

Sub-watershed 15R (Un-named)

General Discussion

This sub-watershed encompasses 1.33 square miles or 853.74 acres of land area, approximately 2.0 of the total study area. This basin is drained by 5.94 miles of tributaries (2.20% of the total length of all watershed tributaries) and contains no appreciable amount of lakes and ponds. Commonwealth records show 5 surface mines and no deep mines in the area. Our field investigation has discovered 7 surface mines, 5 flowing, and 3 deep mines with 7 openings, 2 of which are flowing.

The following information gives the combined averages of the following sampling stations designated as GC15R1, GC15R2, GC15R3, GC15R4, GC15R5 and GC15R6, all un-named. They are shown on Drawing 7316-7, while their individual averages can be found in Table 115. In the case where more than one tributary contributes to a sub-watershed, the values have been combined. The percentages of pollution load and flow that this sub-watershed contributes to Monitoring Station GC8 near the mouth of Georges Creek are also given.

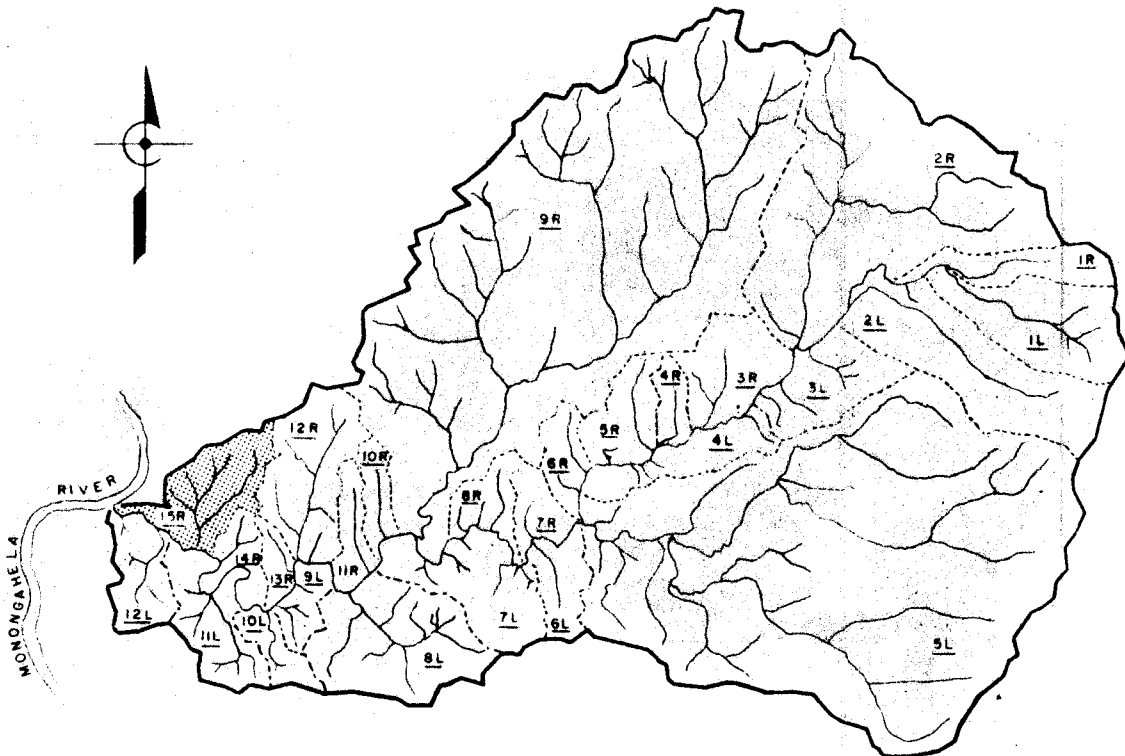
	<u>Averages</u>		<u>Percent of Total Watershed</u>
pH	5.0		
Net Hot Acidity	563	PPD	2.34%
Ferrous Iron	1	PPD	53.12%
Total Iron	72	PPD	2.60%
Sulfate	2,293	PPD	3.34%
Flow	946,080	GPD	1.59%

