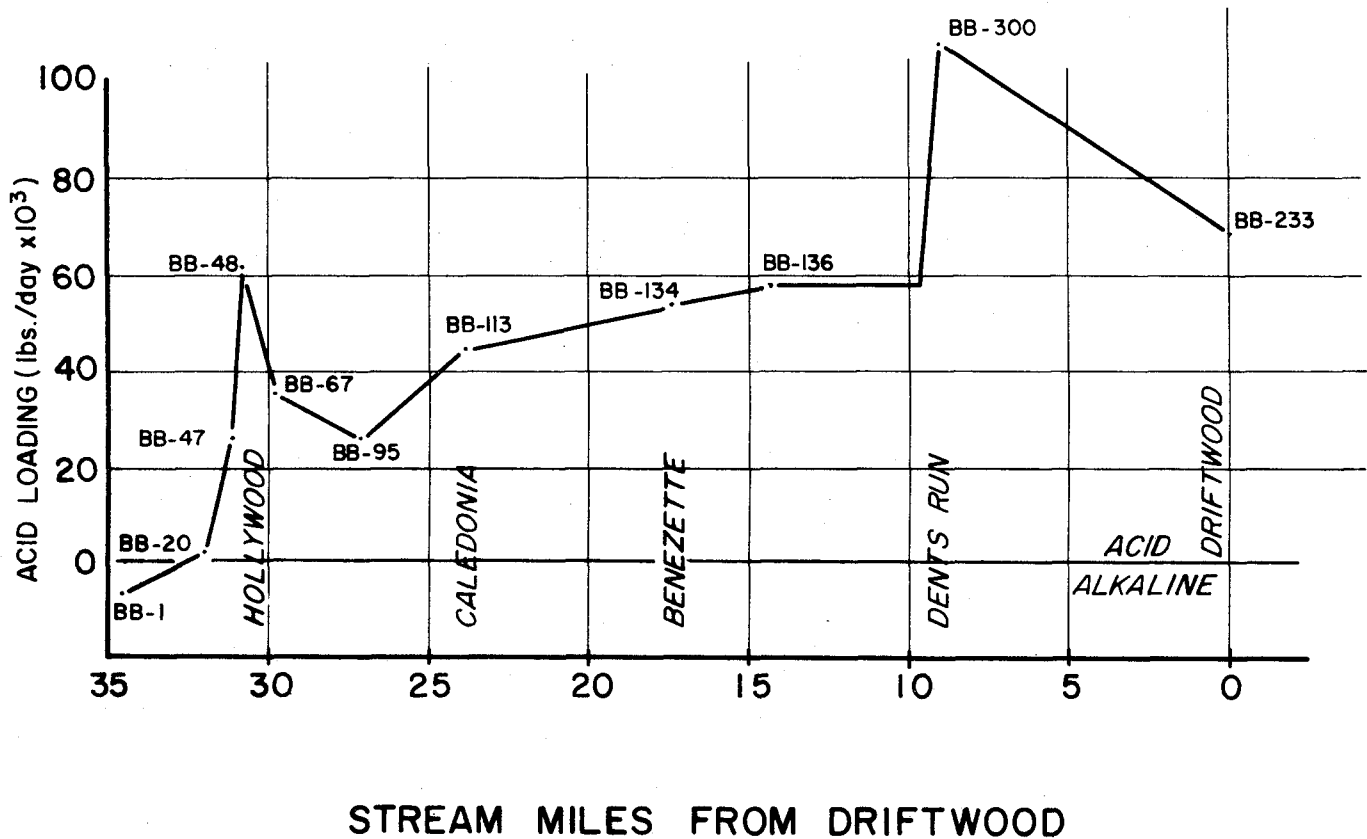
Source No.	Source Type	Measure Type	Location
BB220	Stream	Gauge	Dents Run
BB221	Stream	Grab	Hicks Run
BB222	Stream	Grab	Hicks Hollow
BB223	Stream	Grab	Beaverdam Run
BB224	Stream	Grab	Stone Quarry Hollow
BB225	Stream	Grab	Miller Run
BB226	Stream	Grab	Water Plug Hollow
BB227	Stream	Grab	Mix Run
BB228	Stream	Grab	Little Dent Run
BB229	Stream	Grab	Nanny Run
BB230	Stream	Grab	Unnamed (E. Nanny Run)
BB231	Stream	Grab	Boyer Run
BB232	Stream	Grab	Driftwood Branch
BB233	Stream	Gauge	Bennett Branch Mouth at Driftwood
BB300	Stream	Gauge	Bennett Branch Downstream of Dents Run



