

## IV GEOLOGY AND MINING ACTIVITIES

## 1. GEOLOGY

All of the Youghiogheny Basin lies within the Appalachian Plateaus Province. Some 30%, west of Chestnut Ridge, is in the Pittsburgh Plateaus Section of the province and the rest is in the Allegheny Mountain Section.

A series of folds creates ridges and valleys which generally trend SW to NE. Folds east of Chestnut Ridge are closer and more uniform. West of Chestnut Ridge is more mountainous and includes Mt. Davis formed by the Negro Mountain Anticline, and which is the highest point in Pennsylvania, elev 3,213 ft.

Prominent structural features are shown in Figure 1. Those of particular importance to mine drainage pollution are, from west to east:

	Important	Important
<u>Structure</u>	<u>Strata Group</u>	<u>Coal</u>
Pigeon Creek Syncline	Monongahela	Pittsburgh
Irwin Syncline	Monongahela	Pittsburgh
Greensburg Syncline	Monongahela	Pittsburgh
Latrobe Syncline	Monongahela	Pittsburgh
Uniontown Syncline	Monongahela	Pittsburgh
Ligonier Syncline	Allegheny	L. Kittanning
Centerville Dome	Allegheny	L. Freeport
Negro Mt. Anticline	Allegheny	L. Kittanning & Brookville
Berlin Syncline	Monongahela & Allegheny	Pittsburgh L. Kittanning & U. Kittanning

These geologic structures are discussed starting on page IV-4.

A generalized tabulation of the stratigraphy is included in Table IV-A. The Washington Group is not included since this has been eroded away except on a few hilltops in the deepest syncline basins.

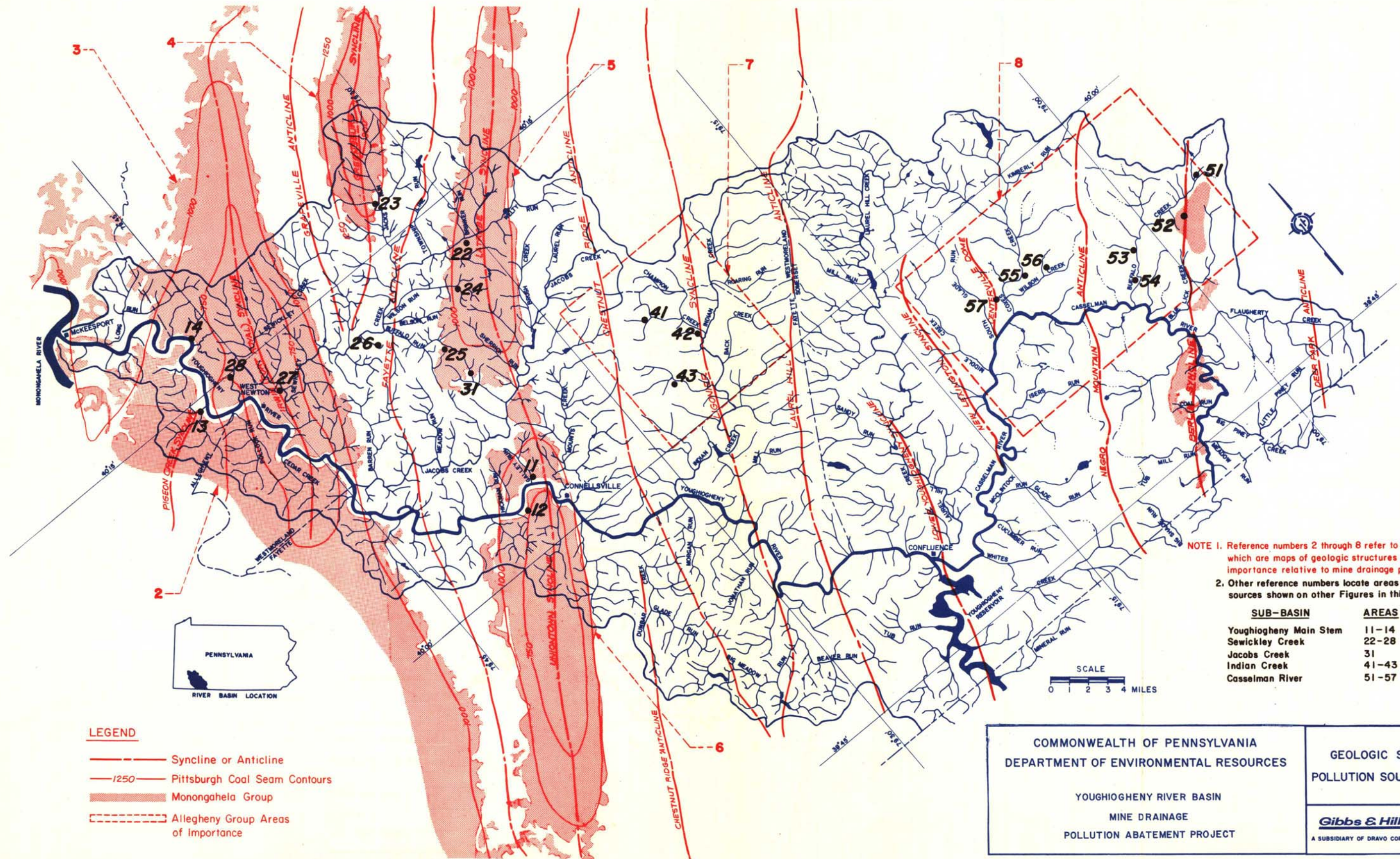
Table IV-A, Geologic Strata

<u>Age</u>	<u>Group</u>	<u>Thickness</u>	<u>Members</u>	<u>Thickness</u>
Pennsylvanian	Monongahela	260-400'	Waynesburg Coal	3 -9'
			Waynesburg Limestone	0-20'
			Uniontown Sandstone	10-20'
			Uniontown Coal	0 -2'
			Uniontown Limestone	25-45'
			Benwood Limestone	30-60'
			Sewickley Sandstone	0-60'
			SEWICKLEY COAL*	0-10'
			Fishpot Limestone	5-30'
			REDSTONE COAL*	1 -5'
			Redstone Limestone	5-20'
			Pittsburgh Sandstone	12-70'
			PITTSBURGH COAL**	6 -14'
Pennsylvanian	Conemaugh	500-750'	Little Pittsburgh Coal	0-1
			Connellsville Sandstone	5 -50'
			Clarksburg Limestone	0 -7'
			Morgantown Sandstone	5 -120'
			Birmingham Shale	50 -60'
			L. Bakerstown Coal	0 -7'
			Saltsburg Sandstone	20 -85'
			Buffalo Sandstone	20 -60'
			Brush Creek Coal	0 -5'
			Mahoning Coal	Thin
			Mahoning Sandstone	20 -120'
Pennsylvanian	Allegheny	250-370'	UPPER FREEPORT COAL*	1 -15'
			Butle Sandstone	10 -50'
			LOWER FREEPORT COAL*	0 -4'
			Freeport Sandstone	30 -60'
			UPPER KITTANNING COAL*	0 -13'
			Worthington Sandstone	10 -70'
			Middle Kittanning Coal	0 -2'
			LOWER KITTANNING COAL*	0 -4'
			Kittanning Sandstone	10 -50'
			CLARION COAL*	0 -6'
			Clarion Sandstone	5 -50'
BROOKVILLE COAL*	0 -6'			
Pennsylvanian	Pottsville	65-250'	Homewood Sandstone	15-70'
			Mercer Shale&Coal	1-50'
			Connoquenessing Sandstone	10 -80'
Mississippian	Mauch Chunk	0-310'	Wymps Gap Limestone	0 -110'
			Loyalhanna Limestone	20 -60'

\*Extensively mined

\*\*Most extensively mined





NOTE 1. Reference numbers 2 through 8 refer to Figures 2 through 8 which are maps of geologic structures with particular importance relative to mine drainage pollution.  
 2. Other reference numbers locate areas of specific pollution sources shown on other Figures in this report as follows.

