

V WATER QUALITY CRITERIA

The following criteria has been used to define the concentration or range of values at which concern over water quality for all uses is indicated, assuming that each characteristic is acting alone and not in synergism with another. The characteristics listed are those common to mine drainage waters and are of concern with most water uses:

pH	Below 6.0, above 8.5
Acidity (Hot to pH 8.3)	Exceeding the alkalinity
Alkalinity	(See Acidity and pH)
Total Iron	Higher than 1.5 mg/l
Sulfates	Higher than 500 mg/l
Specific Conductance	Higher than 350 microhomos/cm
Manganese	Higher than 1.0 mg/l
Hardness	Higher than 150 mg/l
Total Solids	Higher than 750 mg/l
Suspended Solids	Higher than 250 mg/l
Dissolved Solids	Higher than 500 mg/l
Turbidity	Higher than 20C units

It should be noted that only the first five characteristics listed were analyzed in tests of water samples from the Blacklegs Watershed. Certain water quality criteria for the Blacklegs Creek Watershed have been determined in order to establish a goal for the improvement of stream quality. The criteria used are adaptations of similar criteria used by the Federal Water Pollution Control Agency and by the Department of Environmental Resources as published in the Pennsylvania Code Title 25, Section 93.6, Table 13.

The quality indicators or classifications used in this study are:

(1) polluted water - any water with an acid concentration of 13 mg/l or greater, (2) severely acid water - any water with an acid concentration of 178 mg/l or greater, (3) moderately-acid water - any water with an acid concentration of 13 mg/l to 178 mg/l, (4) unpolluted (uncontaminated) water - any water with an acid concentration of 13 mg/l or less.

For the purpose of this study, attempt is being made to reducing stream acid concentration levels toward 13 mg/l and less.

Recommendations are made in the Analysis of Individual Watersheds section of this report to accomplish this objective.

The other characteristics, particularly sulfate and iron, are also considered in recommendations and when possible, abatement measures will be aimed at meeting the criteria set for their respective areas of concern regarding pollution concentrations.

VI ANALYSIS OF INDIVIDUAL WATERSHEDS

A. General

The purpose of this section is to analyze the mine drainage problem of the individual watersheds, relate this problem to the effect that each has on the overall system, and to recommend specific abatement measures to significantly reduce the pollution within the Blacklegs Creek Watershed.

Each watershed analysis will include the following information:

(1) A sketch-type map showing the location of sampling stations and the location and condition of the streams which are symbolized as severely acid and moderately acid, (2) sampling station data consisting of minimums, maximums, and averages of pollution loads, (3) a listing of deep mire complexes located in each watershed, (4) a description of pollution sources, (5) maps showing the location of pollution sources, (6) abatement recommendations.

Based on previously determined criteria, the watersheds with pH levels less than 6.0 are classified as polluted. Those watersheds classified as non-polluted systems may contain some contamination, however, their pH level is above 5.9.

B. Non-Polluted Systems

There are five (5) watersheds in the Blacklegs Creek System, that are classified as non-polluted. These watersheds are analyzed and described below, however, abatement recommendations are not included since the water quality of these streams is considered acceptable for the purpose of this study. The five (5) non-polluted watersheds are: Marshall Run, Unnamed Run, Hooper Run, Nesbit Run, Harpers Run.

Marshall Run Watershed

The headwaters of Marshall Run originates 3 miles east of Clarksburg and flows in a westerly direction for about 3.5 miles where it joins the Blacklegs Creek at Clarksburg. The total length of the stream including all tributaries is 8.9 miles. The total area of the watershed is approximately 4 square miles.

No evidence of coal mining activity within the watershed was found; consequently the water quality is good.

High, low and averages of water quality data for the sampling station W-15 are listed in Table 2.

Plate 5 shows the location of the sampling station at the mouth of Marshall Run and the size and location of the various tributaries of this watershed.

The pH level was consistent with a high of 8.4 and a low of 7.2, and after four months of testing, the sampling was discontinued.

Marshall Run contributed about 1,287,360 gallons of water per day to the Blacklegs Creek system during the study period.

TABLE 2

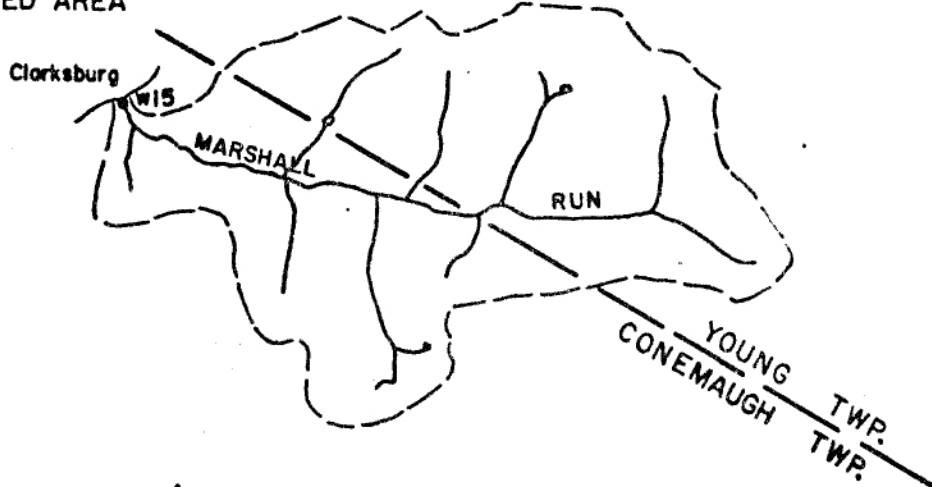
SAMPLE STATION <u>W-15</u>										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
*Sept. 9, 1971	N.M.	8.4			96		.1		38	
Oct. 6, 1971	415	7.2			54	224	.3	1.5	38	189
Nov. 9, 1971	250	7.7			60	180	.1	.3	40	120
Dec. 9, 1971	2017	7.6			18	436	.3	7.3	28	678
Average	894	7.5			44	230	.2	3	35	329

