

Sub-watershed 5R (Un-named)

General Discussion

This sub-watershed encompasses 0.85 square miles or 542.54 acres of land area, approximately 1.31% of the total study area. This basin is drained by 3.30 miles of tributaries (1.22% of the total length of all watershed tributaries) and contains 0.92 acres of lakes and ponds (.17% of the total sub-watershed land area). State records indicate 1 surface mine and 2 deep mines. Our study has located 3 surface mines, 2 flowing, and 1 deep mine with 2 openings, both flowing.

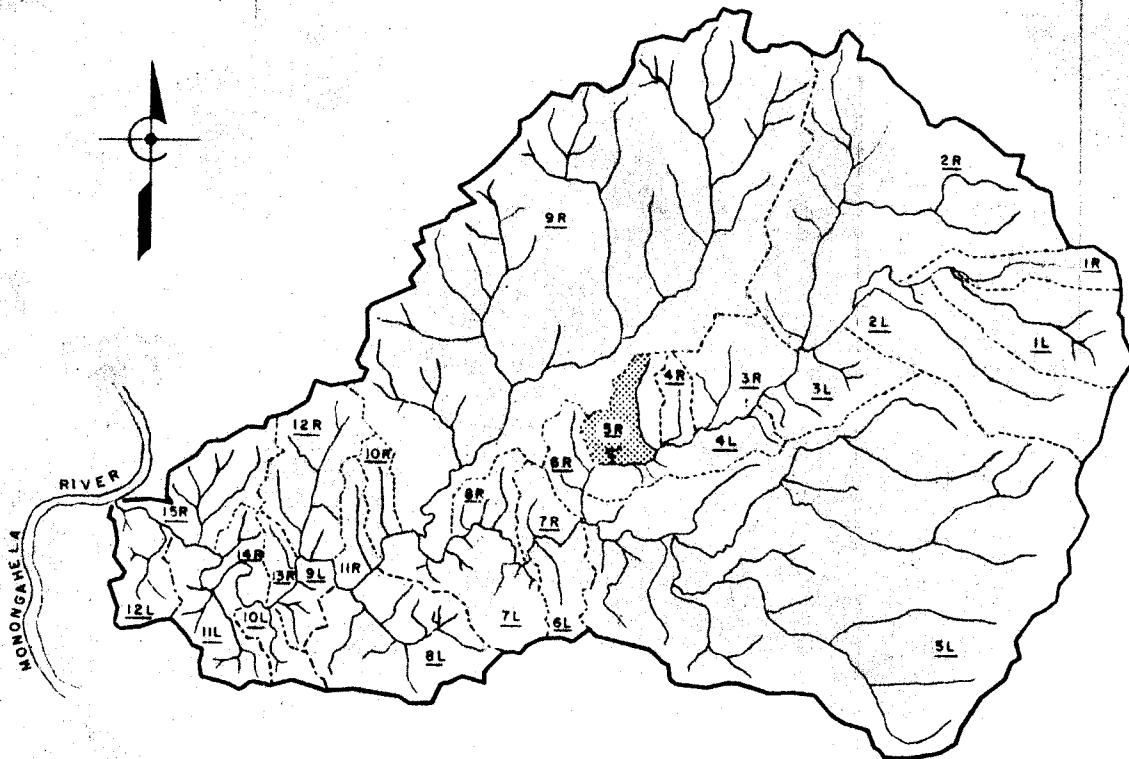
The following information gives the combined averages of the sampling stations designated as GC5R1, GC5R2, GC5R3, and GC5R4, all un-named. They are located on Drawing 7316-7 and their individual averages are shown in Table 37. In the case where more than one tributary contributes to a sub-watershed, the values have been combined. The percentages that these stations contribute in pollution load and flow as measured at Monitoring Station GC8 near the mouth of Georges Creek are also included.

