

## MINING HISTORY

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The area comprising the Slippery Rock Watershed, because of the abundant coal deposits and the proximity to major coal markets, has been extensively mined by both strip and underground methods. From 1885 to the present, approximately 75,000,000 tons of coal have been produced from the area involved in this engineering study. Of this total, approximately 25,000,000 tons of coal have been produced from underground mines. The remainder of the production or about 50,000,000 tons has been produced by strip mining methods. 13,700 acres of land have been affected by these open pit mines in the area under study. At the present time, however, almost all of the coal being produced is being mined by strip mine operations. The largest amount of this total production has come from the Clarion, Middle Kittanning, and Upper Freeport seams of coal.

Mining of coal in the near future will largely be confined to strip mining methods. Large acreages of recoverable coal remain in this area. There is an estimated 1,883 million tons of the original coal reserves of 3,678 million tons in Butler County alone according to a recent survey by Elmer Patterson and J.A. Van Lieu of The Coal Reserves of Butler County Pennsylvania. This recoverable reserve is based on 80% recovery for strip mining and 50% recovery from deep mining with the remaining reserves estimated at 3,456 million tons of which 414 million tons are located in beds where the overburden is less than 60 feet. These reserves are in the Upper Freeport, Middle Kittanning, Lower Kittanning and Clarion seams of coal.

Most of the mine drainage pollution comes from abandoned strip and deep mines where mining was conducted before the regulation of the mining industry. Much of this acid drainage has been aggravated by the methods of mining with the following conditions contributing to the problem.

1. The major cause of pollution is the fact that until recently the mine openings were driven to the rise allowing the gravity draining of water from the mine.
2. The larger mines as well as many of the smaller were interconnected with few, if any, barrier pillars remaining between mines.
3. Caving of mine workings with resulting fracturing of strata and surface subsidence allowing surface and ground water to percolate into the mine workings.

4. Ventilation and supply shafts being left open.
5. The mine openings were not sealed when the mines were abandoned.
6. The strip mine pits were not backfilled or planted before the advent of the land reclamation laws.
7. Outcrop barriers were not left in strip mines.
8. No diversion ditches to bypass surface waters were constructed around mining operations.
9. Mine and tippie refuse consisting of high sulphur material were not disposed of properly.