*Not included in average

MARSHALL RUN WATERSHED



WATERSHED AREA



LEGEND

- — — MARSHALL RUN DRAINING BASIN
- SAMPLING STATION
- MODERATELY ACID
- × SEVERELY ACID

SCALE 1"=5000' FEBRUARY 1973

**BLACKLEGS CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT SL-182
INDIANA COUNTY, PENNA.**

Unnamed Run Watershed

The headwaters of this Unnamed Run originates along State Route-286 three miles east of Clarksburg and flows parallel to the highway in a westerly direction for about 2.5 miles where it empties into Blacklegs Creek. The total stream length, including all tributaries, is 6.8 miles. The total area of the watershed is 2.5 square miles.

There is no evidence of coal mining within the basin and no resulting mine drainage.

The pH level was fairly consistent with a high of 7.8 in September 1971, and a low of 6.7 in December 1971. After four months of sampling, the program was discontinued on this stream due to the alkaline results.

The high, low and average of water quality data for the sampling station is listed in Table 3.

The Unnamed Run contributed about 787,680 gallons of water per day to the Blacklegs Creek during the study period. Plate 6 shows the location of the sampling station at the mouth of the Unnamed Run.

TABLE 3

SAMPLE STATION <u>W-12</u>										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
*Sept. 9, 1971	N.M.	7.8			164		.1		440	
Oct. 6, 1971	266	6.7			54	172	.1	.3	60	192
Oct. 12, 1971	135	6.9			66	99	.1	.2	75	112
Nov. 9, 1971	138	6.9			60	99	.1	.2	70	116
Dec. 10, 1971	1658	6.7			20	398	.7	13.9	38	756
Average	547	6.8			50	328	.25	1.64	61	400

*Not included in average

UNNAMED RUN WATERSHED



WATERSHED AREA



LEGEND

- UNNAMED RUN DRAINING BASIN
- o SAMPLING STATION
- o MODERATELY ACID
- x SEVERELY ACID

SCALE 1" = 5000' FEBRUARY 1973

BLACKLEGS CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT SL-182
INDIANA COUNTY, PENNA.

Hooper Run Watershed

The headwaters of Hooper Run originates near Lowry's Station and flows parallel to Legislative Route 32032 in a southwesterly direction for a distance of 4 miles where it discharges into Blacklegs Creek. The total stream length including all tributaries is 7.5 miles. The total area of the watershed is 3.4 square miles.

Although some of the area is undermined, there are no deep mine entries nor any surface mining within the watershed. There is no mine drainage and stream quality is good.

The results from water data collected at sampling station W-11 are listed in Table 4.

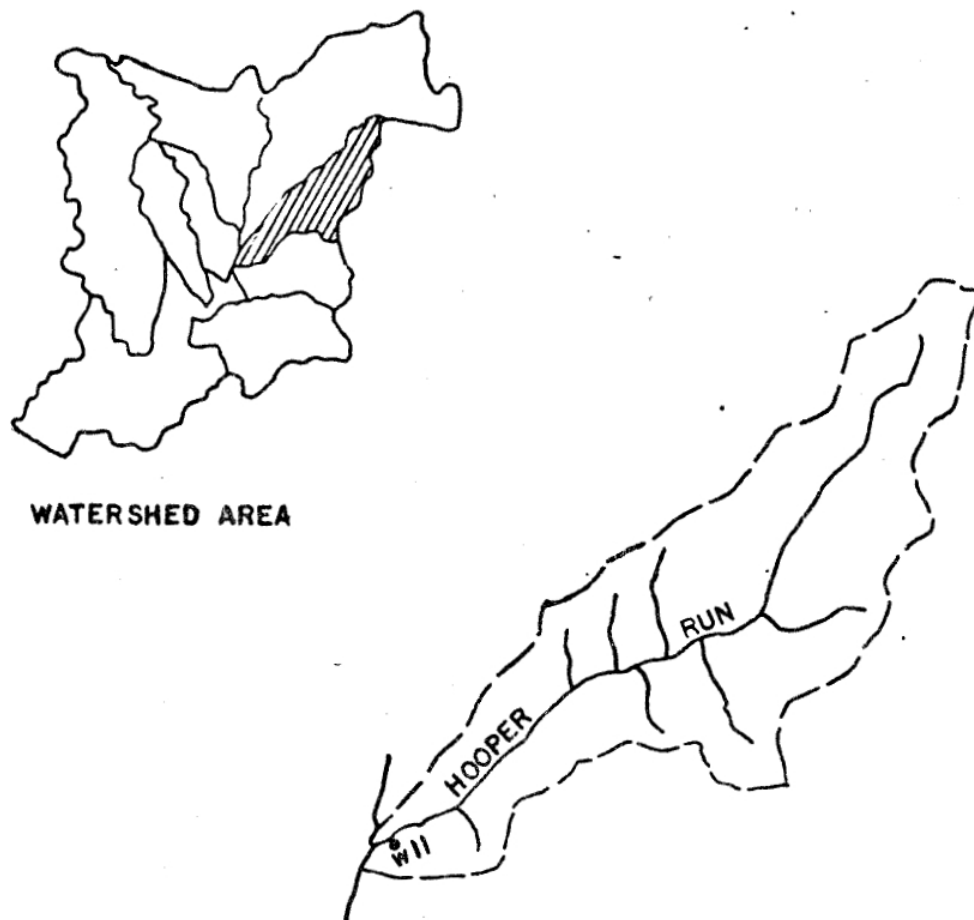
Plate 7 shows the location of the sampling station at the mouth of Hooper Run. PH levels remained quite stable ranging from 6.5 to 7.0. The weir was washed out several times by high water and our sampling was discontinued after several months.