SAMPLING STATION LOCATIONS
ON
BENNETT BRANCH
FROM
TROUT RUN TO DRIFTWOOD
 SCALE 1" = 1/2 MILE

NET ACID LOADING IN BENNETT BRANCH

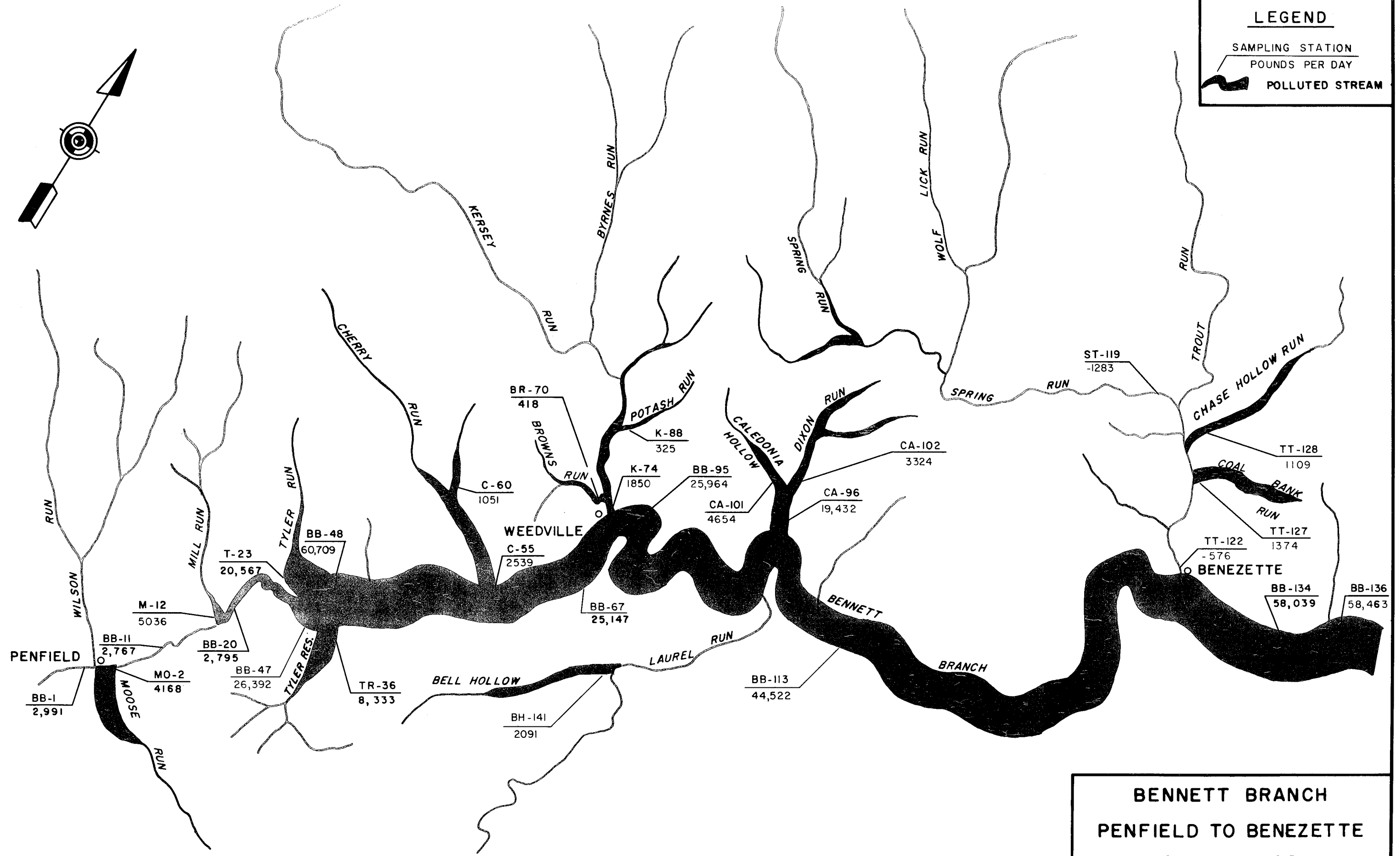
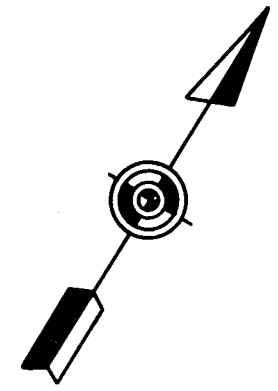
LOCATION	STA.	FLOW G.P.M.	ACID AVERAGES		IRON AVERAGES	
			NET CONC. P.P.M.	NET LOAD LBS/DAY	CONC. MG/L	LOAD LBS/DAY
Penfield	BB-1	40,800	-15	-7,150	0.7	356
Moose Run	BB-11	44,700	-10	-5,600	1.6	838
Mill Run	BB-20	37,400	3	1,321	2.0	946
Tyler Reservoir	BB-47	52,500	42	26,400	7.0	4,434
Tyler Run	BB-48	55,200	91	60,709	16.0	10,162
Cherry Run	BB-67	87,830	33	35,042	4.7	4,970
Kersey Run	BB-95	93,000	23	26,000	3.3	3,748
Caledonia	BB-113	154,900	24	44,522	4.4	8,220
Trout Run	BB-134	250,000	18	53,600	2.9	8,760
Mt. Pleasant Church	BB-136	276,000	18	58,800	2.2	7,340
Dents Run	BB-300	298,700	30	107,980	0.2	698
Driftwood	BB-233	315,400	18	68,160	0.2	760