	<u>Averages</u>		<u>Percent of Total Watershed</u>	
pH 6.1				
Net Hot Acidity	0	PPD	0	%
Ferrous Iron	0	PPD	0	%





TABLE 37  
 TRIBUTARY AVERAGE WATER QUALITY DATA  
 Sub-watershed  
 5R

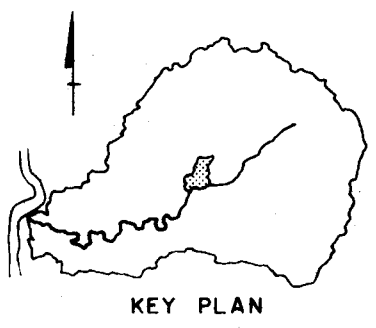
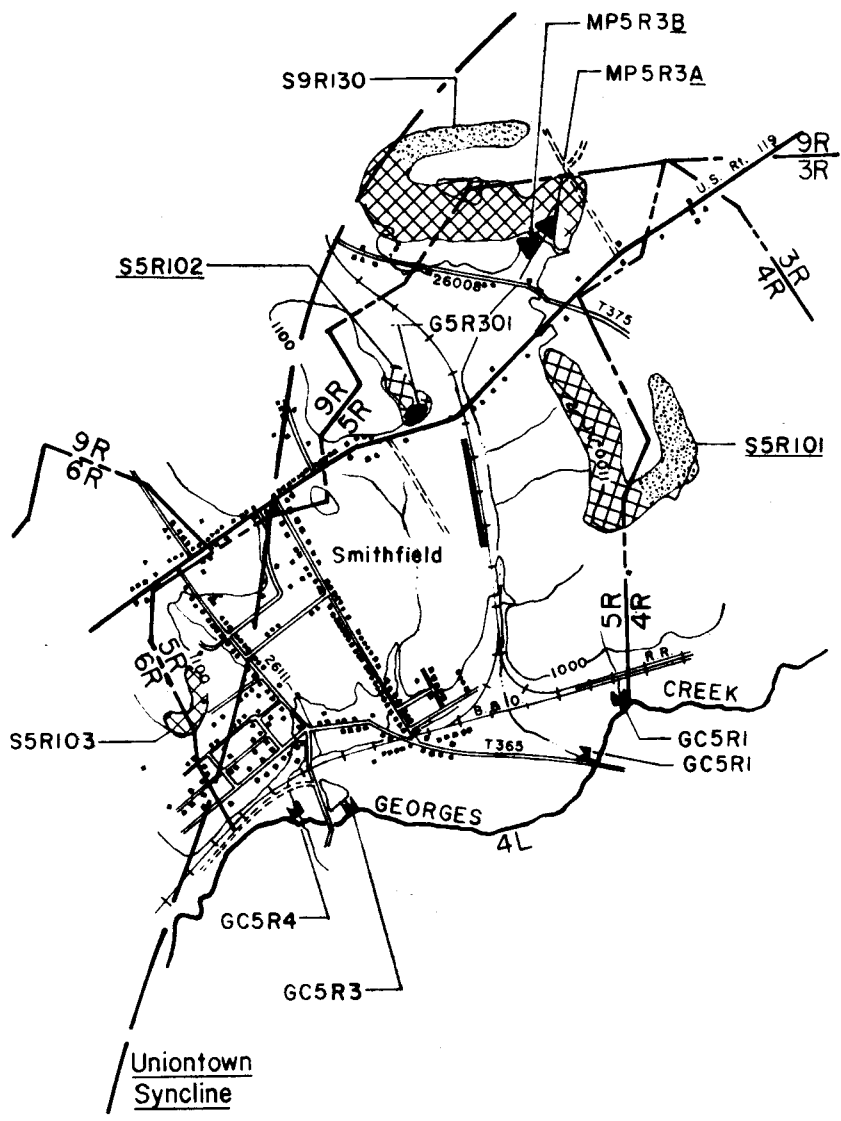
Station	pH	Hot Acid		Alkalinity		Net Hot Acid		Ferrous Iron		Iron as Fe		Sulfate		Flow	
		PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	GPM	G.P.D.
GC5R1	6.7	8	.38	78	3.75	0	0	0	0	.30	.02	55	2.64	9	12,960
GC5R2	5.0	39.67	62.87	8.00	2.41	31.67	60.46	0	0	1.19	1.81	217.83	248.48	83	119,520
GC5R3	6.5	7.33	.20	76.33	2.55	0	0	0	0	.95	.02	33.17	.86	2	2,880
GC5R4	6.3	28.00	96.83	77.00	282.16	0	0	0	0	1.04	3.22	84.50	295.44	272	391,680