Approximately 387,360 gallons of water per day entered Blacklegs Creek system from Hooper Run during the study period.

TABLE 4

SAMPLE STATION <u>W-11</u>										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Oct. 6, 1971	174	7.0			56	117	2.0	4.2	28	58
Oct. 13, 1971	34	7.0			74	30	.1	.04	38	16
Nov. 8, 1971	174	6.5			60	125	.1	.2	44	92
Dec. 9, 1971	694	7.0			24	200	.5	4.1	40	333
Average	269	6.9			54	174	.7	2.3	38	123

HOOPER RUN WATERSHED



LEGEND

- HOOPER RUN DRAINING BASIN
- SAMPLING STATION
- o MODERATELY ACID
- x SEVERELY ACID

SCALE 1" = 5000' FEBRUARY 1973

BLACKLEGS CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT SL-182
INDIANA COUNTY, PENNA.

Nesbit Run Watershed

The headwaters of Nesbit Run originates 2 miles north of Iselin on Legislative Route 32031. The stream flows to the south for 3.2 miles where it discharges into Blacklegs Creek. The total stream length including all tributaries is 4.3 miles. The total area of the watershed is 1.9 square miles.

The area is undermined by abandoned deep mines and stripped by surface mining, however, mine drainage is minimal and is not seriously degrading Nesbit Run and the Blacklegs Creek System.

The results from water data collected at sampling station W-13 are listed in Table 5.

Plate 8 shows the location of the sampling station and Nesbit Run tributaries. Nesbit Run contributed about 665,280 gallons of water per day to the Blacklegs Creek during the study period.

TABLE 5

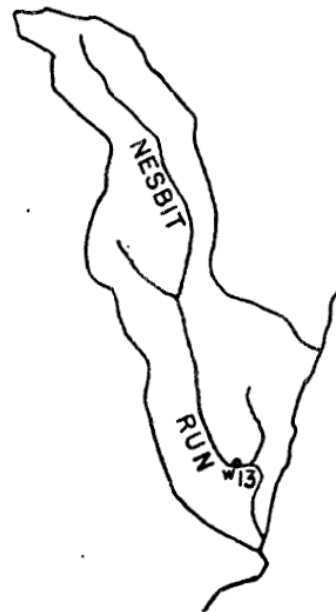
SAMPLE STATION <u>W-13</u>										
DATE	FLOW GPM	PH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Sept. 9, 1971	6	6.5			20	1	.3	.02	390	28
Oct. 6, 1971	94	4.8	20	23			.3	.34	340	384
Oct. 13, 1971	70	4.7			44	37	.4	.34	450	378
Nov. 9, 1971	42	5.0	12	6			.1	.05	440	222
Dec. 9, 1971	1609	6.7			16	309	1.0	19.3	155	2993
Jan. 10, 1972	880	7.5			30	317	5.7	60.2	170	1795
*Feb. 8, 1972	N.M.	5.7			36		1.2		190	
*Mar. 3, 1972	N.M.	7.3	10		29		.3		74	
Apr. 14, 1972	533	7.3	8	51	32	205	.2	1.3	180	1151
*Jun. 7, 1972	N.M.	7.2	4		18		.4		310	
Average	462	6.0	6	33	20	111	1.1	6.1	304	1685

*Not included in average

NESBIT RUN WATERSHED



WATERSHED AREA



LEGEND

- NESBIT RUN DRAINING BASIN
- SAMPLING STATION
- o MODERATELY ACID
- x SEVERELY ACID

SCALE 1" = 5000'

FEBRUARY 1973

BLACKLEGS CREEK
MINE DRAINAGE POLLUTION
ABATEMENT PROJECT SL-182
INDIANA COUNTY, PENNA.

