

V GEOLOGICAL STRUCTURE OF THE PUCKETA CREEK DRAINAGE BASIN

The Pucketa Creek Drainage Basin is located in the Conemaugh Formation and approximately twelve higher hilltops are in the Monongahela Formation. The contact between the Conemaugh Formation and the Monongahela Formation is approximately 1300 feet in the central portion of the watershed.

The Pittsburgh Coal Seam is located at the base of the Monongahela Formation. At one time the Pittsburgh Coal Seam was the major coal seam in the watershed area, but today the majority of the Pittsburgh Coal Seam is mined out in this area.

The axis of the Duquesne-Fairmont Syncline intersects the west-central sector of the watershed approximately 3 miles from the mouth of Pucketa Creek where it discharges into the Allegheny River. The axis of syncline strikes in a northeasterly direction.

The Murrysville-Roaring Run Anticline intersects the extreme eastern edge of the Pucketa Creek Drainage Basin which is approximately 5-1/2 miles east of Duquesne-Fairmont Syncline and approximately 1 mile west from the extreme eastern boundary of the basin. Pucketa Creek is a mature fourth order stream generally flowing from east to west with dendritic drainage pattern covering 37 square miles.

VI COAL MINING

Coal reserves in Westmoreland and Allegheny Counties are contained principally in three seams. These are the Redstone, Pittsburgh and Upper Freeport. Reserves contained in beds of less economic significance included the Kittanning, Waynesburg, Uniontown, Upper Bakerstown and Lower Bakerstown. As of January 1, 1977, it is estimated that Westmoreland County and Allegheny County contain approximately 4.58 and 1.37 billion short tons of coal remaining in place respectively. Strippable coal reserves of Westmoreland County and Allegheny County remaining in place as of January 1, 1968, with 0 - 120 feet of overburden were estimated to be 55.7 and 48 million short tons respectively. The total bituminous coal production of Westmoreland and Allegheny Counties in 1976 was 2.8 and 3.9 million tons respectively.

The majority of deep mining in the Pucketa Creek Drainage Basin was done by drifting. The Pittsburgh Seam was the prime coal seam mined by that method. The Upper Freeport Seam was mined by shaft. The largest single factor to affect the surface/ground water complex is the strip mining, particularly the unreclaimed or poorly reclaimed strip mines in the Pucketa Creek Drainage Basin.

Extensive contour strip mining has been utilized in the Pucketa Creek Drainage Basin to extract the coal due to the outcropping of Pittsburgh Coal Seam on the valley walls.

VII WATER QUALITY CRITERIA

The following criteria have been used to define the concentration or range of values at which concern over water quality for all uses is indicated, assuming that each characteristic is acting alone and not in synergism with another. The characteristics listed are those common to mine drainage waters and are of concern with most water uses:

pH	-	Below 6.0, above 8.5
Acidity (Hot to pH 8.3)		Exceeding the alkalinity
Alkalinity		(See Acidity and pH)
Total Iron		Higher than 1.5 mg/l
Sulphates		Higher than 500 mg/l
Specific Conductance	-	Higher than 350 microhms/cm
Manganese		Higher than 1.0 mg/l
Hardness		Higher than 150 mg/l
Total Solids		Higher than 750 mg/l
Suspended Solids		Higher than 250 mg/l
Dissolved Solids		Higher than 500 mg/l
Turbidity		Higher than 200 units. (J.T.U.)

It should be noted that only the first five characteristics listed were analyzed in tests of water samples from the Pucketa Creek Drainage Basin.

Certain water quality criteria for the Pucketa Creek Drainage Basin have been determined in order to establish a goal for the improvement of stream quality. The criteria used are adaptations of similar criteria used by the Federal Water Pollution Control Agency and by the Department of Environmental Resources as published in the Pennsylvania Code Title 25, Section 93.6, Table L3.

The quality indicators or classifications used in this study are listed as follows:

Classifications	Acid Concentration (mg/L)	Total Iron Concentration (mg/L)
(1) Severely Polluted greater Water	178 or greater	7 or
(2) Moderately Polluted	1 - 178	1.5 - 7 Water
(3) Unpolluted (Uncontaminated) Acidity Water	0 or Alkalinity Exceeding	1.5 or less

Recommendations are made to accomplish the objective of reducing stream acid concentrations to 0 mg/l and total iron concentrations to 1.5 mg/L or less. The other characteristics, particularly sulfate, are also considered in recommendations and abatement measures are aimed at meeting the criteria set for these pollutants.