

## 8. Yellow Creek Watershed

### a. General

Yellow Creek, the main tributary of Two Lick Creek, is arbitrarily split at Yellow Creek State Park into Upper and Lower Portions which are, for the purpose of this report, treated as separate watersheds.

Little Yellow Creek, a major tributary to Yellow Creek, is treated separately earlier in this section of the report.

Yellow Creek originates near Alverda and flows in a southeasterly direction for approximately 23 miles where it discharges into Two Lick Creek Proper at Homer City.

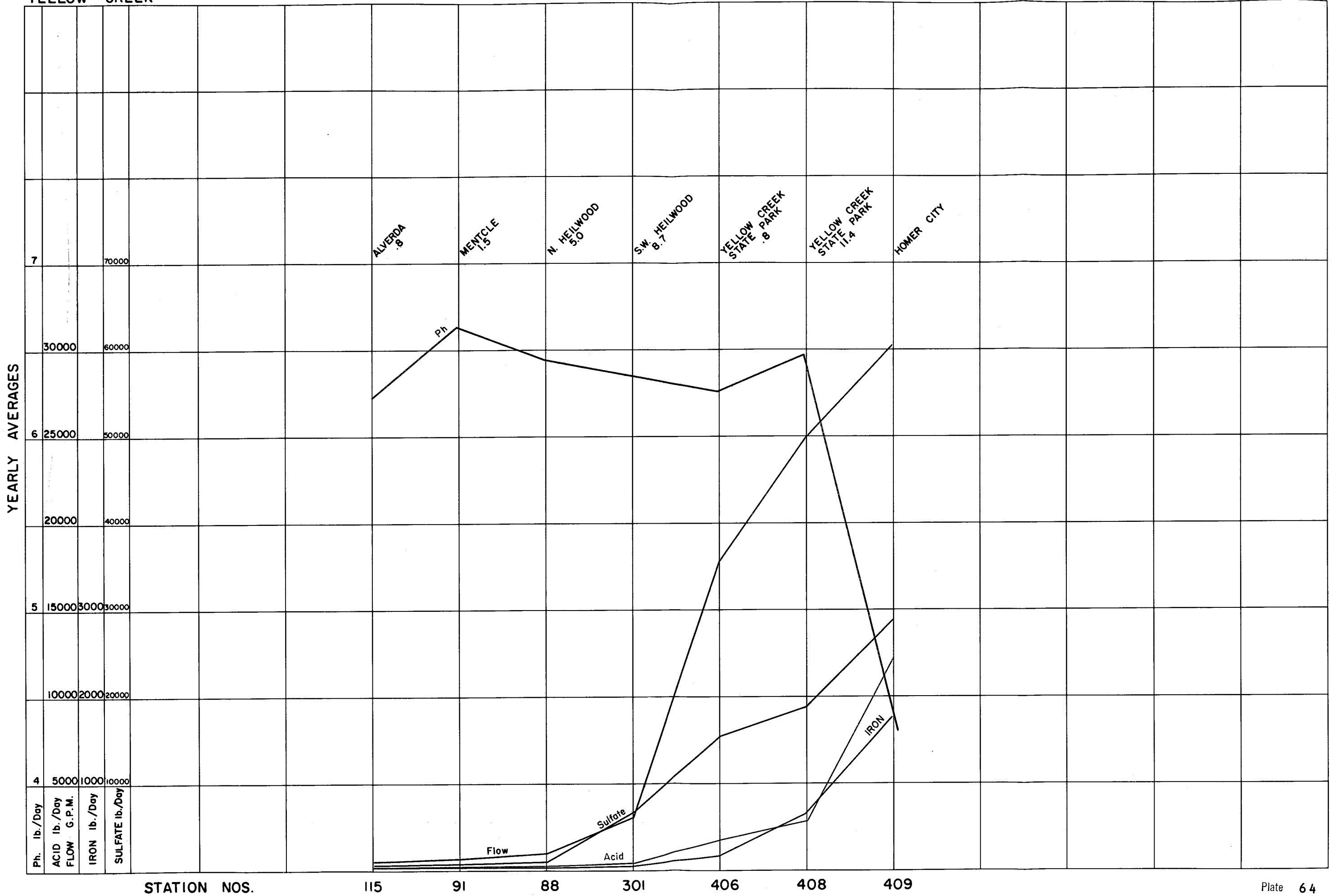
Total stream length including all tributaries (excluding Little Yellow Creek) is approximately 85.4 miles and total area is 51.6 square miles.

Plate 64 graphically illustrates the downstream fluctuation of pollution load and flow as measured at several sampling stations on Yellow Creek.

Plates 65 and 70, Pages 228 and 246 show the locations of the sampling stations and the extent of mine drainage pollution within various portions of the watershed.

FLOW AND POLLUTION LOAD — DOWNSTREAM PATTERN

YELLOW CREEK



8A. Upper Portion, Yellow Creek Watershed

a. General

The Upper Portion of Yellow Creek Watershed covers an area of approximately 28.2 square miles. The principal tributaries in the watershed are Laurel Run #1, Laurel Run #2, Rose Run, and Leonard Run.

The total stream length including all tributaries is approximately 50.1 miles.

b. Stream Condition

An analysis of mine drainage contamination within the watershed provides the following breakdown on stream condition.

