

UPPER MAIN STREAM

UPPER MAIN STREAM SUBWATERSHED

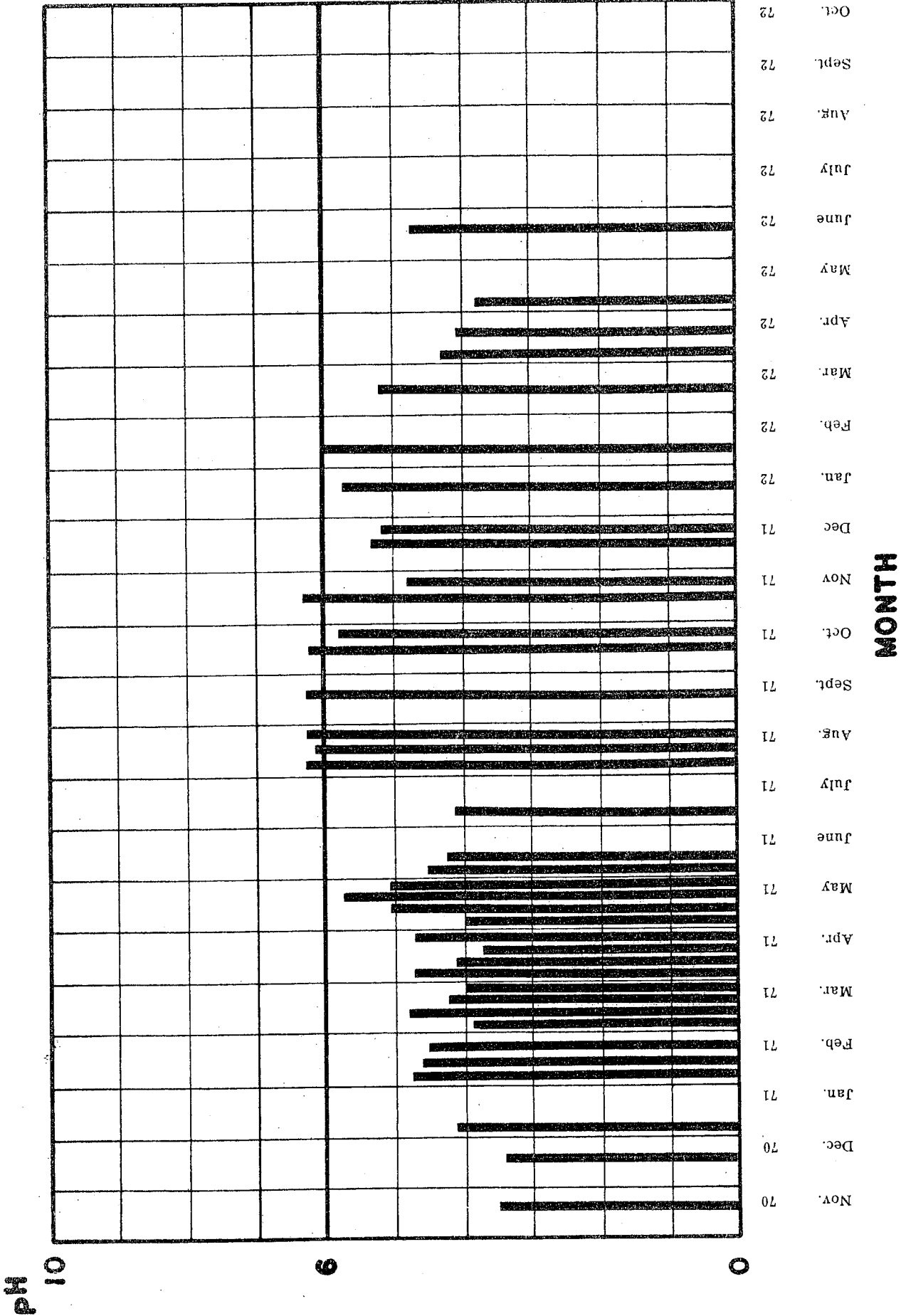
This subwatershed includes the 4.78 square miles of drainage area that form the headwaters of Big Scrubgrass Creek. This includes the western-most portion of the watershed and that portion of the drainage area north of the main stream down to the mouth of Gilmore Run. This area contains 11.9 percent of Big Scrubgrass Creek Watershed and exhibits some of the worst pollution problems on the watershed.

Sampling stations were established on six streams to monitor the water quality discharges of the mines in the area. Flows through Station No. 60 account for almost 24 percent of the average 1371 pounds of acid per day discharge at Station No. 14, which collects discharges from the entire area. The average pH value at Sampling Station No. 14 was determined to be 4.8. Figure 48 shows pH values of all the samples collected at this station during the project period. Discharge rates at Station No. 14 averaged 2771 gpm with a maximum of 46,200 gpm experienced during the flood period of late June, 1972. Total acidity in parts per million followed a fluctuating pattern throughout the study period averaging 41.0 ppm with a maximum of 60.0 ppm (See Figure 49). It was noted, however, that slightly lower acid conditions were measured in June, 1972, and remained constant at 30 ppm for about four months. This indicates that the heavy runoff in June may have flushed out an accumulation of acid which took some time to build back up.

Several standing acid pools in Mine Site No. 10 contain some of the lowest quality water in the watershed. pH read-

ACID MINE DRAINAGE PROJECT
BIG SCRUBGRASS CREEK WATERSHED

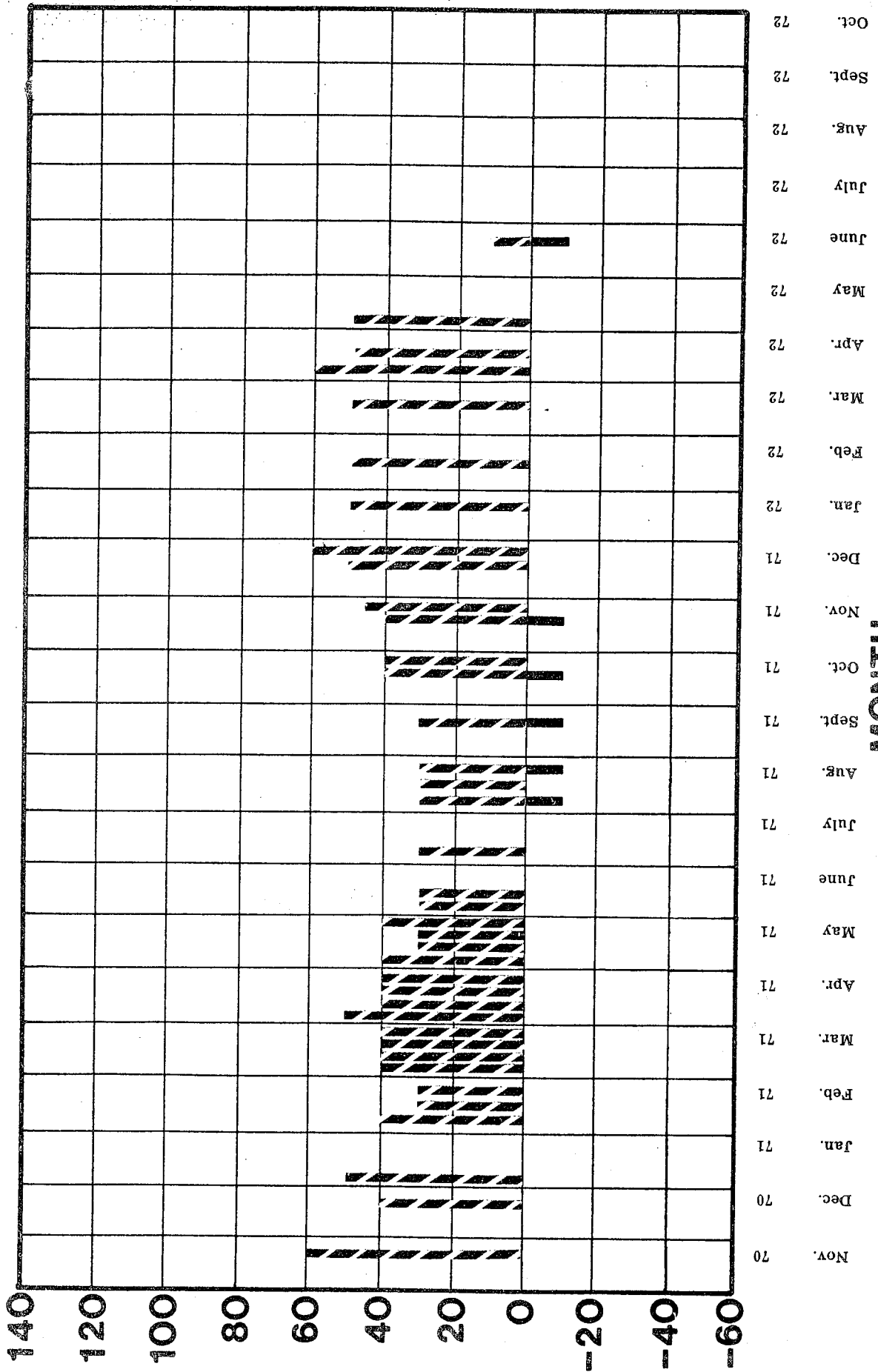
FIGURE 48



SAMPLING STATION NO. 14

ACID MINE DRAINAGE PROJECT
BIG SCRUBGRASS CREEK WATERSHED

TOTAL ACIDITY PPM



MONTH

FIGURE 49

ings ranged from 2.9 to 5.8 with extremely high acid and sulfate characteristics evident. The complete water quality analysis of these pools appears in Appendix B of this report. Percolation from these pools through the ground strata contributes a large portion of the acid water in the Upper Main Stream Subwatershed. This seepage was monitored at Station No. 60.

