Sub-watershed 12L (Un-named)

General Discussion

This sub-watershed encompasses 0.85 square miles or 544.40acres of land area, approximately 1.32% of the total study area. The basin is drained by 3.5 mi les of tributaries (l.30% of the total length of all watershed tributaries) and contains 1 acre of lakes and ponds (.18% of the total sub-watershed area). Commonwealth records show 3 surface mines, but no deep mines. Our field investigations discovered 5 surface mines, 3 flowing, and 6 deep mines with 11 openings, 8 of which are flowing.

The following information gives the combined averages of the sampling stations designated as GC12L1, GC12L2, GC12L3, GC12L4, and GC12L5, all un-named. Their locations ,are shown on Drawing 7316-7, while their individual averages are found in Table 122. 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 in pollution load and flow to Monitoring Station GC8 near the mouth of Georges Creek are also given.

	Averages		Percent of Total Watershed
pH	4.8		
Net Hot Acidity	4,165	PPD	17.32%
Ferrous Iron	9	PPD	2,653.12%
Total Iron	843	PPD	30.41%
Sulfate	8,694	PPD	12.69%
Flow	1,324,800	GPD	2.23%

TABLE 122

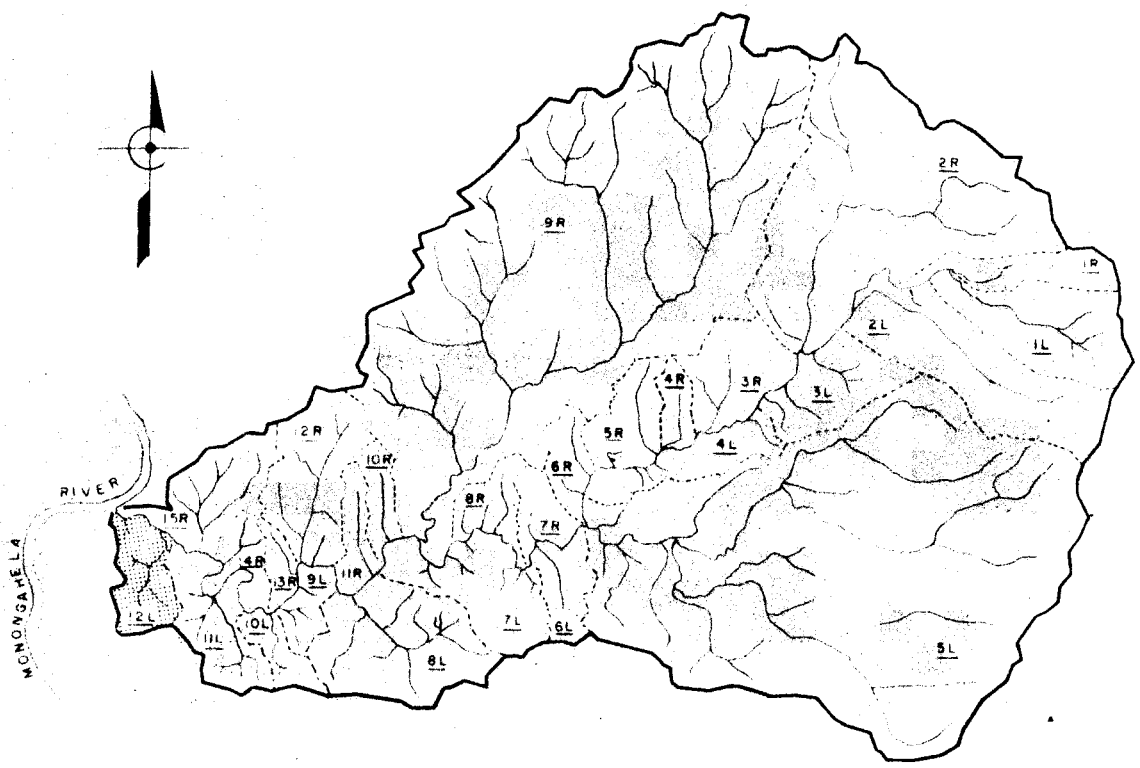
TRIBUTARY AVERAGE WATER QUALITY DATA

Sub-watershed

12L

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.
GC12L1	2.8	568.00	3480.14	0	0	568.00	3480.14	.90	8.49	105.02	514.58	820.20	5013.44	552	794,880
GC12L2	No	Flow													
GC12L3	4.5	56.67	690.15	16.67	5.01	40.00	685.14	0	0	25.65	327.90	358.00	3679.32	367	528,480
GC12L4	7.0	4.00	.10	44.67	.95	0	0	.23	0	.76	.02	64.67	1.15	1	1,440
GC12L5	No	Flow													