LEGEND

SAMPLING STATION
POUNDS PER DAY

POLLUTED STREAM

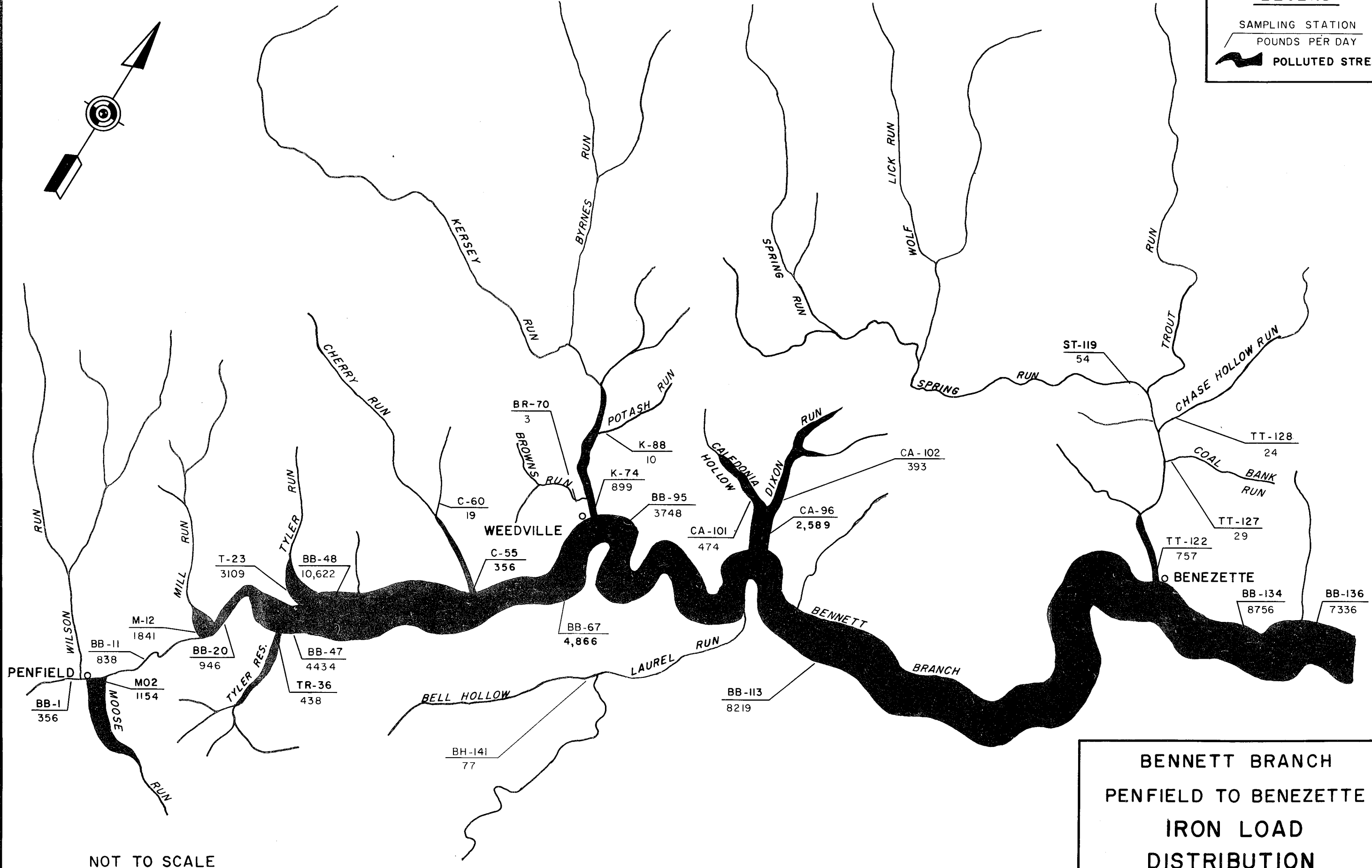


NOT TO SCALE

**BENNETT BRANCH
PENFIELD TO BENEZETTE
ACID LOAD
DISTRIBUTION**

LEGEND

SAMPLING STATION
POUNDS PER DAY
POLLUTED STREAM

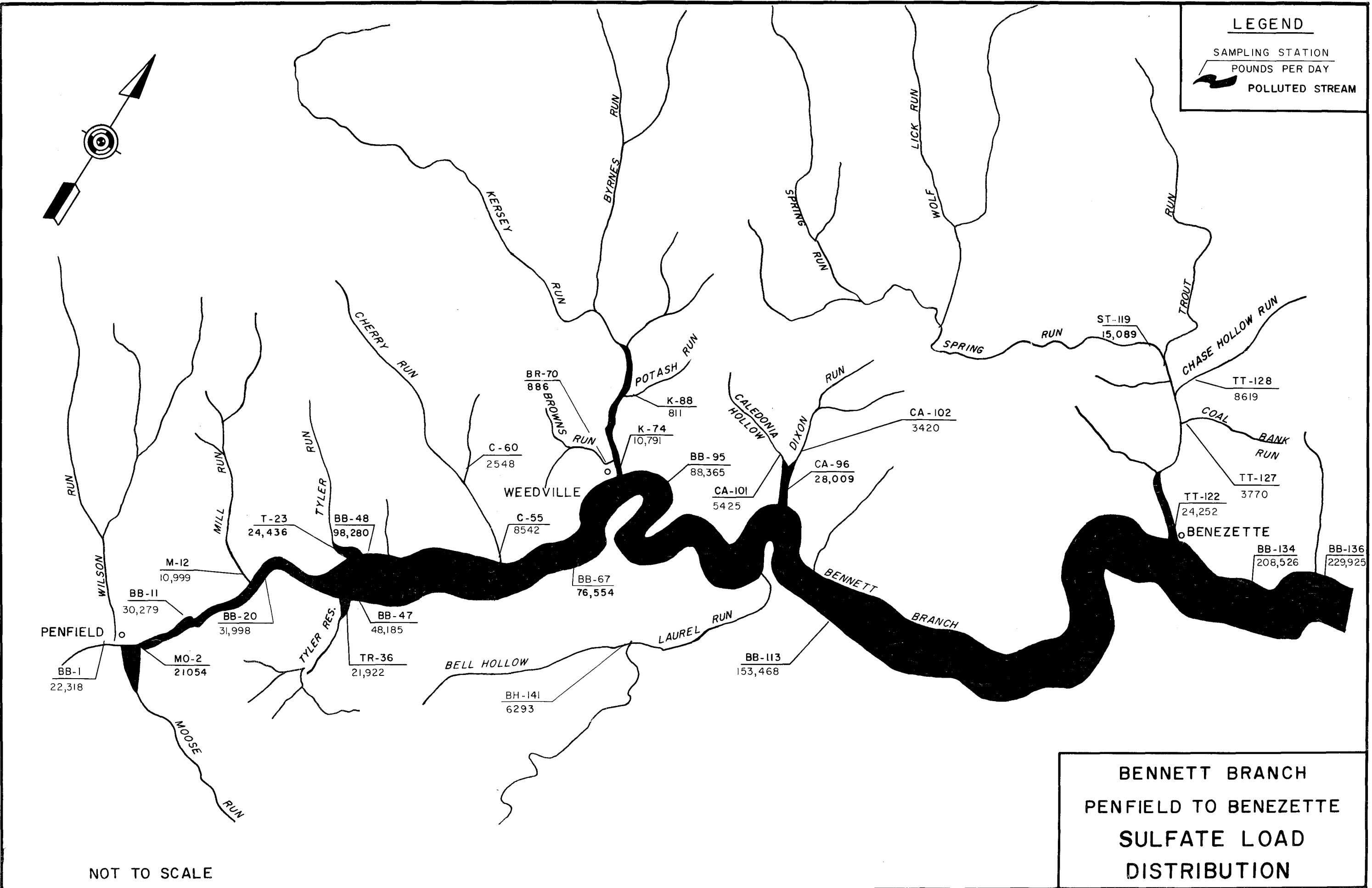


NOT TO SCALE

BENNETT BRANCH
PENFIELD TO BENEZETTE
IRON LOAD
DISTRIBUTION

LEGEND

- SAMPLING STATION
- POUNDS PER DAY
- POLLUTED STREAM



NOT TO SCALE

**BENNETT BRANCH
PENFIELD TO BENEZETTE
SULFATE LOAD
DISTRIBUTION**

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID				IRON				SULFATES			
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours		
		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.
<u>BENNETT BRANCH OF SINNEMAHONING CREEK</u>																
*BB1	5.3-7.0	96,800	5,100	40,776	(-40)-10	6,999	(-48,007)	2,991	0.4-2.2	1,397	43	356	11-175	67,366	4,843	22,318
*BB11	5.3-6.7	169,900	5,200	44,726	(-22)-10	16,378	(-45,040)	2,767	0.1-2.8	2,368	24	838	30-280	83,730	14,850	30,279
*BB20	3.8-6.6	112,400	5,900	37,387	(-14)-16	8,127	(-10,835)	2,795	0-10	4,832	0	1,946	34-280	67,022	10,374	31,998
