

SUB-WATERSHED 2R
(UN-NAMED)

Sub-watershed 2R (unnamed)

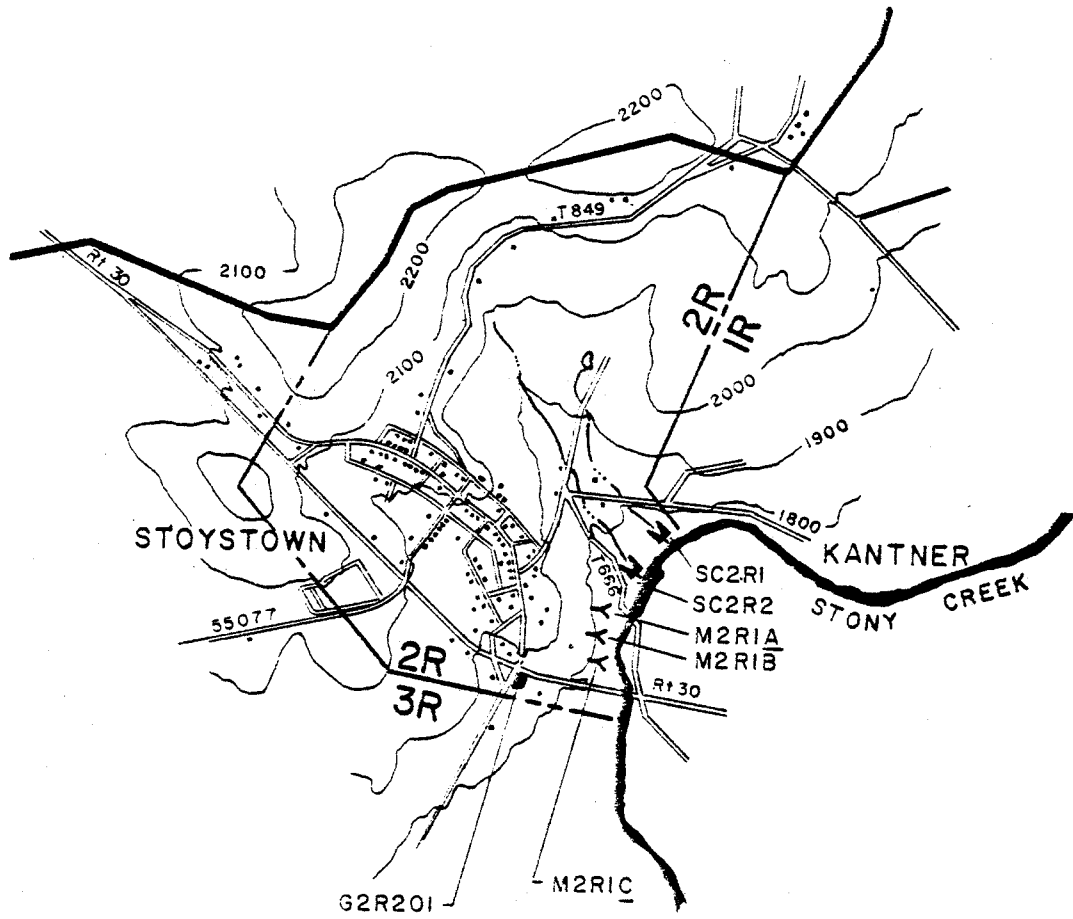
General Discussion

This sub-watershed encompasses seven tenths of a square mile or 452 acres of land, which is approximately .51% of the total study area. It is drained by two small tributaries having a total length of .9 of a mile (.38% of the total length of all watershed tributaries). It also contains .3 acres of lakes and ponds (.07% of the total sub-watershed area). Commonwealth records indicate no mining of any type in this area. Our field investigations find three deep mine openings, two of which are flowing, and no strip mining. The pollution that is emitted from these openings are within the limits set by the Commonwealth; therefore there will be no recommendations for this sub-watershed.