Table 64

Stream Condition

Upper Portion, Yellow Creek Watershed

<u>Stream Classification</u>	<u>Stream Length Miles</u>	<u>Percent Total Stream Length</u>
Non-Polluted	47.8	95
Severely Polluted	0.0	0
Moderately Polluted	2.3	5

As indicated above, approximately 5 percent of the watershed is seriously degraded by mine drainage.

Plate 65 shows the locations of the sampling stations and the extent of mine drainage pollution within the watershed.

Leonard Run is the only major tributary seriously degraded by mine drainage. There are several additional minor sources of mine drainage near Alverda which are evidently being neutralized and diluted by the main stream.

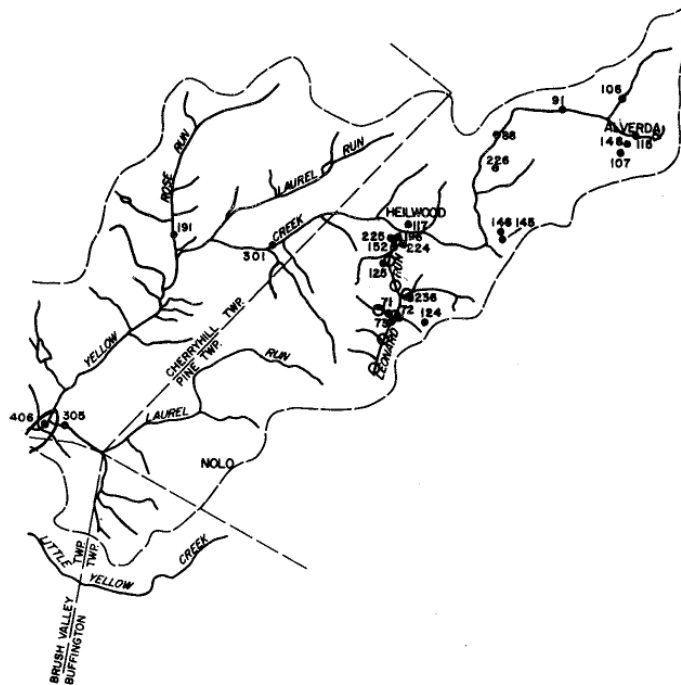
This also holds true of the main stream about one mile below Heilwood where measurements indicate- a buffering of contamination from Leonard Run and the Heilwood area.

Most of the waters below Sampling Station #301 support fish life at least half of the year. The Pennsylvania Fish Commission annually stocks trout near the junction of Rose Run and Laurel Run and near Yellow Creek State Park.

UPPER PORTION: YELLOW CREEK WATERSHED (EXCLUDING LITTLE YELLOW CREEK)

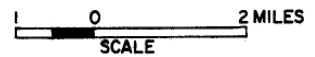


WATERSHED AREA



LEGEND

- YELLOW CREEK DRAINAGE BASIN
- SAMPLING STATION  
MODERATELY ACID



MARCH 1970

<p>PREPARED BY L. ROBERT KIMBALL <i>Consulting Engineers</i> EBENSBURG, PENNSYLVANIA</p>	<p>TWO LICK CREEK MINE DRAINAGE POLLUTION ABATEMENT PROJECT INDIANA COUNTY, PENNSYLVANIA</p>	<p>PREPARED FOR PENNSYLVANIA DEPARTMENT OF MINES AND MINERAL INDUSTRIES</p>
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The Laurel Run tributary, originating near Nolo, is reported to support year round trout populations. Water samples from this and other tributaries not affected by mine drainage indicate that a considerable amount of contamination entering the streams originate from natural sources within the watershed.

#### c. Sampling Station Data

Twenty-four (24) sampling stations were installed and monitored. The minimums, maximums, and yearly averages of water quality data obtained from these stations are listed in Table 65 on Page 230.

Plate 66 graphically illustrates the monthly relationship between stream flow, pollution load, and weather elements within the watershed based on measurements taken at Sampling Station #406 located near Yellow Creek State Park.

Peak average flows and contamination loads occurred during April and May with lows recorded during the fall months pH levels fluctuated very little over the year with the lowest average of 6.1 recorded during October, March, and April.

The Upper Portion of Yellow Creek contributed the following percentages of flow and pollution load to the total flow and load of Yellow Creek as measured at Sampling Station #409 near Homer City: Flow - 80%; Acidity - 5%; Iron - 22%; and Sulfate - 44%.

An average flow of approximately 21,250,000 gallons of water per day was measured at Sampling Station #406.

#### d. Coal Mining Activity General

Coal mining in the Upper Portion of the Yellow Creek Watershed has been concentrated in the Alverda-Heilwood area which has been extensively mined principally in Lower Freeport (D) seam. Most of the coal resources have been exhausted. Map Sheets 7, 8, and 11, Appendix A show the locations and extent of both deep and strip mines.

#### Deep Mines

There is presently only one deep mine, Valley #8, in operation. The Heilwood and Alverda complexes which are interconnected and have openings within the watershed also-have workings that extend into the Little Yellow Creek and Blacklick Creek Watersheds.

Table 66 shown on Page 234, lists the major abandoned mines and the following information: Type of opening, total number of openings, seam mined, maximum head, whether or not the mine is draining water, and number of acres mined.