BB21	2.4-2.9	262	67	156	220-1,200	3,599	364	1,891	103-425	1,338	230	539	224-1,700	3,858	414	2,281
*BB47	2.9-5.5	201,500	6,200	52,463	10-200	96,881	8,149	26,392	3-47	12,352	2,394	4,434	23-340	133,212	7,713	48,185
*BB48	2.8-3.7	210,500	6,500	55,191	40-300	253,021	10,157	60,709	9-54	26,567	2,813	10,622	80-690	252,176	30,471	98,280
*BB67	2.8-4.1	203,200	7,200	67,370	2-200	70,197	2,620	25,147	3-23	13,231	2,116	4,866	35-500	229,854	31,156	76,554
*BB95	3.0-4.4	298,200	16,800	92,958	6-110	99,179	11,292	25,964	2-12	10,744	1,212	3,748	24-275	350,597	41,574	88,365
*BB113	3.1-5.2	509,800	18,700	154,925	4-100	124,056	3,611	44,522	1-7	43,507	606	8,219	41-270	393,307	28,091	153,468
*BB134	3.2-4.5	800,000	31,400	250,352	4-54	267,736	13,955	58,039	1-6	36,541	203	8,756	30-200	461,568	35,776	208,526
BB136	3.2-4.3	954,500	35,100	276,409	4-48	160,623	17,285	58,463	0.4-4	49,334	227	7,336	30-210	717,800	51,854	229,925
#*BB300	3.5-6.3	866,000	40,600	298,700	22-42	313,059	20,548	107,980	0.1-1.8	18,783	50	698	55-275	2,869,700	73,385	415,000
Q#*BB233	3.6-4.4	967,000	61,300	315,400	14-30	163,133	22,160	68,410	0-1.4	8,156	75	760	50-225	2,621,800	110,809	315,447