SUB-BASIN	AREAS	FIGURES
Youghiohony Main Stem	11-14	11-14A
Sewickley Creek	22-28	22-28A
Jacobs Creek	31	31-31A
Indian Creek	41-43	41-43
Casselman River	51-57	51-57A

**LEGEND**

- Syncline or Anticline
- 1250 Pittsburgh Coal Seam Contours
- Monongahela Group
- Allegheny Group Areas of Importance

SCALE  
 0 1 2 3 4 MILES

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES		GEOLOGIC STRUCTURE AND POLLUTION SOURCE LOCATION KEY	
YOUGHIOGHONY RIVER BASIN MINE DRAINAGE POLLUTION ABATEMENT PROJECT		FIGURE NO. <b>1</b>	
Gibbs & Hill, Inc. <small>A SUBSIDIARY OF DRAVO CORPORATION</small>			



## A. Geologic Structures West of Chestnut Ridge

Five syncline basins west of Chestnut Ridge involve major mine drainage pollution problems:

- Pigeon Creek Syncline basin, at the SE corner of Allegheny County, extends to several watersheds including a sub-basin of the Monongahela River as well as the Gillespie Run sub-basin of the Youghiogheny.
- Irwin (Port Royal) Syncline basin, in the southwest part of Westmoreland County, extends to many sub-basins of the Sewickley Creek watershed and several small sub-basins of the Youghiogheny main-stem watershed.
- Greensburg Syncline basin, at the Greensburg area of Westmoreland County, extends to the Jacks Run watershed of Sewickley Creek and to the Crabtree Creek watershed of the Allegheny River basin.
- Latrobe Syncline basin, through the middle of Westmoreland County, extends to the Jacobs Creek and Sewickley Creek areas of the Youghiogheny and to the Loyalhanna basin of the Allegheny
- Uniontown Syncline basin, through the middle of Fayette County, extends to a number of surface watersheds including Galley and Hickman Runs of the Youghiogheny, and Redstone Creek of the Monongahela watershed.

### (1) Pigeon Creek Syncline Basin

Pigeon Creek Syncline Basin, Figure 2, is in Allegheny County between the Youghiogheny and Monongahela Rivers. The uppermost strata are entirely Monongahela group and the Pittsburgh coal outcrop encompasses some 30 sq mi. Throughout the syncline basin, the coal seam is relatively flat with low points at; discharges M77 and M02 on the Youghiogheny side and, on the Monongahela side at the syncline axis.

Of many abandoned mines in the basin, Ocean Mine # 2 and the Warden Mine complex are the only ones with polluting discharges to the Youghiogheny. Possible discharges to the Monongahela were not investigated.

Discharges (M01 and M02) drain Warden Mine and other mines draining into Warden Mine. Ocean Mine # 2, directly north of Warden, is drained by discharge (M77) through two brick arch drift openings side by side on the hillside above the Youghiogheny River. All three discharges are from the same coal seam at elevations in very close range (780-800). Character of drainage is shown on Table IV-B.

Table IV-B, Discharges to the Youghiogheny  
From Pigeon Creek Syncline Basin

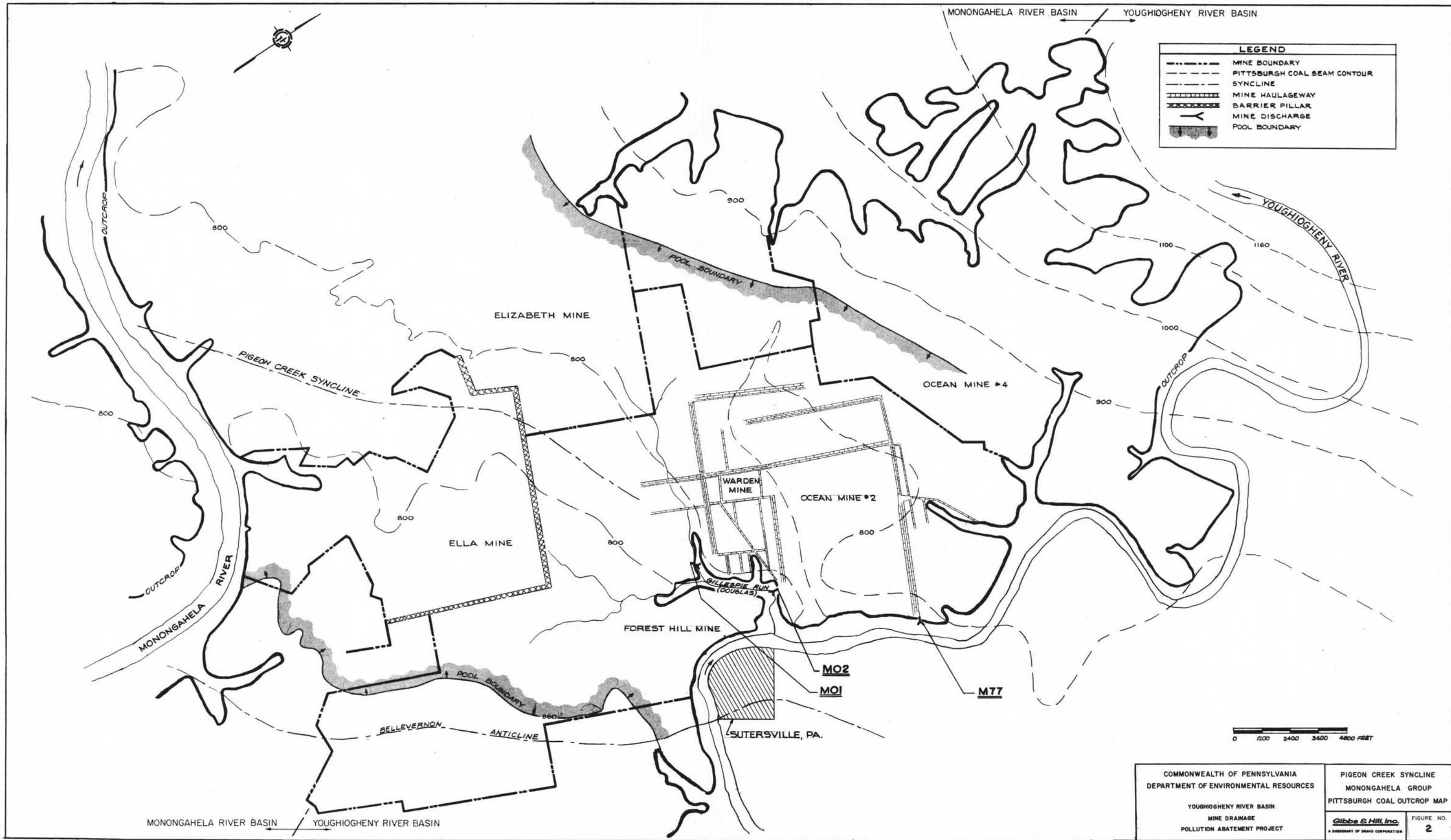
Station	<u>Warden Mine</u>		<u>Ocean #2</u>
	<u>MO1</u>	<u>M02</u>	<u>M77*</u>
Sample	6/69	6/69	5/68
MGD	0.17	1.7	0.8
pH	6.6	6.7	3.7
<u>Mg/l:</u>			
Acidity	0	0	170
Alkalinity	320	220	0
Iron	11	58	35
Sulfate	244	675	740
<u>Lbs/day:</u>			
Net acidity	-450	-3100	1,200
Iron	15	800	240