Harpers Run Watershed

The headwaters of Harpers Run originates 3/4 of a mile northeast of Elders Ridge and flows in the valley past the Village of Iselin in a southerly direction for 3.6 miles where it discharges into Blacklegs Creek at Clarksburg, Pennsylvania. The total stream length including all tributaries is 5 miles. The total area of the watershed is 2.5 square miles.

Extensive mining operations were at one time conducted near the community of Iselin on Harpers Run. There were two drift mines; namely, Iselin #1 and Iselin #2, that operated in the Pittsburgh coal seam from the year 1910 to 1932. All that presently remains are large refuse piles and several miles of reclaimed contour surface mines. The strip or surface mining and partial backfilling has covered the drift locations. A large portion of the refuse has been burned and the resulting "red dog" product is being used for road building and repair. Eradication of a certain portion of refuse occurred in the extinguishment of a burning mine dump. The refuse fire was extinguished and surface sealed with a polyurethane foam in 1969 under Mines and Mineral Industries Department Project 67A-41117.

During a most recent investigation it was discovered that surface and stream water of an unnamed tributary to Harpers Run was disappearing and infiltrating into the Iselin #1 mine workings near the mine location. An abatement project SL 182-I has been initiated to prevent this water from entering the mine. This corrective measure will add more alkaline water to the present stream and consequently reduce the flow of acid mine drainage at a discharge point on the Big Run Watershed.

The results of water data collected at sampling station W-14 are listed in
Table 6

Plate 9 shows the location of the sampling station and tributaries to Harpers
Run.

Approximately 889,920 gallons of water entered the Blacklegs Creek from
Harpers Run during the study period.

TABLE 6

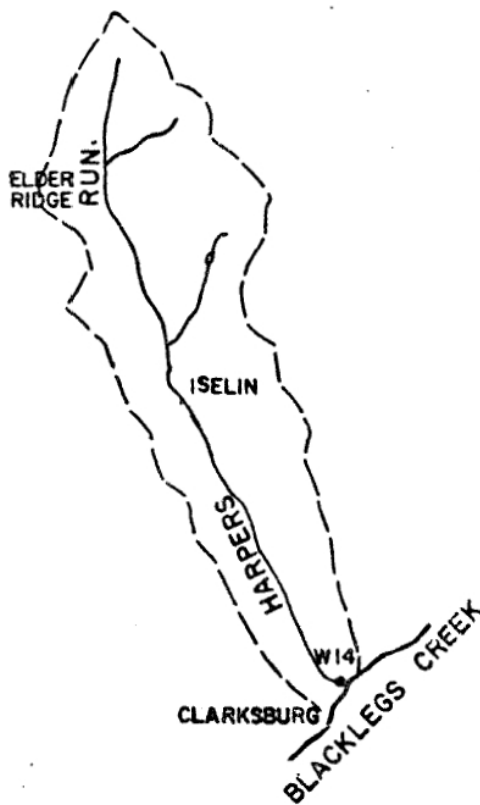
SAMPLE STATION <u>W-14</u>										
DATE	FLOW GPM	PH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/l	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
*Sept. 9, 1971	N.M.	6.3			6		.1		600	
Oct. 6, 1971	123	6.2	4	6			.1	.1	350	517
Oct. 12, 1971	82	6.1					.6	.6	560	551
Nov. 9, 1971	94	6.7			16	18	.4	.5	390	440
Dec. 9, 1971	1912	7.3			48	1101	1.4	32.1	145	3327
Jan. 11, 1972	880	7.3			64	676	11.0	116.2	145	1531
*Feb. 8, 1972	N.M.	4.3	16				3.3		210	
*Mar. 3, 1972	N.M.	6.5	17		37		.2		630	
*Apr. 14, 1972	N.M.	7.4	14		63		.2		206	
*June 7, 1972	N.M.	6.9	8		37		.3		340	
Average	618	6.7	1	7.4	26	193	2.7	20	318	2358

*Not included in average

HARPERS RUN WATERSHED



WATERSHED AREA



LEGEND

- HARPERS RUN DRAINING BASIN
- SAMPLING STATION
- MODERATELY ACID
- × SEVERELY ACID

SCALE 1" = 5000' FEBRUARY 1973

BLACKLEGS CREEK
MINE DRAINAGE POLLUTION
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C. Polluted Systems

There are four watersheds in the Blacklegs Creek System that are classified as polluted. Two of the watersheds on the main branch of the Blacklegs Creek are broken down into the Upper and Lower Portions for the purpose of this analysis. The four polluted watersheds are: Whisky Run, Upper Portion Blacklegs Creek, Big Run, and the Lower Portion of Blacklegs Creek.

Overall stream conditions for the four polluted watersheds in total stream miles is:

1. Total Stream Length	75.2 Miles
2. Total Length Non-Polluted	59.3 Miles
3. Total Length Severely Polluted	1.6 Miles
4. Total Length Moderately Polluted	14.3Miles

Approximately 210 of the polluted watershed streams are seriously degraded by acid mine drainage.

This represents about 15% of the total stream length within the entire Blacklegs Creek System that is polluted.

The total area of the polluted watersheds is 31 square miles.