Q = Total Watershed Characteristics
 * = Stream Gaging Station
 @ = Source With Intermittent Flow
 # = Partial Or Spot Sampling Station
 (-) = Alkaline Measurement
 T = Trace Measurement

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	PH Range	FLOW			ACID				IRON				SULFATES			
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours		
		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.
<u>MOOSE RUN</u>																
*MO2	2.8-3.5	12,032	306	3,649	20-400	23,487	510	4,168	17-70	4,349	58	1,154	224-1,500	101,489	1,548	21,054
#MO3	6.6-7.1	56	18	22	(-26)-(-32)	(-20)	(-7)	(-8)	0.5-3.0	2	T	T	29-72	20	8	14
MO4	3.2-4.2	433	10	77	4-130	208	2	40	T-3	8	T	1	68-330	729	34	136
MO5	3.4-4.5	265	10	76	2-130	127	5	25	2-7	10	0.5	3	46-640	475	56	117
MO6	6.0-8.5	413	T	88	(-200)-12	26	(-228)	(-29)	0.6-1.5	3	T	1	246-2,300	6,096	2	1,467
MO7	2.8-3.3	242	39	99	100-500	1,164	93	356	14-45	76	9	31	200-670	1,382	236	622
MO8	3.0	150	100	125	320-500	600	580	590	10-43	52	18	35	425-650	780	770	775
<u>MILL RUN</u>																
*M12	3.0-4.6	30,532	1,340	7,699	1-240	29,359	139	5,036	0.1-70	12,111	5	1,841	55-320	47,709	1,611	10,999
M13	2.6-3.2	21	1	9	52-520	73	4	26	0.4-43	6	T	2	71-690	97	2	30
M14	2.2-3.1	153	2	32	100-1,400	785	4	172	4.5-220	100	T	26	175-1,800	649	6	195
M15	2.4-2.9	1,800	@	263	1,360-2,500	45,436	0	5,787	425-662	14,323	0	1,510	1325-1,900	41,108	0	4,417
*M16	3.9-5.3	1,300	83	467	(-2)-30	197	(-31)	57	0-0.6	4	0	1	3.4-95	625	5	209
*M17	3.8-4.7	1,600	88	651	4-46	346	21	96	0-3.0	18	1	4	21-346	673	76	404
M18	2.6-5.8	150	1	27	82-1,500	307	11	61	0.4-52	5	T	1	44-2,100	397	11	83
@ M15 Did Not Flow For 135 Days																

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID				IRON				SULFATES			
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours		
		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.
<u>HOLLYWOOD/PROCTOR AREA</u>																
P22	2.1-2.9	15	1	12	200-1,400	168	2	91	51-357	59	3	28	525-1,500	194	16	138
#P22A	2.6-2.9	467	177	315	220-1,280	7,185	553	2,717	45-447	1,929	180	682	600-1,700	4,730	1,511	3,922
#P32	2.8-3.3	83	56	57	280-380	279	215	238	55-70	55	41	44	500-610	499	370	395
P33	2.6-3.4	642	199	361	100-500	3,750	975	1,704	18-100	405	85	290	425-1,775	13,697	1,531	3,608
#P34	2.8-3.4	1,152	343	665	20-500	5,553	150	2,578	10-96	1,030	142	405	224-720	5,630	1,675	3,285
<u>TYLER RUN</u>																
##T23	2.2-3.1	15,086	1,050	6,153	60-600	79,787	1,817	20,567	29-123	3,830	1,415	3,109	150-949	89,761	6,590	24,436
*T24	3.2-4.0	1,762	29	757	24-140	1,246	49	524	0.8-2.8	42	0.8	13	80-280	2,245	249	1,480
*T26	2.7-3.3	500	26	176	128-400	1,230	78	483	4-11	43	1	15	150-570	1,285	153	709
*T27	2.6-3.3	462	12	141	8-380	1,055	19	377	7-32	61	2	25	150-610	1,250	88	581
T28	3.0-3.8	30	@ 0	11	22-150	43	2	10	0.1-2	T	T	T	60-380	69	4	27
T29	2.4-3.2	220	20	58	80-660	664	74	238	15-45	49	6	18	275-760	729	144	272
T30	2.5-3.3	171	10	46	110-550	497	20	153	6-23	30	1	8	250-680	670	99	224
T23 - Flow adjusted in text to 2,329 gpm																

