

SUB-WATERSHED 3R  
(BEAVERDAM CREEK)

Sub-watershed 3R (Beaverdam Creek)

General Discussion

This sub-watershed encompasses 19.4 square miles or 12,426 acres of land, which is 13.96% of the total study area. It is drained by 35.5 miles of tributaries (15.11% of the total length of all watershed tributaries) and contains 10.5 acres of ponds and lakes (.08% of the total sub-watershed area). Commonwealth records indicate 11 surface mines and 13 deep mines in this drainage basin. Our field investigations find 9 surface mines, none flowing, and 34 deep mine openings, 14 of which are flowing.

The following information gives the averages of the sampling station designated as SC3R1, located at the mouth of Beaverdam Creek and shown on drawing 7119-6. The percentage that this station contributes in pollution load and flow to the total pollution load and flow, as measured at Monitoring Station SC1 on Stony Creek, is also included.

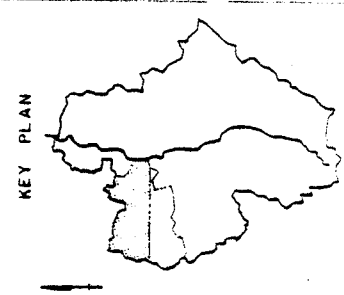
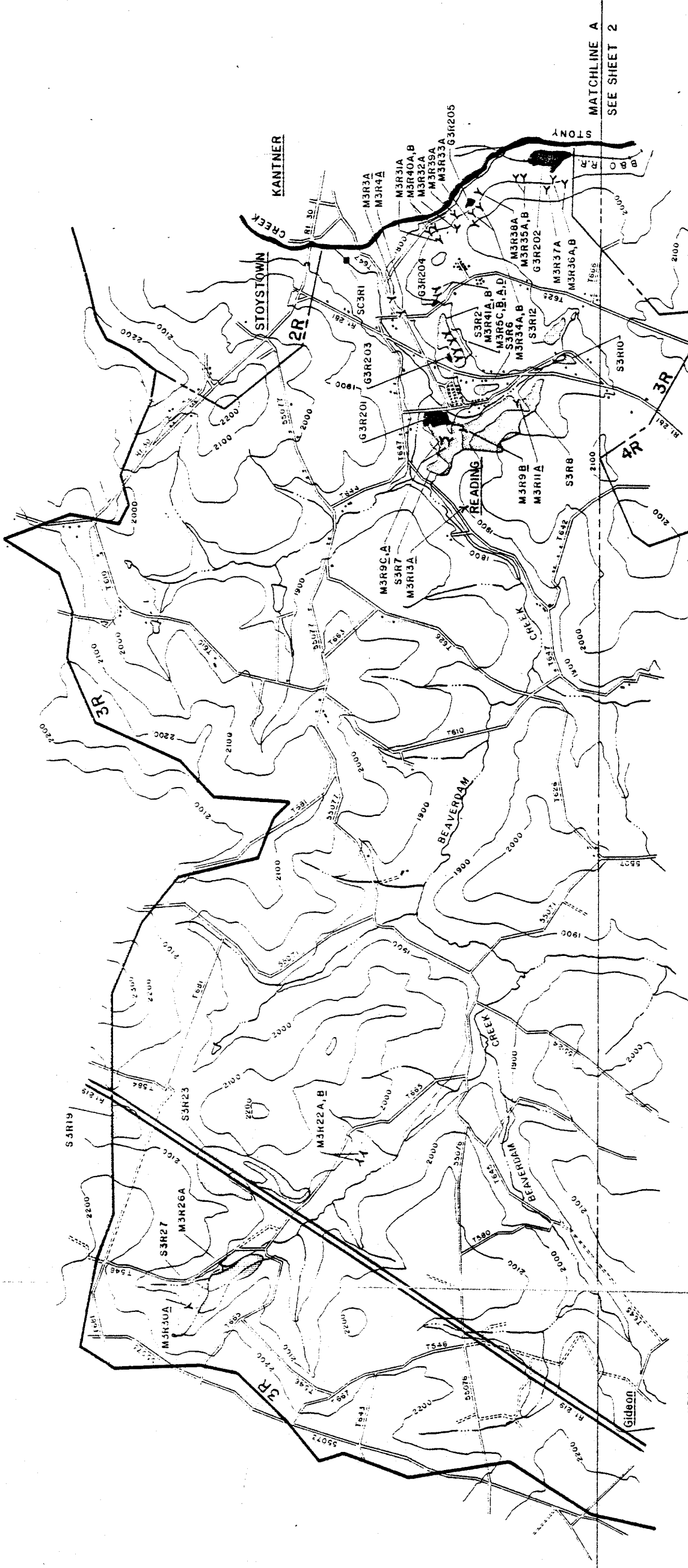
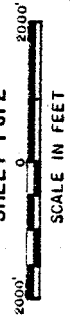
	<u>Averages</u>	<u>Percent of Total Watershed</u>
pH	6.9	
Net Cold Acidity	0 PPD	0%
Net Hot Acidity	0 PPD	0%
Ferrous Iron	17.21 PPD	2.24%
Total Iron	54.63 PPD	1.22%
Sulfate	9,501.00 PPD	4.93
Hardness	24,647.00 PPD	11.97%
Flow	17,719,200 GPD	11.10%