The study of the polluted watersheds revealed approximately thirty known minor and major sources of mine drainage pollution from both deep mines, deep mine refuse, and surface mined areas.

The average daily pollution loads contributed by each major polluted stream on the watershed are shown below:

Sub-Basin	Sta.	Acres	No. Of Sources	Acid Lbs/da	Alk. Lbs/da	Iron Lbs/da	Sulf. Lbs/da
Whiskey Run	W-9	3277	18	843	0	9	481
Upper Portion	△ -10	5486	2	0	3524	46	9,120
Big Run	W-16	5562	9	4000	0	154	15,291
Lower Portion	△ -3	5504	1	2475	788	236	34,313

(△ - 3 located 1 mile upstream from Kiskiminetas River)

Some of the minor pollution loads which emanated from specific sources were not continually monitored but were measured sufficiently to give an order of magnitude to each source, which was useful in the analyses of priorities of abatement measures.

The pollution loads tabulated above were measured at the discharge into the main stream at weir locations. The sampling stations as indicated by the symbol A were sampling points on Blacklegs Creek and had the buffering effect of a greater flow of alkaline water. A deviation from the parameter established in the pollution classification was made in the one instance; that of the Upper Portion of Blacklegs Creek where an alkaline discharge; was high in iron. This occurred at Weir 21 near a vertical shaft discharging water from the McIntyre #1 Mine. The intent was noted in the last paragraph under Water Quality Criteria.

Whisky Run Watershed

A. General

Whisky Run originates 5 miles east of the Village of Shady Plain in close proximity to State Route 56 and flows in a southeasterly direction for 4-1/4 miles where it discharges into Blacklegs Creek.

Total stream length including all tributaries is a-3/4 miles. The total area of the watershed is 5.1 square miles.

B. Stream Condition

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

Table 7

<u>Whisky Run Watershed</u>		
<u>Stream Classification</u>	<u>Stream Length Miles</u>	<u>Percent Total Stream</u>
Non-Polluted	3.5	36
Severely Polluted	.4	4
Moderately Polluted	5.8	60

Approximately 64% of Whisky Run Watershed is seriously degraded by mine drainage.

Plate 10 shows the location of the sampling stations and extent of mine drainage within the various portions of the watershed.

C. Sampling Station Data

Twelve (12) sampling stations were installed and monitored. The minimum, maximum, and yearly averages of water quality data obtained from these stations are listed in Tables 8 through 19

