

BULLION RUN

## BULLION RUN SUBWATERSHED

The greatest concern among local people in the area is the re-establishment of trout fishing in the watershed. No other accomplishment would mean as much in terms of building public relations for the project. The greatest potential for quick success in stocking trout appears to be on Bullion Run.

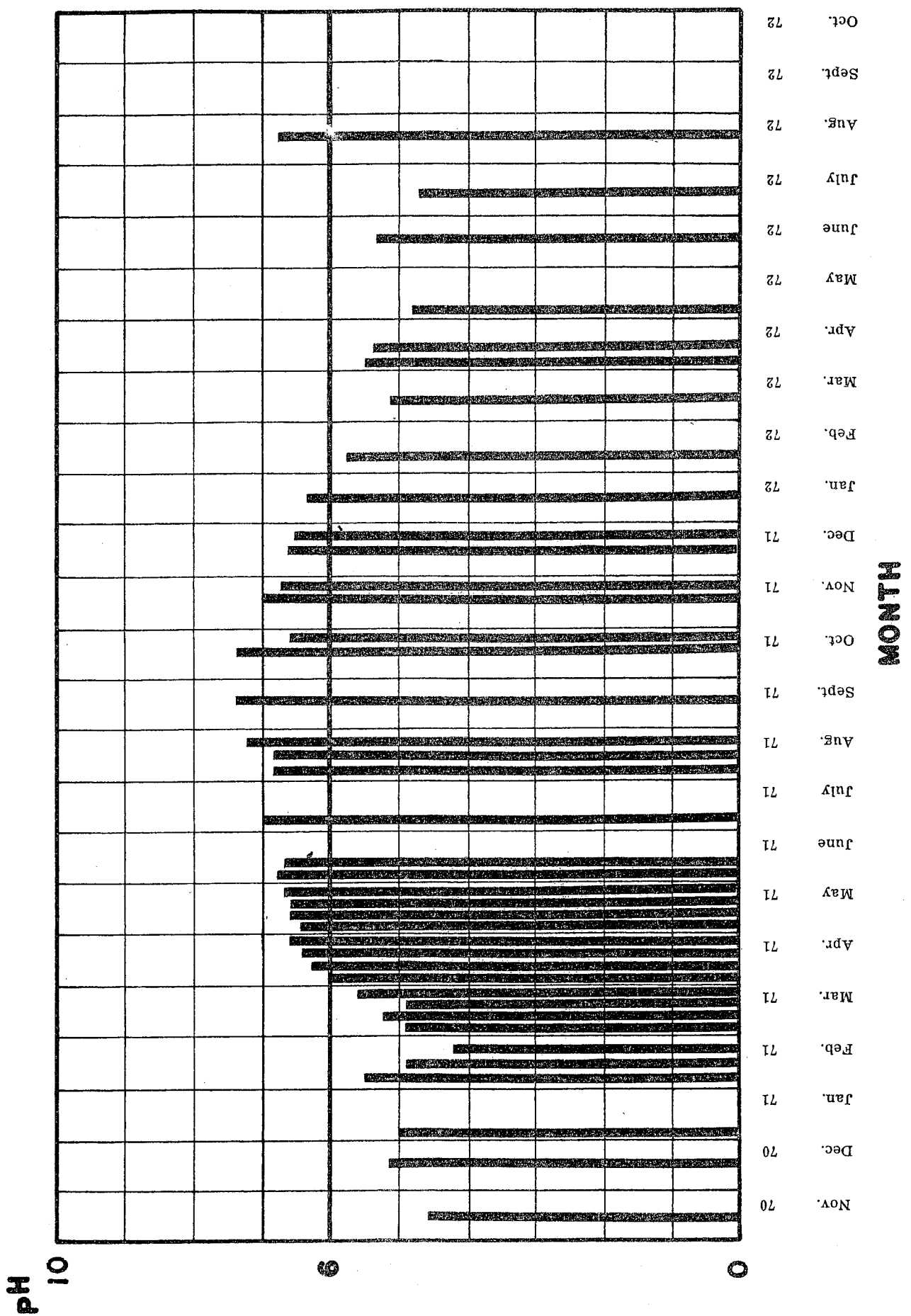
Bullion Run is the main tributary which drains the northern portion of the Big Scrubgrass Creek Watershed. The subwatershed includes 7.33 square miles which drain through Bullion Run plus all of the drainage area on the west side of the main stream up to the mouth of Trout Run. This covers a total area of 8.27 square miles or 20.7 percent of the watershed. The watershed is a remote wilderness area of great natural beauty. There are presently only two access points to the stream with possibility of developing a third. The Pennsylvania Fish Commission is presently interested in developing such areas for wilderness fishing. The lower end of the Bullion Run Watershed will also be included in the new Allegheny River State Park.

Water samples collected during the 22 months between November, 1970, and August, 1972, indicated the pH of Bullion Run ranging between 3.1 and 7.3 with samples taken at the mouth during eight different months and two different springs showing pH below 5.0. Figure 31 shows the pH values measured at the mouth of the stream during the project period. From the data analysis, it was determined that Bullion Run was a net alkaline stream on the average with more of a variation

SAMPLING STATION NO. 7

ACID MINE DRAINAGE PROJECT  
BIG SCRUBGRASS CREEK WATERSHED

FIGURE 31



in ppm alkalinity than total acidity. (See Figure 32).

The fluctuations in pH on Bullion Run indicate a general trend of low pH during the spring months when the soils would be generally saturated and a high pH during the summer months when the soils would be generally dry. There is also evidence that slugs of low pH water pass down the stream system with the first runoff from a period of heavy rainfall and erosion. There thus seems to be two major sources of the polluted waters. The first is discharge from water which becomes ponded on the fill area and seeps through the spoil material. During generally dry periods the flows are small and apparently are not a serious problem, but prolonged ponding during wet periods causes heavy flows of acid waters which affect the main stream. The second source of polluted waters is the first runoff during major runoff events which pick up any accumulated acids on the soil surface and washes it off into the streams. These slugs of polluted water occur sporadically and last for a short period of time so that they can only be detected by continuous sampling or carefully planned grab sampling which coincides with the occurrence of major storms. One such event occurred during the week of June 18 through 24, 1972.