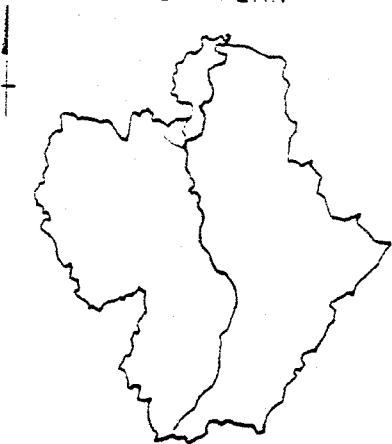
The following is a summation of the flows and pollution loads from the two unnamed tributaries, SC2R1 and SC2R2, located on drawing 7119-6. The percentage that these stations contribute in pollution load and flow to the total pollution load and flow as measure at Monitoring Station SC1 on Stony Creek 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	.50 PPD	.07%
Total Iron	5.13 PPD	.11%
Sulfate	480.80 PPD	.25%
Hardness	304.50 PPD	.15%
Flow	489,600 GPD	.31%

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



KEY PLAN



**MAP OF
SUB-WATERSHED 2R**

(UN - NAMED)
SCALE: 1" = 2000'

Deep Mines

The Commonwealth records indicate no deep mining in this sub-watershed. Our field investigations, however, locate three mine openings, all of which are flowing.

Table 82 lists this mine complex with the following information: name of 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 83 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 this sub-watershed as measured at Sampling Stations SC2R1 and SC2R2. The readings at these two stations are combined to give total pollution values for this subwatershed. The averages, taken at the mine openings, are added together where more than one opening of a mine complex has a flow.

TABLE 82

Abandoned Deep Mines
Sub-watershed 2R

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Est. Elev. of Opening	Flow	Head (Feet)
M2R1	Unknown	No	-	C'*	M2R1A	1800'	Yes	Down Dip
			-	C'*	M2R1B	1800'	Yes	Down Dip
			-	C'*	M2R1C	1800'	Yes	Down Dip

*Indicates assumed.

TABLE 83

Abandoned Deep Mine Average Water Quality Data
Sub-watershed 2R

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
M2R1	6.5	0	*	.07	.07	37.06	*	66,240
		-		14%	1.4%	7.8%		13.5%

*Not analyzed.

SUB-WATERSHED 4L
(OVEN RUN)

Sub-watershed 4L (Oven Run)

General Discussion

This sub-watershed encompasses 7.5 square miles or 4,797 acres of land which is approximately 5.39% of the total study area. It is drained by 26.3 miles of tributaries (11.2% of the total length of all watershed tributaries) and has 7.1 acres in small lakes and ponds (.15% of the total sub-watershed area). Commonwealth records indicate that there are 20 surface mines and 10 deep mines in this area. Our field investigations locate 17 strip mines, with 8 flowing, and 28 deep mine openings, 10 of which have flows.

The following is a summation of the flows from the two sampling stations located at the mouth of the two major tributaries in this sub-watershed and designated as SC4L1 (unnamed), and SC4L2 (Oven Run) located on drawing 7119-6. The percentage that these stations contribute 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	3.7	
Net Cold Acidity	3,086.94 PPD	9.88%
Net Hot Acidity	2,417.12 PPD	2.22%
Ferrous Iron	24.04 PPD	3.13%
Total Iron	156.13 PPD	3.49%
Sulfate	7,199.01 PPD	3.74%
Hardness	14,773.30 PPD	7.17%
Flow	4,464,000 GPD	2.80%