\*M77 analysis from EPA

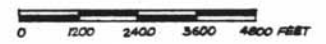
There are no known surface water sink holes in the area. It is believed that water into the mines is infiltration through cracked walls and ceilings. Also, the discharge from Ocean Mine #2 probably includes drainage from the mined area northwest of Ocean #2. The discharges from Warden Mine are believed overflow from a large pool which collects mine waters from all directions of the syncline basin.

Ocean #2 discharge is believed to originate from mines of higher elevation to the northwest since its quality is significantly different from the Warden discharges.

Location of the present Warden discharges (MO1 and M02), their alkaline quality and the history of pumping during active operation, suggest that these discharges are overflows from a mine water pool which may extend into the Monongahela River watershed.



LEGEND	
	MINE BOUNDARY
	PITTSBURGH COAL SEAM CONTOUR
	SYNCLINE
	MINE HAULAGEWAY
	BARRIER PILLAR
	MINE DISCHARGE
	POOL BOUNDARY



COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES	PIGEON CREEK SYNCLINE MONONGAHELA GROUP PITTSBURGH COAL OUTCROP MAP
YOUGHIOGHENY RIVER BASIN MINE DRAINAGE POLLUTION ABATEMENT PROJECT	<b>Gibbs &amp; Hill, Inc.</b> A SUBSIDIARY OF DRACO CORPORATION
	FIGURE NO. <b>2</b>

(2) Irwin (Port Royal) Syncline Basin

Irwin (Port Royal) syncline basin, Figure 3, is in the western part of Westmoreland County. The uppermost strata of the syncline is mostly Monongahela group with scattered small sections of younger Washington group on the top of the Monongahela group. The outcrop line of the Pittsburgh coal at the base of the Monongahela group encompasses some 150 sq mi. Approximately one-third of the syncline basin surface, north of Irwin, drains into a tributary of the Monongahela River, while the rest drains into Sewickley Creek and the main stem of the Youghiogheny River.

Pittsburgh coal in the syncline basin has been mined extensively since the 1860's, and all but two, Hutchinson Mine (M13) and Banning # 4 (M16 and M17), are abandoned. The coal seam is pitched north to south with total drop of 600 feet and slopes up steeply from the syncline axis to the eastern outcrop line. The Youghiogheny River crossing the southern section of the syncline basin has exposed the coal seam below Sewickley Creek. The exposed coal seam near the mouth of Sewickley Creek is the lowest outcrop in the syncline basin, and mine drainages from the syncline basin are mostly in this vicinity. Discharges are listed in Table IV-C.

Table IV-C, Mine Drainage From Irwin Syncline Basin

Station	M03	M04	M13	M14	M16	M17
Sample	6/10/69	6/10/69	6/4/69	6/2/69	6/2/69	6/9/69
MGD	1.6	3.2	4.1	4.5	2.0	2.4
pH	6.1	6.3	5.0	5.4	7.9	5.2
mg /l:						
acidity	10	10	320	320	0	640
alkalinity	0	128	0	0	100	0
iron	95	38	88	138	2	150
sulfate	1,220	725	1,450	750	930	1,220
lbs/day:						
net acidity	130	-3200	11,000	12,000	-1700	12,700
iron	1,240	1,000	3,000	5,200	40	3,000

NOTE:

- M03 -Shaner Mine drainage to Youghiogheny River.
- M04 -Guffey Mine drainage to Youghiogheny River.
- M13 -Hutchinson, active mine, discharge to Sewickley Creek.
- M14 -Keystone, Ocean & Marchand to Sewickley Creek.
- M16 -Banning Mine # 4, treatment plant discharge to Youghiogheny River.
- M17 -Banning Mine #4, pump discharge to be treated, to Youghiogheny River.

All but a small area near West Newton, where there are presently 4 two active operations (Hutchinson Mine and Banning Mine), has been mined out and filled with water. Water flowing into the mined out areas through outcrops and cracks is collected behind barrier pillars and is known to be held much like a large underground lake which overflows into a neighboring mine or an opening depending on a number of factors such as intactness of the barrier pillar, level of the mine water pool, and surface elevation.

Water problems at the Hutchinson Mine, the deepest mine in the syncline basin, has been described by E. P. Hall, "Hutchinson Mine - A Problem in Coal Mine Drainage" (Preprints No. 59F309, Society of Mining Engineers of AIME).

Hutchinson Mine is surrounded by Magee Mine to the east, Keystone and Ocean Mines to the north and Marchand Mine to the northwest. There is a drainage tunnel through the barrier pillar between Keystone and Ocean Mines to equalize their water levels. After abandonment of these mines, a rock tunnel was driven above coal seam at the barrier pillar between Ocean and Marchand Mines to lower the water level in Ocean. The present discharge (MI4) from Marchand Mine includes the mine waters from Keystone and Ocean Mines.

In order to continue the work in the remainder of the active mine, 4 water in Hutchinson Mine is pumped using four 4,200 gpm pumps. Annual average pumping time is 40 machine-hours per day and at times of extremely high-flow, all four pumps have been barely adequate. Water pumped from Hutchinson Mine includes the water flow from Magee Mine through connecting openings (3, 000 gpm) and leakage through the north barrier which separates Hutchinson from Keystone, Ocean and Marchand Mines. The barrier is a minimum of 96 feet in thickness and is subject to pressure of as much as 233 feet of water head.