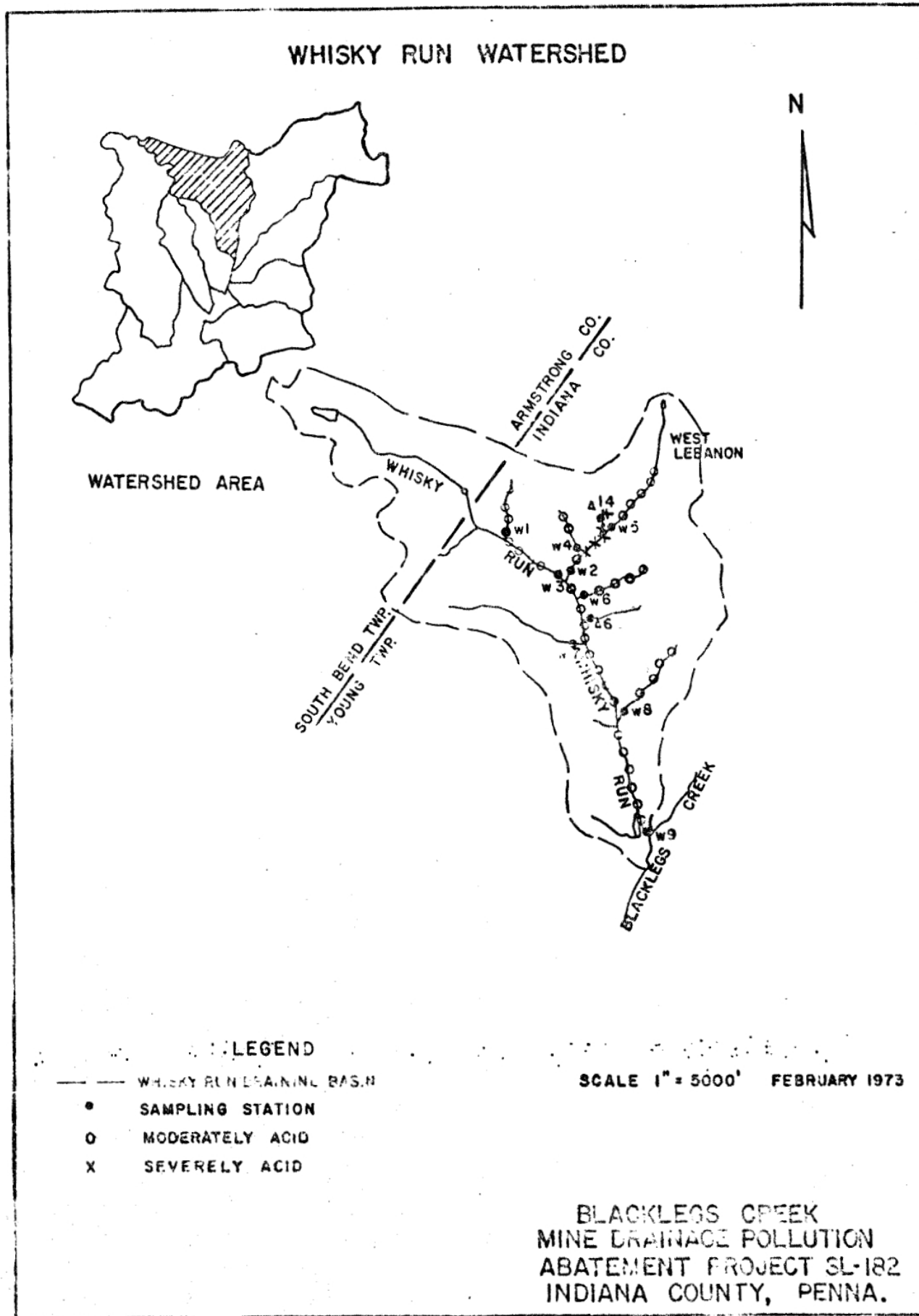


TABLE 8

SAMPLE STATION W-1										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Aug. 27, 1971	21.7	3.3	88	23			3.0	.78	420	109
Sept. 23, 1971	21.7	3.1	180	47			7.5	2.00	750	195
Oct. 14, 1971	16.7	3.0	70	14			4.0	0.80	750	150
Nov. 8, 1971	8.89	3.1	140	15			2.4	0.25	440	47
*Dec. 7, 1971	N.M.	3.2	40				2.5		400	
*Jan. 10, 1972	N.M.	2.5	120				4.5		475	
*Mar. 6, 1972	N.M.	3.3	124				3.96		187	
Apr. 14, 1972	150	3.7	96	172			2.40	4.32	190	342
June 7, 1972	193	3.6	118	273			2.52	5.83	290	672
Average	82	3.3	115	91			3.64	2.33	473	253

*Not included in average

TABLE 9

SAMPLE STATION W-2										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Aug. 27, 1971	284	3.4	88	300			1.2	4.08	390	1329
Sept. 23, 1971	156	3.3	124	232			3.1	5.80	560	1048
Oct. 14, 1971	123	3.1	110	162			2.3	3.40	850	1255
Nov. 8, 1971	123	4.6	16	24			2.0	2.95	310	458
Dec. 7, 1971	252.7	3.2	44	133			3.1	9.40	375	1137
Jan. 10, 1972	1337	4.4	13	289			1.5	24.06	170	2727
*Mar. 6, 1972	N.M.	3.1	220				5.04		410	
Apr. 14, 1972	1609	3.6	80	1545			1.98	38.29	275	5310
June 7, 1972	236	3.7	95	269			1.66	4.70	310	878
Average	515	3.66	72	369			2.16	12	405	1768

*Not included in average

TABLE 10

SAMPLE STATION W-3										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Sept. 23, 1971	214	5.4	60	154			1.0	2.57	280	719
Oct. 14, 1971	193	4.6	20	46			1.0	2.32	350	811
Nov. 8, 1971	174	4.6	16	33			2.0	4.18	310	647
Dec. 7, 1971	252.7	5.9	12	36			2.7	8.18	100	303
Jan. 10, 1972	1337	2.8	54	866			1.6	25.67	190	3048
*Feb. 7, 1972	N.M.	3.8	34				2.2		235	
*Mar. 6, 1972	N.M.	3.7	73				.41		155	
*Apr. 14, 1972	N.M.	4.6	21				.27		160	
June 7, 1972	284	5.6	12	41			.41	1.39	187	637
Average	409	4.8	29	196			1.78	7	236	1028

*Not included in average

TABLE 11

SAMPLE STATION W-4										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Aug. 27, 1971	34.2	3.6	56	23			2.5	1.03	340	140
Sept. 23, 1971	21.7	3.1	90	23			3.25	.85	600	156
Oct. 13, 1971	27.5	3.4	60	20			1.8	.59	520	172
Nov. 8, 1971	3.83	3.2	116	5			1.0	.05	850	39
Dec. 7, 1971	156	3.5	36	67			2.6	4.87	190	356
Jan. 10, 1972	94.2	3.0	60	68			2.9	3.28	375	424
*Mar. 6, 1972	N.M.	3.4	105				.72		225	
Apr. 14, 1972	284	3.8	46	157			.47	1.59	170	579
June 7, 1972	174	3.6	79	165			1.66	3.46	235	491
Average	99	3.40	68	66			2.00	2.00	410	295

*Not included in average

TABLE 12

SAMPLE STATION W-5										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Sept. 23, 1971	50.3	3.3	132	80			2.75	1.66	600	362
Oct. 13, 1971	27.5	3.2	140	46			1.5	.50	775	256
Nov. 8, 1971	34.2	3.2	130	53			9.5	3.90	875	359
Dec. 7, 1971	279	3.7	56	187			0.6	2.01	185	619
Jan. 10, 1972	533	3.0	54	345			1.3	8.31	500	3198
*Feb. 7, 1972	N.M.	2.5	120				1.3		950	
*Mar. 6, 1972	N.M.	3.3	203				.90		350	
*Apr. 14, 1972	N.M.	3.7	74				.61		225	
June 7, 1972	174	3.7	117	244			2.30	4.80	260	543
Average	183	3.35	105	159			3.00	3.53	533	890