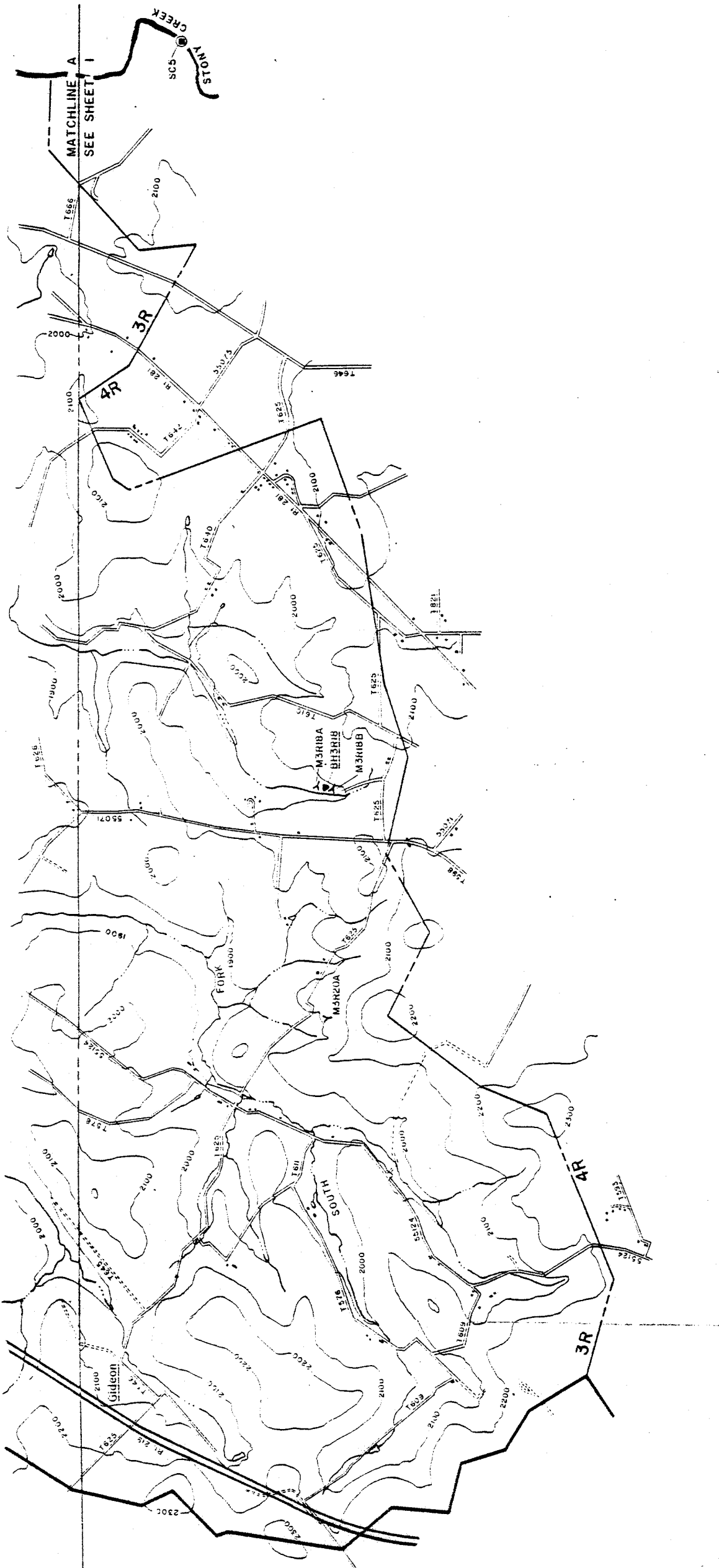
We have, at times, noticed a whitish substance flowing from one of the mine openings near the mouth of Beaverdam Creek. This substance discolors a small portion of Stony Creek as it crosses U.S. Route 30. Microbac Laboratories

identified this substance to be iron-aluminum-hydrate in quantities up to 20 PPM.

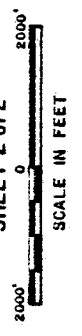
The following plates show the locations of all deep mine openings and strip mines where they exist within this sub-watershed, as well as the locations of all sampling stations.