Table 65

Water Quality DataUpper Portion, Yellow Creek Watershed

<u>Sampling Station</u>	<u>Flow GPM</u>	<u>pH Range</u>	<u>Acid Load Lbs./Day</u>	<u>Acidity Mg./L.</u>	<u>Iron Mg./L.</u>	<u>Sulfate Mg./L.</u>
406	Max. 65,305 Min. 1,831 Ave. 14,757	3.8 - 6.2	930	Max. 50 Min. 1 Ave. 5	Max. 7 Min. 0 Ave. 1	Max. 350 Min. 17 Ave. 149
305	Max. 5,085 Min. 110 Ave. 2,074	4.1 - 7.6	106	Max. 26 Min. 2 Ave. 4	Max. 1 Min. 0 Ave. 0.2	Max. 125 Min. 6 Ave. 19
301	Max. 6,400 Min. 382 Ave. 6,000	3.8 - 6.9	724	Max. 18 Min. 2 Ave. 10	Max. 3 Min. 0.04 Ave. 0.4	Max. 2,400 Min. 160 Ave. 371
236	Max. 18 Min. 1 Ave. 10	4.3 - 5.7	8	Max. 70 Min. 44 Ave. 62	Max. 12 Min. 4 Ave. 8	Max. 140 Min. 89 Ave. 111
226	Max. 11 Min. 1 Ave. 9	4.9 - 5.8	1	Max. 94 Min. 8 Ave. 13	Max. 28 Min. 0.5 Ave. 1	Max. 625 Min. 100 Ave. 124
225	Max. 289 Min. 145 Ave. 221	4.9 - 6.0	418	Max. 828 Min. 14 Ave. 157	Max. 1 Min. 0.4 Ave. 1	Max. 780 Min. 480 Ave. 664
224	Max. 94 Min. 15 Ave. 39	4.8 - 6.0	3	Max. 8 Min. 2 Ave. 6	Max. 50 Min. 0.1 Ave. 0.2	Max. 400 Min. 250 Ave. 342
196	Max. 1,215 Min. 84 Ave. 800	4.3 - 5.1	610	Max. 130 Min. 22 Ave. 63	Max. 18 Min. 1 Ave. 3	Max. 1,500 Min. 420 Ave. 725

Table 65 Continued

Water Quality DataUpper Portion, Yellow Creek Watershed

<u>Sampling Station</u>	<u>Flow GPM</u>	<u>pH Range</u>	<u>Acid Load Lbs./Day</u>	<u>Acidity Mg./L.</u>	<u>Iron Mg./L.</u>	<u>Sulfate Mg./L.</u>
191	Max. 1,277 Min. 236 Ave. 800	5.1 - 5.6	21	Max. 8 Min. 1 Ave. 3	Max. 1 Min. 0.2 Ave. 0.5	Max. 32 Min. 5 Ave. 8
152	Max. 14 Min. 1 Ave. 4	4.6 - 6.5	0	Max. 10 Min. 2 Ave. 4	Max. 0.3 Min. 0.01 Ave. 0.1	Max. 34 Min. 11 Ave. 22
148	Max. 71 Min. 1 Ave. 16	4.9 - 6.5	1	Max. 44 Min. 2 Ave. 6	Max. 1 Min. 0 Ave. 1	Max. 375 Min. 57 Ave. 142
146	Max. 23 Min. 4 Ave. 9	4.5 - 5.4	1	Max. 26 Min. 4 Ave. 11	Max. 0.4 Min. 0.05 Ave. 0.2	Max. 380 Min. 80 Ave. 195
145	Max. 181 Min. 1 Ave. 48	3.6 - 5.9	8	Max. 360 Min. 2 Ave. 13	Max. 1 Min. 0.02 Ave. 0.5	Max. 450 Min. 95 Ave. 158
125	Max. 115 Min. 1 Ave. 29	3.9 - 5.8	8	Max. 170 Min. 6 Ave. 23	Max. 10 Min. 0.2 Ave. 2	Max. 1,600 Min. 225 Ave. 650
124	Max. 108 Min. 4 Ave. 32	3.9 - 5.3	9	Max. 44 Min. 7 Ave. 23	Max. 2 Min. 0.05 Ave. 1	Max. 500 Min. 175 Ave. 453
117	Max. 1,010 Min. 2 Ave. 439	4.2 - 6.0	97	Max. 146 Min. 6 Ave. 18	Max. 6 Min. 1 Ave. 3	Max. 750 Min. 40 Ave. 473

Table 65 Continued

Water Quality DataUpper Portion, Yellow Creek Watershed

<u>Sampling Station</u>	<u>Flow GPM</u>	<u>pH Range</u>	<u>Acid Load Lbs./Day</u>	<u>Acidity Mg./L.</u>	<u>Iron Mg./L.</u>	<u>Sulfate Mg./L.</u>
115	Max. 1,377 Min. 6 Ave. 162	4.6 - 6.7	14	Max. 28 Min. 2 Ave. 7	Max. 14 Min. 1 Ave. 5	Max. 720 Min. 45 Ave. 142
107	Max. 56 Min. 1 Ave. 1	5.0 - 7.8	0	Max. 20 Min. 2 Ave. 6	Max. 3 Min. 0.1 Ave. 1	Max. 375 Min. 10 Ave. 207
106	Max. 356 Min. 17 Ave. 70	5.0 - 8.0	5	Max. 16 Min. 2 Ave. 6	Max. 1 Min. 0.1 Ave. 0.5	Max. 375 Min. 41 Ave. 91
91	Max. 819 Min. 8 Ave. 325	4.4 - 7.6	27	Max. 22 Min. 2 Ave. 7	Max. 1 Min. 0.04 Ave. 0.3	Max. 350 Min. 47 Ave. 108
88	Max. 2,988 Min. 7 Ave. 538	4.6 - 7.7	25	Max. 20 Min. 2 Ave. 4	Max. 1 Min. 0.1 Ave. 0.5	Max. 750 Min. 20 Ave. 167
73	Max. 571 Min. 17 Ave. 236	4.1 - 6.0	35	Max. 82 Min. 2 Ave. 30	Max. 1 Min. 0.3 Ave. 0.5	Max. 1,550 Min. 450 Ave. 660
72	Max. 137 Min. 1 Ave. 53	4.6 - 5.9	3	Max. 10 Min. 0 Ave. 4	Max. 3 Min. 0 Ave. 1	Max. 500 Min. 145 Ave. 294
71	Max. 813 Min. 3 Ave. 113	4.2 - 6.9	17	Max. 28 Min. 2 Ave. 13	Max. 1 Min. 0.1 Ave. 1	Max. 150 Min. 12 Ave. 57