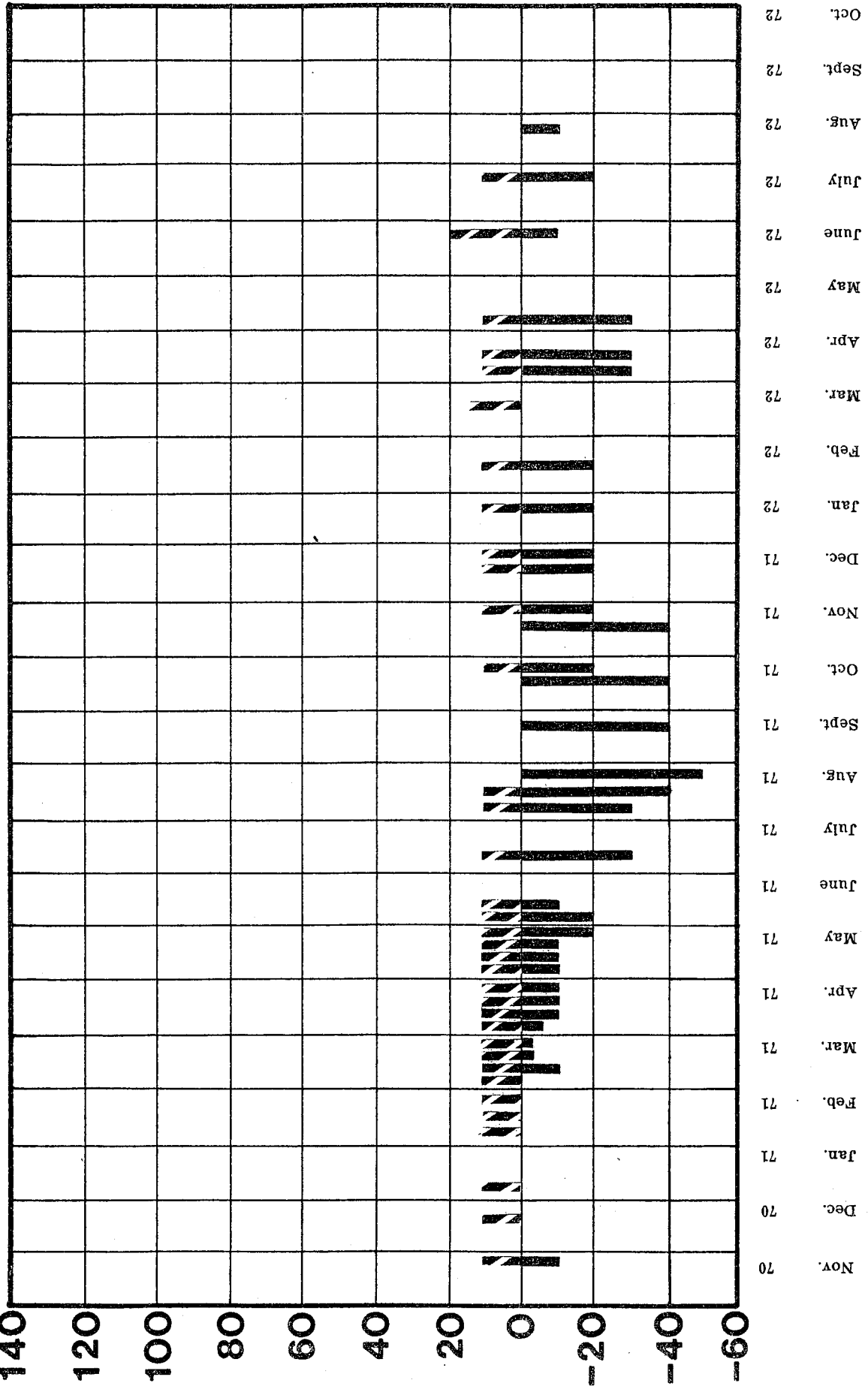
During the period March, 1971, to August, 1972, the Bullion Run Watershed produced an average of 545 pounds of acid per day and a maximum of 1740 pounds per day. The average flow during this period was 5241 gallons per minute and the maximum was 14,500 gallons per minute. Most of the acid

FIGURE 32

SAMPLING STATION NO. 7

ACID MINE DRAINAGE PROJECT  
BIG SCRUBGRASS CREEK WATERSHED

TOTAL ACIDITY PPM



MONTH

discharge appears to originate on Mine Sites No. 4, No. 5 and No. 9. These sites produced nearly 4100 pounds of acid per day during the extremely wet period in June, 1972, when the peak discharge at the stream mouth was estimated at 314,000 gallons per minute with a peak acid load of 75,360 pounds per day. The seepage from the mine site continued at the high rate long after the flow in Bullion Run had returned to normal, suggesting that the acid discharges tended to accumulate within the watershed to be flushed out when conditions are right.

The location, drainage area and summary of water quality test results for each of the sampling stations in the Bullion Run Subwatershed follow. Locations of the sampling stations are shown on the map in Figure 33.

Station No. 1 was located at the east end of a concrete culvert under Pa. Route 308, .6 miles south of the junction with Pa. Route 8. The drainage area of this station is 0.62 square miles and is in the headwaters of Bullion Run. Mine Site No. 1 is located in this drainage area but poses no real problem to the water quality of the stream. The quality of Station No. 1 has been variable in high flows and alkaline in low flows. During the period from November 20, 1970, until May 4, 1972, Station No. 1 was sampled 17 times. Following is the list of average, maximum and minimum values indicated by analysis.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	382	650	260
pH	6.6	6.9	6.2
Total Acidity (ppm)	6.0	10.0	0.0
Alkalinity (ppm)	23.0	40.0	3.0
Iron (ppm)	.05	.05	.05
Sulfates (ppm)	39.0	50.0	20.0
Acid (ppd)	25.0	55.0	0.0
Alkalinity (ppd)	122.0	220.0	13.0
Iron (ppd)	0.3	0.4	0.2
Sulfates (ppd)	182.0	320.0	130.0

A pool in Area No. 5 of Mine Site No. 1 was sampled on July 7, 1972, and found to contain good quality water.

Station No. 2 was established on a tributary to Bullion Run about 100 feet downstream from where the stream crosses Pa. Route 308 about .7 miles south of Station No. 1. Measuring about 0.23 square miles, the drainage area is free of any mine drainage sources upstream. However, about 3,000 feet downstream an acid seep from Mine Site No. 4 enters the flow prior to its confluence with Bullion Run. The quality at this particular station has been predominantly alkaline. This station was sampled 17 times between November 20, 1970, and May 4, 1972, and the following are the indicated test results.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	143	240	100
pH	6.8	7.1	6.5
Total Acidity (ppm)	3.0	5.0	0.0
Alkalinity (ppm)	47.0	85.0	7.0
Iron (ppm)	.05	.05	.05
Sulfates (ppm)	11.0	14.0	6.0
Acid (ppd)	3.9	10.0	0.0
Alkalinity (ppd)	92.0	140.0	4.7
Iron (ppd)	.08	.10	.06
Sulfates (ppd)	21.7	73.0	7.2

Station No. 3 was located about .5 miles north of Bullion on ship Road 354 about 100 feet downstream from the road crossing. This station only has a drainage area of 0.03 square miles but its headwaters are the result of seepage from an acid pool through a spoil pile at the northeast end of Mine Site No. 4 at discharge point "a". For the most part the water quality at this station has been poor. Between November 20, 1970, and May 4, 1972, this station was sampled 31 times resulting in the following average, maximum and minimum values.

	<u>Average</u>	<u>Minimum</u>	<u>Maximum</u>
Flow (gpm)	21.0	60.0	0.0
pH	3.9	6.5	2.9
Total Acidity (ppm)	91.0	135.0	20.0
Alkalinity (ppm)	0.4	10.0	0.0
Iron (ppm)	0.61	1.15	0.3
Sulfates (ppm)	98.0	165.0	30.0
Acid (ppd)	23.0	50.0	2.6
Alkalinity (ppd)	0.08	1.3	0.0
Iron (ppd)	0.17	0.4	0.04
Sulfates (ppd)	23.0	50.0	8.1

Station No. 4 was established at the point where Bullion Run crosses Township Road 354. The drainage area of this station is 3.61 square miles and is the collection point of several headwater tributaries. The stream at this point has had variations in water quality from variable in high flows to alkaline in low flows. During the period between November 20, 1970, and July 17, 1972, this station was sampled 40 times yielding the following average, maximum and minimum values.