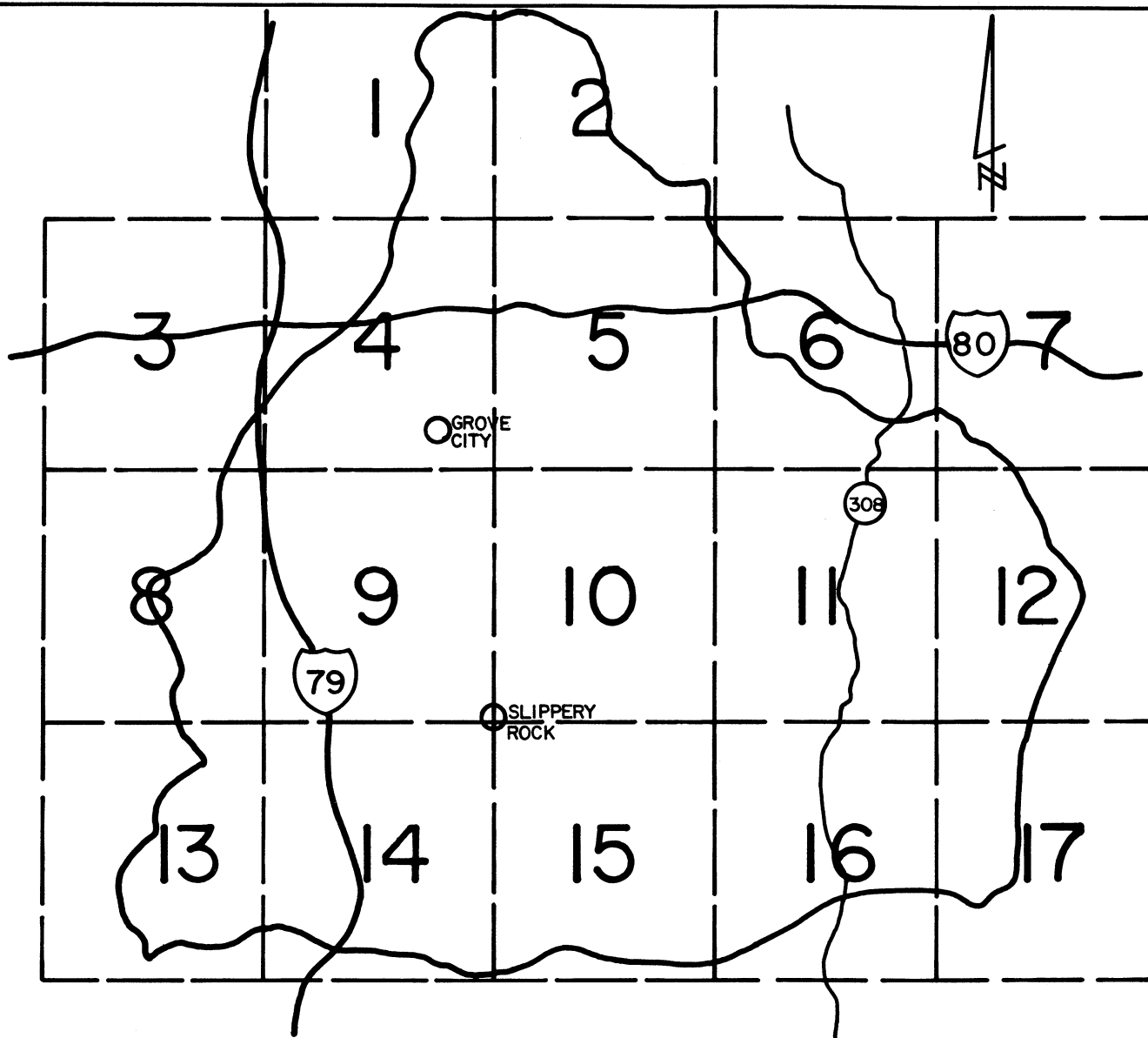
The Pennsylvania Clean Streams Act of 1937 PL1987 with subsequent amendments, the 1963 Bituminous Coal Open Pit Mining Conservation Act 133, and the Land and Water Conservation Act of 1967, are designed to prevent mine drainage pollution from existing and future operations. Effective implementation and enforcement of these laws should eliminate or control any adverse conditions resulting from active mining operations. Meanwhile, as stated above, mine drainage from abandoned deep and strip mines will continue to degrade the water quality in the area placing severe restrictions on the land and water environment.

#### Mining Area Maps

An essential part of this study consisted of mapping the areas involved in past mining in the Watershed; to show the extent of abandoned workings and evaluate these conditions in light of existing pollution problems. These maps are of fundamental importance to a mine drainage control program since they provide the physical basis for applying specific abatement methods and estimating costs.

Complete information relative to early mining activity (maps, coal tonnages, locations and numbers of entries, drilling records, interconnections, etc.) is seldom available for areas having a long mining history, such as Slippery Rock. Plotting strip mine affected areas poses no real problem since this effort is greatly facilitated by aerial photography. Mapping deep mine areas, however, becomes a task ranging from difficult to impossible with approximations of the mined areas usually derived from estimates of coal tonnage and information provided by the local citizenry.

Updated and new information regarding the extent of mining (deep and strip) in the Study Area, is shown on the following pages of 17 maps. Shown on the mining area maps are the deep mined and strip mined areas, the deep mine openings and the location of the weirs. The extent of the deep mine workings were mainly obtained from mine maps of the individual mines or from maps prepared by the U.S. Bureau of Mines. The strip mine affected areas were plotted from recent aerial photography. The mine openings and water discharges were located from aerial photography, extensive field reconnaissance and field surveys. The weirs were located by field surveys. These areas and locations are designated as shown by the following index map legend. These maps also show roads, political subdivisions and various topographic features.