Location Plan



LEGEND FOR THE FOLLOWING PLATES

Y — DEEP MINE OPENING (M9R59A)

▲ — DEEP MINE PIPE (SAMPLE STATIONS - MP5L2A, or BH9R2)

M — WEIR (TRIBUTARY SAMPLE STATION - GC7L1)

■ — CROSS-SECTION (TRIBUTARY SAMPLE STATION - GC9R1)

◉ — GEORGES CREEK CROSS-SECTION (SAMPLE STATION - GC5)

STRIP MINE (ABANDONED-UNRECLAIMED - S11L102)

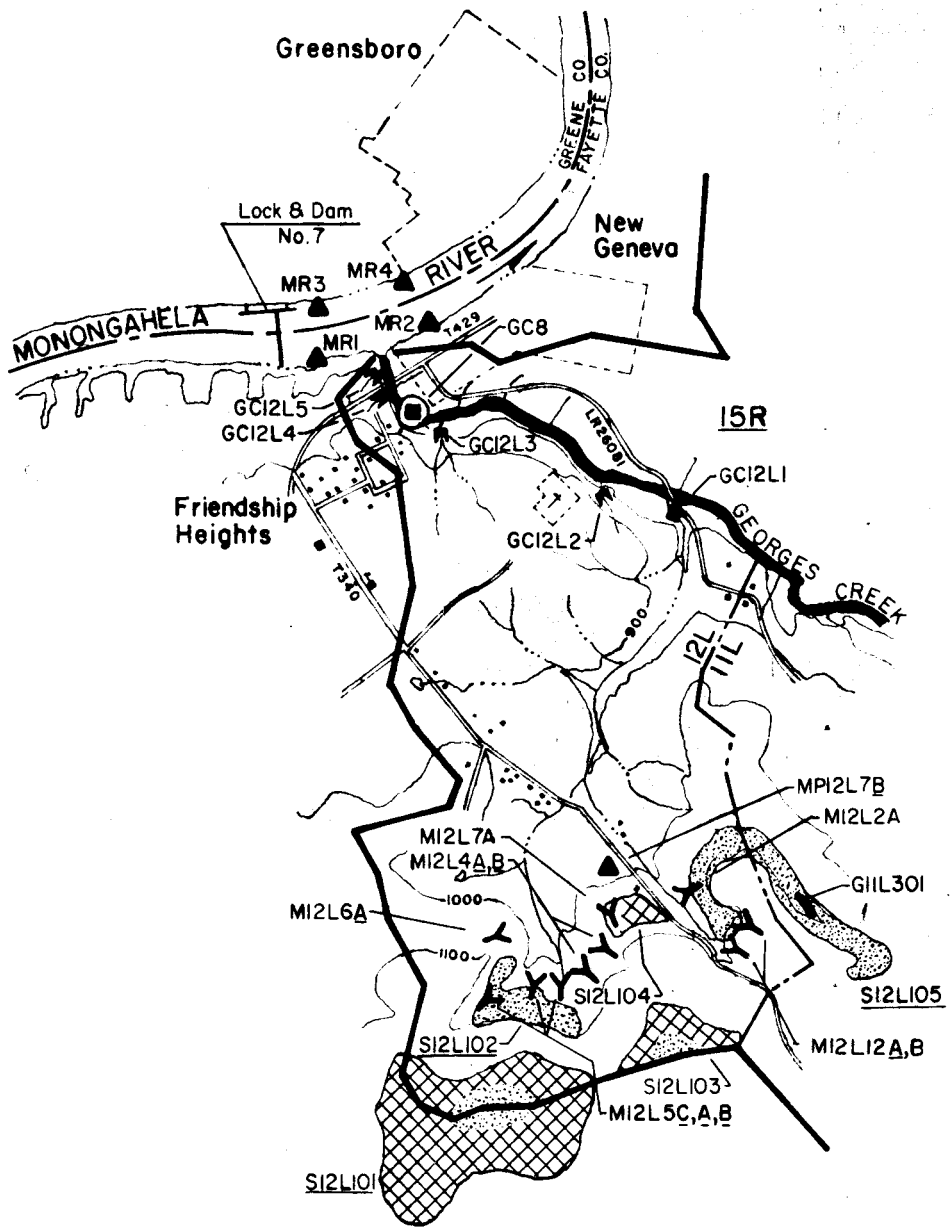
STRIP MINE (ACTIVE - S4R107)