	<u>Average</u>	<u>Minimum</u>	<u>Maximum</u>
Flow (gpm)	2309	15,500	1200
pH	5.7	7.0	4.5
Total Acidity (ppm)	9.8	30.0	0.0
Alkalinity (ppm)	12.0	40.0	0.0
Iron (ppm)	0.44	1.9	0.02
Sulfates (ppm)	46.0	73.0	18.0
Acid (ppd)	378.0	3720.0	0.0
Alkalinity (ppd)	365.0	1860.0	0.0
Iron (ppd)	14.0	59.0	5.0
Sulfates (ppd)	1223.0	3350.0	365.0



Station No. 5 was located at the south end of a concrete culvert under Township Road 371, 0.2 miles west of its intersection with Township Road 354. There is no mining evidence above this station which has a drainage area of 0.05 square miles. The water quality has been in the variable range throughout the project period. The drainage pattern flows south eventually into Bullion Run. Station No. 5 was sampled 17 times between November 20, 1970, and May 4, 1972, and the following are the indicated average, maximum and minimum test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	57.0	95.0	38.0
pH	6.4	7.0	5.1
Total Acidity (ppm)	6.0	20.0	0.0
Alkalinity (ppm)	12.0	20.0	0.0
Iron (ppm)	0.05	0.10	0.05
Sulfates (ppm)	5.0	10.0	2.0
Acid (ppd)	4.2	15.0	0.0
Alkalinity (ppd)	8.9	23.0	0.0
Iron (ppd)	0.03	0.06	0.02
Sulfates (ppd)	3.8	7.9	0.9

Station No. 6 is on the northernmost headwater tributary of Bullion Run located on Township Road 371, 0.5 miles west of Station No. 5. It has a drainage area of 0.12 square miles at this point with no mine drainage sources evident. However, during higher flows, the water quality decreases due to runoff from an old bony access road in the drainage area. During low flows though, the stream tends to be alkaline. There is evidence of native fish life in this tributary downstream from the point of sampling. Between November 20, 1970, and May 4, 1972, Station No. 6 was sampled 31 times and following are indicated average, maximum and minimum test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	70.0	126.0	44.0
pH	6.0	6.9	3.9
Total Acidity (ppm)	7.0	10.0	0.0
Alkalinity (ppm)	9.0	30.0	0.0
Iron (ppm)	0.16	0.9	0.05
Sulfates (ppm)	7.0	16.0	2.0
Acid (ppd)	5.0	10.0	0.0
Alkalinity (ppd)	8.0	30.0	0.0
Iron (ppd)	0.08	0.5	0.03
Sulfates (ppd)	5.3	15.0	1.8

Station No. 7 was established at the mouth of Bullion Run near the intersection of Legislative Route (L.R.) 60077 and L.R. 60011. The drainage area at this point includes about 7.33 square miles. The 41 water samples collected between November 20, 1970, and August 24, 1972, indicate a wide variation in chemical quality. The fluctuations indicate a general trend of low quality during the high flows of winter and spring and predominantly alkaline values during the low flow periods of summer and fall. The following are the average, maximum and minimum water quality determinations at this station.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	5241	314,000	2,690
pH	5.9	7.3	4.2
Total Acidity (ppm)	9.0	15.0	0.0
Alkalinity (ppm)	16.0	50.0	0.0
Iron (ppm)	0.09	0.35	0.0
Sulfates (ppm)	33.0	50.0	18.0
Acid (ppd)	545	75,360	0.0
Alkalinity (ppd)	1188	37,680	0.0
Iron (ppd)	5.5	565.2	0.0
Sulfates (ppd)	2084	67,800	1,160

Station No. 32 was located at the south end of a culvert under L.R. 60011, 0.5 miles from the junction with L.R. 60055. The drainage area at this point includes about 0.18 square miles. Flows have consistently been net alkaline with no mine sites contributing to the flow. Between November 20, 1970, and May 4, 1972, Station No. 32 was sampled 15 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)	100.0	230.0	44.0
pH	6.8	7.0	6.5
Total Acidity (ppm)	2.0	5.0	0.0
Alkalinity (ppm)	31.0	40.0	20.0
Iron (ppm)	0.05	0.05	0.05
Iron (ppm)	20.0	27.0	10.0
Sulfates (ppm)	2.7	5.0	0.0
Acid (ppd)	34.0	55.0	17.0
Alkalinity (ppd)	0.05	0.1	0.03
Iron (ppd)	22.0	47.0	10.0
Sulfates (ppd)			

Station No. 49 was located on a Bullion Run headwater tributary about 100' downstream from where the stream passes under Township Road 371 and 0.9 miles east of the intersection with Pa. Route 8. The drainage area of this station measures 0.05 square miles and except for the last three sampling periods has been a net alkaline feeder stream to Bullion Run. Between March 9, 1971, and May 4, 1972, this station was sampled 18 times and following are the indicated average, maximum and minimum test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	30.0	52.0	21.0
pH	6.6	7.0	5.8
Total Acidity (ppm)	3.8	10.0	0.0
Alkalinity (ppm)	21.0	40.0	5.0
Iron (ppm)	0.09	0.3	0.05
Sulfates (ppm)	4.2	12.0	2.0
Acid (ppd)	1.5	4.4	0.0
Alkalinity (ppd)	7.2	25.0	2.1
Iron (ppd)	0.03	0.1	0.01
Sulfates (ppd)	1.6	4.9	0.6

Station No. 6 was established at the south end of a culvert under L.R. 60011 about 0.9 miles north of the intersection with L.R. 60055. This stream has a drainage area measuring 0.19 square miles at this point and has been a net alkaline stream for the duration of the project. This station was sampled 18 times between March 9, 1971, and May 4, 1972. Following are the indicated average, maximum and minimum test values.

	<u>Average</u>	<u>Maximum</u>	<u>Minimum</u>
Flow (gpm)	99.0	240.0	20.0
pH	6.8	7.0	6.1
Total Acidity (ppm)	1.0	5.0	0.0
Alkalinity (ppm)	22.0	30.0	7.0
Iron (ppm)	0.05	0.05	0.05
Sulfates (ppm)	8.0	16.0	4.0
Acid (ppd)	1.3	6.5	0.0
Alkalinity (ppd)	27.0	86.0	4.2
Iron (ppd)	0.06	0.1	0.01
Sulfates (ppd)	9.4	17.0	1.4

FIGURE 33

Map of the Bullion Run Sub-watershed Showing the Location of Mine Sites and Stream Water Quality Sampling Stations.

586



Water Quality Sampling Station Location

Location of a Strip Mine



Deep Mine Opening - Acid Problem



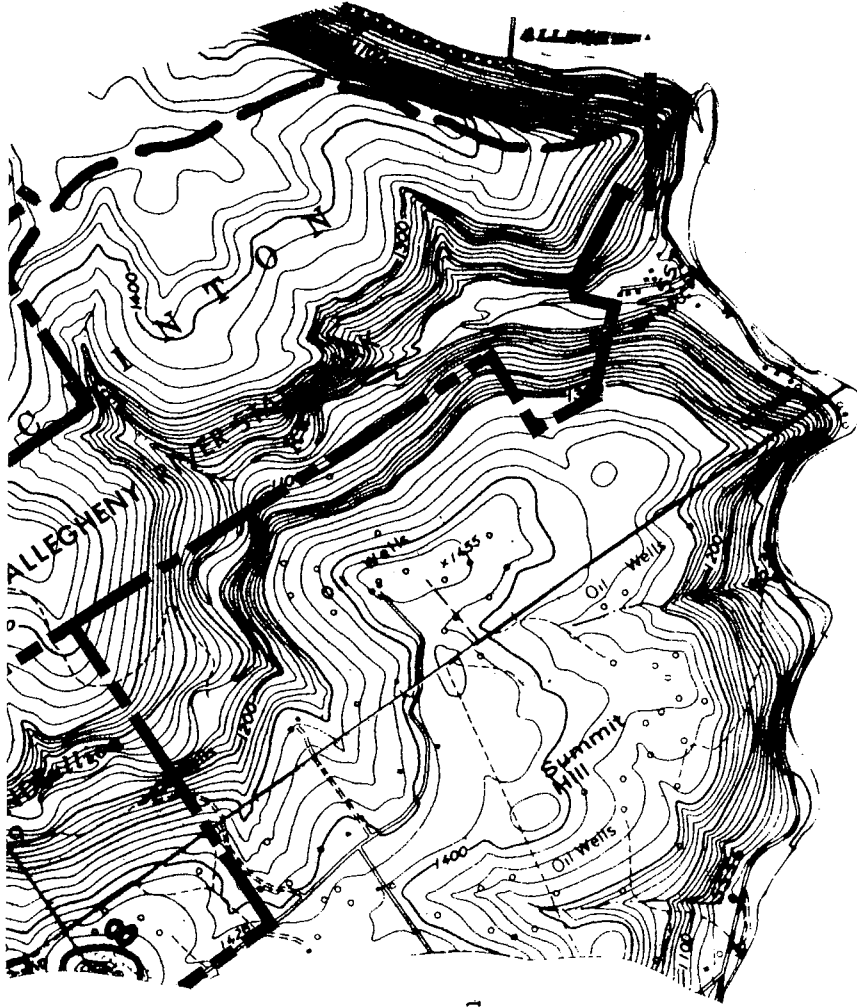
Deep Mine Opening - No Acid Problem



Deep Mine Opening - Workings Stripped Out.



