

## EAST TRIBUTARIES

## EAST TRIBUTARIES SUBWATERSHED

The East Tributaries Subwatershed includes all the drainage area east of the main stream between the confluence with the Allegheny River and the mouth of Surrena Run. This subwatershed covers 7.90 square miles of 19.7 percent of the total watershed and constitutes the area discharging the second largest volume of alkaline water into Big Scrubgrass Creek.

Eleven stream water quality sampling stations were established in this subwatershed. These stations indicated the area discharges an average of 320 pounds per day acid and 1731 pounds per day alkalinity into the main stream resulting in a 1411 pounds per day net alkaline condition.

There are four privately owned man made ponds in the Surrena Run drainage area which all provide excellent ecological criteria for the support of fish and aquatic life. Sampling Station No. 25 which was established below the drainage area of these ponds indicated an average discharge of 947 pounds per day of alkaline water. Visual observations indicated the presence of trout life in the stream. The only sources of acid water entering Surrena Run was indicated by Sampling Stations No. 62 and No. 63 which combined for an average of 209 pounds per day acid discharge. However, this is deleted by the heavy alkaline flows of Surrena Run.

The other major tributary in this subwatershed that contributes alkaline water to Big Scrubgrass Creek is Cassidy Run. The 2.06 square miles of drainage area in this tributary

system discharges an average of 658 pounds per day of alkaline water with an average pH of 6.7. The lower drainage area of Cassidy Run flows through a steep sided stream valley and hemlock forest. Two sampling stations were established in the headwaters region of Cassidy Run (Stations No. 26 and 64) combining for a total of 334 pounds per day average alkaline discharge. Seasonal variations indicated Cassidy Run flowing in a slight variable, but still net alkaline condition during high flows.

A third tributary of this subwatershed on which Sampling Stations No. 31 and No. 55 were established also indicated alkaline conditions. Station No. 55 had an average pH of 6.8 discharging an average of 110 pounds per day alkaline water. Seasonal fluctuations were indicative of a slight decline in water quality during high flow periods.

The location, drainage area and summary of water quality of each of the sampling stations in the East Tributaries Subwatershed are contained in the following discussion. Figure 57 is a map showing sampling station and mine site locations.

Station No. 23 was established about 50' downstream from a dam breastworks on Surrena Run, just north of Pa. Route 208 and east of Clintonville about 0.3 miles. There are about 1.53 square miles of drainage area above this station. The pond behind the dam previously mentioned is privately owned, biologically fertile and provides a good habitat for the fish (bass and bluegill) and other aquatic life present. Between November 20, 1970, and May 4, 1972, this station was sampled 17 times. Following is a list of average, maximum and minimum water quality results.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	1209.0	1700.0	1000.0
pH	6.9	7.2	6.6
Total Acidity (ppm)	2.0	5.0	0.0
Alkalinity (ppm)	47.0	70.0	10.0
Iron (ppm)	0.05	0.05	0.05
Sulfates (ppm)	47.0	70.0	10.0
Acid (ppd)	32.0	100.0	0.0
Alkalinity (ppd)	805.0	1150.0	530.0
Iron (ppd)	1.1	1.0	0.6
Sulfates (ppd)	684.0	1020.0	390.0

Station No. 24 was located about 2000' downstream from Station No. 23 to monitor the discharge from a man-made pond just north of Pa. Route 208, east of Clintonville 0.3 miles. The drainage area at this point is 1.60 square miles. The water quality is essentially the same as that of Station No. 23. Sampling was halted after March, 1972, due to earth excavation in the area to deepen the above mentioned pond. Between November 20, 1970, and May 4, 1972, this station was sampled 14 times. Following is a list of average, maximum and minimum water quality results.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	1275.0	1800.0	1050.0
pH	6.8	7.0	6.5
Total Acidity (ppm)	2.0	5.0	0.0
Alkalinity (ppm)	47.0	80.0	25.0
Iron (ppm)	0.05	0.1	0.05
Sulfates (ppm)	37.0	68.0	10.0
Acid (ppd)	30.0	65.0	0.0
Alkalinity (ppd)	855.0	1220.0	550.0
Iron (ppd)	0.8	1.1	0.6
Sulfates (ppd)	653.0	940.0	470.0

Station No. 25 was established at the north end of a bridge on Surrena Run under Township Road 327, 0.3 miles east of Pa. Route 308. The drainage area of this station is 2.02 square miles. Data from the beginning has indicated this to be of good water quality with no evidence of seasonal variation. Between November 20, 1970, and May 4, 1972, this station was sampled 17 times. Results of average, maximum and minimum water quality records are listed below.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	1591.0	2200.0	1300.0
pH	6.8	7.0	6.2
Total Acidity (ppm)	3.0	7.0	0.0
Alkalinity (ppm)	45.0	60.0	30.0
Iron (ppm)	0.05	0.1	0.05
Sulfates (ppm)	27.0	55.0	10.0
Acid (ppd)	37.0	79.0	0.0
Alkalinity (ppd)	947.0	1510.0	520.0
Iron (ppd)	1.0	1.3	0.8
Sulfates (ppd)	465.0	320.0	290.0