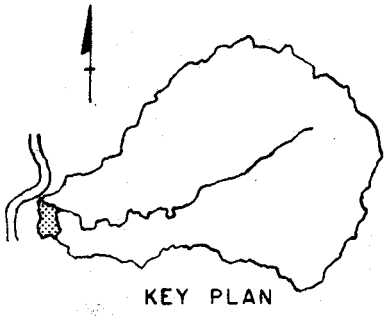
STRIP MINE (ABANDONED-RECLAIMED - S7L106)

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 12L

(UN-NAMED)

SCALE 1" = 2000'

Deep Mines

The Commonwealth records indicate that there are no deep mines in this sub-watershed. Our field investigations located 6 deep mines with 11 openings, of which 8 are flowing. Table 123 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 124 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: GC12L1, GC12L2, GC12L3, GC12L4, and GC12L5, 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 123
ABANDONED DEEP MINES
Sub-watershed
12L

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
M12L2	Unknown	S12L105	-	-	PGH*	M12L2A	1080'	No	-
M12L4	Unknown	-	-	-	PGH*	M12L4A	1040'	Yes	-
						M12L4B	1040'	Yes	
M12L5	Unknown	S12L102	-	-	PGH*	M12L5A	1020'	Yes	-
						M12L5B	1020'	Yes	
						M12L5C	1060'	Yes	
M12L6	Unknown	-	-	-	PGH*	M12L6A	1000'	Yes	-
M12L7	Unknown	-	-	-	PGH*	M12L7A	1020'	Yes	-
M12L12	Unknown	S12L105	-	-	PGH*	M12L12A	1110'	Yes	-
						M12L12B	1110'	No	

*Assumed

TABLE 124

ABANDONED DEEP MINE AVERAGE WATER QUALITY DATA

Sub-watershed 12L

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.
M12L4	2.6	2564.83	230.25	0	0	2564.83	230.25	4.20	.30	463.59	55.85	3260.42	288.18	19	27,360
%	-	-	-	-	-	-	5.53%	-	3.53%	-	6.63%	-	3.31%	-	2.07%
M12L5	2.7	5220	530.49	0	0	5220	530.49	19.88	.71	899.9	120.02	6850	688.91	24	34,560
%	-	-	-	-	-	-	12.74%	-	8.36%	-	14.25%	-	7.92%	-	2.61%
M12L6	2.6	1500	180.3	0	0	1500	180.3	0	0	133.4	16.03	4750	570.95	10	14,400
%	-	-	-	-	-	-	4.33%	-	0%	-	1.9%	-	6.57%	-	1.09%
M12L7	2.6	1442.25	478.62	0	0	1442.25	478.62	2.52	.65	282.95	101.93	2012.5	632.68	25	36,000
%	-	-	-	-	-	-	11.49%	-	7.66%	-	12.10%	-	7.28%	-	2.72%
M12L12	2.6	1500	1004.28	0	0	1500	1004.28	80.8	20.38	413.69	241.33	2100.29	1426.06	63	90,720
%	-	-	-	-	-	-	24.12%	-	240.05%	-	28.64%	-	16.40%	-	6.85%

Deep Mine M12L4

General Description:

This complex is located approximately 4,000 feet from the intersection of T 333 and T 340 in Atlantic. The two openings are located approximately 1,000 feet southwest of T 340 just south of Strip Mine S12L104 in a wooded area. Both openings are flowing. It is assumed that this complex tapped the Pittsburgh coal seam. The openings are shown on the map of Sub-watershed 12L.

Recommendations:

Both openings should be hydraulically sealed to eliminate the objectionable discharges. The seals should be designed to withstand the hydrostatic pressure buildup that would be imminent.

Costs:

Known	2 seals	$50,000

Deep Mine M12L5

General Description:

M12L5 is located about 4,000 feet southeast of the intersection between T 333 and T 340 in Atlantic. The three openings lie about 1,500 feet southwest of T 340 on the northern edge of Strip Mine S12LI02 in a wooded area. All three openings are flowing and partially caved in. A few old mine shacks are surface appurtenances in the area. The Pittsburgh coal seam is assumed to have been mined here. The openings are shown on the map of Sub-watershed 12L.