INDEX TO MINING AREA MAPS

 DEEP MINE OPENINGS

 STRIP MINE AREAS

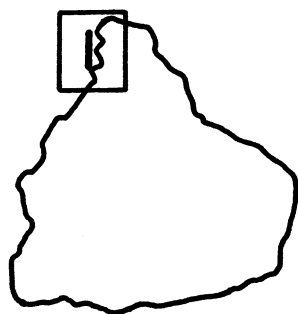
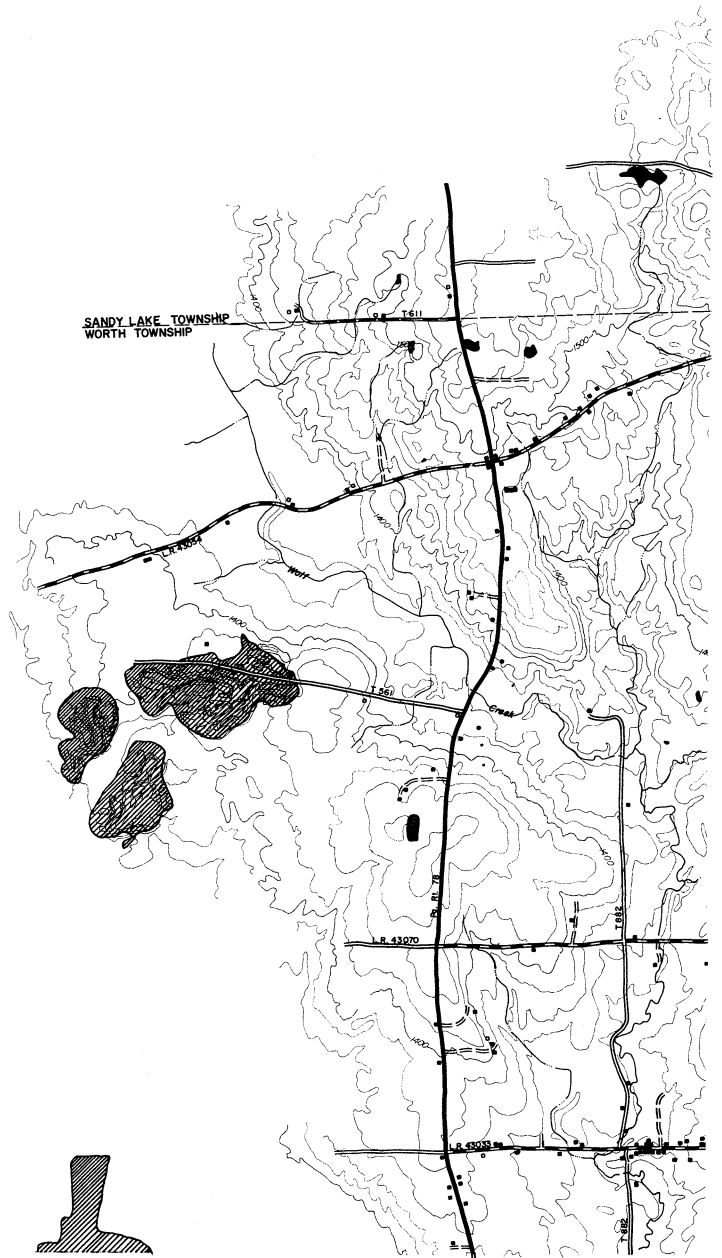
 WEIR LOCATIONS