**MAP OF  
SUB-WATERSHED 3R  
(BEAVERDAM CREEK)**  
SHEET 1 of 2

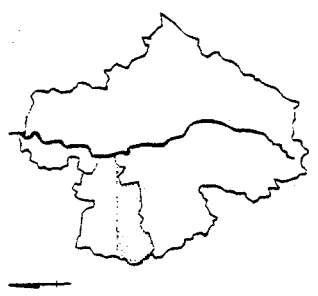




**MAP OF  
SUB-WATERSHED 3R  
(BEAVERDAM CREEK)  
SHEET 2 of 2**



KEY PLAN



## Deep Mines

The Commonwealth records indicate that there are 13 deep mines in this sub-watershed. Our field investigations locate 34 deep mine openings of which 14 are flowing. Table 71 lists the abandoned deep mines within the sub-watershed with the following information: name of mine or operator if known, available mine maps, acres and seam mined, mine opening designation, openings with flows, estimated elevation of openings, and head in feet, which is the difference in coal elevations on an up-dip mine.

Table 72 gives the averages of the abandoned deep mine flows. Directly under the averages are the percentages of flows and pollution loads that each contributes to the pollution load of the sub-watershed as measured at Sampling Station SC3R1 (Beaverdam Creek). The averages, taken at mine openings, are added together where more than one opening of a mine complex has a flow.

TABLE 71

Abandoned Deep Mines  
Sub-watershed 3R

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
M3R3	Unkown	No	-	C*	M3R3A	1800'	Yes	72'
M3R4	Unknown	No	-	C*	M3R4A	1800'	Yes	100'
±M3R5	Royal Quemahoning	No	-	D*	M3R5A	1870'	Yes	100'
				D*	M3R5B	1870'	Yes	
				D*	M3R5C	1870'	No	
				D*	M3R5D	1870'	Yes	
±M3R9	Atlantic Coal & Coke Co. Vulcan #1	Yes	475.4	D	M3R9A	1810'	Yes	250'
	Flick Coal Co., #4 Mine & Reading #5	Yes	547.3	D	M3R9B	1860'	Yes	
	Atlantic Coal & Coke Co., Vulcan #1			D	M3R9C	1810'	Yes	
±M3R11	Reading Iron Co. Mine #4	Yes	145	E	M3R11A	1900'	Yes	75'
M3R13	Unknown	-	-	D*	M3R13A	1900'	Yes	25'
M3R18	Atlantic Coal Co.	No	-	E*	M3R18A	1980'	No	60'
				E*	M3R18B	1980'	No	
M3R20	Unknown	No	-	E*	M3R20A	2020'	No	-
M3R22	Unknown	No	-	E*	M3R22A	1980'	No	50'
		-	-	E*	M3R22B	1980'	Yes	
±M3R26	Atlantic Coal Co.	No	-	E*	M3R26A	2000'	No	-

TABLE 71 (Contd.)

Abandoned Deep Mines  
Sub-watershed 3R

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
M3R30	Unknown	No	-	E*	M3R30A	2050'	Yes	100'
M3R31	(See M3R34)	-	-	D*	M3R31A	1920'	No	-
M3R32	(See M3R34)	-	-	D*	M3R32A	1920'	No	-
M3R33	(See M3R34)	-	-	D*	M3R33A	1950'	No	-
M3R34	Royal Quemahoning	Yes	516	D*	M3R34A	1907'	No	72'
				D*	M3R34B	1907'	No	
M3R35	Royal Quemahoning	Yes	342	C'	M3R35A	1880'	No	100*
				C'	M3R35B	1880'	No	
M3R36	(See M3R35)	-	-	C'	M3R36A	1880'	No	100*
				C'	M3R36B	1900'	No	
M3R37	(See M3R34)	-	-	D*	M3R37A	1930'	No	
M3R38	(See M3R35)	-	-	C'	M3R38A	1880'	No	100*
M3R39	(See M3R35)	-	-	C'	M3R39A	1880'	No	100*
M3R40	(See M3R35)	-	-	C'	M3R40A	1880'	No	100*
				C'	M3R40B	1880'	No	
M3R41	Flick Mine	Yes	361	D*	M3R41A	1843'	Yes	25*
				D*	M3R41B	1843'	No	

\*Indicates assumed.

↗ Possible connection with Strip Mine S3R2.

↘ Possible connection with Strip Mine S3R7.

≡ Possible connection with Strip Mine S3R8.

+ Possible connection with Strip Mine S3R27.