Station No. 26 was located at the north end of a concrete culvert on a headwater tributary of Cassidy Run, under Township Road 327, just west of the intersection with L.R. 60010. There is presently no evidence of mining activity above this station, however, a search of recent mine permit applications has indicated that the area is to be mined in the future. There is 0.26 square miles of drainage area above this station which was sampled 17 times between November 20, 1970, and May 4, 1972. Listed below are the average, maximum and minimum water quality results.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	208.0	290.0	170.0
pH	6.8	7.1	6.5
Total Acidity (ppm)	2.0	5.0	0.0
Alkalinity (ppm)	46.0	60.0	25.0
Iron (ppm)	0.05	0.1	0.05
Sulfates (ppm)	15.0	22.0	5.0
Acid (ppd)	4.7	10.0	0.0
Alkalinity (ppd)	129.0	150.0	86.0
Iron (ppd)	0.1	0.2	0.1
Sulfates (ppd)	37.0	77.0	17.0

Station No. 27 was located at the mouth of Cassidy Run prior to its confluence with Big Scrubgrass Creek. There are 2.06 square miles of drainage area above this point, most of which are steep sided stream valleys and thick hemlock forest. There has been little mining activity in the headwater region basically resulting in a clean mountain stream. The average, maximum and minimum water quality data obtained from the 18 samples taken between November 20, 1970, and June 23, 1972, are listed below.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	1650.0	2320.0	1400.0
pH	6.7	7.0	6.3
Total Acidity (ppm)	3.0	7.0	0.0
Alkalinity (ppm)	29.0	50.0	10.0
Iron (ppm)	0.25	1.5	0.05
Sulfates (ppm)	17.0	32.0	5.0
Acid (ppd)	57.0	96.0	0.0
Alkalinity (ppd)	658.0	1310.0	190.0
Iron (ppd)	7.2	29.0	0.8
Sulfates (ppd)	308.0	750.0	94.0

Station No. 31 was established at the east end of a small culvert under Township Road 400, 0.2 miles from the intersection with L.R. 60055. The drainage area measured by this station was approximately 0.08 square miles. Flows were collected from Mine Site No. 31 which for the most is adequately reclaimed resulting in a net alkaline stream. Between December 17, 1970, and May 4, 1972, this station was sampled 14 times resulting in the following indicated average, maximum and minimum test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	66.0	90.0	54.0
pH	6.7	7.1	6.4
Total Acidity (ppm)	3.0	10.0	0.0
Alkalinity (ppm)	31.0	80.0	15.0
Iron (ppm)	0.06	0.25	0.05
Sulfates (ppm)	21.0	32.0	6.0
Acid (ppd)	2.3	5.4	0.0
Alkalinity (ppd)	26.0	52.0	15.0
Iron (ppd)	0.04	0.05	0.03
Sulfates (ppd)	16.0	24.0	9.0

Station No. 55 had its location at the west end of a culvert passing under Township Road 402 about 0.5 miles south of L.R. 60007. This station has a drainage area of 0.66 square miles. Mine Site No. 31 contributes flows through this station but as in Station No. 31 upstream, the stream has been predominantly alkaline. Station No. 55 was sampled 18 times between March 9, 1971, and May 4, 1972, yielding the following average, maximum and minimum water quality test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	559.0	860.0	390.0
pH	6.8	7.2	6.1
Total Acidity (ppm)	3.0	10.0	0.0
Alkalinity (ppm)	16.0	40.0	5.0
Iron (ppm)	0.05	0.05	0.05
Sulfates (ppm)	11.0	24.0	5.0
Acid (ppd)	17.0	43.0	0.0
Alkalinity (ppd)	110.0	280.0	31.0
Iron (ppd)	0.3	0.5	0.2
Sulfates (ppd)	75.0	210.0	28.0

Station No. 61 was established at the east end of a culvert under Township Road 380, approximately 1000' south of the intersection with L.R. 60055. This small tributary to Big Scrubgrass Creek has a drainage area of 0.01 square miles at this station and was set up primarily to monitor the stream after an oil line break in its headwaters in the spring of 1971. This station, sampled 22 times from May 3, 1971, to May 4, 1972, listed the average, maximum and minimum water quality test determinations.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	3.3	13.0	1.0
pH	6.6	7.2	5.0
Total Acidity (ppm)	5.5	20.0	0.0
Alkalinity (ppm)	36.0	50.0	10.0
Iron (ppm)	0.07	0.2	0.05
Sulfates (ppm)	33.0	57.0	19.0
Acid (ppd)	0.18	0.7	0.0
Alkalinity (ppd)	1.5	7.8	0.4
Iron (ppd)	0.0	0.0	0.0
Sulfates (ppd)	1.3	4.8	0.4

Station No. 62 was located at the west end of a Township Road 380 bridge on a tributary to Surrena Run about 1000' north of the intersection with Township Road 327. There are 0.29 square miles of drainage area above this station and it collects flows from the southern end of Mine Site No. 34. During the summer of 1971, the stream flowed in variable condition, but since then until the spring of 1972 when regular sampling was halted, it was predominantly acid. Between May 3, 1971, and May 4, 1972, Station No. 62 was sampled 20 times. Following is the average, maximum and minimum values indicated by the water quality tests.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	176.0	420.0	10.0
pH	5.3	6.7	3.7
Total Acidity (ppm)	28.5	60.0	3.0
Alkalinity (ppm)	6.0	20.0	0.0
Iron (ppm)	0.2	0.5	0.05
Sulfates (ppm)	69.0	110.0	44.0
Acid (ppd)	70.0	250.0	7.2
Alkalinity (ppd)	14.0	55.0	0.0
Iron (ppd)	0.54	1.8	0.04
Sulfates (ppd)	168.0	500.0	11.0