Only one alkaline stream was found that contributed flows to this subwatershed. Station No. 13 with its 0.45 square miles of drainage area averaged net alkaline conditions to the degree of 47 ppm, however, the average flow of 448 gpm was not sufficient enough to counteract the heavier average acid flows of 1159 gpm from Stations No. 12 and No. 60.

No particular seasonal fluctuations were exhibited in this subwatershed during the project. During low flows, concentration of contaminants were higher and during high flows, the dilution factor was superseded by higher runoff volumes.

A total of ten water quality sampling stations were established in this subwatershed to monitor stream flow characteristics. Following is a discussion of location, drainage areas and a short summary of water quality determination of these stations. Figure 50 is a map showing the location of the sampling stations in the subwatershed.

Station No. 11 was located at the south end of a concrete culvert on a headwater tributary of Big Scrubgrass Creek under Township Road 335, 2.5 miles west of Pa. Route 308. There are 0.52 square miles of drainage area above this station with Mine Site No. 11 the only source of acid mine drainage discharges. No specific seasonal variation was detected, however, during lower flow periods water quality did increase slightly on some occasions. This particular station was sampled 38 times during the project between November 20, 1970, and May 4, 1972. Following are the average, maximum and minimum values indicated by the water quality tests.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	159.0	678.0	2.2
pH	5.1	6.7	2.9
Total Acidity (ppm)	56.0	140.0	3.0
Alkalinity (ppm)	1.6	10.0	0.0
Iron (ppm)	0.49	1.30	0.10
Sulfates (ppm)	72.0	150.0	14.0
Acid (ppd)	77.0	1050.0	1.1
Alkalinity (ppd)	7.0	91.0	0.0
Iron (ppd)	0.63	6.8	0.0
Sulfates (ppd)	135.1	1120.0	2.0

Station No. 12 was established at the south end of a metal culvert under Township Road 335, 0.7 miles east of Pa. Route 8, on a headwater tributary to Big Scrubgrass Creek. This station has 0.69 miles of drainage area and collects small flows from Mine Site No. 11 and a much higher rate from Mine Site No. 10. Seasonal variation indicates a somewhat higher quality of water during lower flow periods. However, on an average, the stream tends to be predominantly acid. During the period between November 20, 1970, and May 4, 1972, Station No. 12 was sampled 38 times yielding the following average, maximum and minimum water quality test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	668.0	1527.0	355.0
pH	5.2	6.6	3.1
Total Acidity (ppm)	38.0	90.0	20.0
Alkalinity (ppm)	1.9	10.0	0.0
Iron (ppm)	0.46	2.5	0.05
Sulfates (ppm)	374.0	550.0	120.0
Acid (ppd)	290.0	1280.0	92.0
Alkalinity (ppd)	17.0	110.0	0.0
Iron (ppd)	2.46	13.0	0.4
Sulfates (ppd)	3021.0	6870.0	1360.0

Station No 13 was located at the east end of a concrete culvert under Pa. Route 8 at the junction of Route 8 and Township Road 335. This headwater tributary of Big Scrubgrass Creek has a drainage area of 0.45 miles and originates from a spring atop the western edge of the watershed divide. There is no evident mining areas in the region and the water quality throughout the project period was good. This station was sampled 17 times between November 20, 1970, and May 4, 1972, resulting in the following average, maximum and minimum water quality values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	428.0	820.0	230.0
pH	6.8	7.2	6.5
Total Acidity (ppm)	3.0	5.0	0.0
Alkalinity (ppm)	50.0	90.0	20.0
Iron (ppm)	0.05	0.2	0.05
Sulfates (ppm)	9.0	15.0	4.0
Acid (ppd)	17.0	49.0	0.0
Alkalinity (ppd)	313.0	495.0	220.0
Iron (ppd)	0.3	0.5	0.1
Sulfates (ppd)	47.0	120.0	25.0

Station No. 14 was on the main branch of Big Scrubgrass Creek, established at the south end of a bridge crossing under Township Road 325, .6 miles east of the junction with L.R. 60003.

There are 3.7 square miles of drainage area above this station and it collects flows from Mine Sites No. 10, No. 11, No. 12, No. 14, No. 21, No. 23, No. 24, No. 25 and No. 59. This station was sampled 39 times between November 20, 1970 and June 23, 1972, resulting in the following average, maximum and minimum water quality analysis.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	2771	46200	760
pH	4.8	6.3	3.4
Total Acidity (ppm)	41.0	60.0	10.0
Alkalinity (ppm)	1.3	10.0	0.0
Iron (ppm)	0.37	1.5	0.175
Sulfates (ppm)	184.0	260.0	42.0
Acid (ppd)	1371.0	5500.0	365.0
Alkalinity (ppd)	39.0	360.0	0.0
Iron (ppd)	13.0	69.0	1.0
Sulfates (ppd)	6771.0	23300.0	2100.0

Station No. 38 in terms of stream miles is the furthest station from the mouth of Big Scrubgrass Creek. It was established at the south end of a small culvert under Township Road 345, 0.3 miles east of Pa. Route 8. This main headwater tributary has a drainage area of 0.27 square miles at this point and has flowed in a net alkaline condition for the project duration. Between March 3, 1971, and May 4, 1972, this station was sampled 17 times yielding the following average, maximum and minimum water quality determinations.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	85.0	350.0	1.0
pH	6.5	6.8	5.4
Total Acidity (ppm)	6.0	10.0	3.0
Alkalinity (ppm)	26.0	40.0	0.0
Iron (ppm)	0.05	0.05	0.05
Sulfates (ppm)	12.0	23.0	6.0
Acid (ppd)	6.13	21.0	0.04
Alkalinity (ppd)	32.6	170.0	0.5
Iron (ppd)	0.05	0.2	0.0
Sulfates (ppd)	15.2	97.0	0.17

Station No. 39 was established at the east end of a concrete culvert under L.R. 60003, 0.3 miles south of the intersection with Pa. Route 8. It contains a drainage area of 0.05 square miles flowing in a variable alkaline condition most of the time. On several occasions when attempts at collecting water samples were made, the stream had run dry. During the period between March 3, 1971, and April 17, 1972, Station No. 39 was sampled 13 times. Following is a list of average, maximum and minimum water quality test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	46.0	76.0	19.0
pH	6.5	6.7	6.3
Total Acidity (ppm)	6.0	10.0	3.0
Alkalinity (ppm)	17.0	30.0	10.0
Iron (ppm)	0.05	0.05	0.05
Sulfates (ppm)	15.0	24.0	6.0
Acid (ppd)	3.1	9.1	0.7
Alkalinity (ppd)	9.9	20.0	2.3
Iron (ppd)	0.02	0.05	0.01
Sulfates (ppd)	8.3	15.0	2.7

Station No. 40 was located at the east end of a concrete culvert under L.R. 60003, 0.8 miles south of the intersection with Pa. Route 8. This station has a drainage area measuring 0.25 square miles and collects flows from Mine Sites No. 21, No. 23 and No. 24. During both extreme low flows and extreme high flows, this headwater tributary ran predominantly acidic. Between March 3, 1971, and May 4, 1972, 32 water samples were collected and analyzed resulting in the following average, maximum and minimum water quality values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	183.0	380.0	51.0
pH	4.4	6.0	3.6
Total Acidity (ppm)	80.0	120.0	30.0
Alkalinity (ppm)	0.0	0.0	0.0
Iron (ppm)	0.29	0.4	0.1
Sulfates (ppm)	296.0	440.0	160.0
Acid (ppd)	169.0	410.0	43.0
Alkalinity (ppd)	0.0	0.0	0.0
Iron (ppd)	0.7	1.4	0.1
Sulfates (ppd)	662.0	1730.0	120.0

Station No. 41 was established at the east end of a small concrete culvert under L.R. 60003, 1.1 miles south of the intersection with Pa. Route 8. This station has a drainage area of 0.03 square miles and has flowed in a net acidic condition during both extreme high and low flows. Across the road from the point of sampling, the stream passes through a barnyard which could account for the acid loads. It was determined though that net alkaline conditions prevailed on occasion. Station No. 41 was sampled 32 times between March 3, 1971, and May 4, 1972. Following is a list of average, maximum and minimum water quality test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	19.0	38.0	1.0
pH	6.1	7.2	3.1
Total Acidity (ppm)	12.0	20.0	0.0
Alkalinity (ppm)	7.0	40.0	0.0
Iron (ppm)	0.13	0.55	0.05
Sulfates (ppm)	15.0	45.0	2.0
Acid (ppd)	3.3	9.1	0.0
Alkalinity (ppd)	1.0	5.5	0.0
Iron (ppd)	0.1	0.1	0.1
Sulfates (ppd)	4.3	16.0	0.6

Station No. 50 was located on the mouth of a tributary about 100' downstream from where Big Scrubgrass Creek passes under Township Road 325, 0.7 miles east of the intersection with L.R. 60003. This station has a drainage area of 0.09 square miles and was set up primarily to monitor flows from an abandoned oil well casing about 20' from the edge of Big Scrubgrass Creek. The pH values were not considerably acidic showing an average of 6.0. The iron content from the casing discharges reached a maximum of 16 ppm. Between March 9, 1971, and May 4, 1972, this station was sampled 23 times revealing the following average, maximum and minimum water quality test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	75.0	131.0	33.0
pH	6.0	7.5	3.8
Total Acidity (ppm)	29.0	60.0	0.0
Alkalinity (ppm)	11.7	30.0	0.0
Iron (ppm)	3.9	16.0	0.1
Sulfates (ppm)	98.0	190.0	42.0
Acid (ppd)	28.0	64.0	0.0
Alkalinity (ppd)	11.2	37.0	0.0
Iron (ppd)	2.9	17.0	0.1
Sulfates (ppd)	80.0	200.0	27.0