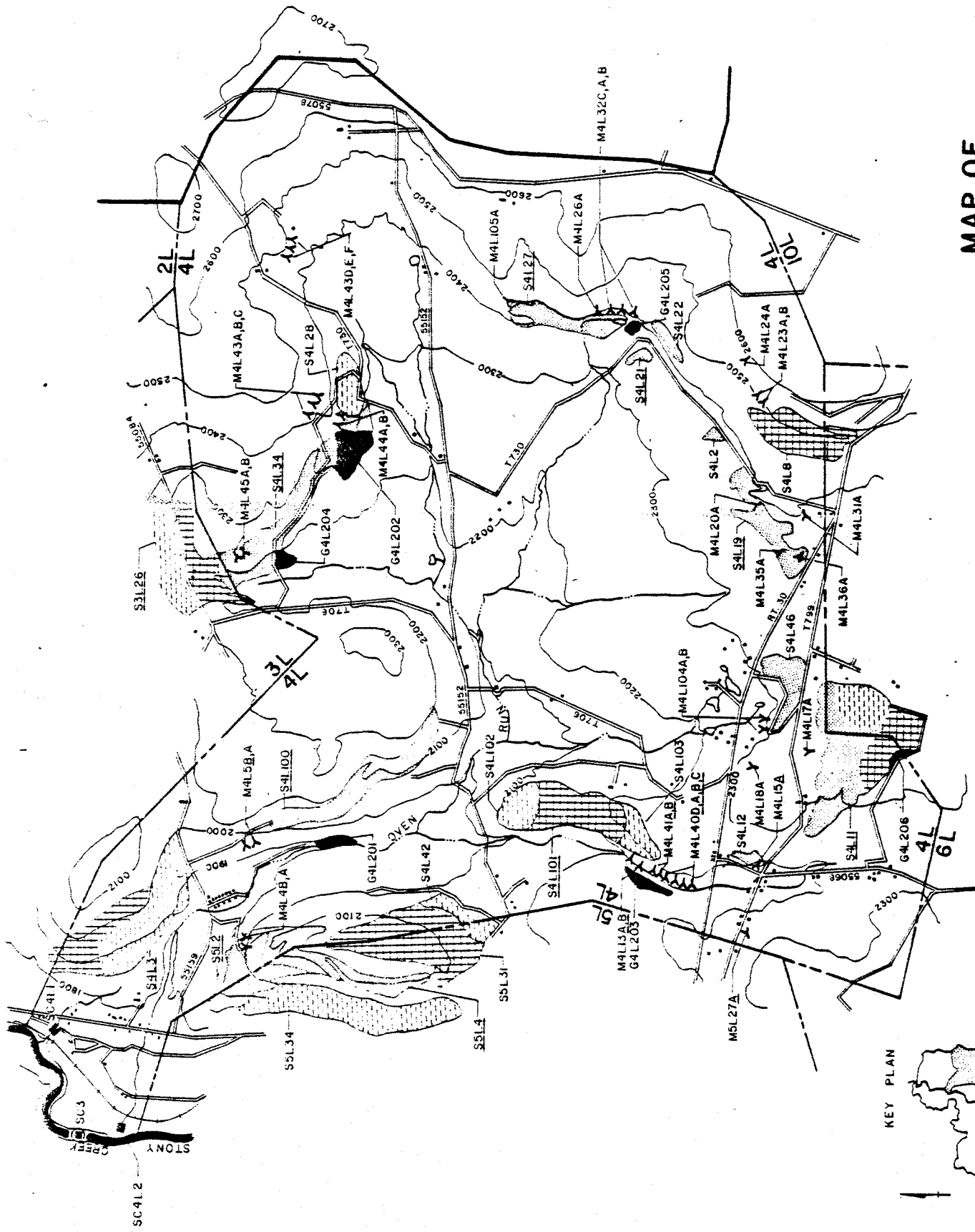
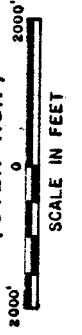
The following plate shows the locations of all deep mine openings and strip mines where they exist within this subwatershed, as well as the locations of all sampling stations.

Deep Mines

The Commonwealth records indicate that there are 10 deep mines in this sub-watershed. Our field investigations locate 28 deep mine openings of which 10 are flowing. Table 84 lists the abandoned deep mines within this 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 the head in feet, which is the difference in coal elevations on an up-dip mine.

Table 85 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 SC4L1 and SC4L2 (Oven Run). The readings at these two stations are combined to give total pollution values from this sub-watershed. The averages, taken at mine openings, are added together where more than one opening of a mine complex has a flow.