TABLE 115
 TRIBUTARY AVERAGE WATER QUALITY DATA
 Sub-watershed
 15R





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.
GC15R1	5.2	55.00	490.82	9.33	24.82	45.67	466.00	.08	.14	6.08	67.78	308.50	2121.83	643	925,920
GC15R2	2.9	558.86	99.42	0	0	558.86	99.42	.29	.03	30.33	3.86	1117.86	169.31	11	15,840
GC15R3	No	Flow													
GC15R4	No	Flow													
GC15R5	No	Flow													
GC15R6	6.9	12.29	.28	203.43	3.61	0	0	.07	0	4.73	.33	79.57	.90	3	4,320

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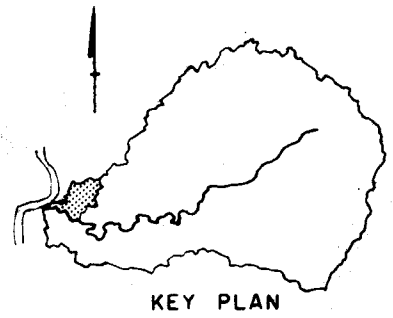
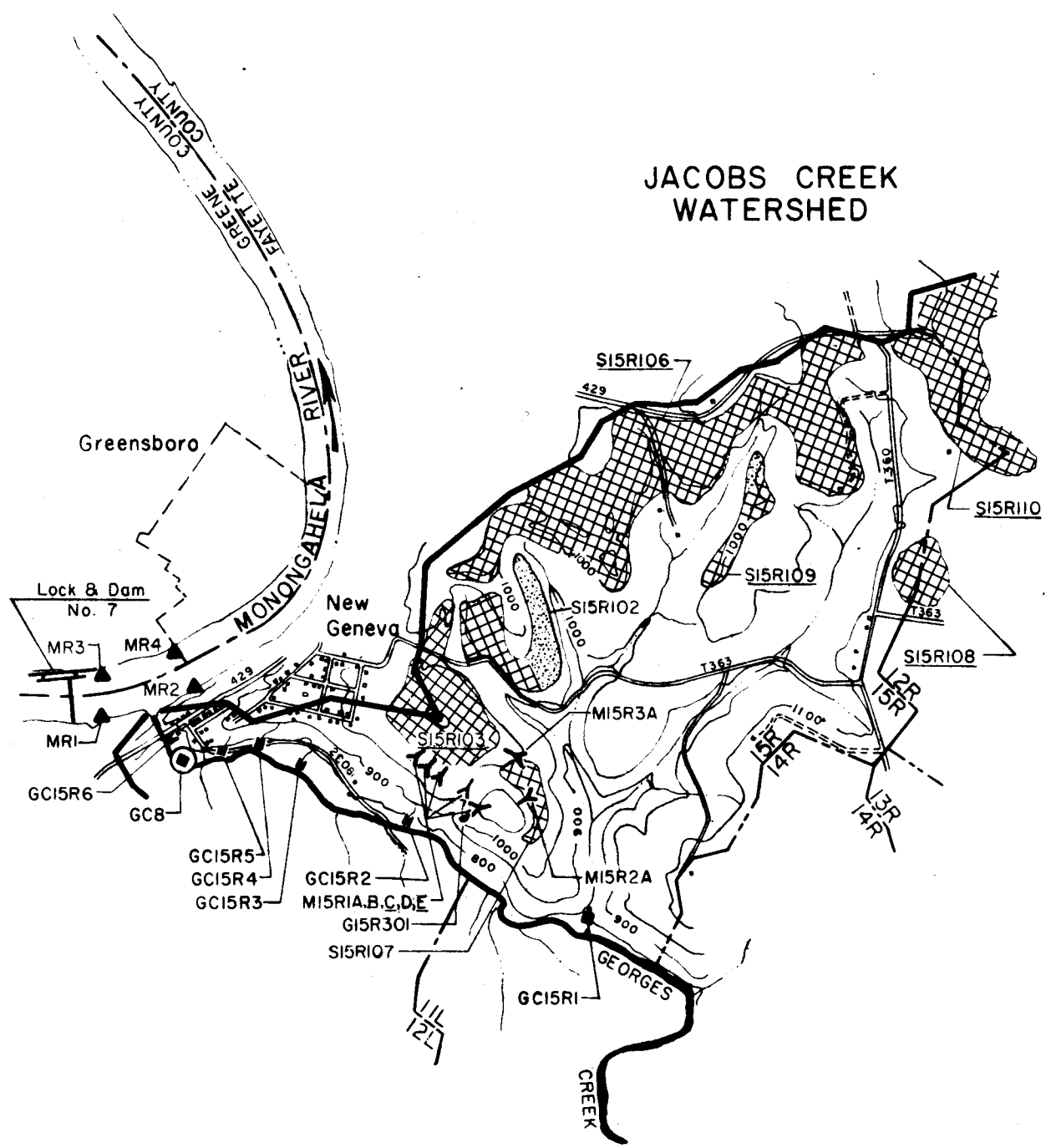
Location Plan