Station No. 60 had its location at the east end of a concrete culvert under Pa. Route 8, 0.7 miles north of the intersection with L.R. 60003. Station No. 60 has a drainage area measuring 0.52 square miles. Flows through this station are collected entirely from Mine Site No. 10. During both heavy runoff periods and low flows, this headwater tributary of Big Scrubgrass Creek is predominantly acid. Samples were collected 31 times at this station between March 9, 1971, and May 4, 1972. Following are the average, maximum and minimum water quality test results.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	491.0	1080.0	270.0
pH	5.2	6.7	3.1
Total Acidity (ppm)	54.0	90.0	40.0
Alkalinity (ppm)	1.2	10.0	0.0
Iron (ppm)	1.93	3.7	0.0
Sulfates (ppm)	376.0	530.0	185.0
Acid (ppd)	326.0	990.0	160.0
Alkalinity (ppd)	6.0	39.0	0.0
Iron (ppd)	11.3	26.0	0.6
Sulfates (ppd)	2051.0	1980.0	1080.0

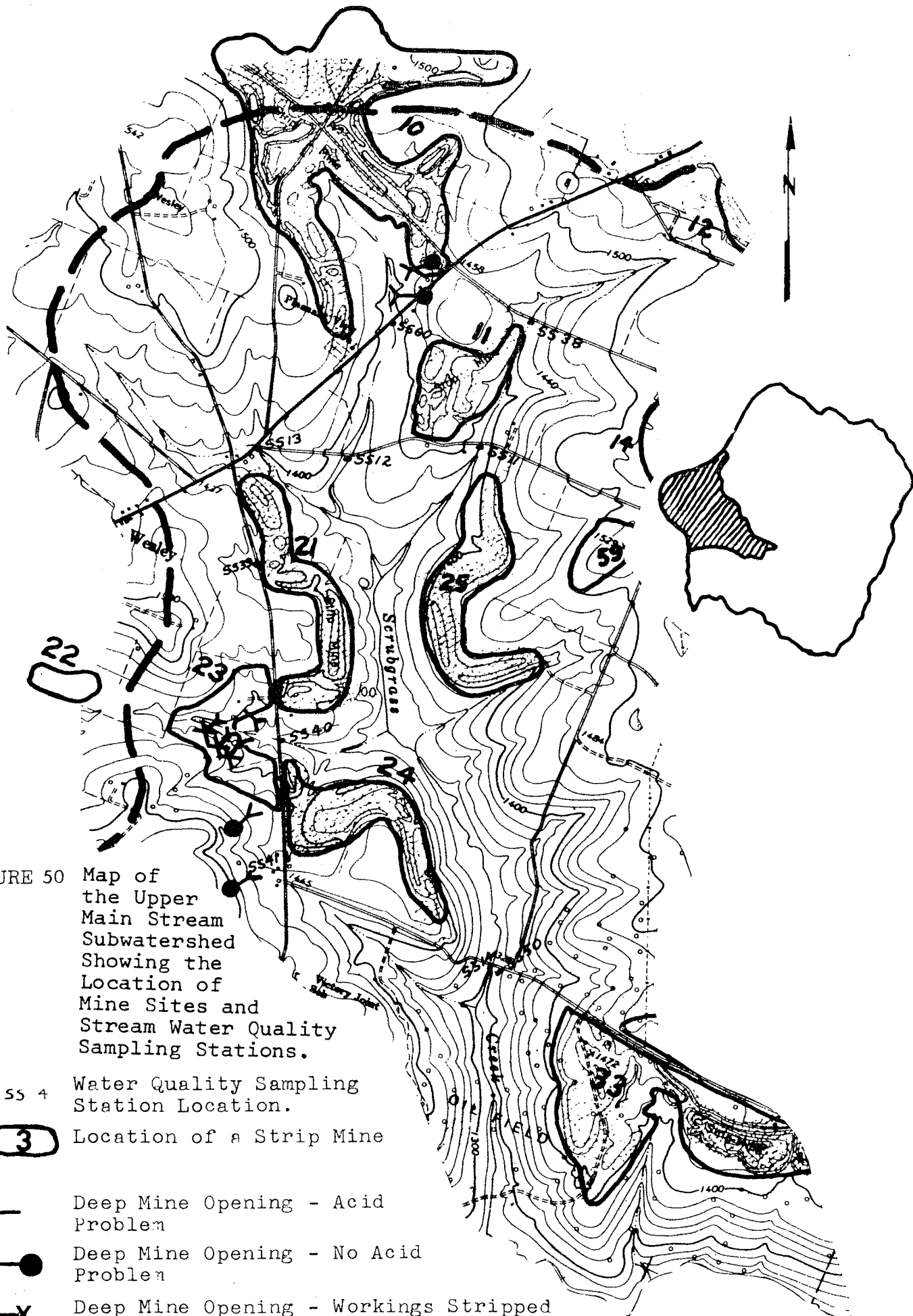


FIGURE 50 Map of the Upper Main Stream Subwatershed Showing the Location of Mine Sites and Stream Water Quality Sampling Stations.

- SS 4 Water Quality Sampling Station Location.
- ③ Location of a Strip Mine
- Y Deep Mine Opening - Acid Problem
- Y● Deep Mine Opening - No Acid Problem
- YX Deep Mine Opening - Workings Stripped Out
- ▲ Air Shaft

SCALE:1:24000



Figure 51 . Aerial Photo Showing
Mine Site No. 10. Scale: 1 in. = 1000 ft.

Specific Reclamation Plans for the Upper Main Stream Subwatershed:

Seven strip mines are located within this area plus part of one other. These mines cover approximately 540 acres or 17.7 percent of the drainage area. Reference to seven old deep mine openings were found in strip mine drainage permit applications and records in the Bureau of Water Quality Management. No additional openings were found during field examination of the area. Only one small deep mine entry was found discharging acid water. Mine No. 10 has more acid pools than any other site in the Big Scrubgrass Creek Watershed.

Water quality samples and related flow measurements indicate that more acid passes through Sampling Station No. 14 than could be accounted for from point sources in the watershed above that station. However, field examination of the strip mines in the watershed confirmed that there is considerable erosion of bare spoil areas which are acid and would produce acid drainage in the storm runoff. These source areas are extremely difficult to evaluate to determine a quantity of acid produced, since field measurements at the source are impossible. Estimates of quantities of acid from individual mines were made based on field observations correlated with measurements from other areas in the watershed.

The recommended reclamation measures for this area would reclaim approximately 84 percent of the acid mine drainage sources in the subwatershed. These should be at least 75 percent successful if properly applied, resulting in a 63

percent reduction in the acid load on the stream. This would mean a reduction of approximately 864 pounds of acid per day in the stream. See Figure 30 for the key to the figures used in the site maps.

SITE 10

This strip mine covers 219 acres in the headwaters of Big Scrubgrass Creek with some drainage going northwest into the South Sandy Creek Watershed. This mine contains more acid pools than any other in the watershed. Sampling Station No. 60 collected most of the drainage from this mine and had an average acid discharge of 326 pounds per day. The northern part of this mine lies on the edge of State Game Land No. 39. Two deep mine openings were reported near the eastern edge of Site #10 but field investigations revealed no evidence of seepage. One of the mines had been sealed by the Pennsylvania Department of Transportation.

Areas #1, #6, #8, #15, #20 and #23 cover 130.4 acres which are good quality water. No reclamation is recommended.

Areas #3 and #11 cover 23.7 acres on the north side of Township Road 345. Area #11 has been planted with white birch trees but, because of the low pH of the spoil material most have not grown well and the surface is bare and eroding and producing acid storm runoff. Area #3 is an area of acid sediment accumulation and thus also a source of acid storm runoff. Selected grading should be done on these areas to establish a system of diversions to stabilize the surface. The area should then be reseeded using revegetation Method No. 1 on Areas #3 and revegetation Method No. 2 among the existing trees on Area #11.

Areas #4 and #13 cover 3.9 acres above the highwall on the northern side of the mine. A diversion should be constructed above these areas to divert surface runoff away from the acid producing areas of the mine. Then to eliminate acid runoff from these areas, the areas should be reseeded using revegetation Method No. 5.

Areas #10, #12, #17 and #19 cover 22.2 acres of rough acid spoil and acid pools. Areas #12 and #17 are quite deep and are supplied with water both from surface runoff and ground water discharge from a perched groundwater table. Seepage from these areas passes through the spoil and under the road to emerge at the base of the spoil to the south as acid drainage. This area should

be regraded to drain the pools, probably through point "d". The pool areas should then be partially backfilled. The area should be reseeded using revegetation Method No. 1.

Areas #14, #21, #22 and #24 cover 15.7 acres which have bare acid spoil which produces acid storm runoff. These areas should be regraded to provide for adequate drainage and reseeded using revegetation Method No. 1.

Areas #16, #18 and #25 cover 20.2 acres of extremely acid spoil, coal waste and acid pools. (See Figure 52). The spoil pH is less than 3.0 and the pools have water with as much as 860 parts per million acid. The source of the acid in the pools is in runoff from the spoil and coal waste. The pools should be drained by cutting drainage ditches to allow surface drainage through point "f". The pool areas should then be partially backfilled including burial of the coal waste under at least 5 feet of compacted neutral soil containing at least 20 percent clay. The area should then be regraded and some type of organic soil conditioner such as wood chips, animal manure or sewage sludge mixed into the top foot of soil at a rate of not less than 200 tons per acre. The area should then be reseeded using revegetation Method No. 1.