# Location Plan



## LEGEND FOR THE FOLLOWING PLATES

- Y DEEP MINE OPENING (M9R59A)
- ▲ DEEP MINE PIPE (SAMPLE STATIONS - MP5L2A, or BH9R2)
- ▼ WEIR (TRIBUTARY SAMPLE STATION - GC7L1)
- CROSS-SECTION (TRIBUTARY SAMPLE STATION - GC9R1)
- ◼ GEORGES CREEK CROSS-SECTION (SAMPLE STATION - GC5)
-  STRIP MINE (ABANDONED-UNRECLAIMED - S11L102)
-  STRIP MINE (ACTIVE - S4R107)
-  STRIP MINE (ABANDONED-RECLAIMED - S7L106)
-  GOB PILE (G9R301)
- A, B, C UNDERLINED SUFFIX INDICATES FLOWING DEEP MINE SAMPLE STATIONS - M9R74A, B, C
- S7L101 UNDERLINE - INDICATES FLOWING STRIP MINE, GOB PILE, OR BORE HOLE SAMPLE STATION



**MAP OF  
SUB-WATERSHED 5R**  
(UN-NAMED)  
SCALE: 1" = 2000'

## Deep Mines

The Commonwealth records indicate that there are 2 deep mines in this sub-watershed. Our field investigations located 1 deep mine with 2 openings, both of which are flowing. Table 38 lists the abandoned deep mines within the sub-watershed with the following information: mine number, name of mine or operator if known, strip mine connection, available mine maps, permit numbers, acres and seam mined, mine opening designation, openings with flows, and estimated elevation of the openings.

Table 39 gives the averages of the abandoned deep mine flows. Directly under the averages are the percentages of flows and pollution loads that each complex contributes to the pollution load of the sub-watershed as measured at the following sampling stations: GC5R1, GC5R2, GC5R3 and GC5R4, all un-named. When more than one major tributary drains a sub-watershed, the averages of each are combined. Similarly, when more than one deep mine opening of the same complex is flowing, the averages are also combined.

TABLE 38  
 ABANDONED DEEP MINES  
 Sub-Watershed  
 5R

Mine Number	Name of Mine or Operator	Strip Mine Connection	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Opening No.	Elev. of Opening	Flow	Permit Number
M5R3	Hutchinson & Stein	S9R130	-	-	PGH	MP5R3A MP5R3B	1080' 1080'	Yes Yes	11163

TABLE 39  
 ABANDONED DEEP MINE AVERAGE WATER QUALITY DATA  
 Sub-Watershed  
 5R

Station	pH	Hot Acid		Alkalinity		Net Hot Acid		Ferrous Iron		Iron as Fe		Sulfate		Flow	
		PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	GPM	G.P.D.
M5R3	2.9	1230.33	898.4	0	0	1230.33	898.4	1.69	.80	60.35	41.18	1733.33	1049.72	111	159,840
%	-	-	-	-	-	-	-	-	-	-	812.2%	-	191.76%	-	30.33%

NOTE:

RECOMMENDATIONS FOR THIS MINE ARE LISTED IN SUB-WATERSHED 9R, UNDER MINE NUMBER M9R28

## Strip Mines

The Commonwealth records indicate there is 1 strip mine in this sub-watershed. Our field investigations located 3 surface mines with 2 having flows. Table 40 lists the abandoned strip mines within the sub-watershed with the following information: the name of the mine or operator if known, permit numbers, the acres of area mined and which seam was mined, the designation we give the mine, whether or not there is a flow, and whether there are any deep mine connections.

The total acreage of abandoned surface mines in Sub watershed 5R is 37.64 acres or 6.94% of the total sub-watershed land area.

Table 41 gives the averages of the abandoned surface 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 the following sampling stations: GC5R1, GC5R2, GC5R3, and GC5R4.

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

Where more than one major tributary drains a sub-watershed, the averages of each are also combined.

Following Table 41 are the descriptions of the flowing strip mines along with abatement recommendations.