MAP OF SUB-WATERSHED 4L (OVEN RUN)



KEY PLAN

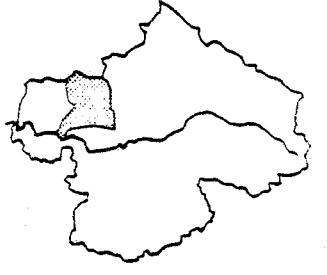


TABLE 84

Abandoned Deep Mines
Sub-watershed 4L

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
↘M4L4	Camarco & Miller	No	-	C'*	M4L4A	1960'	No	-
				C'*	M4L4B	1960'	No	
M4L5	A.M. & K Corp. Mack #1	Yes	340	B	M4L5A	1960'	No	220'
				B	M4L5B	1960'	Yes	
M4L13	Brown Bros. Coal Co.	No	-	B*	M4L13A	2120'	Yes	100'
				B*	M4L13B	2140'	Yes	
↘M4L15	Baker Whitely	No	-	B*	M4L15A	2200'	Yes	50'
M4L17	Dewey Shaffer	No	-	B*	M4L17A	2360'	No	-
M4L18	O. J. Shaw	No	-	B*	M4L18A	2320'	No	-
≡M4L20	Carl E. Wagner & Sons	No	-	B*	M4L20A	2390'	No	-
M4L23	Anson Powell	No	-	E	M4L23A	2500'	No	-
				E	M4L23B	2500'	No	
M4L24	Carl E. Wagner & Sons	No	-	E	M4L24A	2580'	No	-
M4L26	W. J. Honadle	No	-	C'*	M4L26A	2400'	No	-
M4L31	Unknown	No	-	B*	M4L31A	2400'	No	-

TABLE 84 (Contd.)

Abandoned Deep Mines
Sub-watershed 4L

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
M4L32	John Toth Coal Co.	Yes	257	C'	M4L32A	2460'	No	100'
				C'	M4L32B	2460'	No	
				C'	M4L32C	2460'	No	
≠M4L35	Unknown	No	-	B*	M4L35A	2380'	No	-
≠M4L36	Unknown	No	-	B*	M4L36A	2380'	No	-
M4L40	Unknown	No	-	B*	M4L40A	2160'	Yes	100'
				B*	M4L40B	2160'	Yes	
				B*	M4L40C	2160'	Yes	
				B*	M4L40D	2160'	Yes	
M4L41	Unknown	No	-	B*	M4L41A	2140'	Yes	100'
				B*	M4L41B	2140'	Yes	
M4L43**	Solar Fuel Co.	Yes		C'	M4L43A	2420'	No	Down Dip
				C'	M4L43B	2420'	No	
				C'	M4L43C	2420'	No	
				C'	M4L43D	2490'	No	
				C'	M4L43E	2490'	No	
M4L44	Unknown	No		C'	M4L43F	2490'	No	
				B*	M4L44A	2350'	No	-
				B*	M4L44B	2350'	No	

TABLE 84 (Contd.)

Abandoned Deep Mines
Sub-watershed 4L

Mine Number	Name of Mine or Operator	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Head (Feet)
M4L45	Unknown	No	-	C'*	M4L45A	2250'	No	-
				C'*	M4L45B	2250'	No	
M4L104	Unknown	No	-	-	M4L104A	2300'	No	-
				-	M4L104B	2300'	No	
∅M4L105	Unknown	No	-	E*	M4L105A	2440'	No	-

* Indicates assumed.

**Active operation.

↙Possible connection with Strip Mine S5L2.

↘Possible connection with Strip Mine S4L12.

≡Possible connection with Strip Mine S4L19.

∅Possible connection with Strip Mine S4L27.

TABLE 85

Abandoned Deep Mine Average Water Quality Data
Sub-watershed 4L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
M4L5	3.0	1,402.00	934.00	16.80	267.31	1,542.00	558.00	280,800
		45.4%	38.6%	69.9%	171.2%	21.4%	3.8%	6.3%
M4L13	2.9	301.61	1,591.24	9.79	116.40	659.71	294.23	27,480
		9.8%	65.8%	40.7%	74.6%	9.2%	2%	.6%
M4L15	3.1	574.00	612.00	36.49	82.98	1,323.00	886.00	50,400
		18.6%	25.3%	151.8%	53.2%	18.4%	6%	1.1%
M4L40	3.0	177.39	103.92	35.77	66.51	299.22	134.47	24,480
		5.8%	4.3%	148.8%	42.6%	4.2%	.9%	.6%
M4L41	3.9	88.88	212.44	16.66	39.43	156.86	139.31	24,480
		2.9%	8.8%	69.3%	25.3%	2.2%	.9%	.6%

Strip Mines

The Commonwealth records indicate that there are 20 strip mines in this sub-watershed. Our field investigations locate 17 surface mines of which 8 are flowing. Table 86 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 sub-watershed 4L is 431.44 acres (8.99% of this sub-watershed area).