Station No. 63 was established at the west end of a small culvert under Township Road 380 on a tributary to Surrena Run about 0.3 miles north of the intersection with Township Road 327. This station has a drainage area measuring 0.07 square miles and collects flows from the northern end of Mine Site No. 34. Station No. 63 at this point sustained relatively low flows and a predominantly acid condition for the duration of the investigation. Between May 3, 1971, and May 4, 1972, this station was sampled 17 times and following are the average, maximum and minimum water quality values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	50.0	100.0	17.0
pH	3.55	4.2	2.8
Total Acidity (ppm)	208.0	310.0	50.0
Alkalinity (ppm)	0.0	0.0	0.0
Iron (ppm)	2.3	5.5	0.6
Sulfates (ppm)	330.0	625.0	180.0
Acid (ppd)	139.0	370.0	24.0
Alkalinity (ppd)	0.0	0.0	0.0
Iron (ppd)	1.98	6.6	0.2
Sulfates (ppd)	235.0	675.0	47.0



Station No. 64 had its location at the west end of a box culvert on a tributary to Cassidy Run under L.R. 60010 about 0.6 miles south of the intersection with L.R. 60055. The stream at this point measures 0.57 square miles of drainage area and includes the northern section of Mine Site No. 57. This particular mine site was opened in the spring of 1971 and the sampling station was established to monitor discharges and runoff from the active working. The 18 samples collected between May 3, 1971, and May 14, 1972, indicated net alkaline conditions at all times. Below are listed the average, maximum and minimum water quality test results.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	431.0	820.0	70.0
pH	6.8	7.2	6.6
Total Acidity (ppm)	5.0	20.0	0.0
Alkalinity (ppm)	41.0	70.0	20.0
Iron (ppm)	0.06	0.0	0.05
Sulfates (ppm)	31.0	70.0	17.0
Acid (ppd)	26.0	105.0	0.0
Alkalinity (ppd)	205.0	360.0	22.0
Iron (ppd)	0.27	0.5	0.08
Sulfates (ppd)	156.0	330.0	32.0

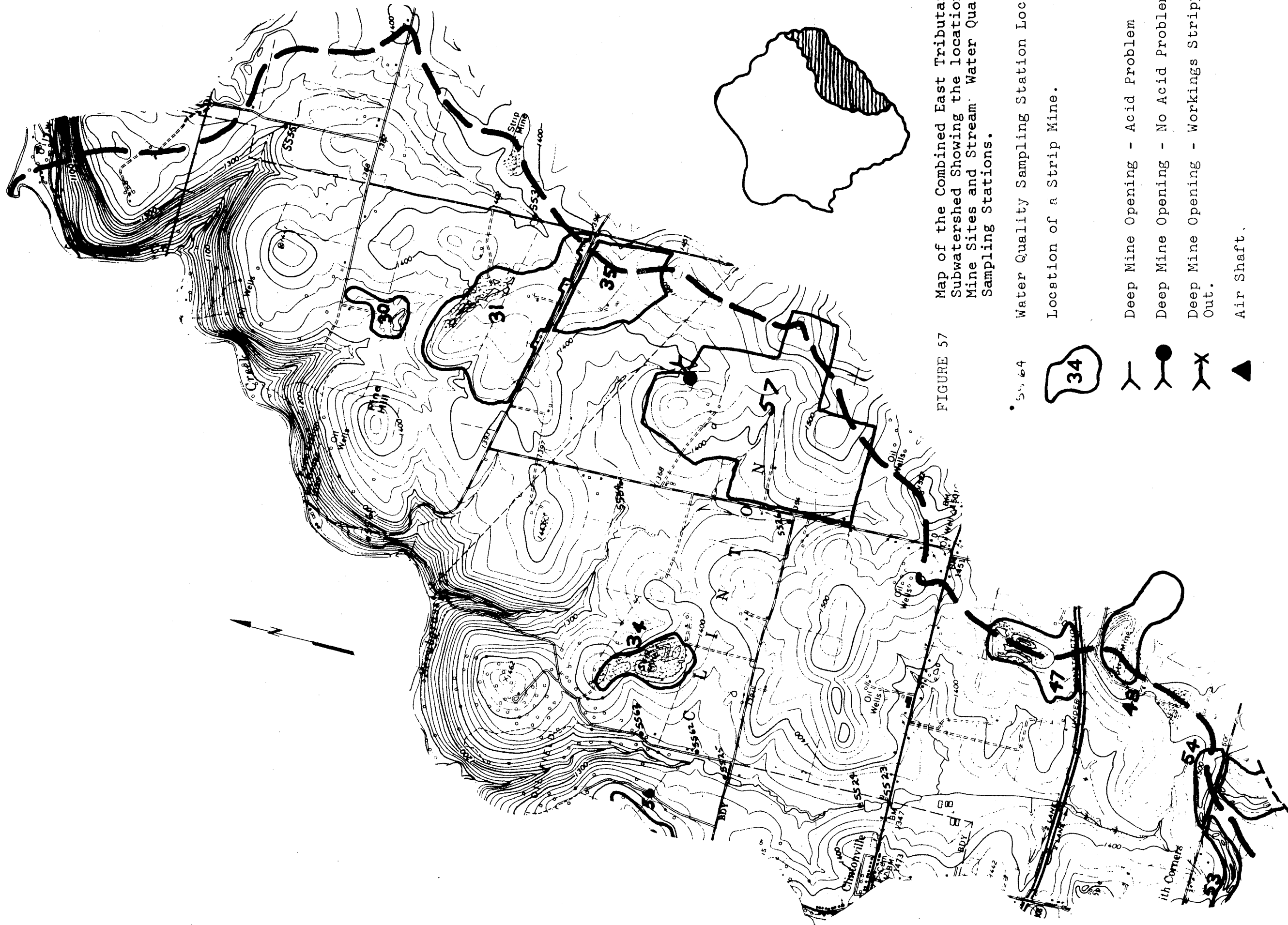


FIGURE 57

Map of the Combined East Tributaries Subwatershed Showing the location of Mine Sites and Stream Water Quality Sampling Stations.