STATION 406 YELLOW CREEK (Upper Portion) RELATIONSHIP BETWEEN STREAM FLOW, POLLUTION LOAD AND WEATHER ELEMENTS

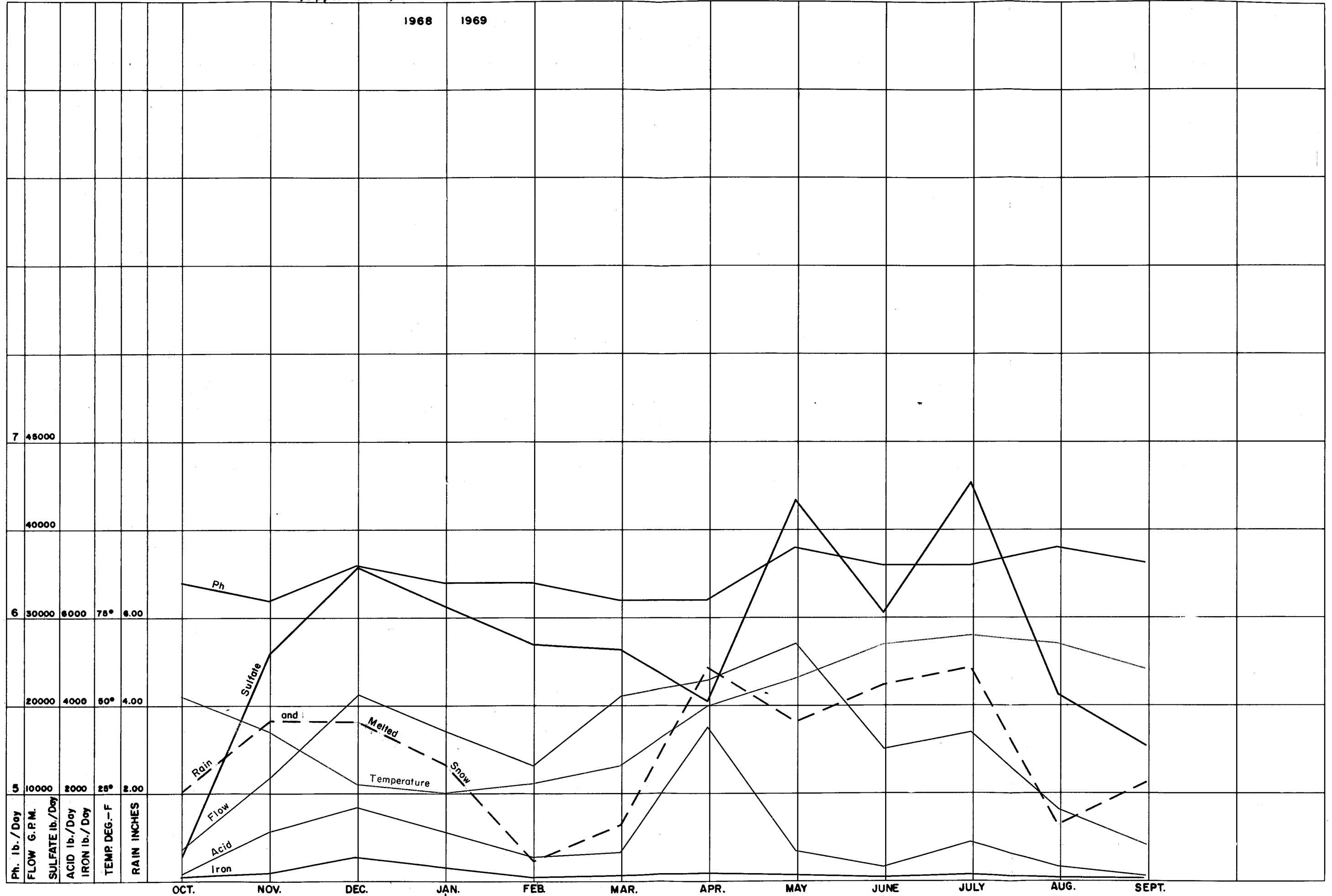


Table 66

Abandoned MinesUpper Portion, Yellow Creek Watershed

<u>Name of Mine</u>	<u>Type of Opening</u>	<u>Seam Mined</u>	<u>Draining Water</u>	<u>Total No. Openings</u>	<u>Area Mined (Acres)</u>	<u>Maximum Head (Feet)</u>
1. Heilwood #1*	Drift	D	X	8	601	369
2. Heilwood #2**	Drift	D	X	4	1,030	202
3. Heilwood #3**	Drift	D	X	5	244	262
4. Heilwood #4	Drift	D	X	4	73	70
5. Heilwood #5	Drift	D	X	4	209	271
6. Heilwood #6*	Drift	D	X	2	367	115
7. Heilwood #7*	Drift	D	X	6	532	70
8. Heilwood #8*	Drift	D	X	2	526	171
9. Heilwood #10	Drift	B	-	1	2	-
10. Cameron's Bottom	Drift	B	X	3	27	50
11. Glenside #9*	Slope	D	-	3	452	-
12. Pine #1*	Slope	D	-	2	359	-
13. Clement #1 Dip	Slope	D	-	4	104	-
14. No. 11 Dip*	Slope	D	X	3	314	40
15. Valley #4***	Drift	D	-	2	11	-
16. Valley #5***	Drift	D	-	1	12	-
17. Valley #6***	Drift	D	-	1	8	-
18. Valley #7***	Drift	D	-	3	41	-