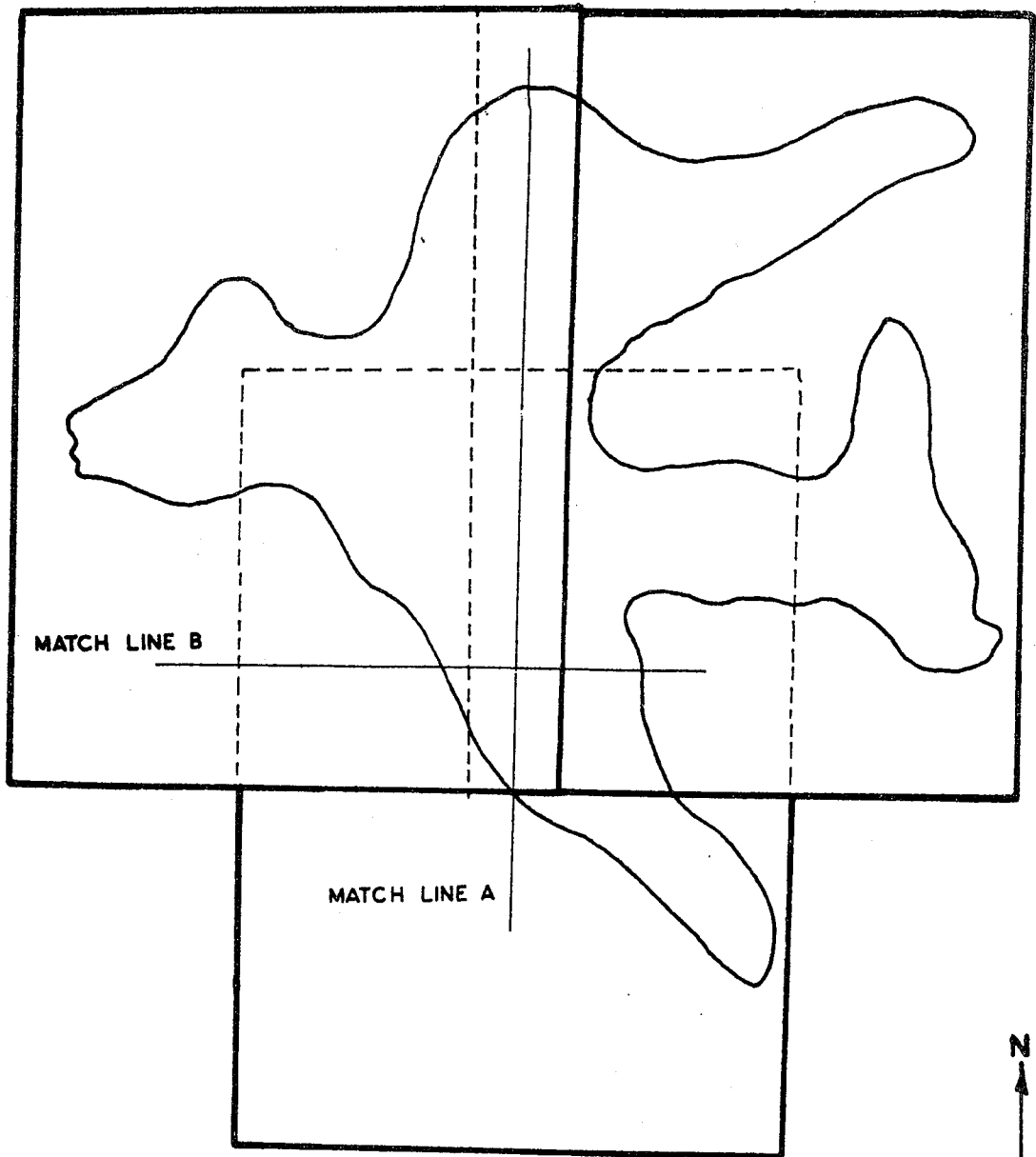
Estimated Cost of Reclamation:

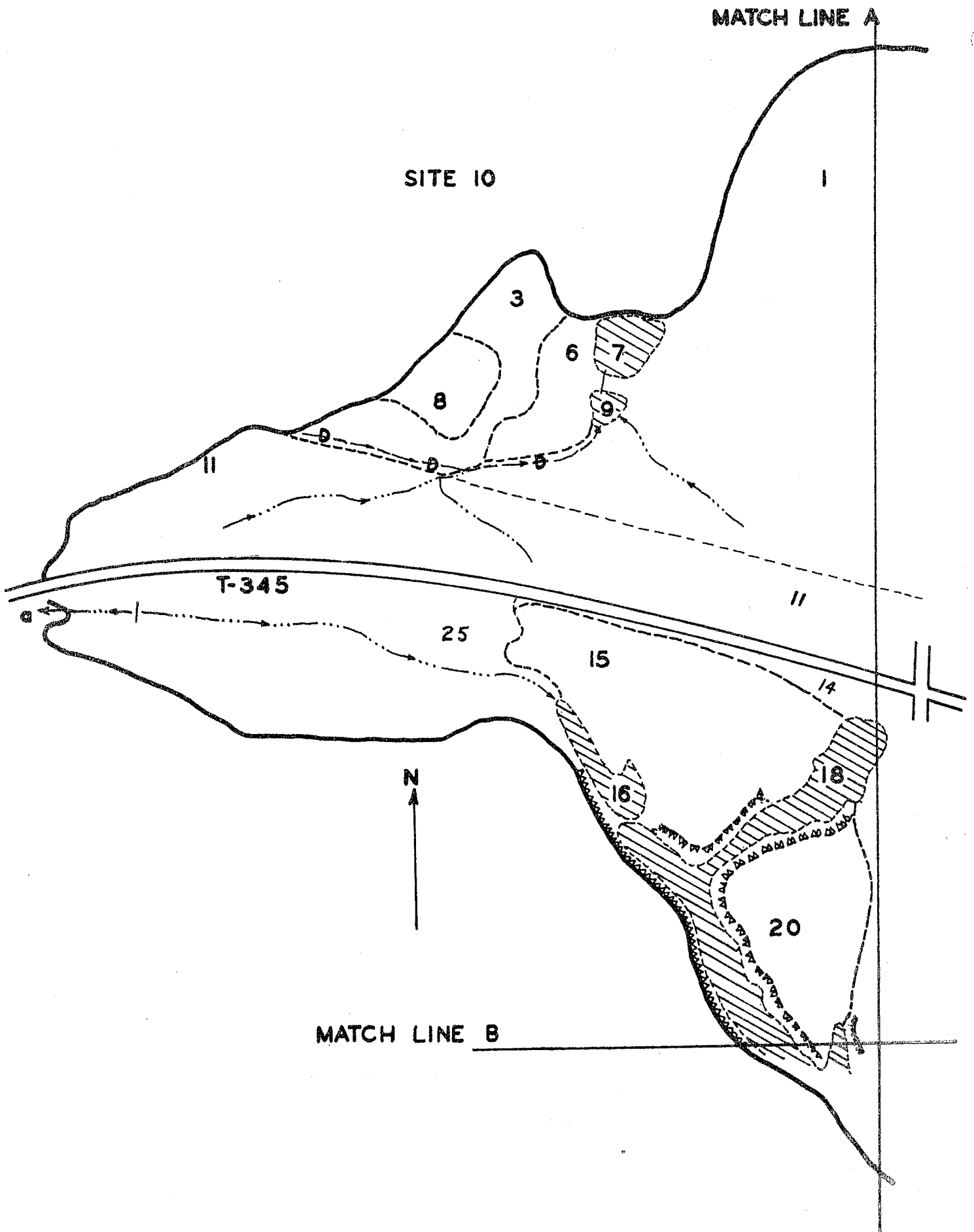
Areas #3 and #11	
23.7 acres of selected grading	\$ 14,200
4.2 acres of revegetation Method No. 1	1,200
19.5 acres of revegetation Method No. 2	11,700
Areas #4 and #13	
2000 feet of diversions channel	2,000
3.9 acres of revegetation Method No. 5	900
Areas #10, #12, #17 and #19	
22.2 acres of selected grading	20,000
22.2 acres of revegetation Method No. 1	6,600
Areas #14, #21, #23 and #24	
15.7 acres of selected grading	9,000
15.7 acres of revegetation Method No. 1	4,700
Areas #16, #18 and #25	
22 acres of selected grading	22,000
5 acres of surface sealing	5,000
14.7 acres of special topsoil treatment	14,700
22 acres of revegetation Method No. 1	<u>6,600</u>
TOTAL	\$118,600