Table 87 gives the averages of the abandoned surface mine flows. Directly under the averages are the percentages of flows and pollution load that each mine contributes to the pollution load of the sub-watershed as measured at Sampling Stations SC4L1 and SC4L2 (Oven Run).

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

Following Table 87 are the descriptions of the flowing strip mines along with abatement recommendations.

TABLE 86

Abandoned Surface Mines

Sub-watershed 4L

Mine Number	Name of Mine or Operator	Area Mined (Acres)	Seam Mined	Flowing	Connection w/Deep Mine
S4L2	Thermal Coal Co.	2.75	E,D	No	No
S4L3	Camarco & Miller	76.19	-	Yes	No
S4L8	Camarco & Miller	31.21	-	No	No
S4L11	Ray E. Bruening	88.13	-	Yes	No
S4L12	E. E. Feller Coal Co.	3.67	B,A'	No	M4L15
S4L19	James D. Powell	22.95	B	Yes	M4L35, M4136
S4L21	Constantino Coal Co.	3.67	C',B	Yes	No
S4L22	Constantino Coal Co.	3.67	C',B	No	No
S4L27	Dunlo Coal Co.	20.20	B	Yes	M4L26, M4L105
S4L28	Somerset High Grade Coal Co.	11.02	B	No	No
S4L34	Unknown	41.31	-	Yes	M4L44, M4L45
S4L42	Unknown	12.85	-	No	No
S4L46	Unknown	17.44	-	No	No
S4L100	Unknown	36.72	-	Yes	No
S4L101	Unknown	34.88	-	Yes	No
S4L102	Unknown	12.85	-	No	No
S4L103	Unknown	11.93	-	No	No

TABLE 87

Abandoned Surface Mine Average Water Quality Data
Sub-watershed 4L

Mine No.	pH	Net Cold Acid ppd	Net Hot Acid ppd	Ferrous Iron ppd	Total Iron ppd	Sulfate ppd	Hardness ppd	Flow gpd
S4L3	4.8	45.20 1.5%	*	10.05 41.8%	22.34 14.3%	778.09 10.8%	*	391,680 8.8%
S4L11	3.4	1,874.90 60.7%	*	6.83 28.4%	13.41 8.6%	3,959.06 55%	*	139,680 3.1%
S4L19	3.3	14.29 .5%	*	.05 .2%	.09 .1%	17.50 .2%	*	41,760 .9%
S4L21	3.2	8.72 .3%	*	.77 3.2%	1.70 1.1%	51.45 .7%	*	21,600 .5%
S4L27	3.6	88.49 2.9%	*	3.77 15.7%	6.25 4%	245.27 3.4%	*	250,560 5.6%
S4L34	4.1	1.51 .1%	*	.02 .1%	.02 -	4.28 .1%	*	11,520 .3%
S4L100	2.7	537.11 17.4%	*	8.49 35.3%	65.94 42.2%	615.91 8.6%	*	138,240 3.1%
S4L101	3.2	435.18 14.1%	*	23.25 96.7%	62.16 39.8%	1,159.30 16.1%	*	135,360 3%

*Not analyzed.

Strip Mine: S4L3

Area: 76.19 acres

Location: South of Pokeytown Run and East of Pa Rt. 403

Status: 30% reclaimed, part active

Owned by: Camarco & Miller

Seam mined: Unknown

Connection with deep mine: None

Flowing: Six leaching areas

General Description:

Two 30' highwalls are perpendicular to a partially reclaimed terraced area. The active portion of the mine is being reclaimed as the strippers finish removing the coal.

Recommendation:

Four diversion ditches should be built along the highwall areas and planting initiated.