Air Shaft.



SCALE: 1:24000



Figure 34 . Aerial Photo Showing  
Mine Sites Nos. 4, 5, 6, 7 and 8.  
Scale: 1 in. = 1000 ft.

### Specific Reclamation Plans for the Bullion Run Subwatershed:

Five strip mine sites lie wholly within this subwatershed, four more lie partially within the watershed, and one is located on the ridge just outside the watershed divide. These ten sites cover an area of approximately 188 acres and are potential mine drainage pollution sources to Bullion Run. One of these, Site No. 3, along Route 308 in the headwaters area, has recently been re-opened. Figure 33 is the map of the Bullion Run subwatershed with mine site locations.

Three old deep mine openings were found on the hillside around strip mine Site No. 5. Two of these were apparently mine entries and one may have been a drainage tunnel. These are also sources of acid pollution to Bullion Run although they may have been in the same seams as the strip mines and thus be acting only as release points rather than separate sources of AMD. Reference was found to possible deep mining around strip mine Site No. 9 also, although no field evidence was found.

The recommendations for this subwatershed were submitted to the Pennsylvania Department of Environmental Resources as a Quick Start Project.

The abatement measures recommended here should effect about 99 percent of the acid sources on Bullion Run with an estimated 75 percent effectiveness. Thus the overall effect should be approximately a 75 percent reduction of the average acid load on Bullion Run. This would amount to an average re-

duction of about 510 pounds per day. By the elimination of ponded water on the acid fills the highly acid discharges associated with wet weather seepage should be greatly reduced causing the pH of the stream to have less fluctuation than it has presently. This should allow reestablishment of fish life in Bullion Run soon after completion of the recommended work.

The key to the site map symbols is on Figure 30.

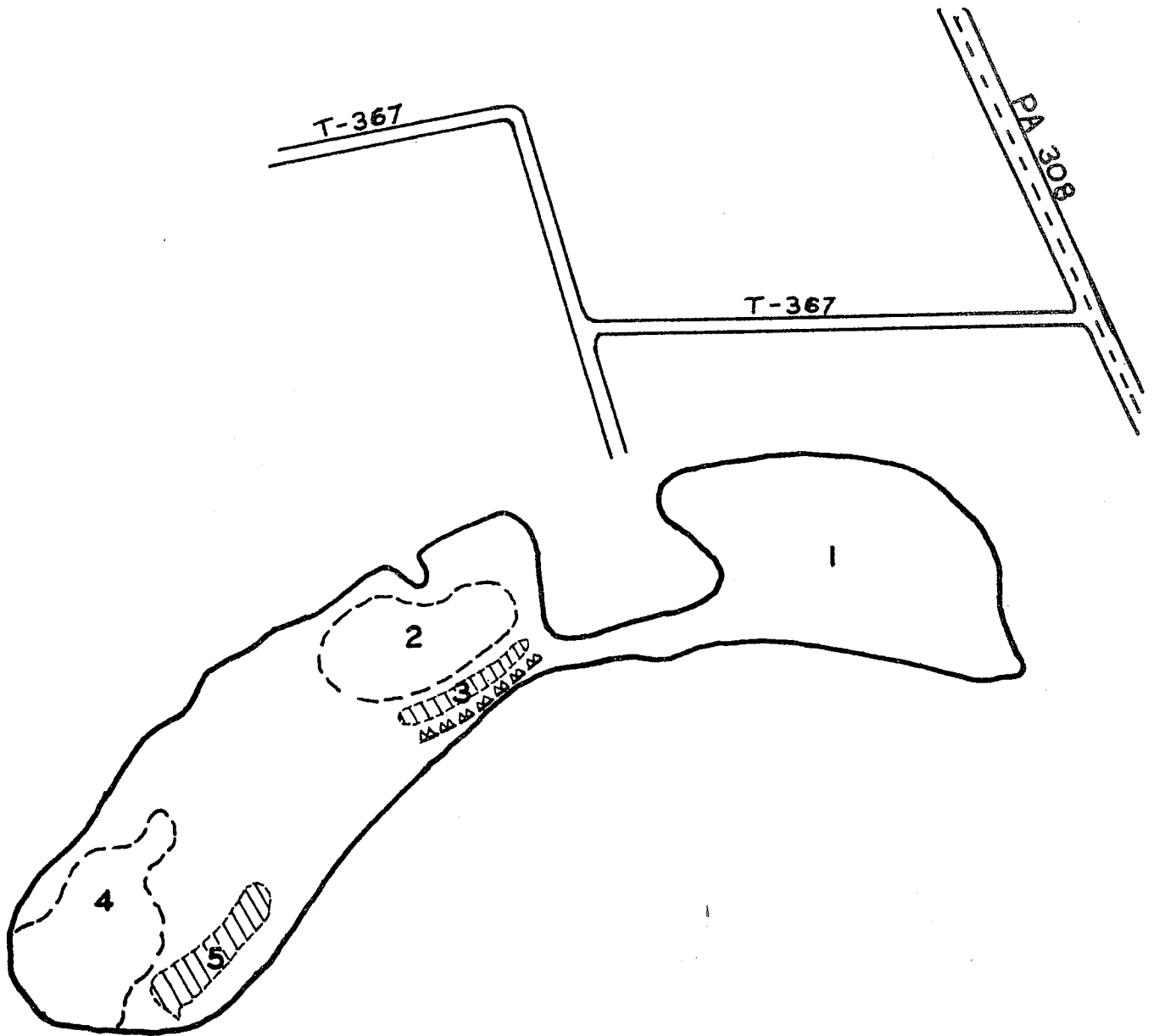
## SITE 1

This site is a strip mine covering an area of 25.7 acres in the upper part of the Bullion Run Subwatershed. The mine is located on private land and is currently being used for a horse pasture. Drainage from this site passes through Sampling Station No. 1 and has generally been good quality water. Two pools in the mine have good quality water and small fish were observed in one. Therefore, no additional reclamation is recommended for this site for acid drainage control.





SITE I



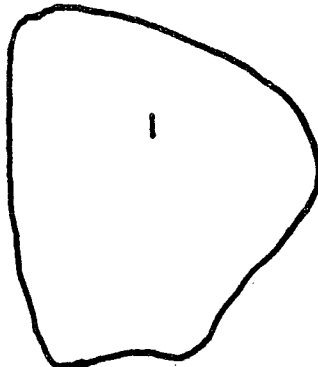
## SITE 2

This strip mine lies about 300 yards north of State Route 308 in the upper part of the Bullion Run Subwatershed. It is 8.2 acres of old spoil material only partially covered by various grasses and scattered trees. The topography is generally rough but there is no apparent drainage problem and because of its location the projected land use would be primarily woodland-wildlife.