 DEEP MINE AREAS

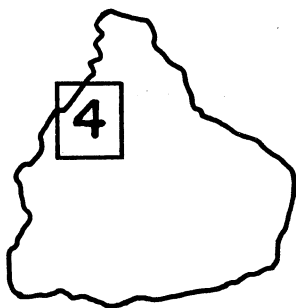
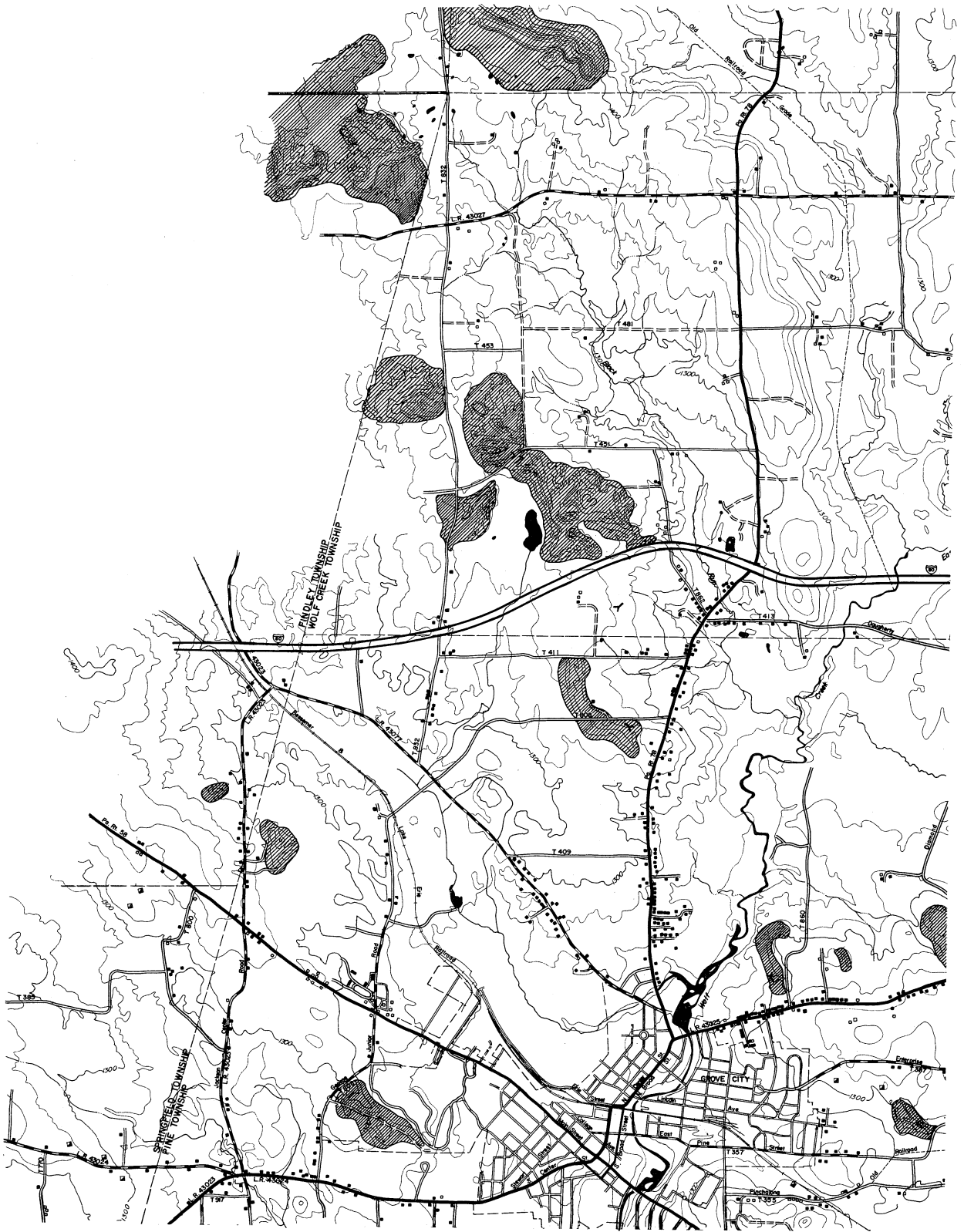
MAP LEGEND

COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF MINES & MINERAL INDUSTRIES  
 SLIPPERY ROCK CREEK WATERSHED  
 MINING AREA MAPS

SCALE: 1"=4000'



# MAP OF MINING AREAS NO. I

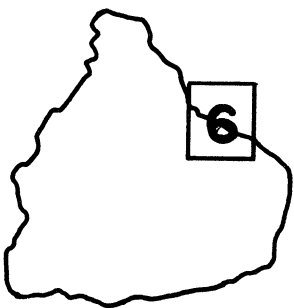


**MAP OF MINING AREAS  
NO. 4**

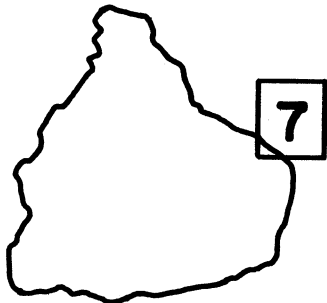
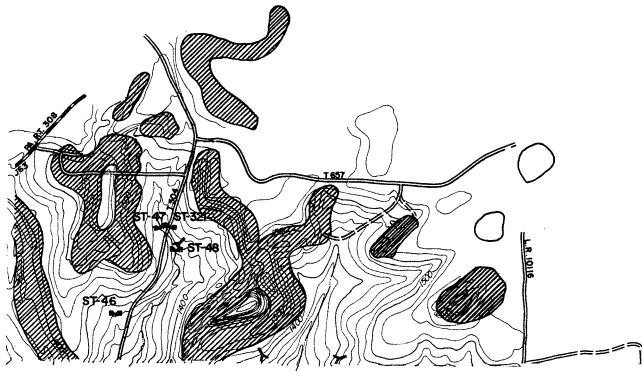


**MAP OF MINING AREAS  
NO. 5**





# MAP OF MINING AREAS NO. 6



**MAP OF MINING AREAS  
NO. 7**