TABLE 72

Abandoned Deep Mine Average Water Quality Data  
Sub-watershed 3R

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
M3R3	6.5	.03	*	.03	.08	7.8	10.5	21,600
		-		-	.2%	.1%	.1%	.1%
M3R4	6.4	0	*	.79	4.47	3,151.8	4,474	1,192,320
		-		4.6%	8.2%	33.2%	18.2%	6.7%
M3R5	5.4	.49	.38	.02	.05	5.02	25.94	23,040
		-	-	.1%	.1%	.1%	.1%	.1%
M3R9	6.6	0	*	.92	16.21	1,519.56	3,241.7	1,379,520
		-		5.4%	29.7%	16%	13.2%	7.8%
M3R11	6.2	1.60	0	.02	.05	10.96	21.68	28,800
		-	-	.1%	.1%	.1%	.1%	.2%
M3R13	7.2	0	*	.0	.0	.51	1.11	2,880
		-		-	-	-	-	-
M3R22	3.9	24.01	4.81	.04	1.10	86.42	83.94	44,640
				.2%	2.01%	.9%	.3%	.3%
M3R30	6.9	0	*	.09	.51	139.86	513.76	203,040
		-		.5%	.9%	1.5%	2.1%	1.2%
M3R41	6.4	0	*	.13	.13	4.39	*	18,720
		-		.5%	.2%	.1%	-	.1%

TABLE 72 (Contd.)

Abandoned Deep Mine Average Water Quality Data  
Sub-watershed 3R

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
BH3R18	6.4	0	0	1.92	35.97	1,643	3,709	2,040,480
		-	-	11.2%	65.8%	17.3%	15.1%	11.5%

\*Not analyzed.

### Strip Mines

The Commonwealth records indicate that there are 11 strip mines in this sub-watershed. Our field investigations locate 9 surface mines with none having flows. Table 73 lists the abandoned strip mines within this sub-watershed with the following information: the name of the mine or operator if known, the area and seam mined, the designation we give the mine, whether or not there is a flow, and whether it connects with a deep mine.

The total acreage of abandoned surface mines in subwatershed 3R is 150.55 acres (1.21 of the sub-watershed area).

TABLE 73

Abandoned Surface Mines  
Sub-watershed 3R

Mine Number	Name of Mine or Operator	Area Mined (Acres)	Seam Mined	Flowing	Connection w/Deep Mine
S3R2	Swank	10.10	E,D,C'	No	M3R5
S3R6	Ray E. Bruening	3.67	D	No	No
S3R7	James Anderson	17.44	E, C'	No	M3R9
S3R8	Godin & Schmidt	33.97	E	No	M3R11
S3R10	Godin & Schmidt	4.59	D	No	No
S3R12	Alumbaugh Coal Co.	3.67	E	No	No
S3R19	Unknown	11.93	-	No	No
S3R23	Lloyd C. Manges	45.90	E, C'	No	No
S3R27	Deer Field Coal Co.	19.28	E	No	M3R26

## Recommendations

Although this sub-watershed is, by the Commonwealth's standards, a non-polluting tributary, there is one mine complex that should be given attention due to the amount of AMD that it places in this otherwise clean stream.

Table 74 gives the recommendations for the polluting deep mines along with the costs associated with each recommendation.

An estimated effectiveness of 60% reduction of pollution load is assigned for each recommendation.

Table 75 gives the sources abated, the amount of benefication and the costs associated with each plan.

TABLE 74

Recommended Abatement Procedures - Cost Benefication  
Sub-watershed 3R

Rank	Number	Recommended Abatement		Total Costs		Cost \$/Pound Acid Removal		Total Acid Abatement ppd	Total Iron Abatement ppd	Percent of Total Sub-watershed	
		Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources			Acid Iron	Acid Iron
1	M3R22	2 Seals	-	\$ 40,000	\$ 40,000	\$ 2,776	\$ 2,776	14.41	.66	-	2.08%
2	M3R11	1 Seal	2 Seals	20,000	60,000	68,966	206,897	.96	.03	-	.10%
3	M3R5	4 Seals	-	100,000	100,000	217,391	217,391	.29	.03	-	.03%
4	M3R3	1 Seal	-	25,000	25,000	1,250,000	1,250,000	.02	.05	-	.16%

Note: The potential costs above include known costs.

TABLE 75

Beneficiation - Recommended Plans  
Sub-watershed 3R

Plan	Above Sources Abated	Acid		Iron		Total Construction Costs	
		ppd	% of Total Sub-water- shed	ppd	% of Total Sub-water- shed	Flowing Sources	Potential Sources
A	1 thru 4	15.68	-	.77	2.37%	\$185,000	\$225,000
B	1	14.41	-	.66	2.08%	40,000	40,000

It is recommended that Plan "B" be initiated for this sub-watershed.

SUB-WATERSHED 5L  
(UN-NAMED)



Sub-watershed 5L (unnamed)

General Discussion

This sub-watershed encompasses 2.4 square miles, or 1,550 acres of land area approximately 1.74% of the total study area. It is drained by 7.5 miles of tributaries (3.19% of the total length of all watershed tributaries) and contains 6.9 acres of lakes and ponds (.45% of this sub-watershed area). Commonwealth records indicate 9 strip mines and 18 deep mines in this sub-watershed. We find 9 surface mines, 5 flowing, and 35 deep mine openings, 26 of which are flowing.