No additional restoration for acid control is needed on this site.



SITE 2

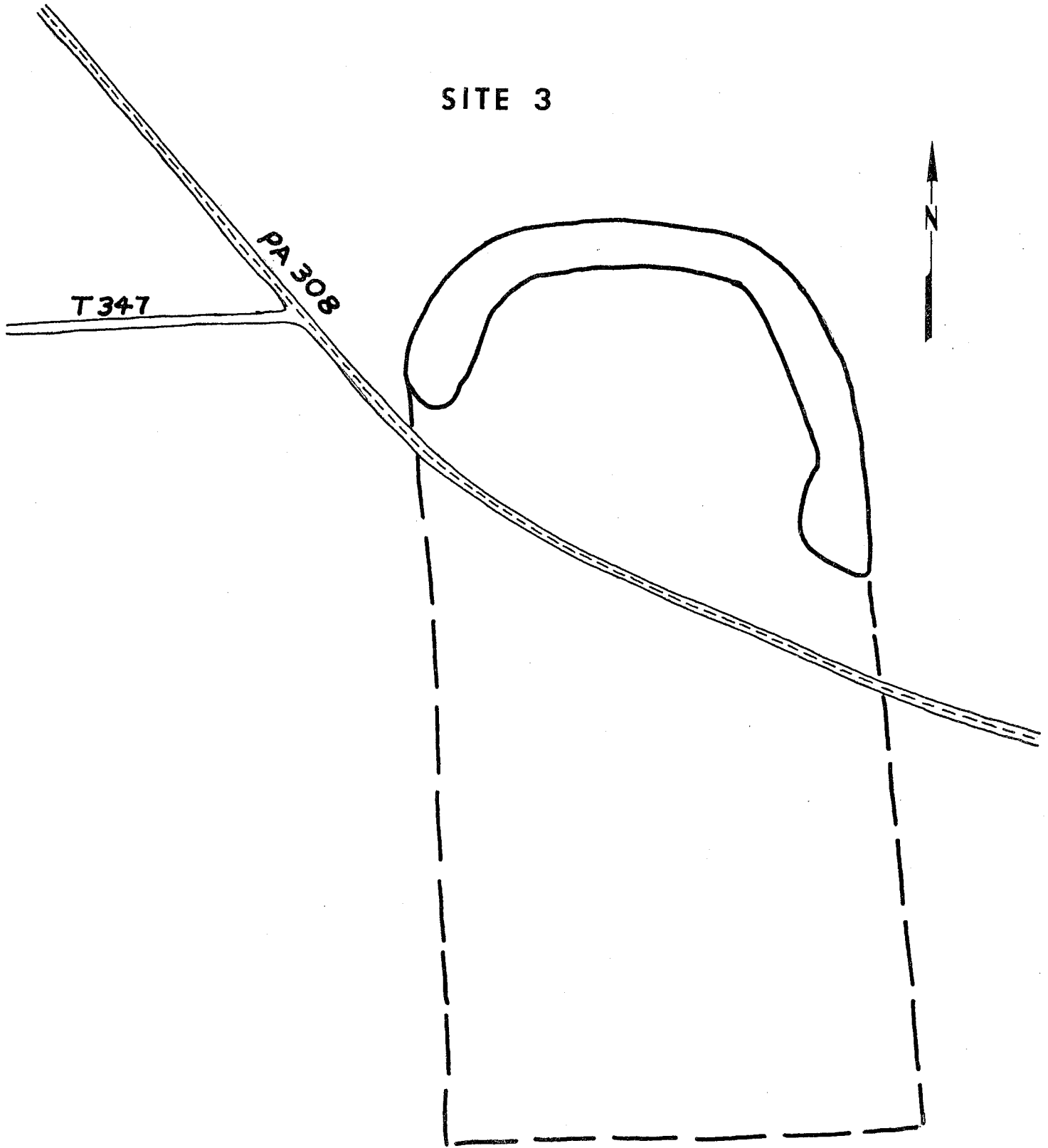


←  
2100' to PA-308

### SITE 3

The old strip mine in this area covered 8.8 acres. In the spring of 1972, Pengrove Coal Company reopened this mine under Mine Drainage Permit Number 3771 BSM 6 issued October 8, 1971. Figure 14 is an aerial view of the present mining operation. The new permit covers an area of approximately 31 acres on both sides of Route 308. The old mined area has been completely disturbed and all reclamation is now the responsibility of the present operator. The present operation was not found to be contributing any pollution to Bullion Run.

SITE 3



## SITE 4

This site is a strip mine covering 35.6 acres and appears to be a main source of pollution to Bullion Run. The area lies at the top of the ridge on the edge of the steep, wooded valley of Bullion Run. During one period of wet weather, runoff from the site was carrying more than 1000 pounds of acid per day.

Areas #1 and #2 cover approximately 6.7 acres of rough toxic spoil and an acid pool. Part of this area is covered with some small trees which have not developed an adequate cover to prevent acid formation. Runoff from area #1 accumulates in Area #2 and seeps out through the spoil at seepage point "a", and through Sampling Station No. 3 which had an average acid discharge of 23 pounds per day. This area should be regraded to fill in the depression, burying the toxic spoil and eliminating the acid pond. The contours of the regraded area should be made to blend in with the surrounding area.

Area #3 covers 18.8 acres which have been planted to several varieties of trees that are providing little effective cover. (See Figure 13). The spoil pH is less than 4.0 and a wet weather pool covering about 0.6 acres within the area has a pH of 3.6. Runoff from the area passes through a cut in the spoil at point "b" and had a pH of 3.5 with high acid, iron and sulfate content. Flow from this area contributes in excess of 100 pounds per day acid to Bullion Run.

Selected grading is needed in this area to provide drainage and reduce some existing slopes, then the area should be seeded to grass using Method No. 1.

Areas #4, #7 and #8 cover 8.1 acres which are rough but which have a good stand of trees established and no additional work is recommended for acid control.

Area #5 consists of 0.9 acres of steep, rocky slopes which are exposed and are a source of acid. These should be stabilized using Method No. 3.