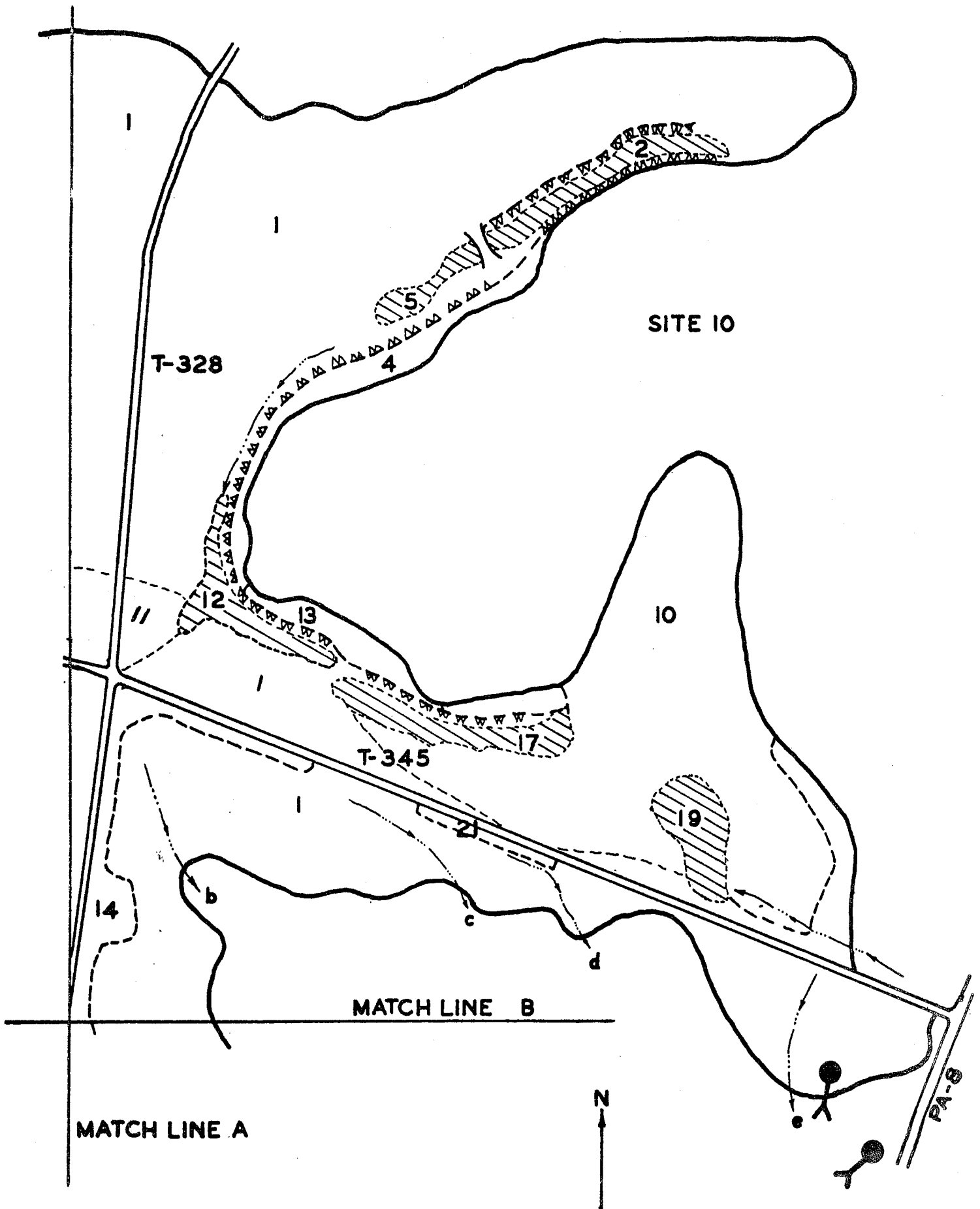


Figure 52. Aerial view of mine site 10 looking north-east. Note the coal spoil at the upper end of pool area 16 in the left foreground and the dark color of the water in pool 18. This mine is the source of more than 300 pounds of acid per day discharge into the Upper Main Stream.

KEY FOR SITE 10

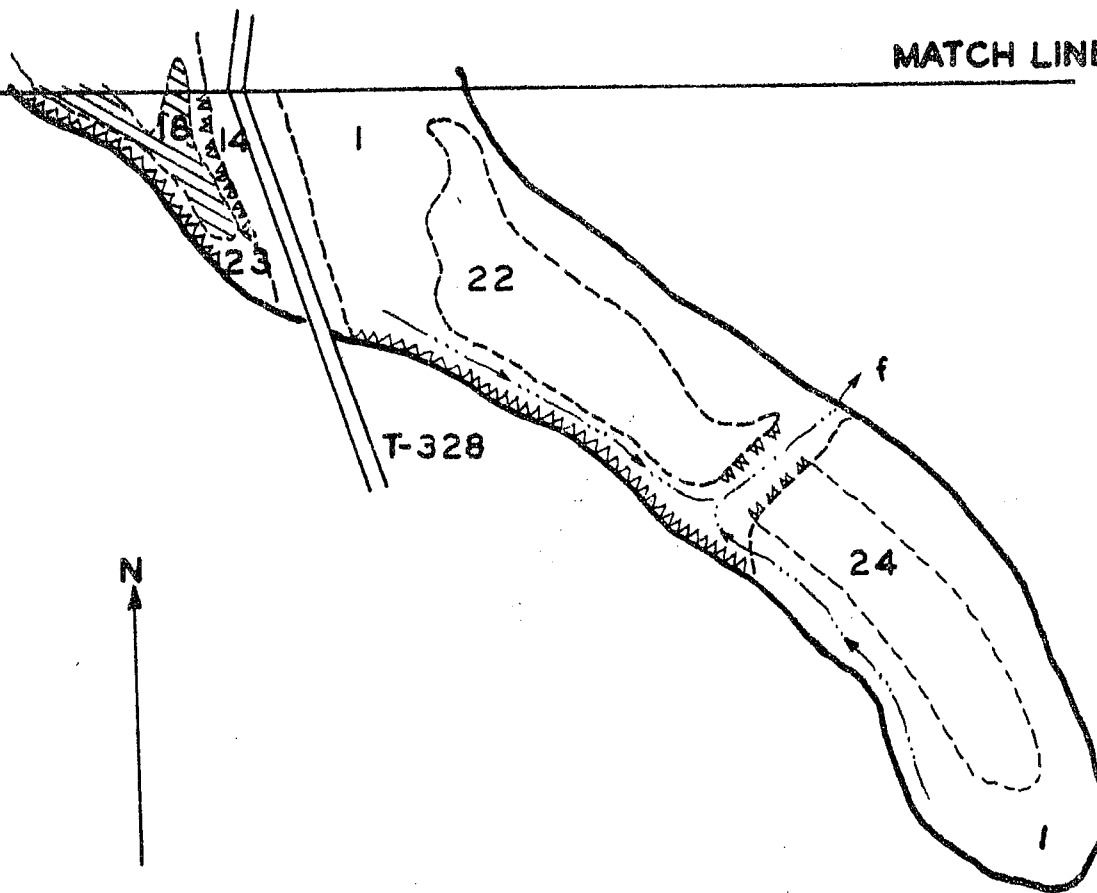






SITE 10

MATCH LINE B



SITE 11

Mine Site No. 11 covers 33.6 acres of old strip mine along T-335 in the Upper Main Stream Subwatershed. Most of the area is rough mine spoil covered with pine trees 10 to 20 years old. The spoil pH is 4.2 to 4.8. A small tributary stream passes along the eastern side of this site. Sampling Station No. 38 was located above the site and Sampling Station No. 11 was located below the site. The acid content of this stream increased 71 pounds per day between these two stations. Additional seepage emerges from the southern edge of the mine which would not pass through Sampling Station No. 11. This seepage was highly acid, but occurred over such a large area that measurement of quantities was impossible. However, it was estimated to be approximately as great as that emerging on the east side. This seepage apparently resulted from acid runoff of bare spoil infiltrating the spoil in some poorly drained areas.

Areas #1, #3, #4 and #6 cover 21.5 acres which are adequately covered to prevent acid formation.

Areas #2 covers 9.8 acres of bare spoil material. About half of this area needs selected grading to provide adequate drainage and produce stable slopes. The entire area should then be reseeded using revegetation Method No. 1.

Areas #5, #7 and #8 cover 2.3 acres of rough bare spoil with unstable slopes which produce acid storm runoff. These areas should be regraded to produce stable slopes and reseeded using revegetation Method No. 1.

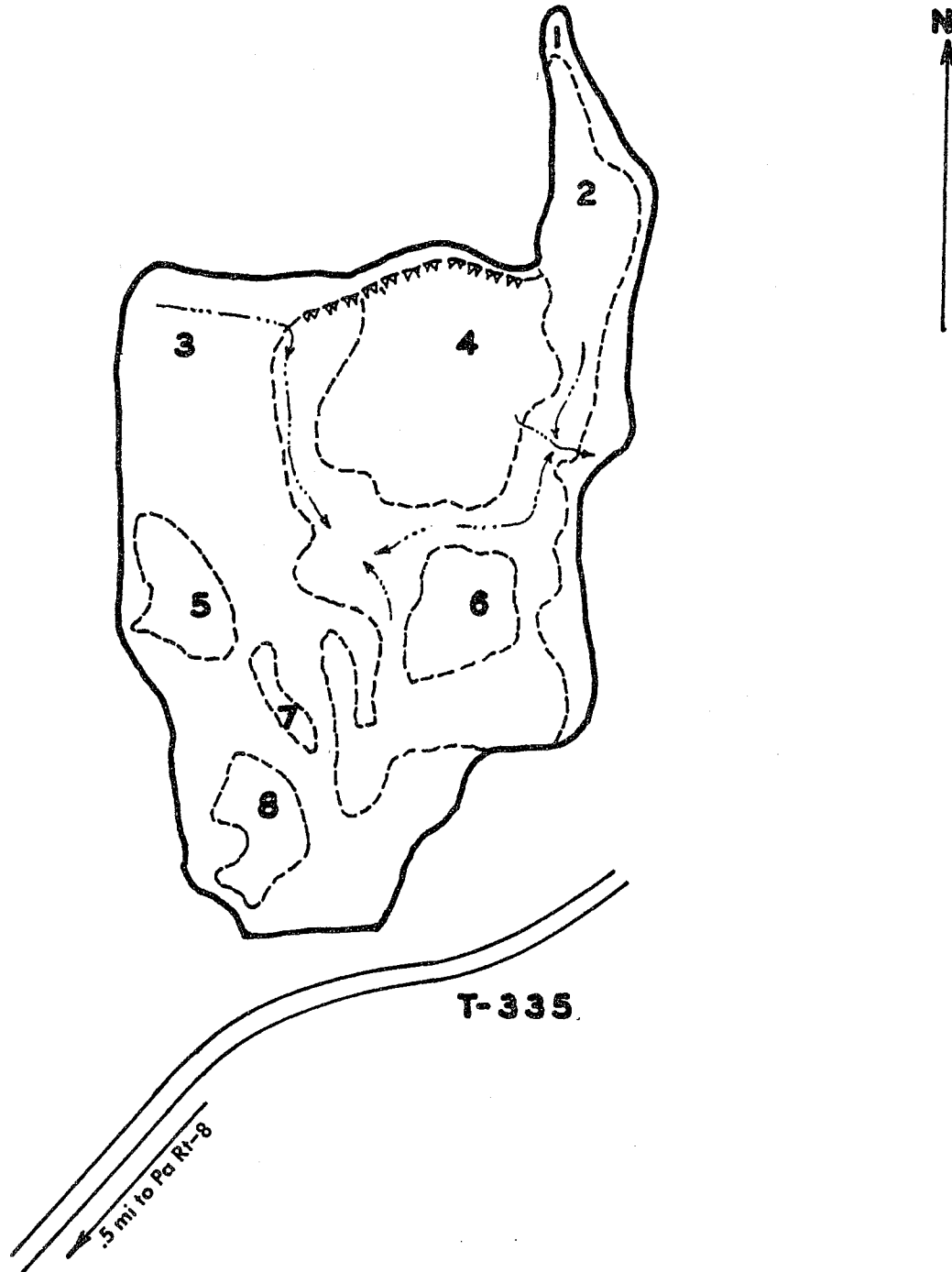
Estimated Cost of Reclamation:

Area #2	
9.8 acres of selected regrading	\$ 5,900
9.8 acres of revegetation Method No. 1	2,900

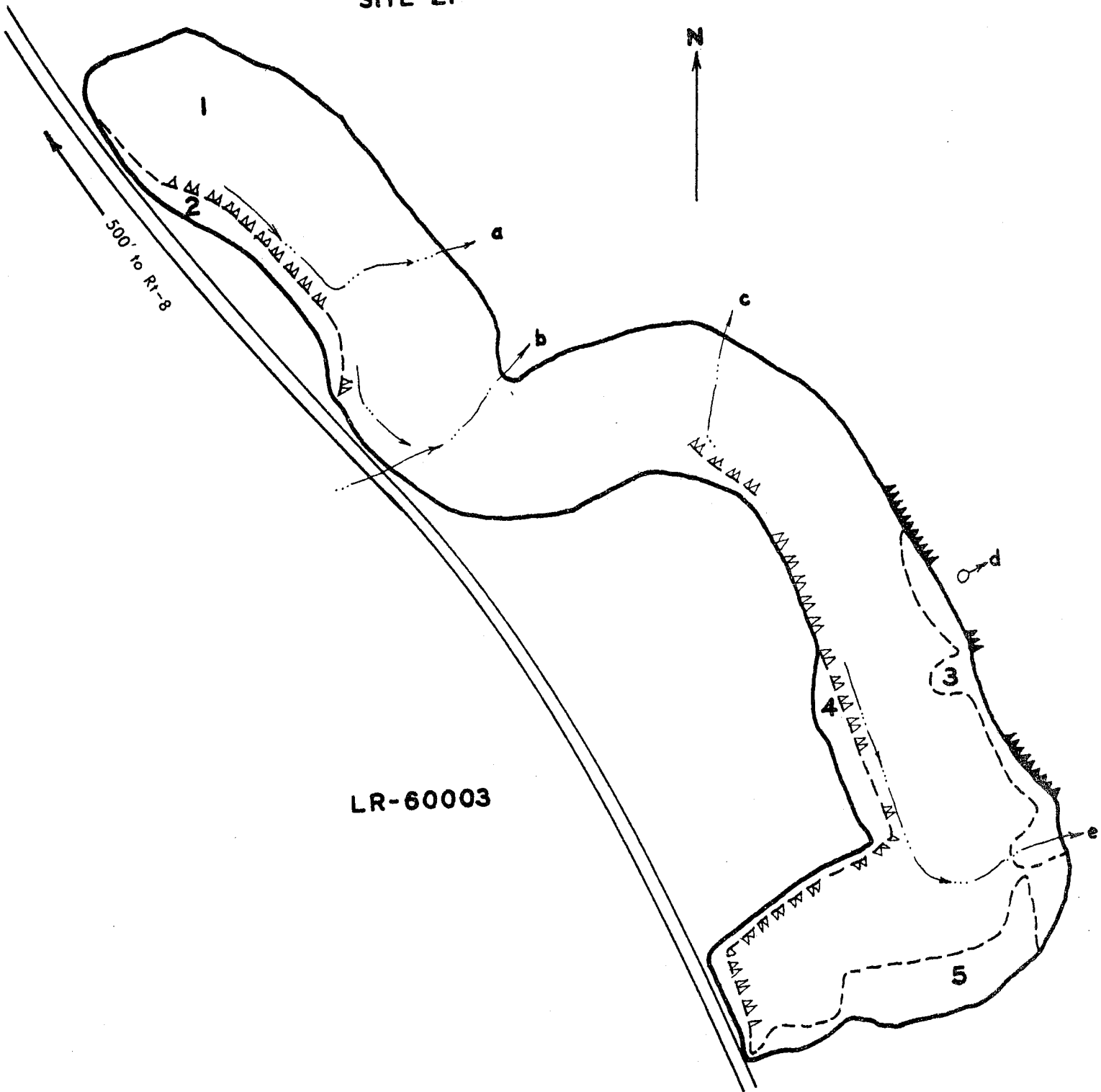
Estimated Cost of Reclamation (Continued):

Areas #5, #7 and #8	
2.3 acres of selected grading	\$ 1,400
2.3 acres of revegetation Method No. 1	<u>700</u>
TOTAL	\$10,900

SITE II



SITE 21



LR-60003

SITE 22

Strip Mine Site No. 22 covers 9.3 acres and was included in the Soil Conservation Service Report on the Big Scrubgrass Creek Watershed. However, it lies outside of the watershed divide and will not be included in these recommendations.

SITE 23

Site 23 includes 46.5 acres of strip mine and three old deep mine openings along L.R. 60003 on the extreme western edge of the watershed. Part of this site has been regraded and planted with grasses and legumes which have developed very good soil cover. The remainder of the area had topsoil saved but the regrading and planting were never completed. These areas are producing acid mine drainage during storm runoff. The old deep mine openings were from family mines and were very small. Only one is still actually in existence, the other two having been so small that the strip mining completely eliminated all traces of them. The remaining shaft is reported to have been a single tunnel about 400 feet long, and the opening, although caved in, is discharging some acid water.

Drainage from this site flows through Sampling Station No. 40 which had an average pH of 4.4 and an average acid discharge of 169 pounds per day. The spoil on this site has a pH of 4.4.

Areas #1 and #2 include 20.6 acres of ungraded strip mine spoil and the area of stockpiled topsoil. The area is a source of acid storm runoff and should be regraded to fit the natural contours and the topsoil spread back over it. The area should then be reseeded using revegetation Method No. 1.

Area #3 includes 19.7 acres which need no additional reclamation.

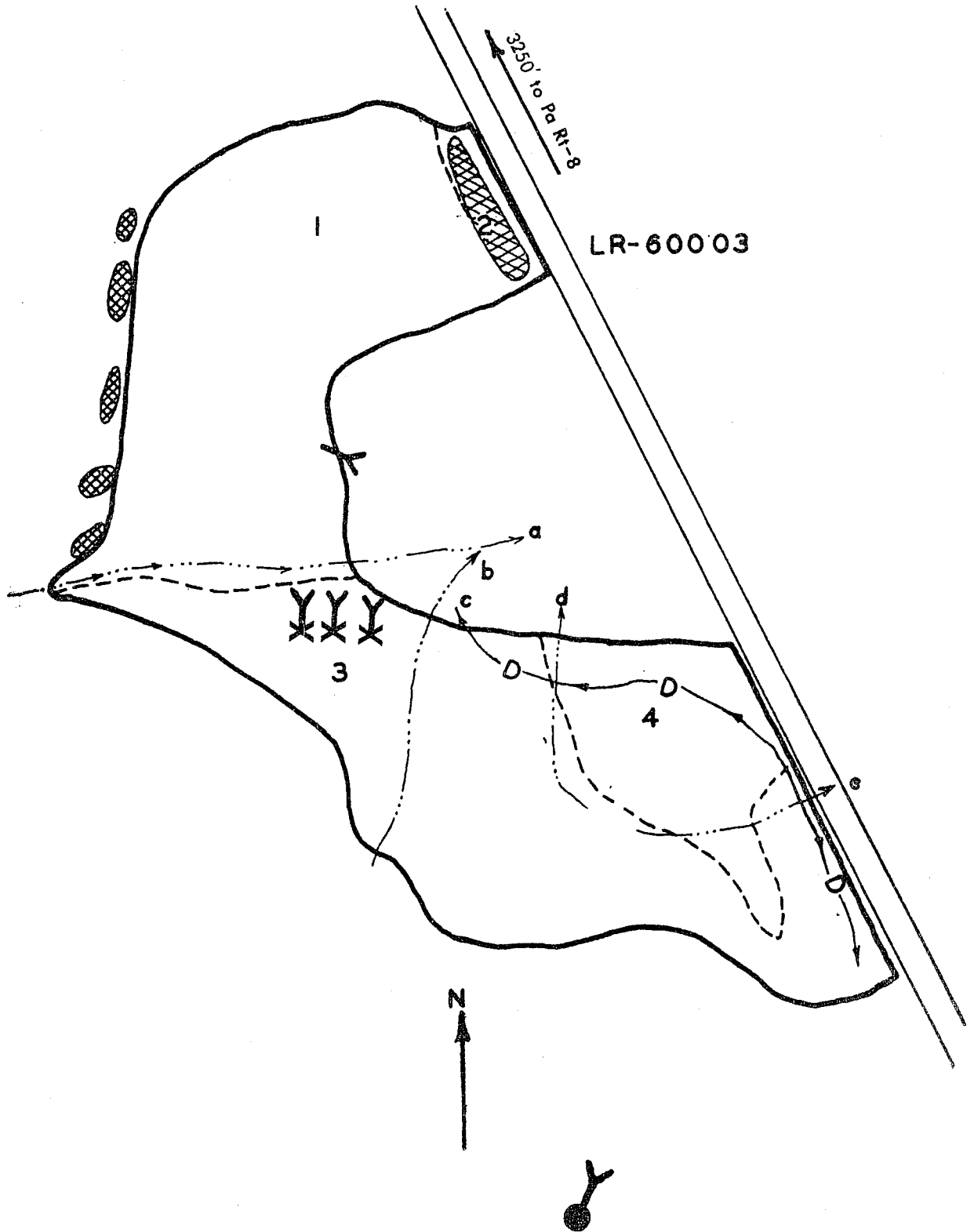
Area #4 includes 6.2 acres of bare, eroding acid spoil which is a source of acid runoff. The area should be regraded to eliminate existing gullies and to construct a diversion to divert unpolluted water away from the acid spoil. The area should then be reseeded using revegetation Method No. 1. The old deep mine entry at the east