- 55, 64 Water Quality Sampling Station Location.
- 34 Location of a Strip Mine.
- Y Deep Mine Opening - Acid Problem
- Y Deep Mine Opening - No Acid Problem
- X Deep Mine Opening - Workings Stripped Out.
- ▲ Air Shaft.

SCALE: 1:24000

### Specific Reclamation Plans for the East Tributaries Subwatershed:

Nine strip mine sites are located within the subwatershed and one other is located on the watershed divide with South Branch. These mines cover a total of approximately 670 acres or about 13 percent of the drainage area. Two of these mined areas were just recently completed and a third is currently active. Only two areas in the watershed are producing net acid water. Two old deep mines have been reported in the area but only one appears to be a source of any acid mine drainage.

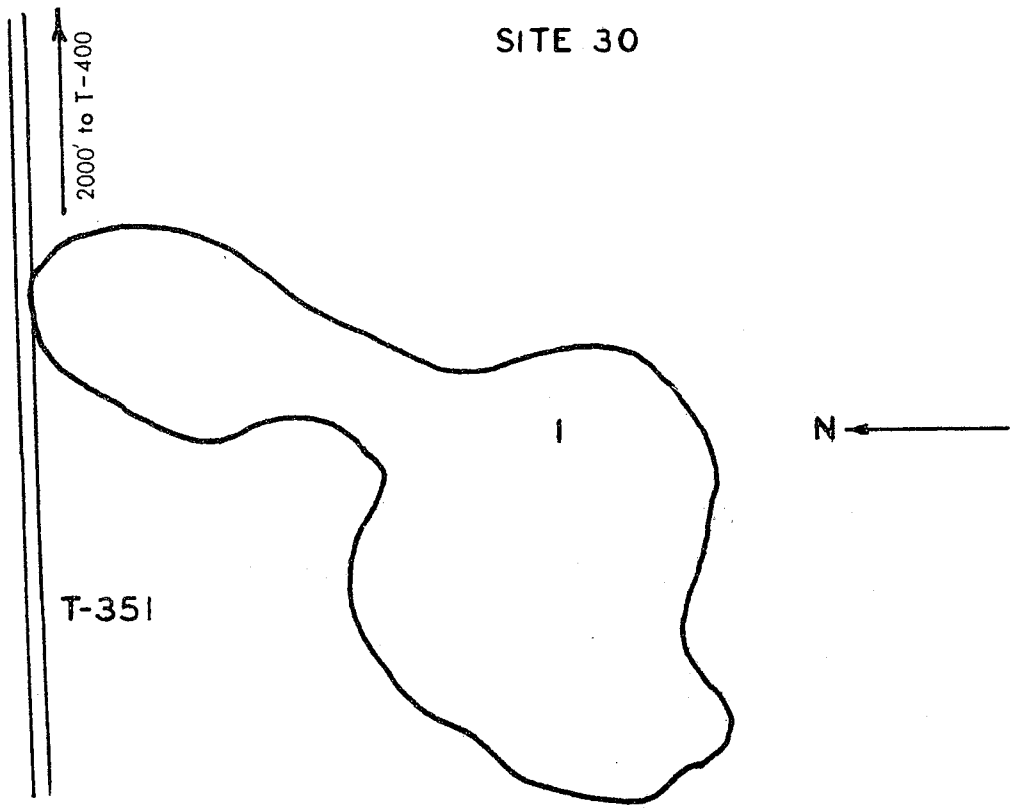
The recommended reclamation for this subwatershed will effect 72 percent of the sources of acid and should be 75 percent effective. The actual reclamation recommended in this section should result in a reduction of approximately 173 pounds of acid per day. This combined with anticipated adequate restoration of present mining areas should result in a reduction of approximately 200 pounds of acid per day in the discharge from this area or approximately 63 percent.

Figure 30 is a key to the symbols used on the site maps.

## SITE 30

Strip Mine Site No. 30 lies quite low on the ridge in the extreme northeast portion of the watershed just upstream from the mouth of Big Scrubgrass Creek. Because of its low elevation, this mine probably was in the Upper Mercer seam. The mine covers 18 acres of rolling spoil material which is well vegetated and needs no further restoration for the control of acid drainage.

SITE 30



T-351

2000' to T-400'

N

## SITE 31

Mine Site No. 31 was recently restripped and reclaimed by the new miner. The area involved was about 120 acres. No further reclamation for acid mine drainage control is necessary.

## SITE 34

Strip Mine Site No. 34 covers 25.2 acres northeast of Clintonville, north of Township Road T-327 and east of Township Road T-380. The northern end of this site has been partially regraded and the largest part is in the original condition, with pine and birch trees planted 15 to 20 years ago. The spoil pH is 4.4 and seepage from this site passes through Sampling Stations No. 62 and No. 63. Both of these streams are acid, producing a combined average of 195 pounds per day net acid discharge.

Area #1 covers 2.1 acres that have been seeded and have volunteer tree growth controlling acid runoff. Thus, no additional reclamation is recommended.

Area #2 covers 4.2 acres which have been regraded but do not have adequate vegetative cover to control acid formation. Use revegetation Method No. 1.