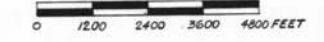
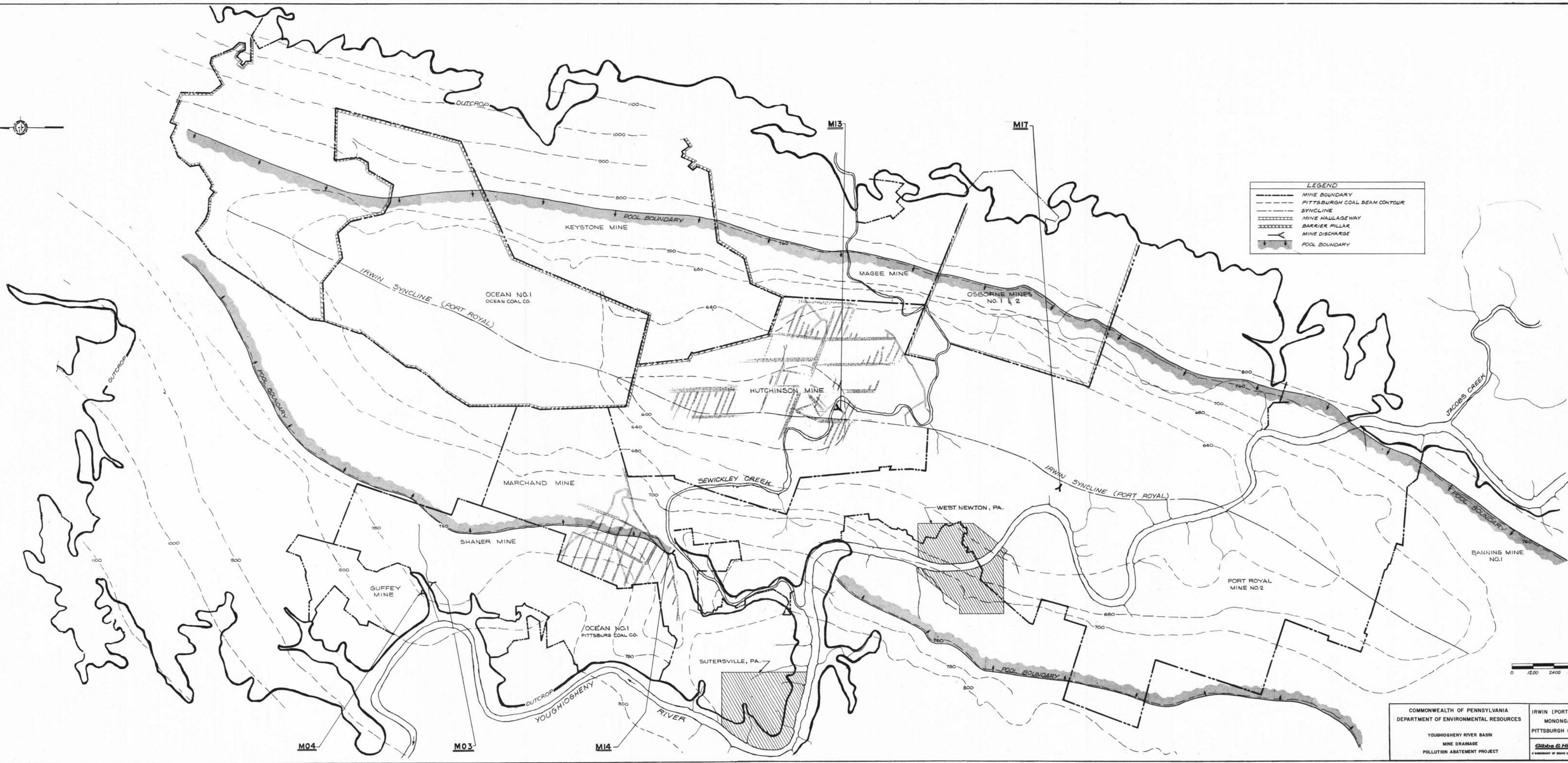
Mine discharges from Guffey Mine (M04) and Shaner Mine (M03) are also from the same coal seam but believed to be separated from Marchand Mine by old mine barriers.

When the Hutchinson Mine pumping stops, the mine will be flooded and mine water presently pumped will eventually join the present overflow of Marchand Mine (MI4).





LEGEND	
	MINE BOUNDARY
	PITTSBURGH COAL SEAM CONTOUR
	SYNCLINE
	MINE HAULAGEWAY
	BARRIER PILLAR
	MINE DISCHARGE
	POOL BOUNDARY



COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL RESOURCES

YOUGHIOGHENY RIVER BASIN  
 MINE DRAINAGE  
 POLLUTION ABATEMENT PROJECT

IRWIN (PORT ROYAL) SYNCLINE  
 MONONGAHELA GROUP  
 PITTSBURGH COAL OUTCROP MAP

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FIGURE NO. 3

### (3) Greensburg Syncline Basin

The Greensburg Syncline Basin, Figure 4, is in the middle of Westmoreland County, between the Fayette and Grapeville Anticlines. The City of Greensburg is within the syncline basin.

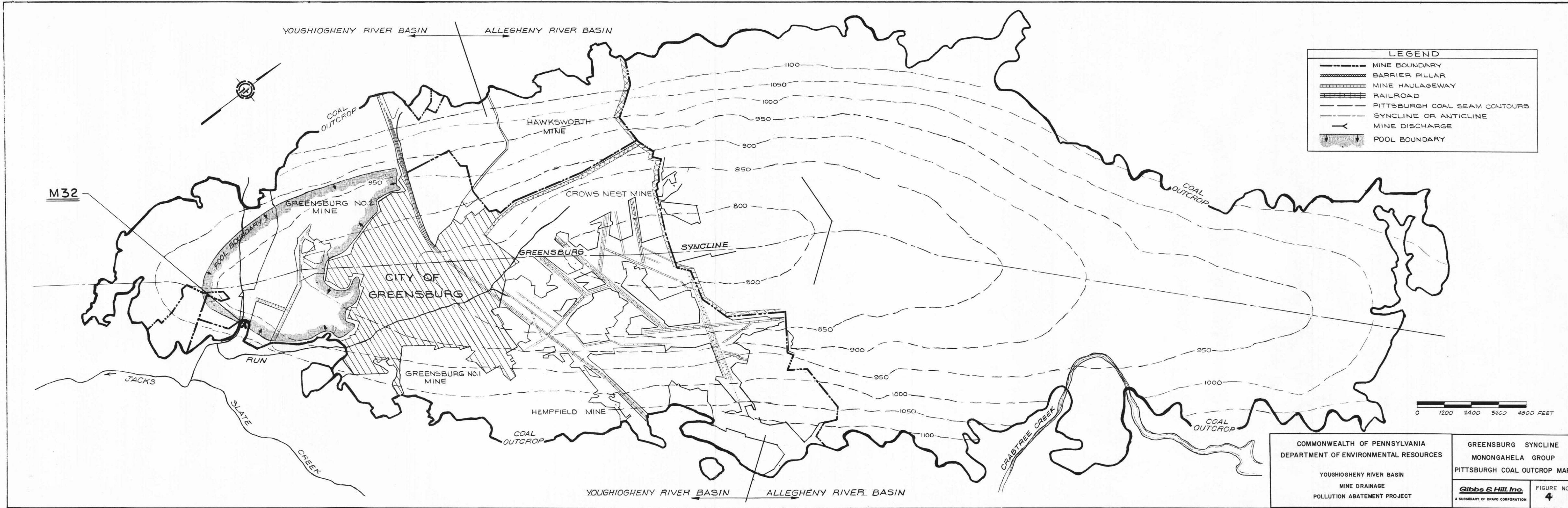
Surface strata are primarily the Monongahela group, and the outcrop line of the Pittsburgh coal seam encompasses 26.5 sq mi Pittsburgh coal outcrops at elevations 950 to 1300 ft and is deepest at elevation 750 ft in the center of the basin.

Surface of the syncline basin is divided into two watersheds. The southern half draining into Jacks Run (Sewickley Creek) of Youghiogheny system, and the northern half drains to a sub-tributary of Allegheny system.

There is only one major mine discharge (M32) which is located at the southern tip of the basin and discharges into Jacks Run. This discharge is from a drift opening at the lowest coal outcrop in the syncline basin.

Pittsburgh coal was extensively mined in the early 1900's by room and pillar method, and in later years most of the pillars were robbed. WPA mine maps show three major mine barriers completely crossing the base, which could form several compartmented mine water pools if the barriers are still intact. More recent mine maps are not available and the status of these mine barriers is uncertain.