central edge of the mines should be investigated with a drilling and pressure testing program and from the data obtained a hydraulic seal should be designed and installed.

Estimated Cost of Reclamation:

Areas #1 and #2	
20.6 acres of contour regrading	\$12,300
20.6 acres of revegetation Method No. 1	6,100
Area #4	
6.2 acres of selected grading	3,700
6.2 acres of revegetation Method No. 1	1,800
Deep Mine Entry hydraulic seal	<u>20,000</u>
TOTAL	\$43,900

SITE 23



SITE 24

Mine Site No. 24 includes 46.9 acres of strip mine on the east side of L.R. 60003 and just north of Township Road T-325 on the west side of Big Scrubgrass Creek. Some of the area has been planted to trees which are about 12 years old. Spoil pH on this mine is between 4.2 and 4.8.

Areas #1, #2, #3 and #4 cover 2.3 acres of rough area including an area covered with coal waste and an acid pool. Selected grading is needed to drain the acid pool and bury the coal waste under at least 5 feet of compacted neutral soil containing at least 20% clay. The surface should be graded to fit the original contours and reseeded using revegetation Method No. 1.

Areas #5, #6 and #8 cover 23.2 acres which are partially bare, eroding and are a source of acid storm runoff. A small amount of selected grading is required to provide adequate drainage and reduce some excessive slopes and the area should then be reseeded using revegetation Method No. 1. A lined channel should be constructed across the area to carry runoff from above through without having gully erosion.

Areas #7 and #9 cover 8 acres of steep eroding soil at the edge of the mine. A diversion is needed above this area to divert unpolluted water away from the acid source areas below. The diversion should be outletted through the lined channel across Area #6. The area should then be seeded using revegetation Method No. 1.

Area #10 covers 0.3 acres of bare, eroding area which is a source of acid storm runoff. The area needs to be reseeded using revegetation Method No. 1.

Area #11 covers 13.1 acres below the highwall. This area has been regraded to slope back toward the highwall with drainage out through a cut at point "c". The area needs some selected grading to provide adequate drainage during wet weather, and the disturbed area reseeded using revegetation Method No. 1.

Estimated Cost of Reclamation:

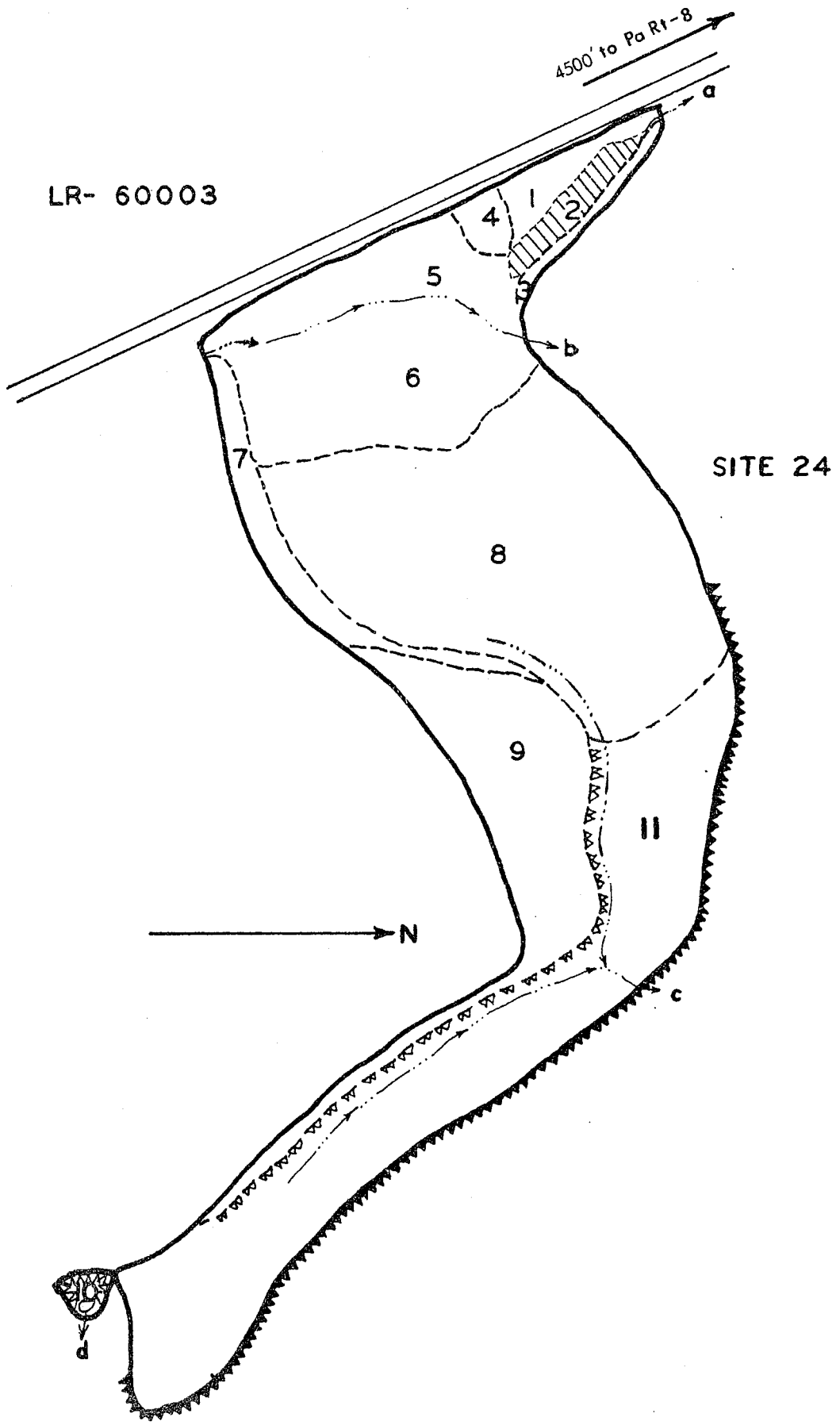
Areas #1, #2, #3 and #4	
2.3 acres of selected grading	\$ 1,400
Surface sealing over burial coal	1,000
2.3 acres of revegetation Method No. 1	700

Estimated Cost of Reclamation (Continued):

Areas #5, #6 and #8	
5 acres of selected grading	\$ 3,000
23.2 acres of revegetation Method No. 1	7,000
700 feet of lined channels	3,500
Areas #7 and #9	
8 acres of revegetation Method No. 1	2,400
2000 feet of diversion channel	2,000
Area #10	
0.3 acres of revegetation Method No. 1	100
Area #11	
3.5 acres of selected grading	2,100
3.5 acres of revegetation Method No. 1	<u>1,000</u>
TOTAL	\$24,200

LR- 60003

4500' to Pa Rt-8



SITE 25

Site No. 25 is a strip mine covering 43.6 acres on the east side of the Upper Main Stream valley south of Township Road T-335. The site is partially regraded with the spoil sloping back toward the highwall. The spoil pH is 4.0 and small acid pools accumulate at the base of the remaining highwall.

Area #1 covers 33.1 acres including some wet weather pools. Some selected grading is needed to provide drainage for these areas and the disturbed areas should be reseeded using revegetation Method No. 1.

Areas #2, #5 and #6 are 4.8 acres of bare, eroding areas above the highwalls. Diversion channels should be constructed at the upper edges of these areas to keep unpolluted runoff water away from the acid source areas in the mine below. These areas should then be planted using revegetation Method No. 5. A lined outlet channel should be constructed to carry the diversion runoff across the mine at point "a".

Area #7 covers 4.3 acres of rough bare acid spoil which is a source of acid storm runoff. This area should be regraded to provide a stable surface and then be reseeded using revegetation Method No. 1.