Areas #3 and #5 cover 0.5 acres including a small wet weather pond and a deep steep sided ravine with no vegetation. Seepage from this area passes through Sampling Station No. 69 which has an average pH of 3.6 and produces 139 pounds of acid per day average. The ravine should be regraded using selected grading so that the sides are no steeper than 3:1 (33 percent slope) and a waterway shaped in the bottom to handle runoff without causing gully erosion. The area should then be reseeded using revegetation Method No. 1.

Area #4 covers 16.7 acres that have not been regraded and have been planted with pine and birch trees that have not yet developed an adequate canopy and ground cover to prevent erosion and acid formation. Seepage from this area passes through Sampling Station No. 62 which has an average pH of 5.3 and produces an average of 56 pounds per day net acid. The area should be overseeded with sod using revegetation Method No. 2.

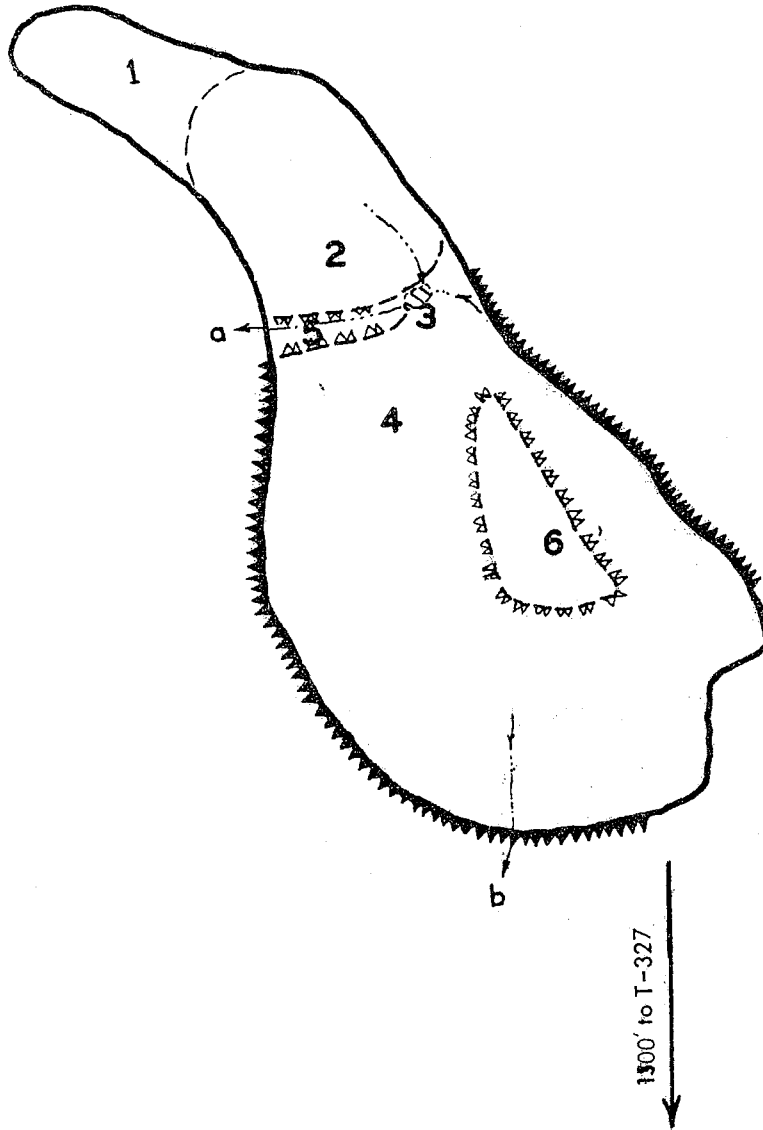
Area #6 is an island which was not mined and needs no further reclamation for acid mine drainage control.

Estimated Cost of Reclamation:

Area #2		
4.2 acres of revegetation Method No. 1		\$ 1,300
Areas #3 and #5		
1 acre of selected grading		700
1 acre of revegetation Method No. 1		300
Area #4		
16.7 acres of revegetation Method No. 2		<u>10,000</u>
	TOTAL	\$12,300