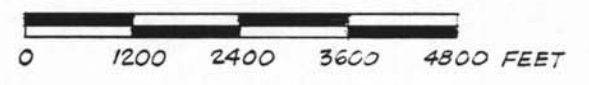




YOUGHIOGHENY RIVER BASIN      ALLEGHENY RIVER BASIN

LEGEND	
	MINE BOUNDARY
	BARRIER PILLAR
	MINE HAULAGEWAY
	RAILROAD
	PITTSBURGH COAL SEAM CONTOURS
	SYNCLINE OR ANTICLINE
	MINE DISCHARGE
	POOL BOUNDARY

M32



COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES	GREENSBURG SYNCLINE MONONGAHELA GROUP PITTSBURGH COAL OUTCROP MAP
YOUGHIOGHENY RIVER BASIN MINE DRAINAGE POLLUTION ABATEMENT PROJECT	Gibbs & Hill, Inc. <small>A SUBSIDIARY OF DRACO CORPORATION</small>
	FIGURE NO. <b>4</b>

YOUGHIOGHENY RIVER BASIN      ALLEGHENY RIVER BASIN

(4) Latrobe Syncline Basin

The Latrobe syncline basin, Figure 5, is in Westmoreland County. Surface strata is almost entirely Monongahela Group. The syncline basin outlined by the outcrops of the Pittsburgh coal seam, is a 25 mile long, 75 sq mi basin.

Pittsburgh coal was extensively mined throughout the syncline basin. It outcrops at elevations 950 to 1220 ft with two deep points at elevations 750 and 800 ft. The coal seam is 7 ft thick in the vicinity of Mammoth and Carpentertown and 8 ft thick near Stewart and Mt. Pleasant. In the Brinkerton area, the higher, 3.5 ft thick Redstone seam was also deep and strip mined.

The northern half of the basin surface drains to Loyalhanna Creek of Allegheny river, while the southern half drains to Sewickley Creek and Stauffer Run (Jacobs Creek) of the Youghiogheny system. All known mine discharges from the basin into Youghiogheny River basin are listed in Table IV-D.

Table IV-D, Mine Drainage from Latrobe Syncline Basin.

Station	M12	M11	M10	M09	M08	M07	M06	M05	M62*	M63*
Sample	6/69	6/69	6/69	6/69	6/69	6/69	6/69	6/69	3/68	3/68
MGD	4.6	0.25	1.55	0.85	0.1	0.35	1.4	0.7	0.04	0.02
pH	6.2	3.1	6.6	6.6	3.5	7.6	6.0	3.1	2.4	2.5
<u>mg/l:</u>										
acidity	300	780	5	0	240	0	10	1,110	1710	1200
alkalinity	80	0	236	198	0	154	60	0	0	0
iron	156	66	121	36	51	9	56	115	312	186
sulfate	700	1,000	538	394	575	570	725	725	2340	1716
<u>lbs/day:</u>										
acidity	8,400	1,650	-3,000	-1,400	190	-450	-580	6,600	585	220
iron	6,000	140	1,600	260	40	30	640	680	110	30

## NOTE:

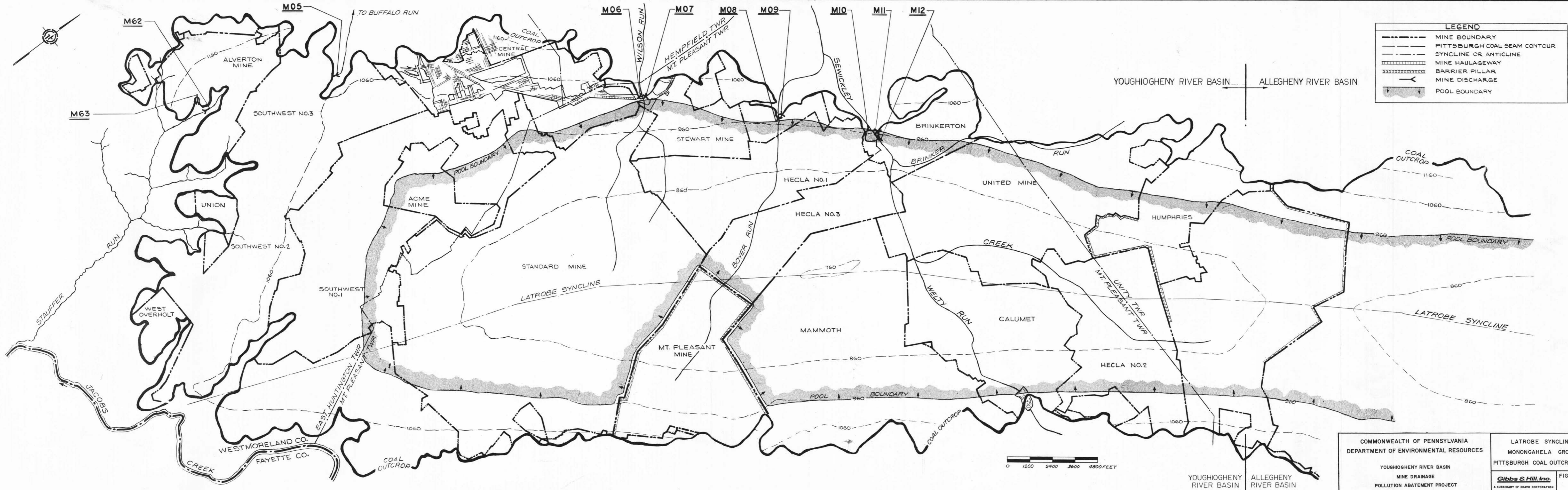
- M10, M11 & M12 are to Sewickley Creek at the Brinkerton Overflow area.
- M08 & M09 are to Boyer Run, tributary to Sewickley Creek.
- M06 & M07 are to Wilson Run, tributary to Sewickley Creek.
- M05 is to Buffalo Run, tributary to Sewickley Creek.
- M62 & M63 are to Stauffer Run, tributary to Jacobs Creek.

\*EPA data.



With the exception of MOS from the northwest corner of the syncline basin, all discharges from the syncline basin into the Youghiogheny watershed are at elevations of 960 to 990 ft. It is believed that most of these discharges are from the same mine water pool but possibly from different compartmented sections.

Known mine drainage discharges from the basin into Sewickley Creek total approximately 10 MGD. Discharges at the Brinkerton area (M12, M11 and M10) are believed to be draining Hecla Mine #1 and #3, Brinkerton Mine, United, Mammoth and Calumet Mines. Two discharges (MOB and M09) on Boyer Run of Sewickley Creek are believed to be draining portions of Hecla Mine No.1, while the discharges (M06 and M07) on Wilson Run drain the area of the Standard and Central Mines. Discharge (MOS), draining Southwest Mine #3 into Buffalo Run at elevation 1060 ft is considerably higher than the other discharges in the syncline basin and is believed to be overflow of water trapped behind a barrier in Southwest #3.



LEGEND	
	MINE BOUNDARY
	PITTSBURGH COAL SEAM CONTOUR
	SYNCLINE OR ANTICLINE
	MINE HAULAGEWAY
	BARRIER PILLAR
	MINE DISCHARGE
	POOL BOUNDARY

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL RESOURCES

LATROBE SYNCLINE  
 MONONGAHELA GROUP  
 PITTSBURGH COAL OUTCROP MAP

YOUGHIOGHENY RIVER BASIN  
 MINE DRAINAGE  
 POLLUTION ABATEMENT PROJECT

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FIGURE NO.  
 5

(5) Uniontown Syncline Basin

The Uniontown syncline basin trends northeast-southwest through the middle of Fayette County as shown in Figure 6. It is approximately 27 miles long, canoe-shaped, with a steeper eastern flank and a wide gradual sloping western flank.