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID			IRON			SULFATES					
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours		
		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.
<u>TYLER RESERVOIR TRIBUTARY</u>																
#TR35	2.9-3.2	350	75	261	114 -214	867	193	548	0.8-3	10	2	7	150-340	1,430	375	796
*TR36	3.0-3.6	17,030	904	7,512	30 -190	19,700	2,065	8,333	0.1-61	1,466	12	438	130-424	82,085	3,151	21,922
TR37	2.8-3.3	462	20	106	116 -320	1,414	40	287	0.4-8	19	T	5	261-540	1,453	106	494
TR38	2.8-4.0	314	66	165	12 -1,600	2,207	10	444	0.3-5	11	1	4	125-410	757	274	421
TR39	4.1-5.1	253	26	103	(-6)-36	24	(-18)	16	0.1-0.4	1	T	T	77-191	335	71	160
TR40	3.1-4.2	220	28	100	18 -94	180	26	70	0.2-2	3	T	1	75-251	436	81	201
TR41	2.9-3.8	115	10	43	20 -104	100	8	34	0.1-2	T	T	T	105-290	235	31	87
TR42	2.8-3.4	250	21	114	94 -214	410	45	232	0.5-2	2	T	2	210-410	697	81	420
TR43	3.6-4.7	300	27	124	(-2)-76	188	(-6)	68	0-0.4	T	0	T	100-296	723	81	304
TR44	3.5-4.5	250	34	122	(-2)-84	172	(-4)	83	0-1	1	0	T	170-291	525	119	373
#TR45	3.6-5.9	25	2	15	(-2)-25	8	(-1)	2	0-4	1	T	T	65-405	53	2	25
<u>SCATTERTOWN AREA</u>																
SC49	3.2-3.6	350	10	97	66 -106	446	11	114	0-2	3	0	1	150-281	926	31	258
*SC50	3.2-4.0	601	71	255	30 -130	676	65	221	0.1-6	7	T	4	96-320	1,259	153	525
SC51	3.2-4.5	530	32	189	8 -140	640	37	137	0.1-7	36	T	3	15-300	958	50	355
SC52	3.0-3.6	115	36	67	14 -150	171	6	95	0-1	1	T	1	150-375	373	94	203
#SC53	5.0-6.5	199	1	46	(-2)-10	(-5)	2	1	0.1-1	T	T	T	10-65	24	1	8
SC54	3.1-6.1	1,037	21	200	4 -340	1,049	10	160	0.1-6	6	T	5	38-370	2,499	53	352

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID			IRON			SULFATES					
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours				
		Max.	Min.	Ave.		Max.	Min.		Ave.	Max.		Min.	Ave.			
<u>CHERRY RUN</u>																
*C55	3.5-4.3	31,430	1,000	8,987	12-80	8,311	692	2,539	0.1-10	612	7	356	40-231	22,667	2,236	8,542
C56	3.3-4.0	1,628	243	648	18-210	2,683	243	674	1-4	29	7	20	175-349	2,943	768	1,842
C57	3.2-3.7	2,215	44	497	32-120	852	47	376	0-2	5	0	3	80-201	1,684	148	863
C58	3.1-3.7	642	66	331	62-400	480	84	404	0.1-2	13	1	3	135-426	1,718	239	898
C59	3.5-4.2	1,200	1	146	6-56	87	1	19	0-2	1	0	T	23-360	861	2	116
*C60	3.4-3.9	3,500	343	1,274	38-140	2,465	405	1,051	1-3	58	7	19	91-320	4,849	1,085	2,548
*C61	3.9-4.8	15,300	550	2,853	4-12	1,839	58	313	0.1-2	110	2	18	29-58	1,932	547	1,484
#C61A	4.3-4.4	10	1	2	16-26	3	T	T	0.3-1	T	T	T	120-170	20	1	2
C62	3.3-3.9	36	10	23	70-120	102	10	26	0.1-1	T	T	T	151-430	367	24	82
C63	3.1-3.7	21	7	12	7-100	18	3	8	0.4-3	T	T	T	74-226	41	9	22
C64	3.4-4.0	10	1	3	12-74	2	1	1	0.1-11	T	T	T	55-250	8	T	4
*C65	2.8-4.3	253	20	92	22-520	368	20	165	0.6-4	12	T	1	85-425	578	48	216
<u>BROWN'S RUN (KERSEY RUN)</u>																
*BR68	2.9-3.9	800	150	279	16-300	270	63	179	0.1-3	14	T	4	55-300	1,928	190	416
BR69	2.9-3.9	10,102	58	1,600	36-110	6,071	61	998	0.6-3	170	1	22	100-321	6,440	195	2,447
*BR70	2.8-3.5	1,152	67	335	60-200	1,164	115	418	0.2-2	15	T	3	150-358	2,643	234	886
BR71	2.7-3.5	600	23	175	64-200	469	55	204	0.1-4	16	1	9	175-395	1,265	102	487
BR72	2.4-3.0	70	1	22	170-520	252	3	74	9-57	31	1	8	122-550	260	4	103

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID			IRON			SULFATES					
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours				
		Max.	Min.	Ave.		Max.	Min.		Ave.	Max.		Min.	Ave.			
<u>KERSEY RUN</u>																
*K74	4.0-5.5	162,762	1,460	32,815	(-4) -8	15,648	(-2,212)	2,127	0.1-6	11,542	10	899	15-151	48,910	614	10,791
#*K75	4.4-5.2	20,900	2,600	11,750	8-0	1,507	T	1,089	1-0.1	51	9	47	9-45	11,305	750	4,189
#*K76	4.8-6.1	9,700	1,300	5,500	6-(-8)	701	(-125)	400	0.4-T	35	6	29	9-30	3,506	219	1,440
#*K77	4.5-6.2	35,800	4,700	19,333	2-(-4)	861	(-840)	716	0.4-T	43	21	29	7-45	19,364	791	11,565
*K78	3.8-4.5	3,000	137	996	(-6)-48	793	(-22)	254	0.3-2	33	1	10	69-230	4,147	281	1,405
*K79	2.9-3.6	383	29	181	50-180	387	63	209	2-5	17	2	8	42-530	1,242	22	642
*K80	3.5-4.2	253	21	90	22-120	81	7	39	0.4-14	9	T	2	80-225	464	34	156
#*K81	6.2-6.6	21	5	15	0.1-1	1	0	T	0.07-0.3	T	T	T	50-53	13	3	9
K82	2.3-3.6	171	15	43	40-140	106	10	40	3-14	6	1	2	80-293	361	27	61
K83	2.3-3.5	29	@ 0	6	96-660	230	1	19	7-124	43	T	3	150-698	192	3	21
K84	2.4-3.5	15	@ 0	4	12-540	65	1	8	3-74	9	T	1	100-690	83	2	14
K85A	2.2-3.7	25	@ 0	10	20-500	106	2	30	10-90	22	T	5	100-470	82	2	28
K85B	3.6-4.4	35	@ 0	9	4-110	19	T	4	0.1-7	1	T	T	80-191	80	1	15
*K87	2.9-3.6	530	23	211	48-190	375	53	187	1-10	17	2	8	100-400	803	111	399
*K88	3.0-3.6	890	33	343	20-140	1,158	56	325	1-7	58	3	10	135-321	2,252	111	811
K90	3.0-3.6	190	10	77	20-158	222	5	78	2-29	45	T	7	100-354	461	26	185