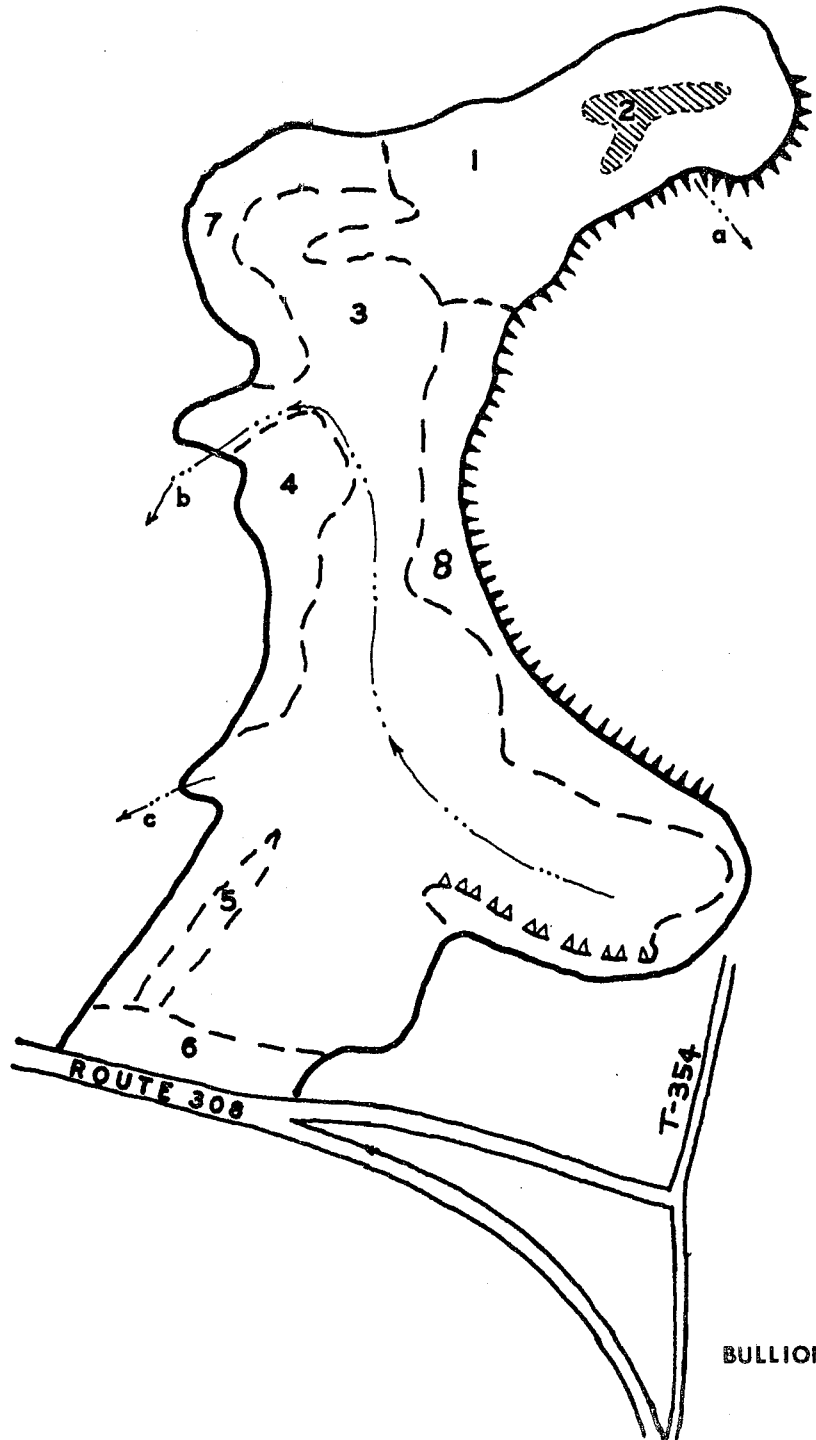
Area #6 is 1.1 acres of regraded and partially vegetated land which needs additional cover to prevent acid formation. Selected grading is required to provide drainage and an adequate water handling system and the area should be reseeded using Method No. 1.

Estimated Cost of Reclamation:

Areas #1 and #2	
6.7 acres of contour backfill	\$10,000
6.7 acres of revegetation Method No. 1	2,000
Area #3	
18.8 acres of selected grading	11,300
18.8 acres of revegetation Method No. 1	5,600
Area #5	
0.9 acres of revegetation Method No. 1	200
Area #6	
1.1 acres of selected grading	700
1.1 acres of revegetation Method No. 1	<u>400</u>
TOTAL	\$30,200

SITE 4

NORTH



BULLION



## SITE 5

This site includes 41.2 acres of strip mining and three deep mine openings with some drainage going south into Trout Run and most going north into Bullion Run. The site lies along Township Road T-349 northeast of the village of Bullion. One deep mine opening is still quite evident in a ravine below the stripped area. This opening is flowing approximately 20 gallons per minute with 630 parts per million acidity. The final cut on the strip mine has no surface outlet and yet holds very little water, indicating a significant subsurface release. It is believed that adequate backfilling and surface regrading on the stripped area should clear up the seepage from the old deep mine openings.

Regrading is needed to improve drainage and reduce slopes within the strip mine which are acid sources. During the regrading the bottom of the final cut should be investigated thoroughly to determine if there are any openings in it which connect directly with the old deep mine workings. If surface sealing and regrading in the stripped area does not substantially improve the rate and quality of seepage from the old deep mine openings, these should be sealed. However, the work on the old deep mine openings should wait until the effects of surface sealing have been evaluated.

Area #1 consists of 4.9 acres of sparsely covered but fairly level mine spoil. Drainage from this area passes through Sampling Station No. 46 in the Trout Run Subwatershed. This station had an average net acid discharge of 31 pounds

per day. This area should be cleared and reseeded using revegetation Method No. 1.

Area #2 is rough spoil with an adequate cover of trees so that no additional work is needed for acid control.

Area #3 and #4 cover 17.1 acres which include the final cut and highwall. All but about 6 acres have been planted to white birch. However, these are generally small and have not succeeded in developing any effective soil cover beneath them to reduce the acid formation on the exposed spoil surface. Several large pools form along the base of the highwall during wet weather which have a pH below 4.0. This area should be cleared and backfilled to a depth of at least five feet with compacted soil containing at least 20 percent clay to prevent future deep percolation of water into the old deep mine workings. The surface of the regraded area should be planted using revegetation Method No. 1.

Area #5 consists of 3.3 acres of bare, eroding material above the highwall which are a source of acid. Selected grading should be done on this area and a diversion constructed at the upper edge to catch runoff water from the surrounding field. The surface should then be planted using revegetation Method No. 5.

Area #6 includes 3 acres of bare, gullied land which contributes acid runoff to Trout Run. Selected grading should be done on this area to provide an adequate water handling system and the area should be reseeded using revegetation Method No. 1.

Estimated Cost of Reclamation:

Area #1		
4.9 acres of clearing		\$ 500
4.9 acres of revegetation Method No. 1		1,500
Areas #3 and #4		
11 acres of clearing		1,100
Surface sealing of final cut		1,000
17.1 acres of Terrace Backfill		25,600
17.1 acres of revegetation Method No. 1		5,100
Areas #5		
3.3 acres of selected grading		2,000
2400 Feet of Diversion		2,400
3.3 acres of revegetation Method No. 5		700
Area #6		
3 acres of selected grading		1,800
3 acres of revegetation Method No. 1		900
TOTAL		\$42,600

If the above reclamation does not accomplish acid mine drainage abatement from the three deep mine openings associated with this site, these should be sealed.