SITE 34



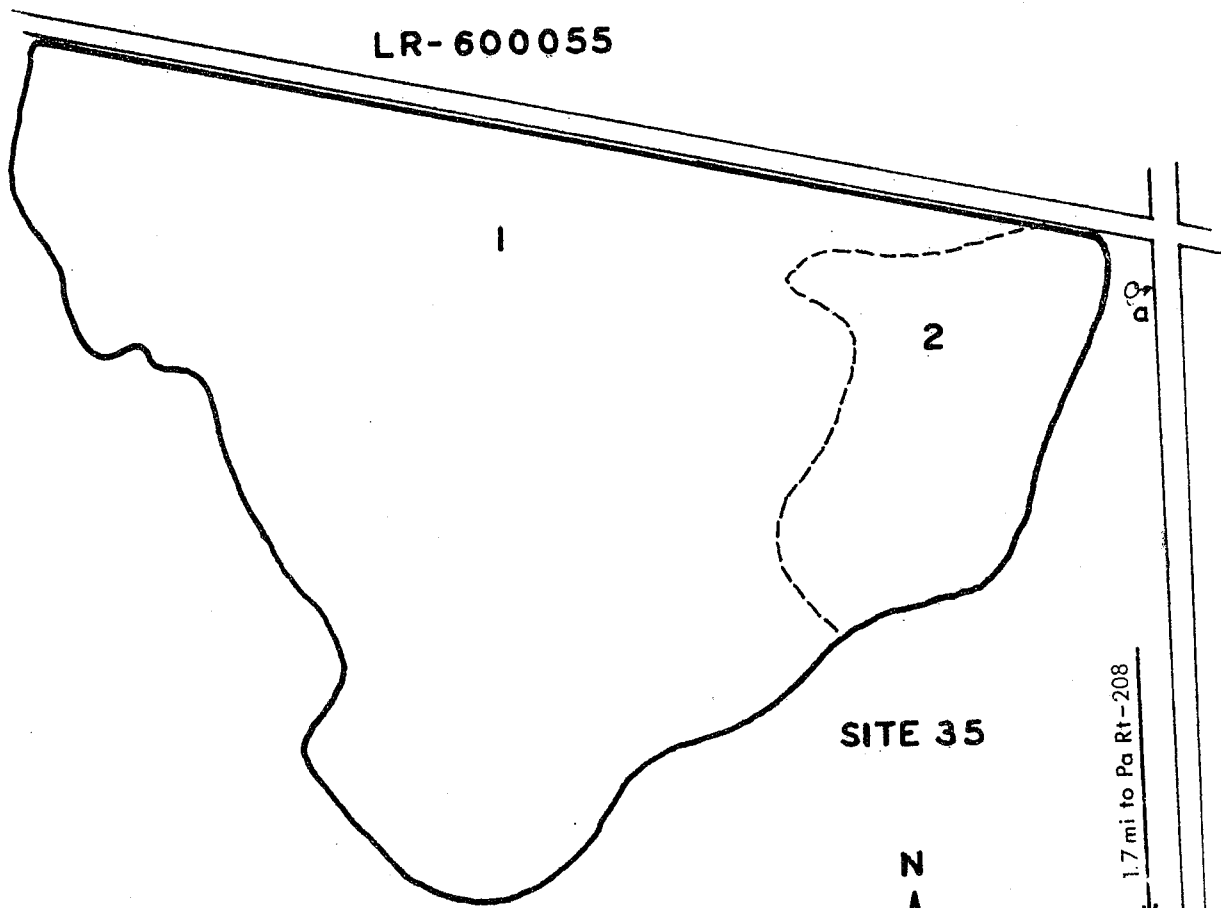
SITE 35

Strip Mine Site No. 35 covers 51.4 acres located at the intersection of L.R. 60055 and T-400 on the northeastern edge of the watershed. This mine was recently completed by Winger Coal Company, under mine drainage Permit No. 2566BSM 26 and was regraded and seeded. Some seepage is still occurring at point "a" which is reported to have been a small deep mine location at one time. During August, 1971, two samples were taken on this seep indicating a net acid