Estimated Cost of Reclamation:

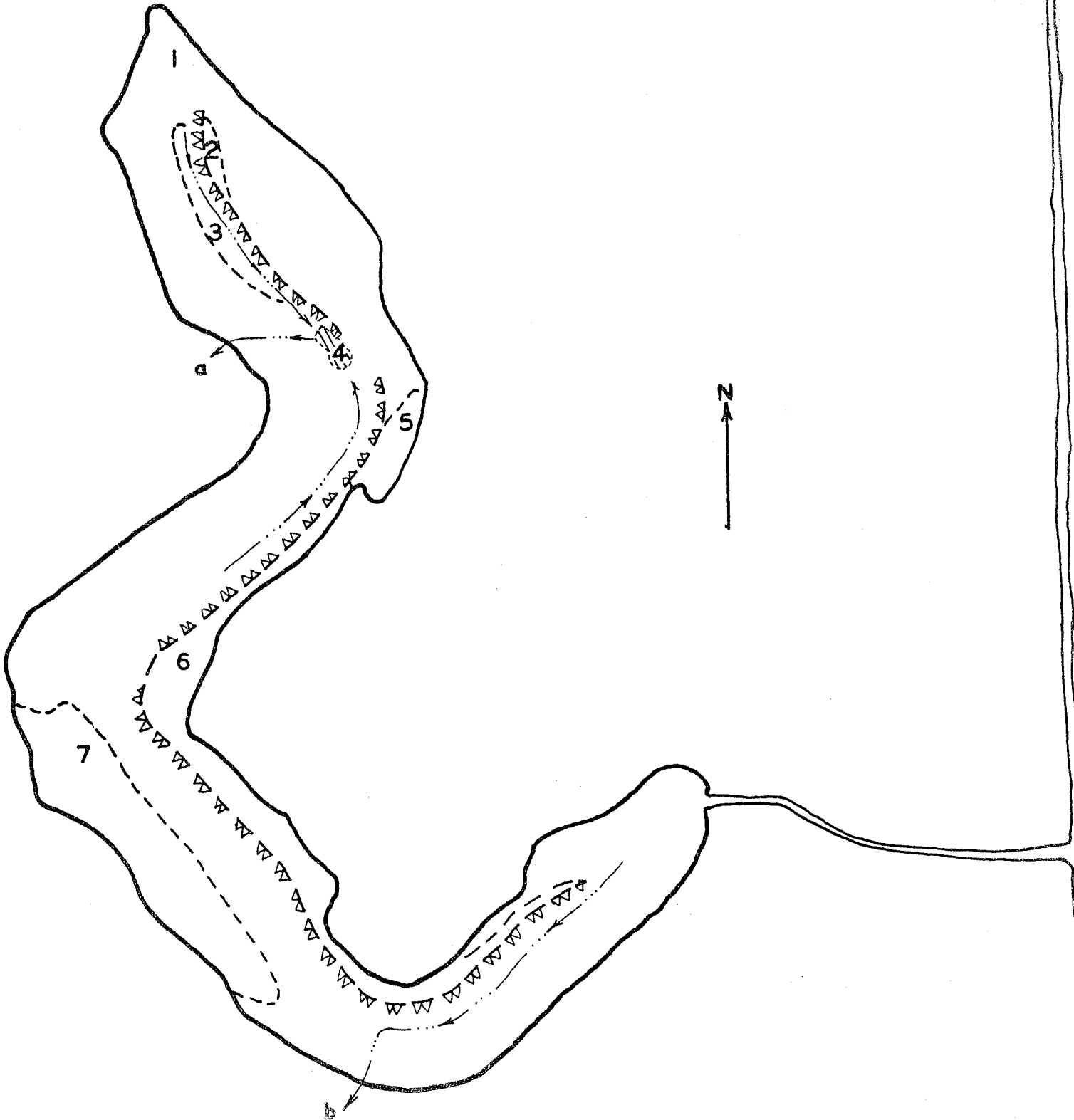
Area #1		
6 acres of selected grading		\$ 3,600
6 acres of revegetation Method No. 1		1,800
Areas #2, #5 and #6		
2700 feet of diversion channel		2,700
500 feet of lined drainage channel		2,500
4.8 acres of revegetation Method No. 5		1,100
Area #7		
4.3 acres of selected grading		2,500
4.3 acres of revegetation Method No. 1		<u>1,300</u>
	TOTAL	\$15,500

T-335

← 4000' to Pa Rt-8

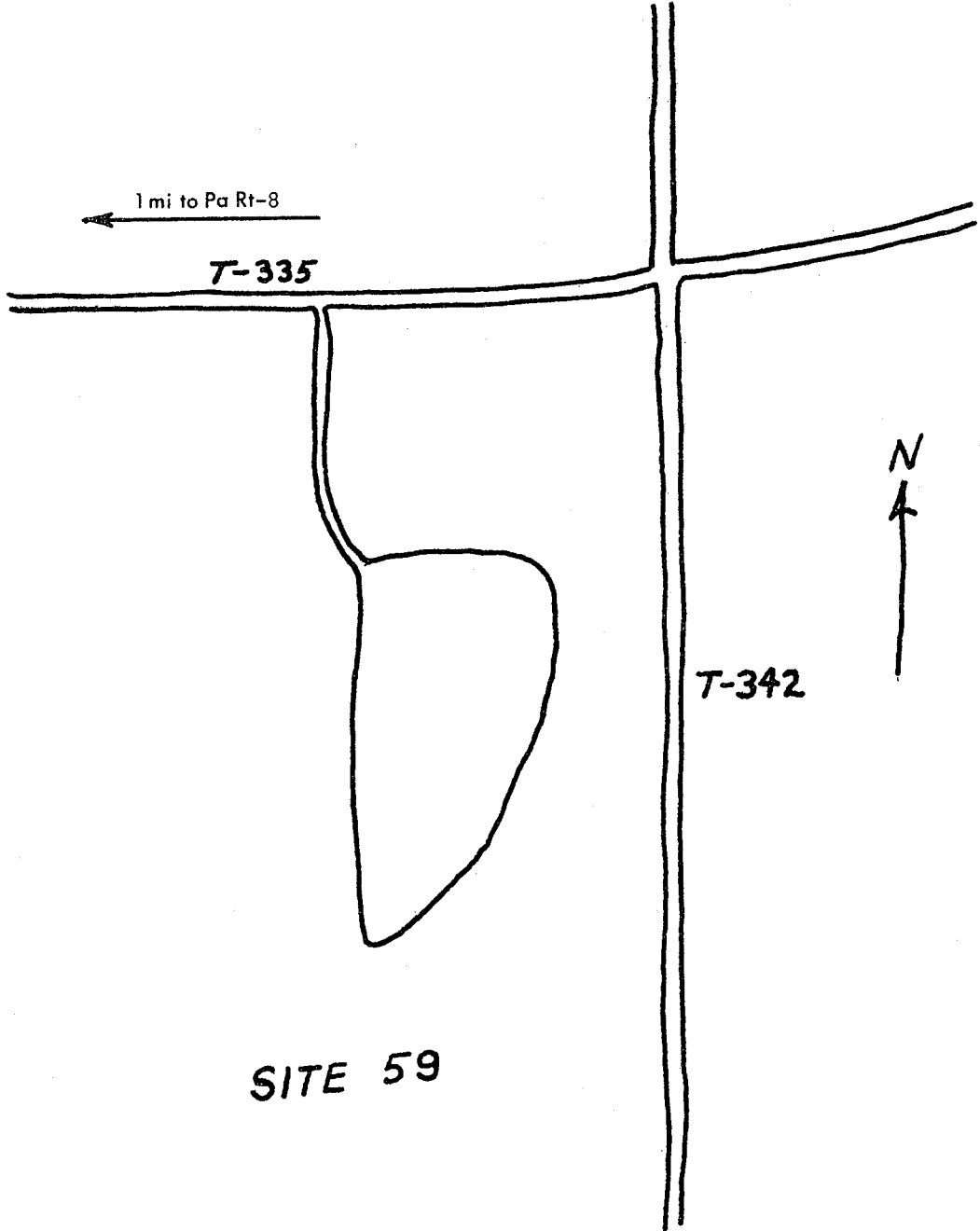
SITE 25

T-342



SITE 59

Strip Mine Site No. 59 covers 6.5 acres on the watershed divide between the Gilmore Run Watershed and the Upper Main Stream watershed. This mine has been regraded and is currently being used for cropland. No reclamation is recommended.



1 mi to Pa Rt-8

T-335

T-342

SITE 59

N

TABLE 13. SUMMARY OF ABATEMENT PLANS AND COSTS FOR THE UPPER MAIN STREAM SUBWATERSHED

Mine Site No.	CLEARING		TERRACE BACKFILL		BACKFILL		SELECTED GRADING		SURFACE SEALING		DEEP MINE SEALING		SOIL REVEGETATION		DIVERSION		LINED CHANNELS		TOTAL COST
	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Cost	Cost	Cost	Acres	Cost	Acres	Cost	Feet	Cost	Feet	Cost	
10							83.6	65200					87.5	46400	2000	2000			\$118,600
11							12.1	7300					12.1	3600					\$ 10,900
21							6.5	3900					9.2	3900	1300	1300	450	2200	\$ 11,300
22																			*
23							20.6	12300			20000		20.6	7900					\$ 43,900
24							10.8	6500	1000				37.3	11200	2000	2000	700	3500	\$ 24,200
25							10.3	6100					15.1	4200	2700	2700	500	2500	\$ 15,500
59																			*

TOTAL \$224,400

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

**Includes \$14,700 of Special Topsoil Treatment