The following is a summation of the pollution loads and flow from the three unnamed major tributaries SC5L1, SC5L2, and SC5L3, in this sub-watershed located on drawing 7119-6. The percentage that these stations contribute to the total pollution load measured at Monitoring Station SC1 on Stony Creek is included also.

	<u>Averages</u>	<u>Percent of Total Watershed</u>
pH	4.0	
Net Cold Acidity	470.87 PPD	1.51%
Net Hot Acidity	404.86 PPD	.37%
Ferrous Iron	5.07 PPD	.66%
Total Iron	42.81 PPD	.96%
Sulfate	3,267.60 PPD	1.69%
Hardness	3,744.00 PPD	1.82%
Flow	1,706,400 GPD	1.07%

The following plate shows the locations of all deep mine openings and strip mines where they exist within this subwatershed, as well as the locations of all sampling stations.

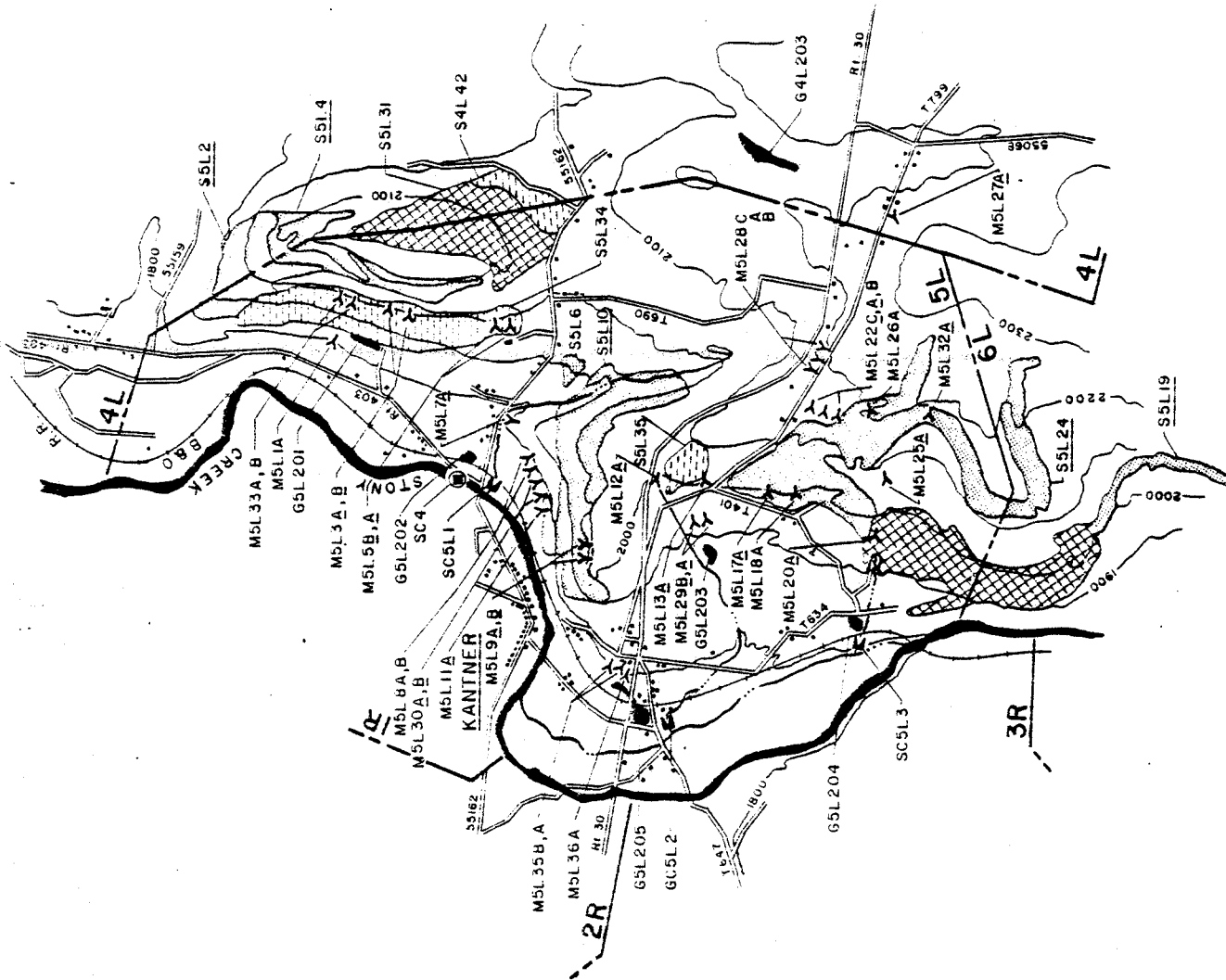
## Deep Mines

The Commonwealth records indicate that there are 18 deep mines in this sub-watershed. Our field investigations locate 35 deep mine openings of which 26 are flowing. Table 76 lists the abandoned deep mines within the sub-watershed with the following information: name of mine or operator if known, available mine maps, acres and seam mined, mine openings with flows, estimated elevation of openings, and the head in feet, which is the difference in coal elevations on an up-dip mine.