*Not included in average

TABLE 13

SAMPLE STATION W-6										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Sept. 23, 1971	6.05	4.3	30	2.18			.7	.05	350	25
Oct. 13, 1971	2.19	5.7			10	.26	.6	.02	390	10
Nov. 8, 1971	2.19	5.8			16	.42	3.1	.08	450	12
Dec. 7, 1971	132	3.1	90	150			4.8	8.00	625	1043
Jan. 10, 1972	50.3	3.3	54	33			1.5	.91	290	175
*Feb. 7, 1972	N.M.	3.4	40				.5		350	
*Mar. 6, 1972	N.M.	3.2	167				1.86		370	
Apr. 14, 1972	70	3.8	55	46			.44	.37	295	248
June 7, 1972	6.02	4.7	21	2			.52	.04	250	18
Average	22.30	4.30	50.00	47	13	.34	1.66	1.35	372	210

*Not included in average

TABLE 14

SAMPLE STATION W-0										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Oct. 12, 1971	15	2.9	130	23			3.8	.68	950	171
Nov. 9, 1971	3	3.0	144	5			5.5	.20	1100	40
Dec. 9, 1971	N.M.	3.5	28				1.2		250	
Jan. 10, 1972	50	2.5	110	66			6.0	3.6	300	180
*Feb. 9, 1972	N.M.	3.5	44				1.3		450	
*March 6, 1972	N.M.	3.3	173				4.6		330	
April 14, 1972	70	3.4	173	145			4.6	3.9	410	344
*June 7, 1972	N.M.	3.5	158				7.8		505	
Average	35	3.0	139	59			5.0	2	690	290

*Not included in average

TABLE 15

SAMPLE STATION W-7										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Sept. 23, 1971	34	6.5			44	18	.8	.3	250	102
Oct. 13, 1971	22	6.1			18	5	.4	.1	350	92
Nov. 8, 1971	17	6.2			48	10	.3	.1	310	63
Dec. 7, 1971	275	6.4			82	271	.7	2.3	70	231
Jan. 10, 1972	310	7.6			72	268	1.7	6.3	135	500
*Feb. 7, 1972	N.M.	6.6			66		2.6-		170-	
*March 6, 1972	N.M.	7.6	7-		28-		.3-		160-	
April 14, 1972	237	7.2	12	34	67	191	.2	.6	144	410
June 7, 1972	70	7.9	2	2	79	66	1.9	1.6	206	173
Average	138	6.75	2	5	59	118	.8	1.6	219	224

*Not included in average

TABLE 16

SAMPLE STATION W-8										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Aug. 27, 1971	42	4.3	28	14			.1	.1	225	113
Sept. 23, 1971	34	4.3	50	20			.4	.2	250	102
Oct. 13, 1971	50	4.2	52	31			.1	.1	310	186
Nov. 8, 1971	42	4.1	44	22			.3	.2	340	171
Dec. 9, 1971	694	4.3	140	1166			.3	2.5	185	1541
Jan. 10, 1972	397	4.0	70	333			.4	1.9	190	905
Feb. 7, 1972	236	3.7	78	221			.1	.3	235	666
April 14, 1972	156	4.4-	68-	135-			.2-	.4-	200-	374-
June 7, 1972	193	4.7	52	120	.2	.5	.3	.7	210	486
Average	205	4.2	57	140	.2	.5	.3	.7	236	581

TABLE 17

SAMPLE STATION <u>W-9</u>										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Aug. 27, 1971	564	4.3	60	405			.3	2.0	370	2504
Sept. 23, 1971	739	4.4	40	355			.7	6.2	1600	14188
Oct. 13, 1971	483	4.2	50	290			.1	.6	390	2260
Nov. 8, 1971	483	4.0	60	348			.1	.6	340	1971
Nov. 24, 1971	478	4.7	52	301			.4	2.3	280	1623
Dec. 9, 1971	5215	4.5	34	2128			1.7	106.4	190	11890
*Mar. 3, 1972	N.M.	3.8	66				.3		240	
Apr. 14, 1972	2070	4.5	46	1143			.3	7.5	195	4844
*June 7, 1972	N.M.	4.9	26		2-		.6-		252	
Average	1434	4.4	49	841			.5	8.6	481	8277

*Not included in average

TABLE 18

SAMPLE STATION <u>Δ-13</u>										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Oct. 12, 1971	N.M.	3.5	64				1.7		620	
Nov. 9, 1971	N.M.	3.6	68				.3		320	
Dec. 9, 1971	N.M.	3.7	40				1.5		195	
Jan. 10, 1972	N.M.	3.3	40				1.7		210	
Feb. 9, 1972	N.M.	2.9	56				.4		425	
Mar. 6, 1972	N.M.	3.2	53				6.2		315	
Apr. 14, 1972	N.M.	3.9	67				.3		187	
June 7, 1972	N.M.	4.2	51				.1		320	
Average	1200	3.5	55	792			1.5	38	324	8165