Recommendations:

All three openings require a hydraulic seal to reduce or eliminate the pollution flow from this complex. The seals should be designed to withstand heads caused by the buildup of hydrostatic pressure.

Costs:

Known	3 seals	$75,000

Deep Mine M12L6

General Description:

This complex is located about 3,000 feet southeast of the intersection of T 333 and T 340 in Atlantic. The only opening lies 1,500 feet southwest of T 340 and is directly north of Strip Mine S12L102. The opening is caved in and flowing. It is assumed that the Pittsburgh coal seam was mined here. The openings are shown on the map of Sub watershed 12L.

Recommendations:

One hydraulic seal should eliminate the objectionable pollution discharge from this complex. The seal will cause the mine to become slowly inundated, which would reduce the air supply to the pyritic material and, thereby reduce the pollution formed.

Costs:

Known	1 seal	$25,000

Deep Mine M12L7

General Description:

This complex is situated about 3,300 feet southeast of intersection between T 340 and T 333 in Atlantic. The opening and mine pipe to this complex lie southwest of T 340. The opening is about 400 feet southwest of T 340 on Strip Mine S12L104 while the mine pipe is immediately adjacent to the southwestern edge of T 340. The mine pipe drains the opening and is flowing. The Pittsburgh seam is assumed to have been mined here. The apertures are shown on the map of Sub-watershed 12L.

Recommendations:

Since the mine pipe drains the opening, a hydraulic seal in the opening will be the only seal required. It is not known whether an air seal was placed in the portal. Prior to reclamation of S12L104, the opening should be sealed.

Costs:

Known	1 seal	$25,000

Deep Mine M12L12

General Description:

This complex is located about 4,500 feet southeast along T 340 from its intersection with T 333. The 2 openings are immediately adjacent to the northeastern side of T 340. The openings are on Strip Mine S12L105 along a highwall. Both are partially caved in and one is flowing. There are block supports in the openings that shale and dirt have covered. It is assumed that this complex mined the Pittsburgh coal seam. The openings are spotted on the map of Sub-watershed 12L.

Recommendations:

The flowing opening requires a hydraulic seal, and the non-flowing opening is considered for a potential hydraulic seal. The purpose of the hydraulic seal is to inundate the mine and reduce the air supply to the pyritic material, therefore the pollution producing capability is drastically reduced.

Costs:

Known	1 seal	$25,000
Potential	1 seal	25,000
Total		$50,000

Strip Mines

The Commonwealth records indicate there are 3 strip mines in this sub-watershed. Our field investigations located 5 surface mines with 3 having flows. Table1251ists 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 12L is 104.65 acres or 19.22% of the total sub-watershed land area.

Table126 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: GC12L1, GC12L2, GC12L3, GC12L4 and GC12L5.

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

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

Following Table 126 are the descriptions of the flowing strip mines along with abatement recommendations.

TABLE 125
Abandoned Surface Mines
Sub-watershed
12L

Mine Number	Name of Mine or Operator	Permit No.	Area Mined (Acres)	Seam Mined	Flowing	Connection w/Deep Mine
S12L101	Unknown	--	59.67	PGH *	Yes	--
S12L102	Unknown	--	9.18	PGH *	Yes	M12L5
S12L103	Menallen Coke Co.	15836	7.34	RED	No	--
S12L104	Muller Coal Co.	10662	5.51	PGH	No	--
S12L105	Steve Oberlechner	461M117	22.95	SEW & RED	Yes	M11L14A,B,C M11L13

*Assumed

TABLE 126
ABANDONED SURFACE MINE AVERAGE WATER QUALITY DATA
Sub-watershed
12L

tation	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.
S12L101	3.2	370.5	19.74	0	0	370.5	19.74	.56	.03	132.46	6.55	812.5	43.42	6	8,640
%	-	-	-	-	-	-	.47%	-	.35%	-	.78%	-	.50%	-	.65%
S12L102	2.8	1239	59.87	0	0	1239	59.87	106.2	3.99	263.9	15.26	2338	113.9	8	11,520
%	-	-	-	-	-	-	1.44%	-	47%	-	1.81%	-	1.31%	-	.88%
S12L105	2.7	9419	1081	0	0	9419	1081	40.88	5.16	1936	206.2	13963	1467	70	100,800
%	-	-	-	-	-	-	25.96%	-	60.78%	-	24.47%	-	16.87%	-	7.61%

Strip Mine S12L10l

General Description:

This strip mine is located about 6,500 feet south of Friendship Heights and 2,000 to 3,000 feet south of T 340. It straddles the watershed boundary line. It contains 59.67 acres and is assumed to have mined the Pittsburgh coal seam. It is 90% reclaimed through grading and revegetation. The vegetation covers 95% of the area and consists of grasses and trees. The central portion is abandoned and has partially vegetated spoil piles. There is no highwall or any evidence of deep mining. Only one leach was found which is located on the northeastern side of the strip. There are erosion ditches around the perimeter of the mine. The strip is shown on the map of Sub-watershed 12L.