Table 77 gives the averages of the abandoned deep mine flows. Directly under the averages are the percentages of flows and pollution loads that each contributes to the pollution load of the sub-watershed as measured at Sampling Stations SC5L1, SC5L2, and SC5L3. The readings at these three stations are combined to give total pollution values for this sub-watershed. The averages, taken at the mine openings, are added together where more than one opening of a mine complex has a flow.

# MAP OF SUB-WATERSHED 5L

(UN-NAMED)



KEY PLAN

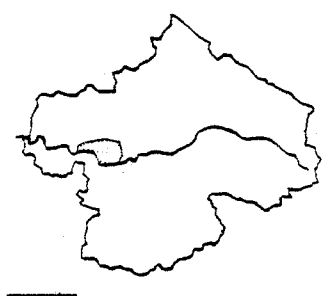


TABLE 76

Abandoned Deep Mines  
Sub-watershed 5L

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
M5L1	C & G Coal Co.	No	-	B*	M5L1A	1800'	No	-
M5L3	Berkebile Bros. Coal Co.	Yes	34.6	C'	M5L3A	2000'	Yes	-
				C'	M5L3B	2000'	Yes	
<del>M5L5</del>	B & B Coal Co.	No	-	C'*	M5L5A	1990'	Yes	50'
		-		C'*	M5L5B	1990'	Yes	
M5L7	Quemahoning Coal Mines	Yes	94.5	B	M5L7A	1800'	Yes	100'
M5L8	(See M5L7)	-	-	B	M5L8A	1790'	No	-
				B	M5L8B	1790'	No	
→M5L9	(See M5L7)	-	-	B	M5L9A	1790'	Yes	100'
		-		B	M5L9B	1790'	Yes	
M5L11	(See M5L7)	-	-	B	M5L11A	1790'	Yes	100'
M5L12	Griffith S. Meyers	No	-	C'*	M5L12A	2000'	Yes	50'
M5L13	Griffith S. Meyers	No	-	C'*	M5L13A	2020'	Yes	50'
≡M5L17	Roy #7 Mine	Yes	75.6	C'	M5L17A	1980'	Yes	150'
≡M5L18	(See M5L17)	-		C'	M5L18A	1980'	No	-
≡M5L20	Russell Kennedy & Oscar Bruening	No	-	C'*	M5L20A	1940'	Yes	75'
+M5L22	V. R. Paul Coal Co.	Yes	68.7	E	M5L22A	2160'	Yes	-
				E	M5L22B	2160'	No	

TABLE 76 (Contd.)

Abandoned Deep Mines  
Sub-watershed 5L

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
				E	M5L22C	2160'	Yes	-
M5L25	Swank Coal Co.	Part.	-	C'	M5L25A	2050	Yes	75'
M5L26	J. M. Croyle & Son	No	-	C'*	M5L26A	2200'	No	-
M5L27	Camarco & Miller	No	-	C'*	M5L27A	2250'	Yes	Down Dip
M5L28	Unknown	No	-	E*	M5L28A	2180'	No	-
				E*	M5L28B	2180'	No	
				E*	M5L28C	2180'	No	
M5L29	Unknown	No	-	C'*	M5L29A	1930'	Yes	50**
				C'*	M5L29B	1930'	Yes	
M5L30	(See M5L7)	-	-	B	M5L30A	1790'	Yes	100'
				B	M5L30B	1790'	Yes	
M5L32	Quemahoning Valley Coal Co.	Yes	56.5	D	M5L32A	2180'	Yes	20'
M5L33	Berkebile Coal Co.	No	24.6	C'*	M5L33A	2000'	Yes	-
				C'*	M5L33B	2000'	Yes	
M5L35	Bowman #1	Yes	29.4	C'	M5L35A	1800'	Yes	50'
				C'	M5L35B	1800'	Yes	
M5L36	(See M5L7)	No	-	C'*	M5L36A	1780	Yes	

TABLE 76 (Contd.)

Abandoned Deep Mines  
Sub-watershed 5L

\*Indicates assumed.

∕ Possible connection with Strip Mine S5L34.

→ Possible connection with Strip Mine S5L10.

≐ Possible connection with Strip Mine S5L19.

∅ Possible connection with Strip mine S5L24.