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID				IRON				SULFATES			
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours			mg/l Range	Lbs./24 Hours		
		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.		Max.	Min.	Ave.
<u>DIXON RUN</u>																
*CA96	2.5-3.2	15,700	1,300	5,591	34 -700	55,671	531	19,436	19-66	5,097	781	2,589	325-995	72,089	8,751	28,009
CA97	3.3-6.5	47	@ 0	24	(-30)-212	58	(-8)	15	0.1-3	1	T	T	200-370	172	27	84
#CA98	6.1-7.4	29	1	7	(-36)-10	4	(-3)	T	0.1-1	T	T	T	14-180	63	T	13
CA99	2.4-3.2	444	190	403	400 -1,560	8,346	754	3,294	41-591	2,236	125	535	674-2,025	10,834	1,379	5,182
CA100	2.9-3.6	57	@ 0	12	59 -300	54	1	23	1-9	1	T	T	75-400	192	5	33
*CA101	2.5-3.3	3,656	458	1,056	120 -800	17,901	2,046	4,654	15-107	2,394	260	474	245-710	16,756	2,632	5,425
*CA102	2.6-3.1	3,000	287	867	144 -542	12,020	1,550	3,324	23-124	938	161	393	175-710	14,725	775	3,420
CA103	2.4-3.1	95	@ 0	28	116 -1,100	552	T	221	74-139	94	T	49	490-1,300	687	T	232
CA104	2.5-3.6	146	6	47	58 -600	553	7	171	10-43	83	1	17	140-1,045	1,834	17	213
CA105	2.4-3.6	300	56	142	280 -740	1,388	377	958	33-121	158	50	117	400-1,125	3,421	559	1,144
CA107	2.4-3.0	369	56	138	300 -800	2,491	413	1,053	73-140	335	62	157	525-1,125	2,392	390	1,266
CA108	2.0-2.7	200	12	50	240 -2,600	1,563	116	839	50-570	374	24	147	150-2,400	1,430	72	733
CA109	2.5-3.0	1,300	130	420	320 -600	5,938	698	2,017	26-99	484	95	221	350-730	5,469	949	2,179
CA110	2.8-3.6	45	8	18	10 -300	24	1	24	2-29	5	1	3	85-399	56	15	35
CA111	2.5-2.9	200	15	44	44 -520	980	8	190	5-40	13	2	6	230-725	1,337	94	299

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID			IRON			SULFATES					
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours				
		Max.	Min.	Ave.		Max.	Min.		Ave.	Max.		Min.	Ave.			
<u>SPRING RUN (TROUT RUN)</u>																
ST114	3.3-4.0	10	@ 0	3	42 -410	9	0	3	0.3-7	T	T	T	60-700	32	0	9
ST115	2.6-3.4	39	20	25	80 -300	94	51	73	42-140	44	11	27	400-1,100	375	34	234
ST116	2.6-3.2	45	@ 0	9	52 -200	65	0	18	10-22	7	0	2	150-250	122	0	21
ST117	3.0-4.5	25	@ 0	4	4 -140	26	0	3	0-7	1	T	T	0-340	54	0	7
ST118	3.0-3.6	300	20	94	40 -150	144	13	56	0.4-9	4	1	2	110-250	452	54	148
ST119	5.1-6.6	43,238	6,600	20,688	(-14)-8	2,500	(-7,154)	(-1,424)	0.1-0.4	125	15	54	0-175	10,097	0	15,089
ST120	3.6-4.3	100	1	17	10 -78	17	1	6	0.1-3	1	T	T	85-270	127	2	36
<u>TROUT RUN</u>																
*TT122	4.6-6.3	269,400	5,500	61,749	(-14) -8	17,063	(-28,438)	3,500	0-4	13,924	0	757	11-130	87,431	5,090	24,252
TT123	2.9-3.5	622	94	231	100 -350	756	226	489	4-13	29	11	16	314-1,200	2,909	1,112	1,576
TT124	4.3-5.5	115	20	53	(-2)-20	11	(-3)	6	0.3-2	4	T	1	165-289	290	58	149
TT125	3.0-3.6	45	2	10	110 -330	87	7	21	0-9	4	0	T	260-950	289	23	64
*TT126	3.8-4.7	3,530	150	1,083	34 -110	1,587	119	703	2-7	89	5	40	261-1,200	11,106	828	4,681
*TT127	3.0-3.5	5,124	180	573	122 -330	7,903	441	1,374	3-8	167	13	29	350-1,000	22,720	1,503	3,770
*TT128	3.4-4.6	4,873	500	1,767	26 -290	5,872	275	1,109	0-2	72	0	24	275-970	16,870	2,705	8,619
*TT129	5.2-6.5	53,000	4,700	43,020	(-14)-6	1,298	(-6,387)	(-779)	0.1-1	549	0	66	14-48	22,300	1,017	13,763
*TT130	5.3-7.0	43,600	3,260	21,980	(-12)-8	2,386	(-4,772)	(-946)	0-0.4	159	0	29	10-40	18,867	745	6,002
TT131	4.2-4.9	45	@ 0	10	10 -32	7	0	3	0-1	T	0	T	22-148	49	0	11
TT132	3.2-3.6	63	8	30	94 -240	178	13	61	0.1-1	1	T	T	35-705	381	13	139
TT133	3.1-3.7	30	1	7	70 -210	42	1	11	0-14	1	0	T	225-990	117	3	34
TT133A	5.5-6.5	300	25	175	(-38)-8	14	(-91)	(-38)	0-1	0.4	0.2	0.3	91-220	66	362	215