TABLE 19

SAMPLE STATION <u>Δ-14</u>										
DATE	FLOW GPM	pH	ACIDITY		ALKALINITY		TOTAL IRON		SULPHATES	
			mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D	mg/L	lbs/D
Nov. 9, 1971	94.2	2.9	180	203			4.4	4.97	1000	1130
Dec. 9, 1971	279	2.7	110	368			15.2	51.0	750	2511
*Jan. 10, 1972	N.M.	2.6	90				5.5		600	
*Feb. 9, 1972	N.M.	2.4	90				1.5		500	
*Mar. 6, 1972	N.M.	3.0	199				5.8		390	
Apr. 14, 1972	200	3.4	102	245			1.66	3.98	290	696
*June 7, 1972	N.M.	3.7	92				1.50		255	
Average	191	3.0	131.00	272			7.00	20		680

*Not included in average

D. Coal Mining Activity

Three extensive deep mines have been identified within the Whisky Run Watershed; namely, the Iselin #3, 4 and #5 Mines. These mines are in the Pittsburgh seam of coal and were owned and operated by the Rochester and Pittsburgh Coal Company under different affiliates from the year 1910 to 1932. Approximately twelve other small house coal mine operations were reported to be on the outcrop of the aforementioned Iselin deep mine workings. The outcrop of the Pittsburgh seam of coal in the Whisky Run Watershed has been strip mined approximately 85%. The strip mining cut into the deep mine workings at numerous locations. Due to erosion and partial backfilling the penetration of these deep mine workings are difficult to locate. One major deep mine refuse bank has been identified. The refuse is located near the Iselin #5 mine site where four drift entries were driven into the hillside.

E. Description of Pollution Sources

Field investigations were made on Whisky Run and all tributaries flowing into this main stream. Identification of acid mine discharge was made by field tests and water samples. The pollution was traced to its flow from out of the spoil of strip cuts or discharge from mine openings. An account of acid mine drainage encountered in field investigations is as shown on Plate II, Page 44.

I. North and upstream 600 feet from Weir #1 location on the east side of the stream - open strip cut with two open mine drifts, water collecting in strip cut and discharging out of toe of spoil into unnamed run.

North and upstream 800 feet from Weir #1 location, on the west side of the stream - partially filled strip cut, water flowing out from under spoil. Reported mine drift location.

The above two pollutant sources monitored at Weir #1 contributed an average of 91 lbs. of acid per day to Whisky Run. See Table 8 , Page 37 .

2. Northwest and upstream 500 feet from Weir #3 location on the north side of Whisky Run - partially backfilled strip cut intercepting mine workings, discharging acid mine drainage with an acid load of 6 lbs/day.

3. North and upstream 800 feet and 1600 feet from Weir #4 location on the north side - open strip cut with two open deep mine drifts, water discharging from strip cut. From Table 11 , Page 38 , an average of 66 lbs. of acid per day is produced from these sources.

4. Northwest opposite Weir #5 location - four mine drifts, one mine drift discharging acid mine water and contributing 272 lbs. of acid per day to the unnamed tributary. This is the abandoned Iselin #5 Mine. Table 19.

5. South and opposite Weir #5 location - three backfilled mine drifts leaking acid mine water and contributing 6 lbs. of acid per day to the unnamed tributary to Whisky Run. This is the abandoned Iselin #3 mine.

6. South and downstream 200 feet from Weir #5 location - major refuse bank, unnamed stream flows between refuse piles.

7. Northeast and upstream from Weir #5 location on the east side of the stream 1500, 2500 and 2900 feet respectively - three openings in highwall into mine workings, northeast and upstream from Weir #5 location on the west side of the stream 250 and 1000 feet respectively - two mine drifts. These discharges are monitored at Weir #5 and indicate an acid load per day of 159 pounds. (See Table 12 , Page 38 .)

8. South and downstream 600 feet from Weir #5 location on the south side of the stream - open strip cut, coal and old mine workings exposed, water coming through the toe of the spoil. Estimated acid load 6 lbs/day.

9. Northeast and upstream 1800 feet from Weir #6 location on the south side of the stream - open strip cut, coal and old mine workings exposed, acid mine water coming through the toe of the spoil. For stream quality and acid load see Table 13 , Page 38.

10. East and upstream 800 feet from Weir #62 location - open strip cut into old mine workings discharging acid mine water and monitored in Table 14, Page 39.

11. Northwest and upstream 1500 feet from Weir #7 location on north side of stream - open strip cut into old mine workings, discharging acid mine water and monitored in Table 15 , Page 39

12. Northeast and upstream 3000 feet from Weir #8 location, acid mine drainage was noted in a swampy strip mined area. Water was coming up through the swamp but no definite source was found. Stream quality and acid load recorded in Table 16 , Page 39.

13. Alkaline surface water entering the Iselin #4 Mine through a stream bed and broken strata over the coal seam. Project SL 182-1 has been initiated to correct this situation. Sealing and channel construction will assure an alkaline surface flow to Whisky Run.

Plate 11 , Page 44 , shows mined areas and acid mine drainage discharges on the Whisky Run Watershed.