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

JACOBS CREEK WATERSHED



KEY PLAN

**MAP OF
SUB-WATERSHED 15R
(UN-NAMED)**
SCALE: 1" = 2000'

Deep Mines

The Commonwealth records indicate that there are no deep mines in this sub-watershed. Our field investigations locate 3 deep mines with 7 openings, of which 2 are flowing. Table 116 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 117 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: GC15R1, GC15R2, GC15R3, GC15R4, GC15R5, and GC15R6, 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 116
 ABANDONED DEEP MINES
 Sub-watershed
 15R

Mine Number	Name of Mine or Operator	Strip Mine Connection	Mine Map Obtained	Area Mined (Acres)	Seam Mined	Mine Opening No.	Elev. of Opening	Flow	Permit Number
M15R1	Unknown	S15R103	-	-	PGH*	M15R1A	1100'	No	-
						M15R1B	1100'	No	-
						M15R1C	1100'	Yes	-
						M15R1D	1060'	No	-
						M15R1E	1100'	Yes	-
M15R2	Unknown	S15R107	-	-	PGH*	M15R2A	1100'	No	-
M15R3	Unknown	S15R107	-	-	PGH*	M15R3A	1100'	No	-

*Assumed

TABLE 117
 ABANDONED DEEP MINE AVERAGE WATER QUALITY DATA
 Sub-watershed
 15R

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.
M15R1	2.5	3150	93.45	0	0	3150	93.45	0	0	641.08	20.79	4056.25	179.79	5	7,200
%	-	-	-	-	-	-	16.63%	-	0%	-	28.89%	-	7.84%	-	.76%

Deep Mine M15R1

General Description:

This complex is located about 1200 feet southeast of the southeast corner of New Geneva. Five openings were found and were located on Strip Mine S15R103. Access is provided by an old strip mine road originating in New Geneva. Two of the openings are flowing and all are caved in. It is assumed that the Pittsburgh coal seam was mined by this complex. The openings are shown on the map of Sub-watershed 15R.

Recommendations:

The 2 flowing openings require hydraulic seals to reduce or eliminate the pollution from this complex. A potential of 3 more seals exists for the 3 openings that are not presently flowing.

Costs:

Known	2 seals	\$ 50,000
Potential	3 seals	<u>75,000</u>
Total		\$125,000

Strip Mines

The Commonwealth records indicate there are 5 strip mines in this sub-watershed. Our field investigations located 7 surface mines with 5 having flows. Table 118 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 they are connected to any deep mines.

The total acreage of abandoned surface mines in Sub-watershed 15R is 298.35 acres or 34.95% of the total sub-watershed land area.

Table 119 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: GC15R1, GC15R2, GC15R3, GC15R4, GC15RS, and GC15R6.

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 combined.

Following Table 119 are the descriptions of the flowing strip mines along with abatement recommendations.