Estimated Cost	\$60,000
TOTAL	\$102,600

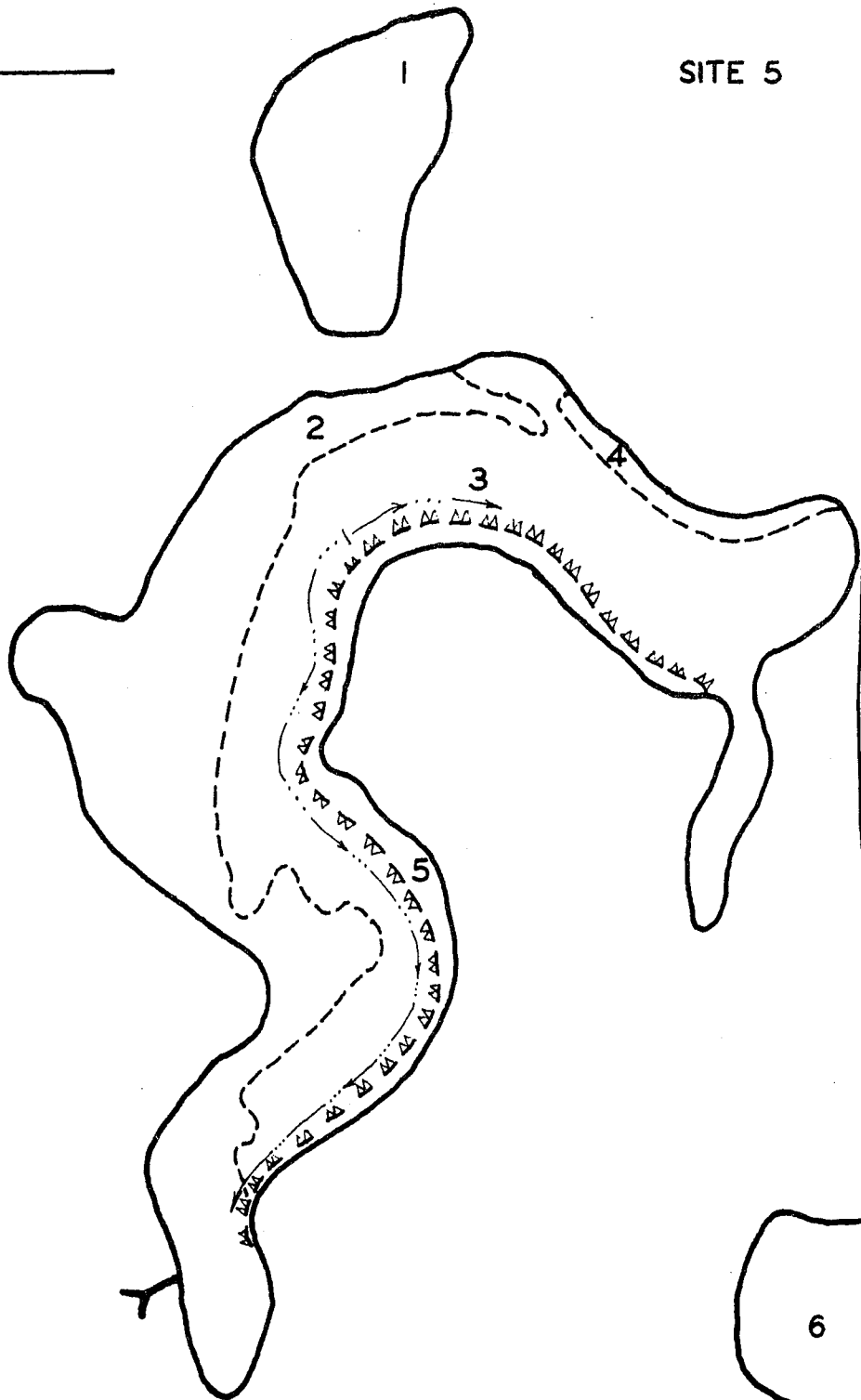


Figure 35. This seep which comes out of the lower side of the spoil area in the western end of area 2 on mine site 5 is a major source of pollution on Bullion Run. During the wet period in late June 1972, this seep had an estimated discharge of 400 pounds of acid per day. This mine intersects with old deep mine workings on the hillside, and the final cut needs to be backfilled with compacted earth to provide surface drainage and to prevent high rates of infiltration into the subsurface openings which are causing these kinds of seeps on the hillside.

N

SITE 5

Y  
Y



T-349

BULLION

RT 308

## SITE 6

This strip mine covers 2.0 acres and the surface drainage goes into Trout Run. However, any deep seepage could contribute to pollution in Bullion Run also. The spoil has been graded but has sparse vegetation. The spoil pH is about 4.2. Runoff from this bare spoil area contains acid. The surface should be stabilized by planting using revegetation Method No. 1.

### Estimated Cost of Reclamation

2.0 acres of revegetation Method No. 1	\$600
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## SITE 7

This strip mine covers 5.8 acres which lie entirely within State Game Land #39. Almost the entire area has been planted to Pine, now standing 12 to 15 feet high, which provide adequate soil erosion control.

No additional reclamation for acid control is needed on this site.

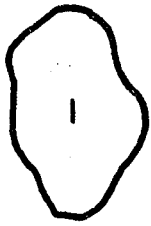
## SITE 8

This strip mine covers 11 acres within State Game Land #39. A small part of the surface drainage goes south into Trout Run with the remainder going into Bullion Run. The spoil material has a pH of about 4.0.

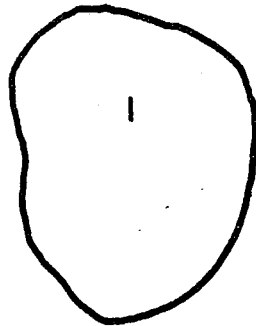
No additional work is needed for acid control on this site.



.75 mi to Pa Rt-308

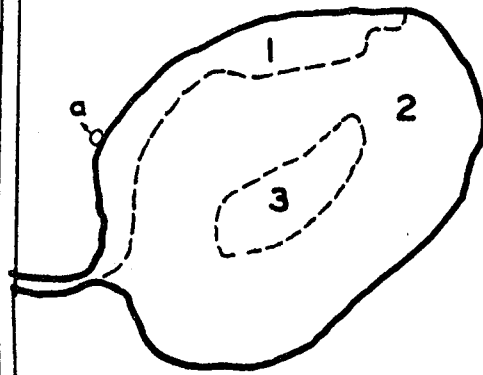


SITE 6



SITE 7

T-349



SITE 8



## SITE 9

This strip site covers 39.5 acres in State Game Lands #39. Most of the area has been regraded and planted to same type of vegetation. However, the vegetation has not survived and reproduced well so that the surface remains exposed and runoff from the area contains in excess of 100 pounds of acid per day which flows into Bullion Run.

The strip mine permit application for this site contains reference to an old deep mine opening. However, extensive field exploration failed to turn up any present remains of this opening and no acid seepage points were found that could be attributed to deep mine workings.

Area #1 covers 8.6 acres with about 0.6 acres of wet weather pools. Surface drainage to the north through point "a" shows a net acidity of 80 parts per million. Drainage to the south through point "d" shows a net acidity of 450 parts per million. This area contributes an average of more than 100 pounds of acid per day to Bullion Run. Selected grading is required on this area to provide adequate drainage and water handling and the surface should be reseeded using revegetation Method No. 1.