TABLE 40  
 ABANDONED SURFACE MINES  
 Sub-Watershed  
 5R

Mine Number	Name of Mine or Operator	Permit No.	Area Mined (Acres)	Seam Mined	Flowing	Connection w/Deep Mine
S5R101	Hutchinson & Stein	11083	27.54	PGH	Yes	M9R8
S5R102	Unknown	--	3.67	PGH *	Yes	--
S5R103	Unknown	--	6.43	PGH *	No	--

TABLE 41  
 ABANDONED SURFACE MINE AVERAGE WATER QUALITY DATA  
 Sub-Watershed  
 5R

Station	pH	Hot Acid		Alkalinity		Net Hot Acid		Ferrous Iron		Iron as Fe		Sulfate		Flow	
		PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	PPM	#/Day	GPM	G.P.D.
S5R101	3.7	350	24.04	0	0	350	24.04	0	0	74.56	3.63	475	28.85	10	14,400
%	-	-	-	-	-	-	-	-	0%	-	71.60%	-	5.27%	-	2.73%
S5R102	2.6	700	8.41	0	0	700	8.41	0	0	.44	.01	775	9.31	1	1,440
%	-	-	-	-	-	-	-	-	0%	-	.20%	-	1.70%	-	.27%

\* Assumed



Strip Mine S5R101 (permit number 11083)

General Description:

This strip mine is located 3,000 feet east of Smithfield and 500 feet south of the U.S. Route 119 and T 3 intersection. It contains about 27.54 acres and mined the Pittsburgh coal seam. It is 70% reclaimed through grading and revegetation, which consists of grasses and trees. There is a definite distinction between the reclaimed portion and the abandoned area. The abandoned section has a 15 foot highwall and a few gob piles, which are vegetated. Two leaches are evident which originate from the reclaimed western portion. A deep mine connection with M9R8 has been established. The strip is shown on the map of Sub-watershed SR.

Recommendations:

The leaches are caused by surface runoff upslope on the reclaimed section. A ditch here would divert the surface water around the strip, and thus eliminate or reduce the leaches.

Costs:

Ditches	2,000 feet @ \$1/foot	\$2,000
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## Strip Mine S5RI02

### General Description:

This strip mine is located northeast of Smithfield along US. Route 119. It is situated about 2,000 feet southwest of the intersection between U.S. Route 119 and L.R. 26008. It is a small mine, only 3.67 acres, and is assumed to have mined the Pittsburgh coal seam. It is 90 percent reclaimed through grading and revegetation. About 20% of the strip is vegetated with grasses only. There is no highwall or any deep mine connection. The leach seems to be originating at a gob pile on the southern edge of the strip. The mine is shown on the map of Sub-watershed SR.

### Recommendations:

The gob pile should be graded to an adequate slope and then planted. A diversion ditch upslope will prevent surface runoff from traversing the gob.

### Costs:

Grading	1 acres @ \$1,800/acre	\$1,800
Vegetation	1 acre @ \$600/acre	600
Ditches	800 feet @ \$1/foot	<u>800</u>
		\$3,200

## Recommendations

Table 42 gives the recommendations for the polluting deep and strip mines, along with the costs associated with each recommendation. The order in which they are placed is determined by the cost per pound of acid removal.

An estimated effectiveness of 75% reduction of pollution load is assigned for each recommendation.

Table 43 lists the sources abated, the amount of beneficiation, and the costs associated with each plan.

The distance from Sampling station GC5R2 to the next polluting tributary downstream, GC4L10, is .2 miles. This is the minimum distance on Georges Creek that would benefit from the recommended work.

TABLE 42  
 RECOMMENDED ABATEMENT PROCEDURES - COST BENEFICATION  
 SUB-WATERSHED  
 5R

Rank	Mine No.	TOTAL COSTS		COST \$/POUND ACID REMOVAL		Total Acid Abated PPD.	Total Iron Abated PPD.	% of Total Sub-Watershed	
		Known Sources	Potential Sources	Known Sources	Potential Sources			Acid	Iron
1	S5R101	\$2,000	\$2,000	\$110.93	\$110.93	18.03	2.72	-	.45
2	S5R102	\$3,200	\$3,200	\$507.13	\$507.13	6.31	-	-	-

TABLE 43  
 BENEFICATION - RECOMMENDED PLANS  
 SUB-WATERSHED  
 5R

PLAN	No. of Sources ABATED	ACID		IRON		SULFATE		TOTAL CONS'T COSTS	
		PPD	% of Total Sub-Watershed	PPD	% of Total Sub-Watershed	PPD	% of Total Sub-Watershed	Known Sources	Potential Sources
A	2	24.34	-	2.72	-	38.16	.07	\$5,200	\$5,200

It is recommended Plan "A" be initiated for this Sub-Watershed