TABLE 118
Abandoned Surface Mines
Sub-watershed
15R

Mine Number	Name of Mine or Operator	Permit No.	Area Mined (Acres)	Seam Mined	Flowing	Connection w/Deep Mine
S15R102	Pontorero & Sons	2966BSM56	21.11	PGH	No	--
S15R103	DiCenzo Coal & Const. Co.	15636	36.72	RED	Yes	M15R1
S15R106	Genovese Coal Co.	17882	121.18	RED	Yes	--
S15R107	Unknown	--	7.34	PGH*	No	M15R2
S15R108	Ford & Gaskill	12181	5.51	RED	Yes	--
S15R109	Unknown	--	11.02	PGH*	Yes	--
S15R110	Harvey Gaskill	15281	95.47	PGH	Yes	--

*Assumed

TABLE 119
 ABANDONED SURFACE MINE AVERAGE WATER QUALITY DATA
 Sub-watershed
 15R

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.
S15R103	2.6	4645	497	0	0	4645	497	1.68	.31	929.8	73.09	6019	562.3	21	30,240
%	-	-	-	-	-	-	88.42%	-	182.35%	-	101.56%	-	24.53%	-	3.20%
S15R106	3.0	339.5	7.69	0	0	339.5	7.69	.56	.01	17.80	.41	762.5	16.98	2	2,880
%	-	-	-	-	-	-	1.37%	-	5.88%	-	.57%	-	.74%	-	.30%
S15R108	3.4	1396	28.24	0	0	1396	28.24	1.68	.03	185.9	3.18	2676	52.88	4	5,760
%	-	-	-	-	-	-	5.02%	-	17.65%	-	4.42%	-	2.31%	-	.61%
S15R109	2.7	12997	969.6	29.5	1.42	12968	968.2	29.12	.62	1709	158.1	17158	1272	53	76,320
%	-	-	-	-	-	-	172.25%	-	364.70%	-	219.67%	-	55.50%	-	8.07%
S15R110	2.9	1010	36.72	0	0	1010	36.72	2.24	.05	69.93	2.23	1538	51.53	6	8,640
%	-	-	-	-	-	-	6.53%	-	29.41%	-	3.10%	-	2.25%	-	.91%

Strip Mine S15R103 (permit number 15636)

General Description:

This strip mine is located about 500 feet east of New Geneva and is crossed by T 363. It encompasses 36.72 acres and mined the Redstone coal seam. It is 50% reclaimed chiefly through revegetation with some grading. Vegetation covers 85% of the strip and consists of grasses and trees. Three highwalls exist along the hillside which suggests multiple seam mining although no records indicate this. The spoil from each connection with M15R1 has been established. Three leaches, all on the western portion, have been located. The strip mine is shown on the map of Sub-watershed 15R.

Recommendations:

Minimal grading and vegetation are required in this case. Water does not lay on the existing spoil and percolate. The surface water can be collected by a ditch system above and below the lowest (in elevation) highwall and transported off the strip. This should eliminate the pollution from the strip while not affecting the deep mine sealing program.

Costs:

Grading	5 acres @ \$1,800/acre	\$ 9,000
Vegetating	5 acres @ \$600/acre	3,000
Ditch	3,500 feet @ \$1/foot	<u>3,500</u>
		\$15,500

Strip Mine S15R106

General Description:

This strip mine is located northeast of New Geneva and encompasses 121.18 acres. It lies south of T 429, north of T 363, and west of T 360. It is 95% reclaimed through grading and vegetating. Vegetation blankets 85% of the strip with grasses and trees. A 5-20 foot highwall exists on different parts of the strip. The spoil piles have been leveled to a slight slope. No deep mine connection has been established. The only leach found is located on the southwestern side of the strip. It seems to be caused by surface water which traverses the graded spoil pile much too slowly. This strip mined the Reds tone coal seam and is shown on the map of Sub-watershed 15R.

Recommendations:

A ditch system is required to eliminate much of the water that comes into contact with the spoil. Minor revegetation will also be necessary.

Costs:

Vegetation	2 acres @ \$600/acre	\$1,200
Ditches	2,000 feet @ \$1/foot	<u>2,000</u>
		\$3,200

Strip Mine S15R108 (Permit number 12181)

General Description:

This strip mine is located about 500 feet northeast of the intersection between T 360 and T 363. It contains 5.51 acres and mined the Redstone coal seam. It is 90% reclaimed through grading and revegetating. The vegetation, which covers 30% of the strip, consists primarily of grasses. There is no highwall remaining or any evidence of deep mining. There were two leaches found, both on the western edge. The strip is bisected by the 12R-15R sub-watershed boundary line and is shown on the map of Sub-watershed 15R.