TABLE 77

Abandoned Deep Mine Average Water Quality Data  
Sub-watershed 5L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
M5L3	3.3	939.88	1,038.77	4.49	124.77	1,557.85	623.97	129,600
		199.6%	256.6%	88.6%	291.5%	47.7%	16.7%	7.6%
M5L5	3.3	63.94	29.42	1.84	12.92	135.02	162.25	50,400
		13.6%	7.3%	36.3%	30.2%	4.1%	4.3%	3%
M5L7	3.9	.69	.64	0	0	.97	.86	2,880
		.2%	.2%	-	-	-	-	.2%
M5L9	3.7	2.56	5.90	.01	.12	9.64	9.46	8,640
		.5%	1.5%	.2%	.3%	.3%	.3%	.5%
M5L11	3.1	243.65	169.15	2.47	25.23	519.44	610.63	108,600
		51.8%	41.8%	48.7%	58.9%	15.9%	16.3%	6.4%
M5L12	7.4	0	*	0	0	.71	2.70	1,440
		-	-	-	-	-	.1%	.1%
M5L13	6.1	0	.22	0	.51	12.51	12.82	7,200
		-	.1%	-	1.2%	.4%	.3%	.4%
M5L17	3.3	97.13	51.58	.56	4.86	636.54	749.85	64,800
		20.6%	12.7%	11.1%	11.4%	19.5%	20%	3.8%

TABLE 77 (Cont d.)

Abandoned Deep Mine Average Water Quality Data  
Sub-watershed 5L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
M5L20	3.0	43.63 9.3%	11.76 2.9%	1.29 25.4%	9.38 21.9%	141.31 4.3%	127.53 3.4%	17,280 1%
M5L25	2.9	30.50 6.5%	3.48 .9%	1.2 23.7%	11.19 26.1%	67.54 2.1%	56.08 1.5%	8,640 .5%
M5L27	6.7	0 -	* -	.01 .2%	.04 .1%	2.44 .1%	11.13 .3%	15,840 .9%
M5L29	3.4	190.95 40.6%	100.01 24.7%	.75 14.8%	4.55 10.6%	1,177.82 36.1%	1,308.69 35%	139,680 8.2%
M5L30	7.0	0 -	* -	0 -	0 -	2.33 .1%	5.58 .2%	5,760 .3%
M5L32	3.6	40.48 8.6%	1.2 .3%	.04 .8%	.33 .8%	48.31 1.5%	49.21 1.3%	103,680 6.1%

\*Not analyzed.



## Strip Mines

The Commonwealth records indicate that there are 9 strip mines in this sub-watershed. Our field investigations located 9 surface mines with 5 flowing. Table 78 lists the abandoned strip mines within the sub-watershed with the following information: the name of the mine or operator if known, the area and seam mined, the designation we give the mine, whether or not there is a flow, and whether it connects with a deep mine.

The total acreage of abandoned surface mines in subwatershed 5L is 433.30 acres (27.96% of this sub-watershed area).

Table 79 gives the averages of the abandoned surface mine flows. Directly under the averages are the percentages of flows and pollution load that each contributes to the pollution load of the sub-watershed as measured at SC5L1, SC5L2, and SC5L3.

Where a single surface mine has more than one flow, the averages of the flows are added together.

Following Table 79 are the descriptions of the flowing strip mines along with abatement recommendations.

TABLE 78  
Abandoned Surface Mines  
Subwatershed 5L

Mine Number	Name of Mine or Operator	Area Mined (Acres)	Seam Mined	Flowing	Connectin w/Deep Mine
S5L2	Freeman Berkebile	29.38	C'	Yes	M4L4
S5L4	L. C. Mining Co.	33.97	B	Yes	No
S5L6	Gavin S. Miller	2.75	D,C',B	No	No
S5L10	Buhl A. Black	65.18	E,D	Yes	M5L9
S5L19	James Anderson & Gavin S. Miller	76.19	D,E,C',B	Yes	M5L17, M5L18, M5L20
S5L24	Lebor Coal Co.	105.57	B	Yes	M5L22, M5L26, M5L32
S5L31	Unknown	60.59	-	No	No
S5L34	Unknown	50.49	-	No	M5L5
S5L35	Unknown	9.18	-	No	No

TABLE 79

Abandoned Surface Mine Average Water Quality Data  
Sub-watershed 5L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
S5L2	5.0	15.83	*	4.40	9.66	470.62	*	125,280
		3.4%		86.8%	22.6%	14.4%		7.3%
S5L4	4.9	7.76	*	5.96	1.53	176.00	*	70,560
		1.7%		117.6%	3.6%	5.4%		4.1%
S5L10	5.5	1.20	*	.10	.23	18.59	*	40,320
		.3%		2%	.5%	.6%		2.4%

\*Not analyzed.