discharge of 25 pounds per day. Some of the area above in Area No. 2 has not developed a good stand of sod and should have some follow-up reclamation work. This point drains outside this watershed. The opening should be drilled and pressure tested, and a hydraulic seal designed and installed.

Estimated Cost of Reclamation:

Deep Mine Hydraulic Seal	\$20,000
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LR-600055



T-400

SITE 35

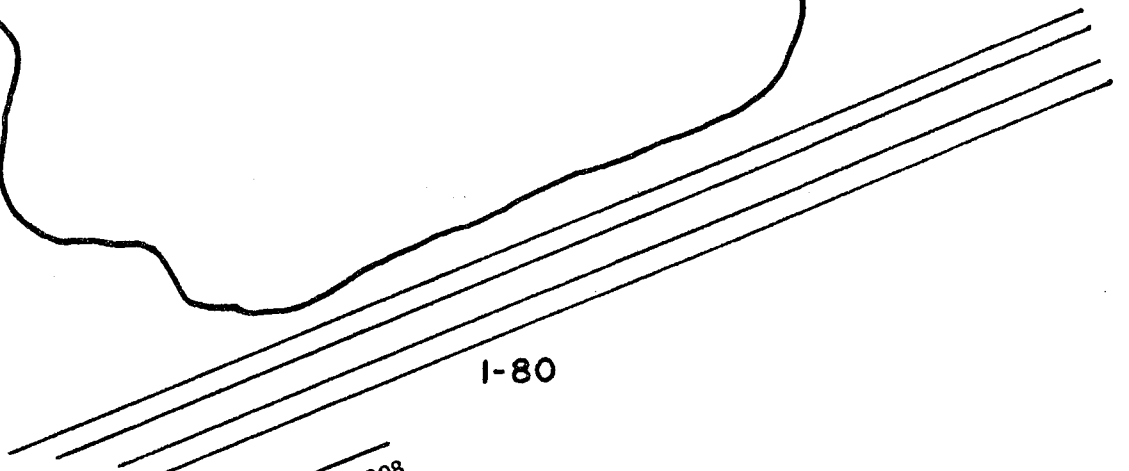
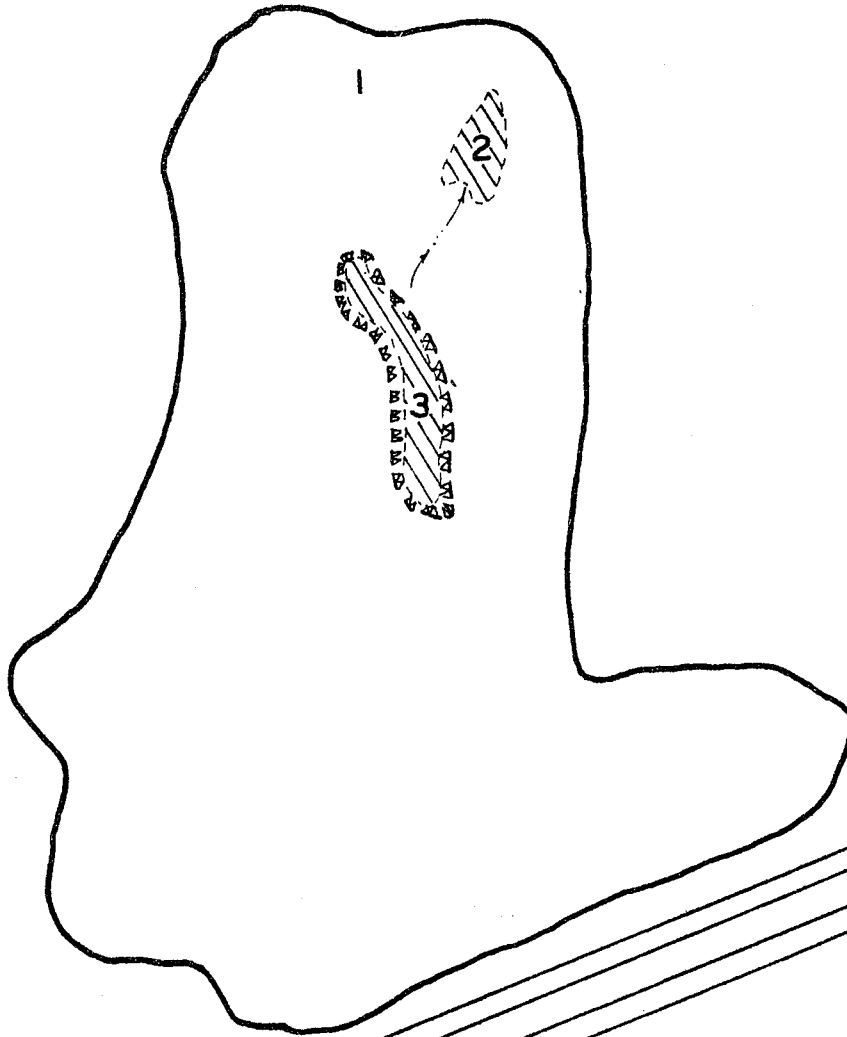
N