Surface strata of the syncline basin is of Monongahela and Washington groups. Approximately 95 sq mi is within the Pittsburgh coal cropline, which is used herein to define the syncline basin boundaries. The Washington group covers some 20 sq mi of the Monongahela group. Approximately thirty per cent of the syncline basin surface drains to the Youghiogheny River system with the remainder draining into tributaries of the Monongahela River.

Two major streams cross the syncline basin. Redstone Creek of the Monongahela system runs through the middle of the basin and first intersects the Pittsburgh seam at elevation 920 ft. The Youghiogheny River runs through the basin near Connellsville and has cut through the coal seam west of Galley Run. The coal seam exposed by the river, elevation 830 ft, is the lowest outcrop in the syncline basin.

Pittsburgh coal has been extensively mined by drift and slope entries along the outcrop and by shaft in the center of the basin. This seam lies in an ovated saucer shape with its lowest point, elevation 500 ft, at the center and sloping to outcrops at elevations ranging from 830 to 1,200 ft. There is no active mining in the basin.

Eight known mine drainages from the syncline basin are discharging into the Youghiogheny River as listed in Table IV-E.

Table IV -E, Mine Drainage from Uniontown Syncline Basin into Youghiogheny River

	<u>South of the Youghiogheny</u>			<u>North of the Youghiogheny</u>				
	<u>M19</u>	<u>M54</u>	<u>M55</u>	<u>M56*</u>	<u>M20</u>	<u>M57</u>	<u>M58</u>	<u>M59</u>
MGD	5.5	0.65	0.33	0.37	0.5	0.1	0.13	0.065
pH	6.2	4.0	3.3	5.0	4.4	3.2	3.7	3.2
<u>mg/l:</u>								
Acidity	80	100	275	130	1,440	500	350	500
Alkalinity	0	0	0	27	0	0	0	0
Iron	115	100	75	59	28	63	25	99
Sulfate	598	775	1,115	1,352	612	625	775	750
<u>lbs/day:</u>								
Net acidity	3,700	540	740	310	6,000	400	380	270
iron	5,300	540	200	180	110	50	30	50

\*EPA Data

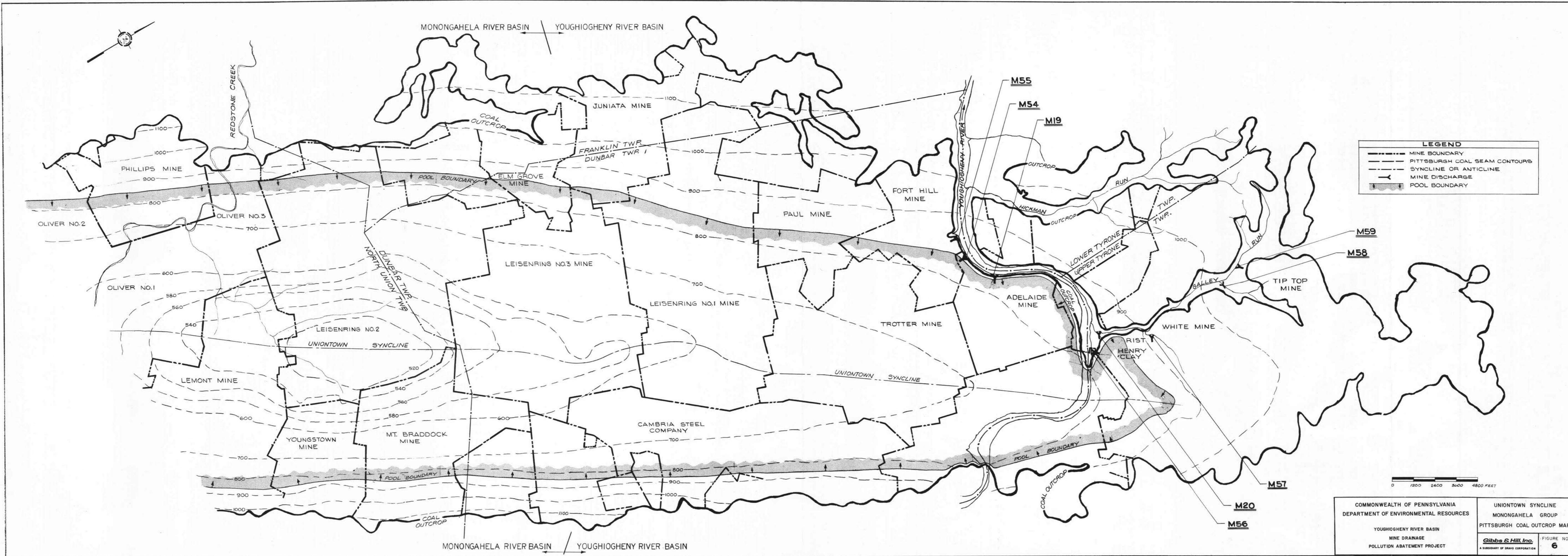
Although all drainages are from the same coal seam, there is no indication that the concerned mines are interconnected. Unfortunately, detail mine maps, other than WPA maps, are not available for the area.

The Adelaide discharge (M19), the largest in the basin, is a 5.5 MGD artesian-like discharge from an earth covered drift opening, this is believed an overflow of a large mine water pool, about 20 miles long and three miles wide, probably with some compartments created by mine barriers.

PHD records show that Leisenring Mine #1, south of Adelaide Mine, had 80 tons of acid per day discharged by pumping when the mine was active. Assuming 1,000 mg/l of acidity, over 15 MGD were being pumped from Leisenring. Since there are no records showing that the Adelaide discharge was present when this pumping was conducted, it is believed that Adelaide is overflow from a pool created after pumping stopped.

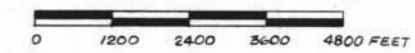
Discharges (M54 & M55) on the south bank of the Youghiogheny River are about the same elevation as M19, and they might very well be draining the same pool as M19.





**LEGEND**

- MINE BOUNDARY
- - - PITTSBURGH COAL SEAM CONTOURS
- - - SYNCLINE OR ANTICLINE
- MINE DISCHARGE
- ▬ POOL BOUNDARY



COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES	UNIONTOWN SYNCLINE MONONGAHELA GROUP PITTSBURGH COAL OUTCROP MAP
YOUGHIOGHENY RIVER BASIN MINE DRAINAGE POLLUTION ABATEMENT PROJECT	<b>Gibbs &amp; Hill, Inc.</b> <small>A SUBSIDIARY OF DRavo CORPORATION</small>
	FIGURE NO. <b>6</b>

B. Geologic Structures East of Chestnut Ridge(1) Ligonier Syncline

The Ligonier syncline, Figure 7, parallels the main stem of Indian Creek and has strong anticlines on each side, Laurel Hill on the east and Chestnut Ridge on the west. Conemaugh and Allegheny Groups are the predominant surface strata.

Lower Kittanning coal of the Allegheny Group was extensively mined in the areas where Indian Creek and its tributaries cut deep into the Allegheny deposits. Mining was active from the early 1900's until 1966.