Recommendations:

As is evidenced by the erosion ditches, surface runoff is a major factor on the strip. A diversion ditch system upslope from the leach would prevent the entrance of the surface runoff onto the strip. The leach area is also sparsely vegetated so some revegetating will be necessary to aid in the control of the erosion.

Costs:

Vegetation	10 acres @ $600/acre	$6,000
Ditch	1,500 feet @ $1/foot	1,500
		$7,500

Strip Mine S12L102

General Description:

This strip mine is located about 3,000 feet southeast of Friendship Heights. It lies about 1,800 feet south of T 340. It contains 9.18 acres and is assumed to have mined the Pittsburgh coal seam. The strip is 30% reclaimed through revegetation and some minimal grading. The vegetation covers 90% of the strip and consists of both grasses and trees. A ten foot highwall still exists and it seems that the spoil was simply pushed downslope leaving a depression between the two. There are deep mine openings (M12L5) along the highwall while a tipple and some old mine shacks are also nearby. Three leaches were found in the area of the deep mine openings. The strip is shown on the map of Sub-watershed 12L.

Recommendations:

There is evidence that the leaches are not originating from the strip mine but rather from the deep mine workings. Therefore, no recommendations can be made until further investigation is made.

Strip Mine S12L105 (permit number 461M117}

General Description:

This strip mine is located about 2,500 feet southeast of Friendship Heights and is approximately 200 feet north of T 340. It straddles the 12L-1lL sub-watershed boundary line. The strip covers 22.95 acres and mined the Sewickley and Redstone coal seams. The strip is classified as abandoned since only a minimal amount of revegetation was performed and no grading was evidenced. Natural vegetation covers 80% of the strip. A 15-20 foot highwall exists for the entire length of the mine. There are many gob and spoil piles, depressions, and ponds. Deep mine openings of the M11L13 and M11Ll4 complexes have been found. Ten leaches have been located at various points on the edge of the strip mine area. The strip is shown on the map of Sub-watershed 12L.

Recommendations:

Depressions and ponds have formed between the highwall and the spoil banks which collect water and allow maximum percolation. Minimal grading and revegetation will be required in some areas. However, the crux of the reclamation scheme for this strip will be a diversion ditch system. One ditch, above the highwall, will divert surface runoff from the area. Another ditch, at the base of the highwall, will remove water from the strip before percolation occurs.

Costs :

Grading	5 acres @ $1,80O/acre	$ 9,000
Vegetation	5 acres @ $600/acre	3,000
Ditches	6,000 feet @ $l/foot	6,000
		$18,000

Recommendations

Table 127 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 128 lists the sources abated, the amount of beneficiation, and the costs associated with each plan.

The distance from Sampling Station GC12L1 to the Monongahela River is .8 of a mile. This is the minimum distance on Georges Creek that would benefit from the recommended work.

TABLE 127
RECOMMENDED ABATEMENT PROCEDURES - COST BENEFICATION
SUB - WATERSHED
12L

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	S12L105	$ 18,000	$ 18,000	$ 22.20	$ 22.20	810.75	154.65	20%	18%
2	M12L12	25,000	50,000	33.19	66.38	753.21	180.99	18%	22%
3	M12L7	25,000	25,000	69.64	69.64	358.97	76.45	9%	9%
4	M12L6	25,000	25,000	184.87	184.87	135.23	12.02	3%	1%
5	M12L5	75,000	75,000	188.50	188.50	397.87	90.02	10%	11%
6	M12L4	50,000	50,000	289.54	289.54	172.69	41.89	4%	5%
7	S12L101	7,500	7,500	506.41	506.41	14.81	4.91	1%	1%

TABLE 128
BENEFICATION - RECOMMENDED PLANS
SUB-WATERSHED
12L

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	7	2,644	64%	560.93	67%	3,838	44%	$ 225,500	$ 250,500
B	6	2,629	63%	556.02	66%	3,805	44%	218,000	243,000

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