1.7 mi to Pa Rt-208

## SITE 47

Strip Mine Site No. 47 covers 67.5 acres just north of Interstate 80 west of T-388 and southeast of Riddle Crossroads. This mine lies just on the watershed divide. The area consists of rough mine spoil with one deep pool and several smaller wet-weather ponds. The area is covered with trees about 15 years old. The spoil has a pH of 4.0 on the bare areas but the water pH is 6.0 and contains aquatic life. No reclamation is needed for acid mine drainage control.

SITE 47



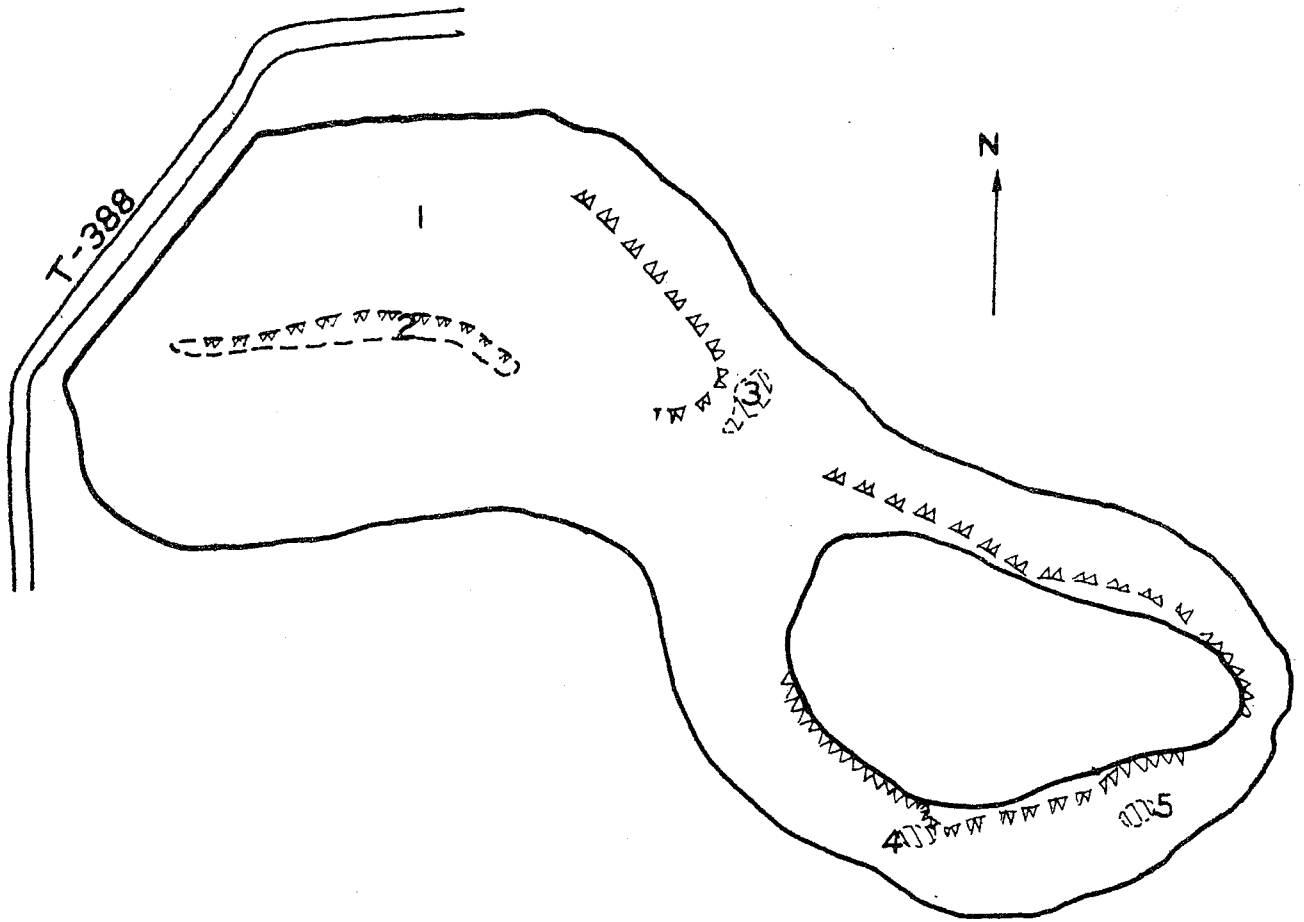
I-80

← 5000' to Pa Rt-308

## SITE 48

Strip Mine Site No. 48 covers 37.5 acres just south of Interstate 80 on the watershed divide along Township Road T-388. The spoil is rolling and covered with trees 10 to 15 years old. No acid drainage problem exists which needs restoration work.

SITE 48



## SITE 54

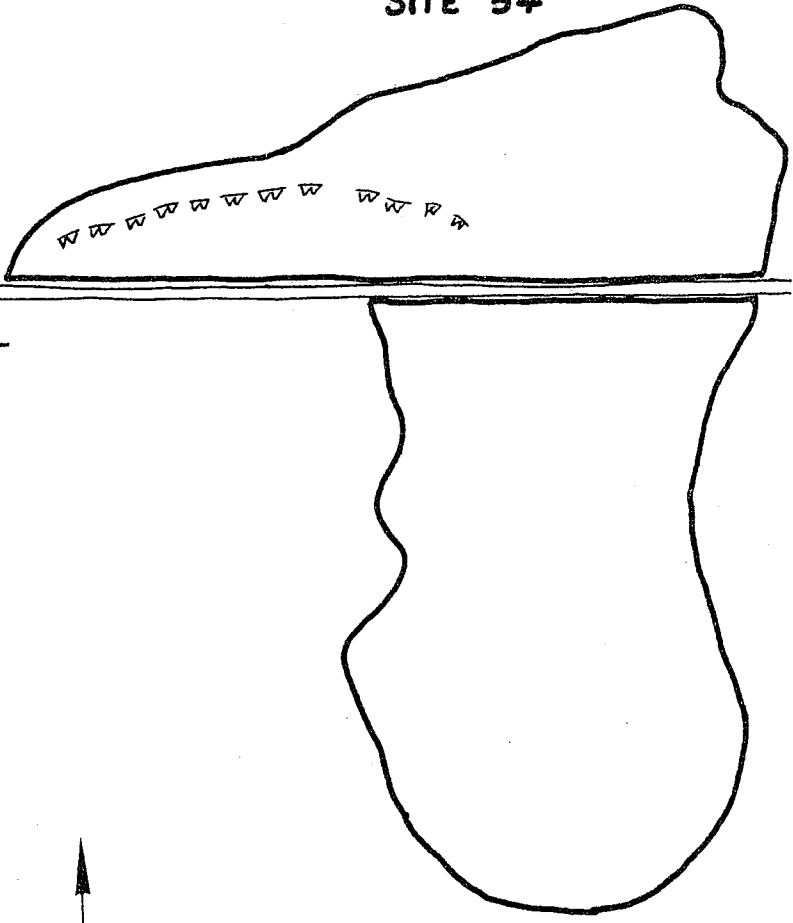
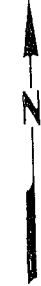
This strip mine site occupies 31.8 acres on both sides of L.R. 60006 just east of Smith Corners on the watershed divide. The area is very rough and has been planted with pine trees which are about 20 years old. The mine lies adjacent to cropped fields which show no effects of acid drainage. Because of good tree cover, no additional reclamation is recommended to control acid mine drainage.



SITE 54

LR-60006

← .4 mi to Pa Rt-308



## SITE 56

Mine Site No. 56 covers 22 acres south of Clintonville on the east ridge above Scrubgrass Creek. This mine was not included in the SCS report. The area has been regraded and seeded. No additional reclamation is needed.

## SITE 57

Mine No. 57 is an active mine covered under several permits including 2568BSM26 to Allied Fuel Company issued January 8, 1969. The exact extent of mining is unknown but the area under permit covers approximately 292 acres along L.R. 60010 north of Riddle Crossroads. Restoration of this area will be the responsibility of the miner.

TABLE 16. SUMMARY OF ABATEMENT PLANS AND COSTS FOR THE EAST TRIBUTARIES SUBWATERSHED

Mine Site No.	ABATEMENT METHOD											TOTAL COST				
	CLEARING Acres	Cost	TERRACE BACKFILL Acres	Cost	CONTOUR BACKFILL Acres	Cost	SELECTED GRADING Acres	Cost	SURFACE SEALING Cost	DEEP MINE SEALING Cost	SOIL REVEGETATION Acres		Cost	DIVERSION Feet	Cost	LINED CHANNELS Feet
30																*
31																*
34					1.0	700					21.9	11600				\$12,300
35										20000						\$20,000
47																*
48																*
54																*
56																*
57																*

TOTAL \$32,300

\*Where no costs are shown, no work has been recommended