Cost based on portion not being mined and reclaimed:

Ditches	\$3,000	\$ 3,000
Vegetation		<u>9,000</u>
Total		\$12,000

Strip Mine: S4L11

Area: 88.13 acres

Location: South of TR. T799, northwest of TR. T 708

Status: Partly abandoned, reclaimed and active operation

Owned by: Ray E. Bruening

Seam mined: Unknown

Connection with deep mine: None

Flowing: Five leaching areas

General Description:

There is neither natural vegetation nor much planted vegetation on this strip. Some recontouring has been done on the north side of the site, however there are quite a few depressions collecting water and allowing leaching. The highwall is 35' to 40' high.

Recommendation:

Drainage ditches are required to remove water from the site. The numerous depressions must be backfilled as well as regraded.

Cost:

Ditch	10,000'	\$10,000
Grading	30% or 27 acres	17,000
Backfilling		3,000
Revegetation	40 acres	<u>20,000</u>
	Total	\$50,000

Strip Mine: S4L19

Area: 22.95 acres

Location: Bounded on the south by U. S. Rt. 30 and the east by TR. T 730.

Status: Abandoned

Owned by: James D. Powell

Seam mined: B

Connection with deep mines: M4L35 and M4L36

Flowing: One leaching area

General Description:

This long and narrow strip is completely surrounded by trees with a few shrubs on it. The five highwalls are 10' to 20' high. Many surface depressions exist where water collects, especially since no longitudinal slope is present for runoff except at the north end of the strip. Two deep mine complexes exist on the strip.

Recommendation:

Terracing of spoil against the highwalls is required for all but the north end highwall. At the north end highwall ditches should be constructed instead of terracing. Deep mine and strip mine reclamation should be done in conjunction with each other.

Cost:

Ditches	5000'	\$ 5,000
Backfilling and grading (75%)	17 acres	31,000
Revegetation	(75%)	<u>14,000</u>
	Total	\$50,000

Strip Mine: S4L21

Area: 3.67 acres

Location: NW of TR. T 730

Status: Abandoned

Owned by: Constantino Coal Co.

Seams mined: B, C'

Connection with deep mine: None

Flowing: One leaching area

General Description:

Very thick vegetation is in evidence over most of the strip area. Depressions allowing leaching through the spoil piles are the major sources of pollution.

Recommendation:

Good drainage is necessary and can be accomplished by a ditch from the depressions to the tributary and from the highwall to the ponds.

Cost:

Ditches	\$3,000
Grubbing	<u>1,500</u>
Total	\$4,500

Strip Mine: S4L27

Area: 20.20 acres centrally

Location: Intersected by TR. T 730

Status: Abandoned

Owned by: Dunlo Coal Company

Seam mined: B

Connection with deep mines: M4L26, M4L105

Flowing: Five leaching areas

General Description:

This stripped area is partially vegetated. Along the 25' highwall water drains to low depressions and leaches through the spoil piles. Two deep mine openings are noted in this highwall.

Recommendation:

Several branches of a ditch system should remove the water and prevent leaching. Beginning along the highwall, going between the now existing spoil piles to a settling pond, some regrading will be necessary. The two deep mine openings and the strip mine reclamation should be done in conjunction with each other.

Cost:

Ditches	6,000'	\$ 6,000
Grading	50% or 10 acres @\$1800/acre	18,000
Revegetation	50%	<u>6,000</u>
	Total	\$30,000

Strip Mine: S4L34

Area: 41.31 acres

Location: Between routes T 706 and T 730

Owned by: Unknown

Seam mined: Unknown

Connection with deep mines: M4L44 and M4L45

Flowing: One leaching area

General Description:

This long rather narrow strip is bordered on one side by a 25' highwall. The narrow bench has depressions which allow leaching under the steep gob piles. The piles are fairly well vegetated with grass while the bench has a tree and grass cover. A deep mine complex is at either end of the strip mine.

Recommendation:

Two ditches: one at the top and one at the base of the highwall, converging at the center through the gob pile area, is recommended. A section of the gob pile will have to be removed to allow drainage.