\*Indicates interconnected Heilwood-Alverda Complexes which are draining into Yellow Creek.

\*\*Heilwood Nos. 2 and 3 are interconnected.

\*\*\*Valley Mines are interconnected.

Table 67

Major Mine Drainage SourcesUpper Portion, Yellow Creek Watershed

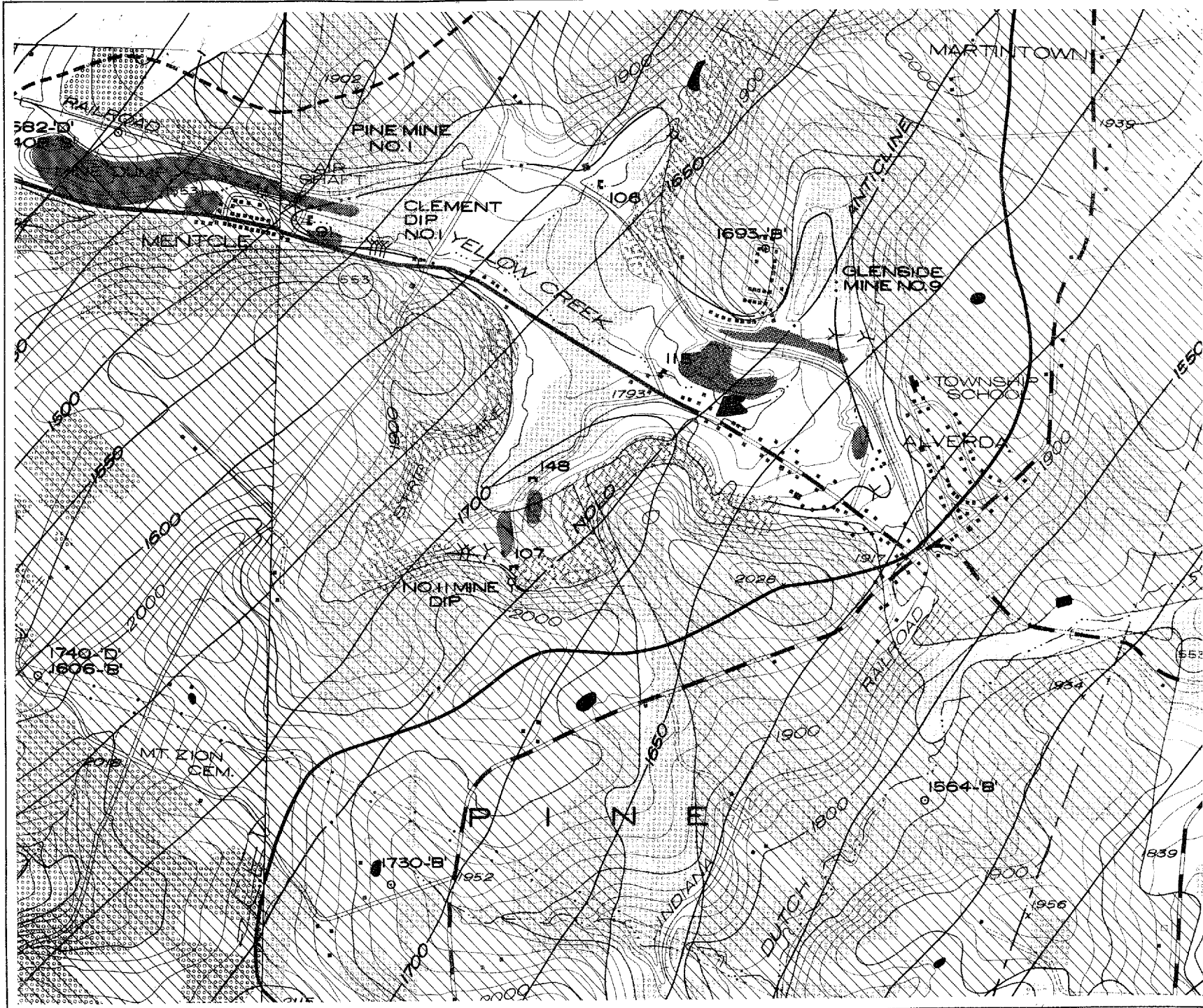
<u>Source Description</u>	<u>Flow GPM</u>	<u>Sampling Station(s)</u>	<u>Pollution Load - Lbs./Day</u>			<u>Combined Maximum Head (Feet)</u>
			<u>Acid</u>	<u>Iron</u>	<u>Sulfate</u>	
1. Leonard Run* Coal Tipple Coal Refuse	320	196 (Minus 71, 72, 73, 125, 224, 236 )	485	27	4,444	-
2. Heilwood #2 and #3 Mines	250	125, 225	427	3	1,999	262
3. Heilwood #1, #6, #7, and #8 Glenside #9 Pine #1 Clement #1 Dip and #11 Dip Mines	439	117	97	2	473	369
4. Valley #4, #5, #6, #7, and #8 Coal Refuse Piles	236	73	80	1	1,783	-
5. Heilwood #2 Strip Mine	113	71	17	1	78	-
6. Glenside #9 Coal Refuse	162	115	14	1	277	-
7. Heilwood #4 Mine	32	124	9	0	173	70
8. Cameron's Bottom Mine	10	236	8	1	134	50