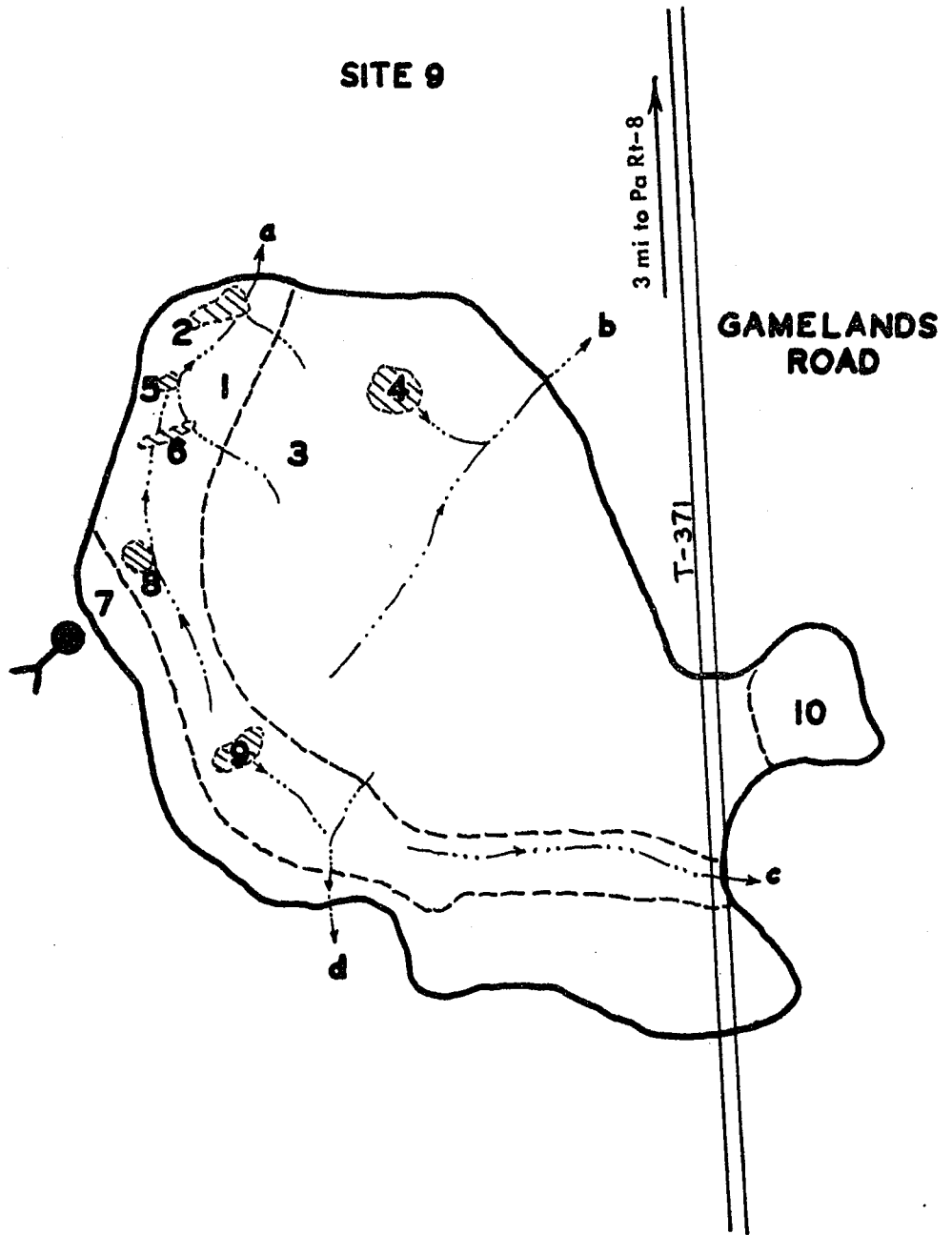
Areas #3 and #7 cover 28.8 acres. The area is well graded but the surface is scattered with a lot of red and black mine waste material. The spoil pH is generally less than 5.0 and vegetation is sparse in most areas. This area should be reclaimed using revegetation Method No. 1.

Area #10 covers 1.5 acres which includes a small unreclaimed cut area and some exposed coal waste. This area should be regraded to fit the original contours and reseeded using revegetation Method No. 1.

Estimated Cost of Reclamation:

Area #1		
8.6 acres of selected grading		\$ 5,200
8.6 acres of revegetation Method No. 1		2,600
Area #3 and #7		
28.8 acres of revegetation Method No. 1		8,700
Area #10		
1.5 acres of contour backfilling		2,700
1.5 acres of revegetation Method No. 1		<u>500</u>
	TOTAL	\$19,700

**SITE 9**



3 mi to Pa Rt-8

**GAMELANDS ROAD**

T-371

10



## SITE 12

This strip mine site covers 32.9 acres on the watershed divide with drainage into the extreme upper portions of Bullion Run, Trout Run and the Upper Main Stream. Most of the drainage flows north through Sampling Station No. 1. The planned four-lane relocation of Route 8 will pass through the western end of this site. Because of this the reclamation plans were omitted from the Bullion Run Quick Start Report. The site is extremely rough and covered with trees 8 to 14 years old. Water in pools on the site has pH ranging from 3.8 to 5.1 and seepage water has 230 parts per million acid. The spoil pH ranges from 4.8 to 5.4.

Areas #1, #3 and #6 cover 27.9 acres which are very rough but have adequate vegetative cover. No additional reclamation is needed on these areas for acid control.

Areas #4 and #7 are acid pools and Area #8 is a final cut with exposed coal refuse in the bottom. Water seepage from these areas was found to contain 230 parts per million net acid. These areas should be regraded to drain the pools and bury the coal refuse under at least 5 feet of compacted soil with a clay content of at least 20%. The regraded surface should blend into the surrounding contours. The area then should be reseeded using revegetation Method No. 1.

Area #2 is 2.3 acres of rough, eroding material along Township Road T-342. No additional reclamation for acid drainage is needed on this area.

Estimated Cost of Reclamation:

Areas #4, #7 and #8	
2 acres of clearing	\$ 200
2.7 acres of contour regrading	3,300
Surface sealing of final cut	1,000
2.7 acres of revegetation Method No. 1	<u>800</u>
TOTAL	\$5,300

RT. 8



SITE 12

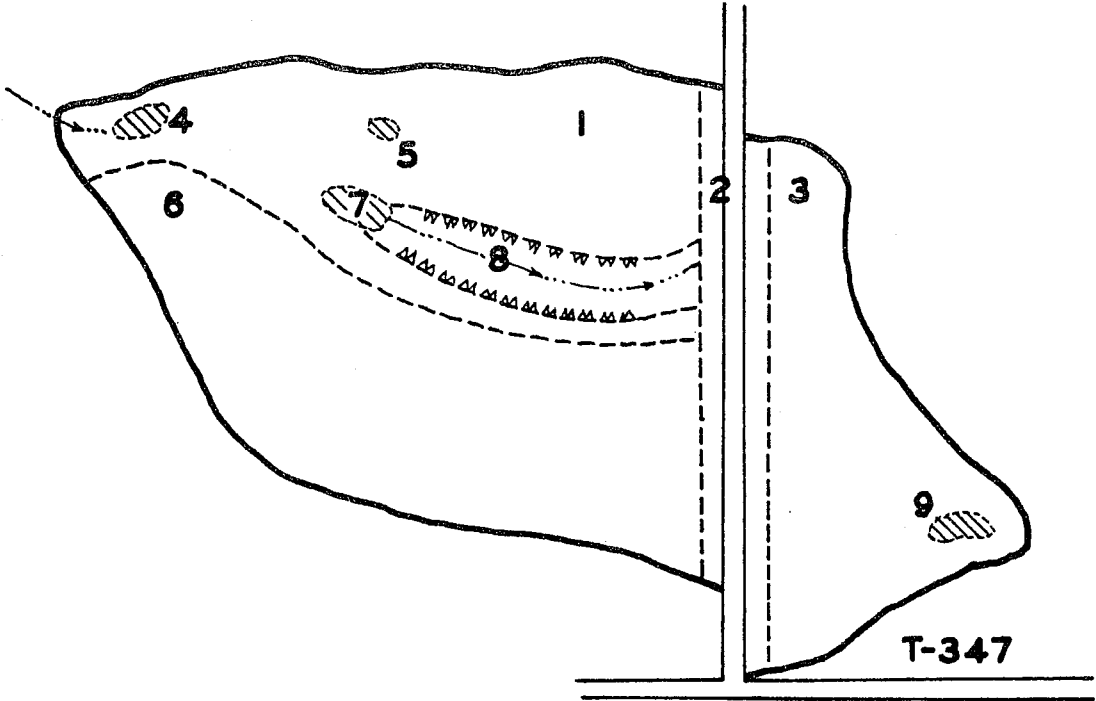


TABLE 10. SUMMARY OF ABATEMENT PLANS AND COSTS FOR THE BULLION RUN SUBWATERSHED

ABATEMENT METHOD																	
Mine Site No.	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	Cost	TOTAL COST
1																	*
2																	*
3																	*
4					6.7	10000	19.9	2000			27.7	8200					\$ 30,200
5	15.9	1600	17.1	25600			6.3	3800	1000	60000	28.3	8200	2400	2400			\$102,600
6											2.0	600					\$ 600
7																	*
8																	*
9					1.5	2700	8.6	5200			38.9	11800					\$ 19,700
12	2.0	200			2.7	3300			1000		2.7	800					\$ 5,300
TOTAL																\$158,400	

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