Cost:

Ditch	8,000'	\$ 8,000
Grading	20% @ \$1800/acre	15,000
Grubbing		500
Revegetation	30%	<u>5,000</u>
	Total	\$28,500

Strip Mine: S4L100

Area: 36.72 acres

Location: East of Oven Run and North of L.R. 55152

Status: Abandoned

Owned by: Unknown

Seam mined: Unknown

Connection with deep mine: None

Flowing: Four leaching areas

General Description:

The strip is well vegetated on the bench and on the gob pile (G4L201) situated on the Oven Run tributary to the west of the strip. No vegetation is on the highwall, however. Ponds are formed in the low areas.

Recommendation:

A ditch at the base and on top of the highwall is required. Very little earthwork is foreseen except in conjunction with the gob pile beyond the strip. Gob pile G4L201 should be reclaimed.

Cost:

Ditches	10,000'	\$10,000
Grubbing		1,000
Backfilling		1,000
Gob Pile Reclamation		<u>5,000</u>
	Total	\$17,000

Strip Mine: S4L101

Area: 34.88 acres

Location: South of L. R. 55152 and west of T. R. T 706

Status: Reclaimed

Owned by: Unknown

Seam mined: Unknown

Connection with deep mine: None

Flowing: Thirty-one leaching areas

General Description:

Most of this strip mine is covered by grass and shrubs. The strip is divided lengthwise by a spoil pile which produces leaching to the west and has many small depressions which collect water.

Recommendation:

Drainage ditches flowing to the east are required with minimal grading and depression filling.

Cost:

Ditch	13,000'	\$13,000
Grading		3,000
Revegetation		<u>14,000</u>
	Total	\$30,000

Recommendations

Table 88 gives recommendations for the polluting deep and surface mines along with the costs associated with each recommendation.

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

Table 89 lists the sources abated, the amount of beneficiation and the costs associated with each plan.

The distance from Station SC4L2 Oven Run to the next polluting tributary downstream, SC3L2 Pokeytown Run, is .48 miles. This is the minimum distance on Stony Creek that would benefit from this sub-watershed being cleaned up.

TABLE 88

Recommended Abatement Procedures - Cost Benefication

Sub-watershed 4L

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
1	S4L11	88.13 Acres	-	\$ 50,000	\$ 50,000	\$ 45	\$ 45	1,124.94	8.05	36.44	5.16
2	M4L5	2 Seals	1 Seal	40,000	60,000	48	72	841.20	160.39	27.25	102.73
3	S4L100	36.72 Acres	-	17,000	17,000	52.75	52.75	322.27	39.56	10.44	25.34
4	M4L15	1 Seal	-	25,000	25,000	73	73	344.40	49.79	11.16	31.89
5	S4L101	34.88 Acres	-	30,000	30,000	115	115	261.11	37.30	8.46	23.89
6	M4L13	2 Seals	-	50,000	50,000	277	277	180.97	69.84	5.86	44.73
7	S4L3	76.19 Acres	-	12,000	12,000	443	443	27.12	13.40	.88	8.58
8	S4L27	20.20 Acres	2 Seals	30,000	80,000	566	1,507	53.09	3.75	1.72	2.40
9	S4L21	3.67 Acres	-	4,500	4,500	861	861	5.23	1.02	.17	.65
10	M4L41	2 Seals	-	50,000	50,000	938	938	53.33	23.66	1.73	15.15
11	M4L40	4 Seals	-	100,000	100,000	940	940	106.43	39.66	3.45	25.40
12	S4L19	22.95 Acres	2 Seals	50,000	100,000	5,835	11,669	8.57	.05	.28	.03
13	S4L34	41.31 Acres	4 Seals	28,500	128,500	31,319	141,209	.91	.01	.03	-

NOTE: The potential costs above include the known costs.

TABLE 89

Beneficiation - Recommended Plans
Sub-watershed 4L

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	3,330	107.87	447	286.30	\$487,000	\$707,000
B	1 thru 7	3,102	100.49	379	242.75	224,000	245,000
C	1 thru 6	3,075	99.61	365	233.78	212,000	232,000
D	1 thru 4	2,633	85.29	258	165.25	132,000	152,000

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