Table 67 Continued

Major Mine Drainage SourcesUpper Portion, Yellow Creek Watershed

<u>Source Description</u>	<u>Flow GPM</u>	<u>Sampling Station(s)</u>	<u>Pollution Load - Lbs./Day</u>			<u>Combined Maximum Head (Feet)</u>
			<u>Acid</u>	<u>Iron</u>	<u>Sulfate</u>	
9. Pine #1 and Clement #1 Dip Coal Refuse	306	88 (Minus 106 and 115)	6	1	728	-
10. Glenside #9 Drift and Strip Mine	42	106 and Estimate	5	0	76	27
11. Valley Strip Mine	42	73 and Estimate	5	0	100	-

















\*Denotes active mine source



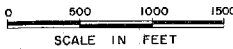

# UPPER YELLOW CREEK

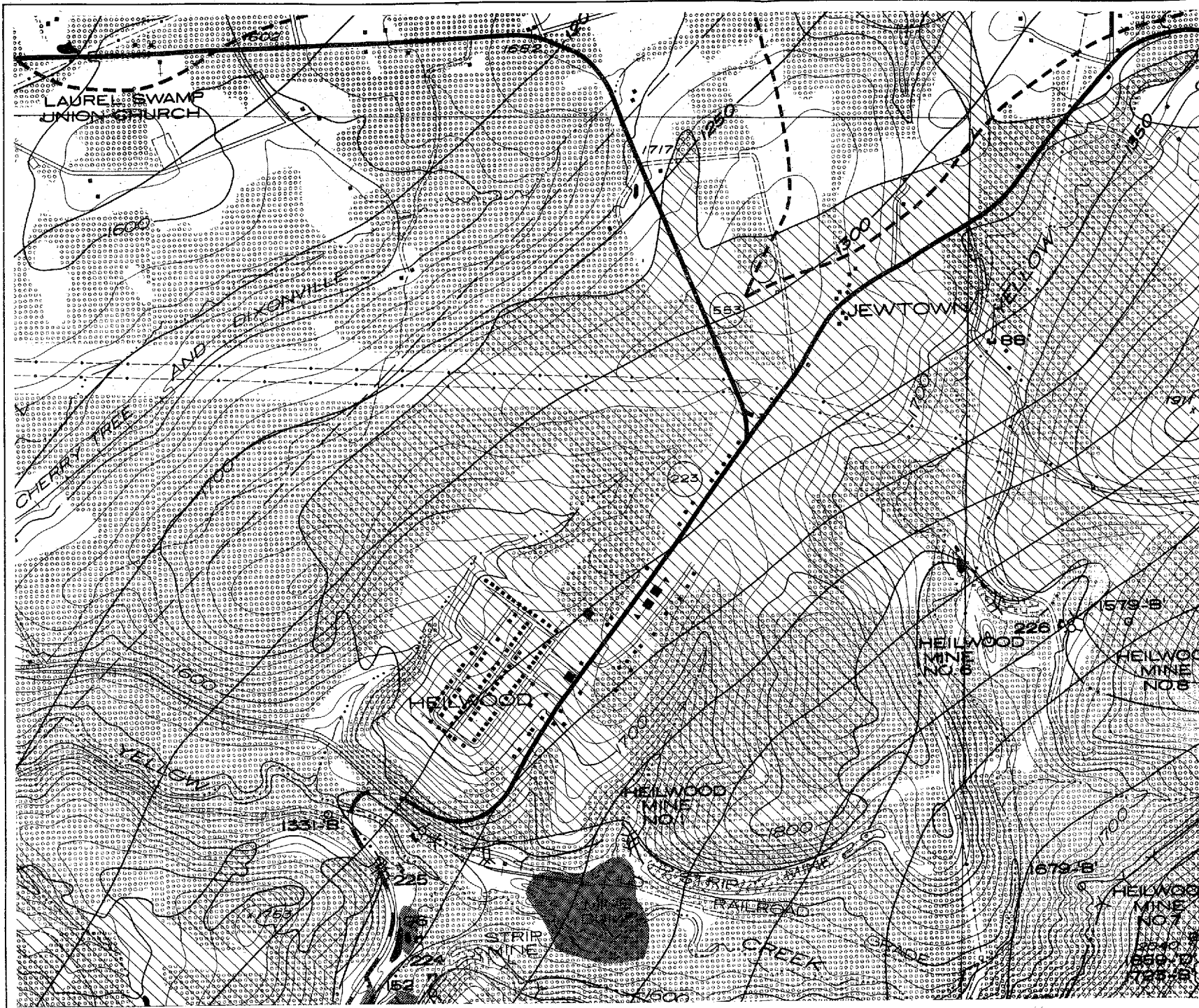


## LEGEND

-  KITTANNING SEAM
-  FREEPORT SEAM
-  UPPER FREEPORT (E) SEAM
-  LOWER FREEPORT (D) SEAM