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	PH Range	FLOW			ACID			IRON			SULFATES					
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours				
		Max.	Min.	Ave.		Max.	Min.		Ave.	Max.		Min.	Ave.			
<u>MOUNT PLEASANT</u>																
*MP135	3.1-3.6	190	21	64	76 -400	274	36	110	5-7	13	1	5	150-760	520	101	332
<u>BELL HOLLOW (LAUREL RUN)</u>																
BH137	3.6-5.0	278	@ 0	85	20 -82	49	0	10	0.3-4	8	0	1	0-340	519	0	65
BH138	3.0-3.5	45	4	14	60 -192	39	10	19	0.1-6	5	T	T	53-376	172	3	75
BH139	2.7-3.1	150	20	56	74 -1,090	886	133	413	1-209	89	1	39	220-1,200	859	144	409
BH140	2.6-3.4	35	3	8	214 -540	90	16	35	1-52	5	T	2	190-680	104	15	41
*BH141	3.1-4.1	4,700	350	2,234	28 -520	7,500	822	2,091	2-9	167	13	77	160-500	11,327	1,632	6,293
<u>BAKEMAN'S RUN</u>																
#BA160	6.7-7.1	300	150	196	(-32)-(-16)	(-65)	(-29)	(-60)	0.3-1	1	1	1	50-82	263	69	136
BA161	2.6-3.6	100	@ 0	13	30 -880	395	1	42	3-120	31	T	13	150-1,700	322	2	49
<u>DENTS RUN</u>																
#*BB220	3.2-3.3	45,300	4,500	20,700	68-214	32,750	6,500	27,700	2-5	1,259	108	750	185-425	150,000	18,957	74,000

FIELD & LABORATORY TESTS SUMMARY

Sampling Station Number	pH Range	FLOW			ACID			IRON			SULFATES					
		(Gallons Per Minute)			mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours		mg/l Range	Lbs./24 Hours				
		Max.	Min.	Ave.		Max.	Min.		Ave.	Max.		Min.	Ave.			
BENNETT BRANCH (FORCE TO WEEDVILLE)																
#UN180	3.1-3.4	510	10	172	66 -130	467	16	216	0-1	4	0	2	75-360	1,413	43	497
#UN181	4.8-5.6	15	2	8	(-10)-20	1	0	1	0.1-13	1	T	T	92-291	32	7	16
#UN182	4.9-6.4	80	12	48	(-8)-1	1	(-5)	(-1)	0-0.4	T	0	T	55-200	145	21	58
#UN183	2.8-3.1	750	10	156	152 -500	1,374	46	626	8-42	124	3	37	200-695	2,485	57	772
#UN184	3.5-4.0	200	25	87	28 -54	98	14	53	0-1	T	0	T	150-200	482	45	161
CHASE HOLLOW (TROUT RUN)																
#CH190	3.5-3.7	70	50	55	274 -640	540	198	245	15-16	13	9	10	1525-1775	1,455	1,069	1,094
#CH189	4.2-5.2	40	20	25	250 -264	121	63	78	64-82	33	20	22	1525-1700	819	368	457
#CH191	4.0-4.2	20	2	12	114 -122	27	3	17	0.8-1	T	T	T	1600-1800	404	43	248
#CH192	4.3-4.5	20	5	8	50 -66	12	4	5	0-0.1	T	0	T	800-1075	259	48	91
#CH193	2.7-2.9	30	15	22	960 -1160	419	202	268	88-96	35	16	23	2275-2625	949	411	616
WHISKEY RUN (TROUT RUN)																
#*W195	5.4-6.6	200	150	197	(-18)-(-14)	(-34)	(-33)	(-34)	0.2-0.3	1	1	1	23-24	58	42	57
#W196	4.5-5.2	100	100	100	4 -14	17	5	16	0.1-0.3	T	T	T	205-213	257	247	256