Strip Mine: S5L2

Area: 29.38 acres

Location: South of LR. 55159

Status: Abandoned

Owned by: Freeman Berkebile

Seam Mined: C'

Connection with deep mines: M4L4

Flowing: Six leaching areas

General Description:

Large depressions collecting runoff and spoil piles are the principle features of this strip mine. The 20' highwall is located on the north side of the strip area.

Recommendations:

Drainage ditches, backfilling and regrading along with revegetation is necessary on this stripped area.

Costs:

Backfilling, regrading and revegetation

@ \$2,000/acre for 30 acres

\$60,000

Strip Mine: S5L4

Area: 33.97 acres

Location: East of Penna Rt. 403 and South of L. R. 55159

Status: Abandoned

Owned by: L. C. Mining Co.

Seam mined: B

Connection with deep mine: None

Flowing: One leaching area

General Description:

Large depressions, scattered spoil piles and little vegetation are the prominent features of this stripped area.

Recommendations:

Complete regrading and revegetation are necessary on this strip mine.

Cost:

34 acres @ \$2,000/acre

\$68,000

Strip Mine S5L10

Area: 65.18 acres

Location: East of Kantner, south of Lr. 55152, and north of U. S. Rt. 30

Owner: Buhl A. Black

Seams Mined: D, E

Connection with deep mine: M5L9

Flowing: One leaching area

General Description:

The 25' highwall is located on the southern side of this strip mine. Water lies in the ravine made by the highwall and spoil pile. Most of the spoil piles are well vegetated with natural growth.

Recommendation:

A drainage system at top and bottom of highwall will drain the area. Regrading is called for to make this possible, and to eliminate the depressions collecting the runoff. Deep and strip mine reclamation will have to be done in conjunction with each other.

Cost:

Ditches	11,000'	\$11,000
Grading	30 acres @ \$1800/acre	<u>54,000</u>
	Total	\$65,000

## Recommendations

Table 80 gives the recommendations of the polluting deep and surface mines along with the cost associated with each recommendation.

An estimated effectiveness of 60% reduction of the pollution load is assigned for each recommendation.

Table 81 lists the sources abated, the amount of beneficiation and the costs associated with each plan.

The distance from Station SC5L2 to the next polluting tributary downstream, SC4L1 Oven Run, is 2.56 miles. This is the minimum distance on Stony Creek that would benefit from this sub-watershed being cleaned up.

TABLE 80

Recommended Abatement Procedures - Cost Benefication

Sub-watershed 5L

REC NO	Number	Recommended Abatement		Total Costs		Cost \$/Pound Acid Removal		Total Acid	Total Iron	Percent of Total Sub-watershed	
		Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources	Known Sources	Poten- tial Sources	Abate- ment ppd	Abate- ment ppd	Acid	Iron
1	M5L3	2 Seals	-	\$40,000	\$ 40,000	\$ 71	\$ 71	563.93	74.86	119.76	174.87
2	M5L11	1 Seal	9 Seals	20,000	180,000	137	1,231	146.19	15.14	31.05	35.37
3	M5L17	1 Seal	2 Seals	20,000	40,000	344	686	58.28	2.92	12.38	6.82
4	M5L29	2 Seals	-	50,000	50,000	437	437	114.57	2.73	24.33	6.38
5	M5L20	1 Seal	-	25,000	25,000	955	955	26.18	5.63	5.56	13.15
6	M5L32	1 Seal	-	25,000	25,000	1,030	1,030	24.29	.20	5.16	.47
7	M5L5	2 Seals	-	50,000	50,000	1,304	1,304	38.36	7.75	8.15	18.10
8	M5L25	1 Seal	-	25,000	25,000	1,366	1,366	18.30	6.72	3.89	15.70
9	S5L2	29.38 Acres	2 Seals	60,000	110,000	6,316	11,579	9.50	5.80	2.02	13.55
10	S5L4	33.97 Acres	-	68,000	68,000	14,592	14,592	4.66	.92	.99	2.15
11	M5L9	2 Seals	9 Seals	40,000	180,000	25,974	116,883	1.54	.07	.33	.16
12	M5L7	1 Seal	9 Seals	20,000	180,000	48,780	439,024	.41	-	.09	-
13	S5L10	65.18 Acres	9 Seals	65,000	245,000	90,278	340,278	.72	.14	.15	.33

NOTE: The potential costs above include the known costs.

TABLE 81  
 Benefication - Recommended Plans  
 Sub-watershed 5L

Plan	Above Sources Abated	Acid		Iron		Total Construction Costs	
		ppd	% of Total Sub-water- shed	ppd	% of Total Sub-water- shed	Flowing Sources	Potential Sources
A	1 thru 13	1,007	213.86%	123	287.32%	\$508,000	\$1,218,000
B	1 thru 5	910	193.26%	102	238.26%	155,000	335,000
C	1 thru 4	883	187.53%	96	224.25%	130,000	310,000

It is recommended that Plan "C" be initiated for this sub-watershed.