(2) Centerville Dome, Negro Mt. Anticline and the Berlin Syncline

All of the known mine drainage pollution problems in the Casselman River sub-basin are related to these geologic structures which are shown in Figure 8. Structure, coal seam, discharges and related problem areas are:

	<u>Discharge</u>	<u>Area</u>
Centerville Dome		
L. Freeport coal (57)	M71, M72	Rockwood - Hays
Negro Mt. Anticline		
L. Kittanning coal	M37, M38, M66, M67, M68	Shamrock (55)
Brookville coal	M37	Shamrock (55)
Brookville coal	M69, M70	Wilson Creek (56)
Berlin Syncline		
Pittsburgh coal	M75	Goodtown (52)
U. Kittanning coal	M25, M34	Shober (53)
U. Kittanning coal	M73, M74	Ponfeigh (54)
L. Kittanning coal	M76	Pen Mar Mines (51)

NOTES: 1. Area numbers refer to Figure numbers in this report and locations shown on Figure 1.

2. Shaw Mines complex, outside the scope of this report, is related to Pittsburgh coal in the Berlin syncline.

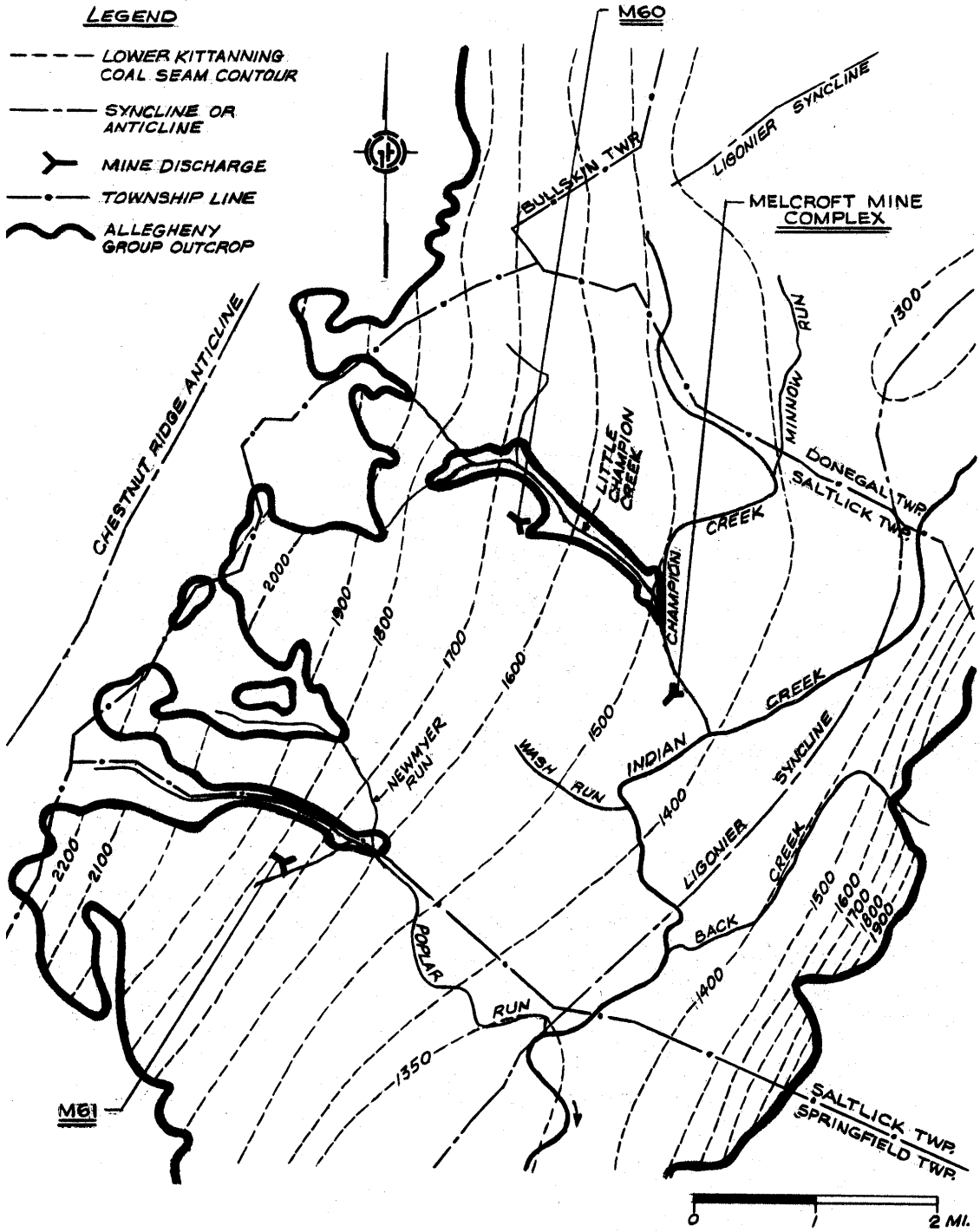
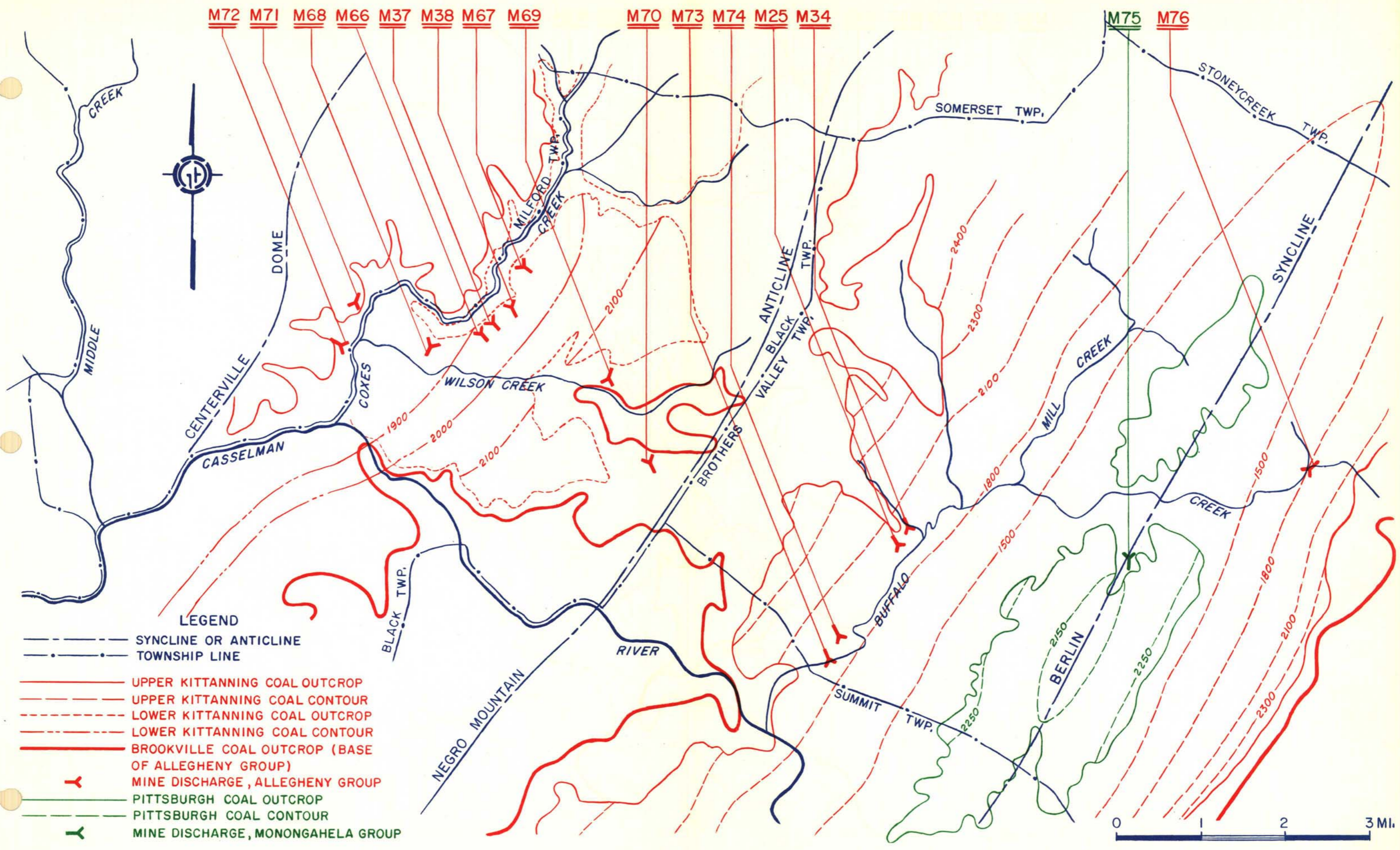