Recommendations:

The strip is well graded but the top layer has been left in a loose, spongy state. Therefore, it is recommended that the area first be compacted and then planted. A lined ditch system upslope will be required to reduce surface water entering the area.

Costs:

Vegetation	6 acres @ \$600/acre	\$ 3,600
Compaction	6 acres @ \$900/acre	5,400
Ditches	1,300 feet @ \$7/foot	<u>9,100</u>
		\$18,100

Strip Mine S15R109 (Permit number 15406)

General Description:

This strip mine is located about 2,200 feet northwest of the intersection between T 363 and T 360 and 2,000 feet southwest of the T 360 and T 429 intersection. It contains 11.02 acres and is assumed to have mined the Pittsburgh coal seam. No deep mine connection has been established. The strip mine is about 95% reclaimed through grading and revegetation. The vegetation covers the entire strip with grasses and trees. Nine leaches were found on the strip. The strip mine is shown on the map of Sub-watershed 15R.

Recommendations:

There are many sink holes on the strip which should be filled. Grading and vegetating of about 7.5 acres should also be performed. Approximately 2,000 feet of line diversion ditch will reduce surface runoff which comes in contact with the spoil.

Costs:

Grading	7.5 acres @ \$1,800/acre	\$13,500
Vegetation	7.5 acres @ \$600/acre	4,500
Miscellaneous filling and grubbing		1,000
Lined diversion ditches	2,000 feet @ \$7/foot	<u>14,000</u>
		\$33,000

Strip Mine S15R110 (permit number 15281)

General Description:

This strip mine begins 600 feet east of the intersection between T 360 and T 429 and is bisected by the latter for a distance of about 3,000 feet. Most of the strip lies south of T 429. The strip covers 95.47 acres and mined the Pittsburgh coal seam. There is no highwall and no evidence of deep mining. The mine is about 75% reclaimed through grading and revegetation. The vegetation covers the entire strip and consists of grasses and trees. There were two leaches found both on the western portion of the strip. The strip mine is shown on the map of Sub-watershed 15R.

Recommendations:

The leaches are probably being caused by excessive surface water traversing the graded spoil. Therefore, a ditch system upslope from the leaches and some revegetation is the reclamation required.

Costs:

Vegetation	15 acres @ \$600/acre	\$ 9,000
Ditches	1500 feet @ \$1/foot	<u>1,500</u>
		\$10,500

Recommendations

Table 120 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 121 lists the sources abated, the amount of beneficitation, and the costs associated with each plan.

The distance from Sampling Station GCISR1 to the next polluting tributary downstream, GC12L1, is .5 miles. This

is the minimum distance on Georges Creek that would benefit from the recommended work.

TABLE 120
 RECOMMENDED ABATEMENT PROCEDURES - COST BENEFICATION
 SUB - WATERSHED
 15R

Rank	Mine No.	TOTAL COSTS		COST \$/POUND ACID REMOVAL		Total Acid Abated	Total Iron Abated	% OF TOTAL SUB-WATERSHED	
		Known Sources	Potential Sources	Known Sources	Potential Sources	Ppd	Ppd	Acid	Iron
1	S15R106	\$ 3,200	\$ 3,200	\$ 12.57	\$ 12.57	254.63	.31	45%	-
2	S15R103	15,500	140,500	41.58	376.93	372.75	54.82	66%	76%
3	S15R109	33,000	33,000	45.45	45.45	726.15	118.58	129%	165%
4	S15R110	10,500	10,500	182.48	182.48	57.54	1.67	10%	2%
5	M15R1	50,000	125,000	713.37	1,783.42	70.09	15.59	12%	22%
6	S15R108	18,100	18,100	854.58	854.58	21.18	2.29	4%	3%

TABLE 121
 BENEFICATION - RECOMMENDED PLANS
 SUB-WATERSHED
 15R

Plan	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	6	1,502	267%	193.26	268%	1,602	70%	\$ 130,300	\$ 330,300
B	5	1,481	263%	190.97	265%	1,562	68%	112,200	312,200
C	4	1,411	251%	175.38	244%	1,427	62%	62,200	187,200

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