-  LOWER KITTANNING (B) SEAM
-  COAL REFUSE AREA (NEW)
-  COAL REFUSE AREA (OLD)
-  STRIP MINE AREA
-  SAMPLING STATION
-  DIAMOND DRILL HOLE
-  MINE OPENING (DRY)
-  MINE OPENING (DRAINING)
-  WATERSHED PERIMETER (EXTERIOR)
-  WATERSHED PERIMETER (INTERIOR)
-  COAL CONTOUR LOWER KITTANNING SEAM
-  COAL CONTOUR LOWER KITTANNING SEAM (COAL MISSING DUE TO EROSION)

## TWO LICK CREEK MINE DRAINAGE POLLUTION ABATEMENT PROJECT INDIANA COUNTY, PENNSYLVANIA PROJECT NO. SL109 INVENTORY MAP

 SCALE IN FEET	MARCH, 1970	 N
L. ROBERT KIMBALL <i>Consulting Engineers</i> EBENSBURG, PENNSYLVANIA		SHEET NO. <b>1</b>



# UPPER YELLOW CREEK

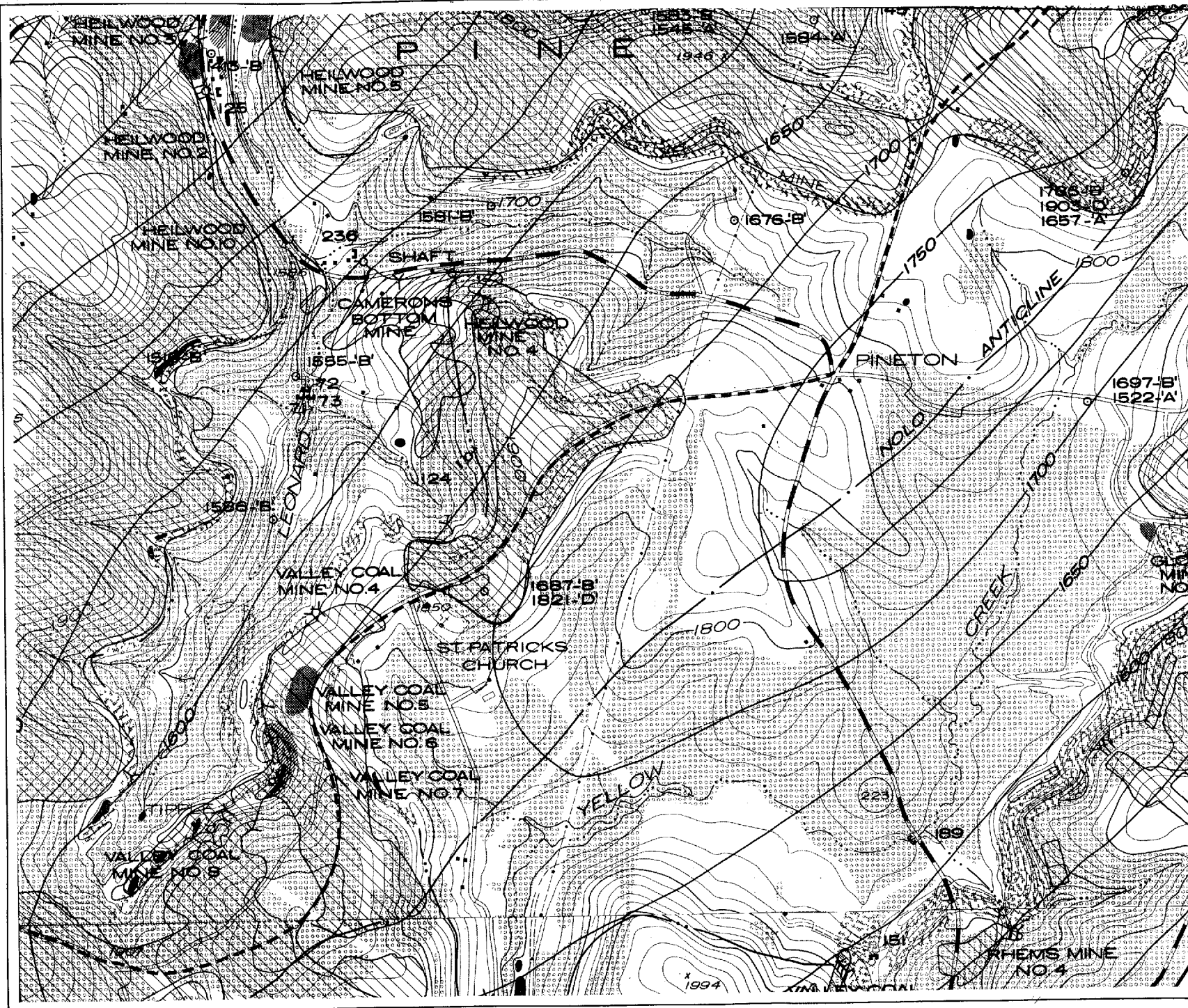
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## LEGEND