FIGURE 7 , LIGONIER SYNCLINE





M72 M71 M68 M66 M37 M38 M67 M69 M70 M73 M74 M25 M34 M75 M76

LEGEND

- SYNCLINE OR ANTICLINE
- · - · - TOWNSHIP LINE
- UPPER KITTANNING COAL OUTCROP
- - - UPPER KITTANNING COAL CONTOUR
- · - · - LOWER KITTANNING COAL OUTCROP
- - - LOWER KITTANNING COAL CONTOUR
- BROOKVILLE COAL OUTCROP (BASE OF ALLEGHENY GROUP)
- Y MINE DISCHARGE, ALLEGHENY GROUP
- PITTSBURGH COAL OUTCROP
- - - PITTSBURGH COAL CONTOUR
- Y MINE DISCHARGE, MONONGAHELA GROUP

CENTERVILLE DOME, NEGRO MOUNTAIN ANTICLINE & BERLIN SYNCLINE

FIGURE 8



## 2. MINING ACTIVITIES

Coal production within the basin dates from the late 1800's. It reached high levels from 1910 through the late 1940's and has fallen greatly since about 1950. Table IV-F lists estimates of reserves and production for four counties and estimates of 1970 production for the Youghiogheny basin portion of each county.

Table IV-F Bituminous Coal Production (Millions of Tons)

	<u>Allegheny</u>	<u>Fayette</u>	<u>Somerset</u>	<u>Westmoreland</u>
Original Reserve	4,000	5,000	6,000	6,000
Exhausted or Lost	1,000	1,300	400	1,500
Max. Annual Prod. (year)	20.2 (1913)	34 (1916)	10.8 (1927)	33.2 (1913)
1970 Production	4.6	1.8	3.7	2.6
Estimated 1970 Production Youghio- gheny River Basin	0	0	2.0	1.0
Economically Important Coal Seams	Red, Pgh	Pgh, Sew UK, LK UF, LF Red	BR, LK, UK LF, UF Pgh, Sew	Pgh, UF, Red LK, MK

Locations and mines where the various seams have been mined within the basin are in Table IV-G. Cross reference listings of mines and mine discharge sample numbers are in Appendix A.

Table IV-G, Coal Seams Mined in the Youghiogheny River Basin

Coal	Sub-basin	Area		Mine (2)	Discharge No. (3)	
		Name	No (1)			
Sewickley	Casselman R	Goodtown	52	Unknown	M75	
Redstone	Sewickley Cr	Brinkerton	22	Brinker Run	M10	
	Casselman R	Goodtown	52	Unknown	M75	
Pittsburgh	Youghiogheny	Galley Run	11	Henry Clay	M20, M56	
	"	"	11	Rist	M57	
	"	"	11	Tip Top	M58, M59	
	"	Adelaide Sta	12	Adelaide	M19, M54	
	"	"	12	Fort Hill	M55	
	"	Warden Mine	13	Warden	MO1, MO2	
	"	"	13	Ocean #2	M77	
	"	Guffey Sta	14	Guffey	MO3	
	"	"	14	Shaner	MO4	
	"	Banning Mine		<u>Banning #4*</u>	M16, M17	
	Sewickley Cr	Brinkerton	22	Brinkerton	M11, M12	
	"	Brinkerton	22	Hecla #1	MO8, MO9, M10	
	"	Jacks Run	23	Greensburg #2	M32	
	"	Wilson Run	24	Central	MO6	
	"	Wilson Run	24	Stewart	MO7	
	"	Buffalo Run	25	Southwest #3	MO5	
	"	Hutchinson	27	<u>Hutchinson*</u>	M13	
	"	Marchand	28	Marchand	M14	
	"	Jacobs Creek	Stauffer R	31	Alverton M62,	M63
	"	Casselman R	Goodtown	52	Quality #1, Wills #1, Gambert #2	M75
Upper Freeport (E Seam)	Sewickley Cr	Fayette Ant	26	<u>Delmont*</u>	M50	
	"	Fayette Ant	26	Greensburg #4	M51	
	"	Fayette Ant	26	Ella	M52	
Lower Freeport (D Seam)	Casselman R	Rockwood	57	Rockwood #1	M71	
	"	Rockwood	57	Rockwood #1, Hays	M72	
Upper Kittanning (C Seam)	CasselmanR	Shober	53	Mt. Valley #2	M25, M34	
	"	Shober	53	Shober	M25	
	"	Ponfeigh Mine	54	Ponfeigh #1A	M73	
	"	Ponfeigh Mine	54	Ponfeigh #1	M74	

Table IV-G (cont)

<u>Area</u>		<u>Discharge</u>				
<u>Coal</u>	<u>Sub-basin</u>	<u>Name</u>	<u>No (1)</u>	<u>Mine (2)</u>	<u>No (3)</u>	
Lower Kittanning (BSeam)	Indian Creek	L. Champion Cr	41	Coffman	M60	
	"	Melcroft	42	Melcroft #1	M21, M43 M47, M48	
	"	Melcroft	42	Melcroft #3	M21, M23 M46	
	"	Poplar Run	43	Marston	M61	
	"	Indian Creek		Oneida	M41	
	"	Indian Creek		Big Chief	M42	
	Casselman R	Pen Mar Mines	51	Pen Mar #2	M76	
	"	Shamrock	55	Ruth	M37, M38	
	"	Shamrock	55	Hocking	M68	
	"	Shamrock	55	Mary Jeanne	M66	
"	Shamrock	55	MacGregor	M67		
Brookville	Casselman R	Shamrock	55	Betsy Slope	M37	
	(A Seam)	"	Wilson Creek	56	Fogle	M69
	"	"	Wilson Creek	56	Atlantic #2	M70

(1) See Figure 1, for location of area.

(2) Refer to App A Table 1 for mine name cross reference.

(3) Refer to App A Table 2 for mine discharge cross reference.

Active Mine\*