- KITTANNING SEAM
- FREEPORT SEAM
- UPPER FREEPORT (E) SEAM
- LOWER FREEPORT (D) SEAM
- LOWER KITTANNING (B) SEAM
- COAL REFUSE AREA (NEW)
- COAL REFUSE AREA (OLD)
- STRIP MINE AREA
- SAMPLING STATION
- DIAMOND DRILL HOLE
- MINE OPENING (DRY)
- MINE OPENING (DRAINING)
- WATERSHED PERIMETER (EXTERIOR)
- WATERSHED PERIMETER (INTERIOR)
- COAL CONTOUR LOWER KITTANNING SEAM
- COAL CONTOUR LOWER KITTANNING SEAM (COAL MISSING DUE TO EROSION)

### TWO LICK CREEK MINE DRAINAGE POLLUTION ABATEMENT PROJECT INDIANA COUNTY, PENNSYLVANIA PROJECT N° SL109 INVENTORY MAP

















0 600 1000 1500	MARCH, 1970	N
SCALE IN FEET		
L. ROBERT KIMBALL Consulting Engineers EBENSBURG, PENNSYLVANIA		SHEET N° <b>2</b>



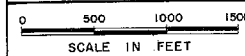
# UPPER YELLOW CREEK



## LEGEND

-  KITTANNING SEAM
-  FREEPORT SEAM
-  UPPER FREEPORT (E) SEAM
-  LOWER FREEPORT (D) SEAM
-  LOWER KITTANNING (B) SEAM
-  COAL REFUSE AREA (NEW)
-  COAL REFUSE AREA (OLD)
-  STRIP MINE AREA
-  SAMPLING STATION
-  DIAMOND DRILL HOLE
-  MINE OPENING (DRY)
-  MINE OPENING (DRAINING)
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-  COAL CONTOUR LOWER KITTANNING SEAM
-  COAL CONTOUR LOWER KITTANNING SEAM (COAL MISSING DUE TO EROSION)

## TWO LICK CREEK MINE DRAINAGE POLLUTION ABATEMENT PROJECT INDIANA COUNTY, PENNSYLVANIA PROJECT N° SL109 INVENTORY MAP



MARCH, 1970

L. ROBERT KIMBALL  
Consulting Engineers  
EBENSBURG, PENNSYLVANIA

SHEET N°  
**3**

f. Recommended Abatement Procedures - Cost Benefication

Recommended abatement treatments and related costs are listed for the various sources of pollution in Table 68.

All treatments and costs are based on data described in Section X.

A key to define the recommended abatement procedures is shown on Page 244.

Two abatement plans, a primary and alternate, are recommended for rehabilitation of the watershed.

Plan A is recommended as the primary plan and Plan B as the alternate.

An estimated effectiveness of 75% reduction of pollution load is assigned for each recommended treatment in both plans.\*

Plan A is based on an arbitrary maximum cost of \$1,000.00 per pound of acid load abated and will provide an estimated reduction of acid load in the magnitude of 82% for the watershed.

Plan B is based on an arbitrary cost of \$400.00 per pound of acid load abated and will provide an estimated reduction of acid load of approximately 78% for the watershed.

Table 68a lists the sources to be abated, the amount of benefication, and costs associated with both plans.

\*With the exception of treatment plants which are assigned an effectiveness of 100% reduction of pollution load.



Table 68

Recommended Abatement Procedures - Cost BeneficationUpper Portion, Yellow Creek Watershed

<u>Source Name</u>	<u>Pollution Order</u>	<u>Recommended Treatment Procedures</u>	<u>Total Cost \$</u>	<u>Cost Per Pound \$</u>	<u>Total Abatement Lbs. Acid/Day</u>
1. Heilwood #2 Strip Mine	5	6A - Pond	\$ 4,260	\$ 360.94	13
2. Valley Strip Mine	11	6A - R2	2,145	564.47	4
3. Heilwood #4 Mine	7	1 Seal	11,000	1,617.65	7
4. Glenside #9 Drift Mine	10	1 Seal	11,000	2,894.74	4
5. Cameron's Bottom Mine	8	2 Seals	22,000	3,666.67	6
6. Glenside #9 Refuse Pile	6	9A - R1 - SC	53,955	5,138.57	10
7. Pine #1 and Clement #1 Dip Refuse Pile	9	24A - R1 - SC	<u>143,880</u>	31,973.33	<u>4</u>
Total all Sources			\$248,240		48

Table 68a

Benefication - Recommended Plans

Upper Portion, Yellow Creek Watershed

<u>Plan</u>	<u>Above Sources Abated</u>	<u>Benefication Pollution Reduction Acid Lbs./Day - % of Total</u>	<u>Benefication Pollution Reduction Iron Lbs./Day - % of Total</u>	<u>Benefication Pollution Reduction Sulfate Lbs./Day - % of Total</u>	<u>Total Cost</u>
A	1 - 2	17 - 1%	1 - 3%	133 - 1%	\$6,765
B	1	13 - 1%	1 - 3%	58 - 0.6%	4,620

KEY TO RECOMMENDED ABATEMENT PROCEDURES

- R1 - Grass and legumes - Method #1
- R2 - Grass and legumes - Method #2
- R3 - Seedlings
- F - Flumes
- D - Ditching
- B - Terrace backfill
- A - Acreage on strip mines and refuse piles
- RP - Standard Refuse Pile Reclamation
- RB - Refuse Burial and Reclamation
- SC - Soil Cover
- Plant - Treatment Plant
- Pond - Pond Construction and Reclamation
- Seal - Mine Seal