WATER QUALITY OF STREAMS

The present stream water quality criteria of concern in this report adopted by the Department of Environmental Resources are:

pH - not less than 6 or greater than 8.5

Total Iron - no values to exceed 1.5 ppm

Total Manganese - no values to exceed 1 ppm

Acidity - no acid

Sulfate - not greater than 250 ppm or natural levels, which ever is greater

Dissolved Solids - not more than 500 ppm as a monthly average

The average water quality of the major polluted streams of the Mahanoy Creek Watershed is summarized as follows:

	EASTERN HALF MAHANOY CREEK	WESTERN HALF MAHANOY CREEK	ZERBE RUN	SHENANDOAH CREEK
Acidity (ppm)	-31* to 60	-22 to 12	3 to 154	28 to 232
pH	4.5 to 6.5	6.4 to 6.8	3.6 to 6.9	4.6 to 5.9
Total Iron	6 to 29	9 to 22	.4 to 13	23 to 38

*Negative acidity represents alkalinity

The North Mahanoy Creek (acidity = 8 ppm, pH = 4.5, total iron = .6 ppm) and Big Run (alkalinity = 219 ppm, pH = 7.4, total iron = 10 ppm) which consists entirely of coal mine drainage, are smaller polluted streams, These polluted streams clearly do not meet the criteria given above.

The clean streams of the watershed include Little Mahanoy Creek, Rattling Run, Waste House Run, Schwaben Creek and Mouse Creek. The water quality of these tributaries which contain fish is characterized by 1) pH values between 6.6 and 7.6, 2) alkalinity values between 0 and 83 ppm, and 3) total iron contents of less than .5 ppm.

Significant changes in water quality occur in several sections of Mahanoy Creek and its tributaries. These changes are primarily the result of one or a combination of the following factors:

a. introduction of coal mine drainage

b. confluences of streams with differences in chemical constituents (dillution effects)

c. domestic sewage

d. influence of acid producing silt and culm banks

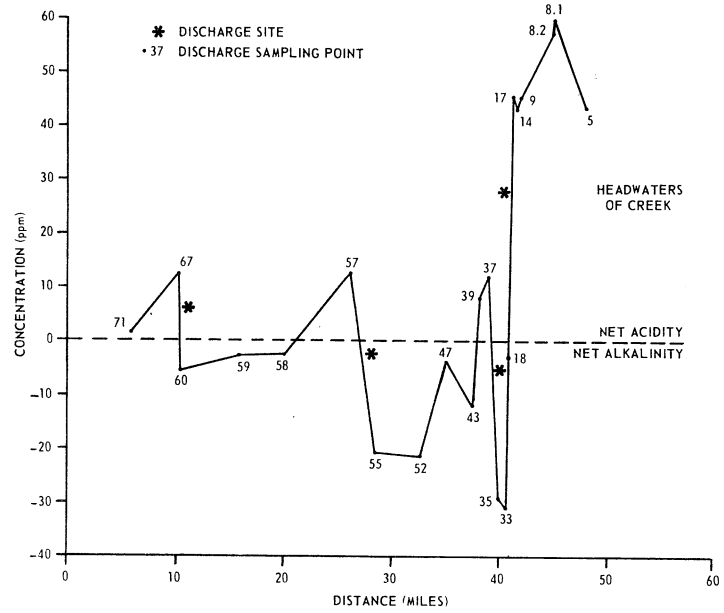
Deterioration in water quality of the Mahanoy Creek occurs in the following areas: vicinity of Mahanoy City, Gilberton, Girardville, East and South of Ashland, at sample Site 55, and at the confluence of Zerbe Run and Mahanoy Creek (Site 67). The changes in water quality of the stream are shown in the three graphs of Figure 17, p. 94. Since Mahanoy Creek originates from an abandoned mine and does not have a significant flow until the Mahanoy City Borehole Discharge enters the stream, the discharge which is located east of Mahanoy City is considered to be the major influence on water quality in the headwaters region. The Gilberton Shaft Discharge with its high concentration of iron and sulfate causes an abrupt increase of these pollutants in the stream downstream of sample Site 8.1. The increase in acidity between Sites 5 and 8.1 is due primarily to pyritic materials along the banks of the stream. In the vicinity of Girardville the Packer No. 5 discharges enter the creek downstream of Site 17. These discharges also increase the iron and sulfate content of Mahanoy Creek. However, the discharges which have a high alkalinity concentration also produces a net alkalinity in the stream. As the Centralia Tunnel Discharge (Site 36) enters the stream the high acidity of the discharge causes a net acidity in the stream east of Ashland which negates the affect of the Packer No. 5 discharges.

South of Ashland between Sites 43 and 47 the effects of silt and culm banks containing pyrite and the oxidation of ferrous iron result in an increase in acidity in the stream. Ferrous iron content decreases from 17 ppm to 9 ppm, a decrease of almost 50 percent. The Little Mahanoy Creek which enters the Mahanoy Creek downstream from sample Site 43 probably contains sufficient dissolved oxygen to cause oxidation reactions to occur. Dilution effects after the confluence of these two streams may also account for part of the reduction in ferrous iron content. The Doutyville Tunnel Discharge, entering

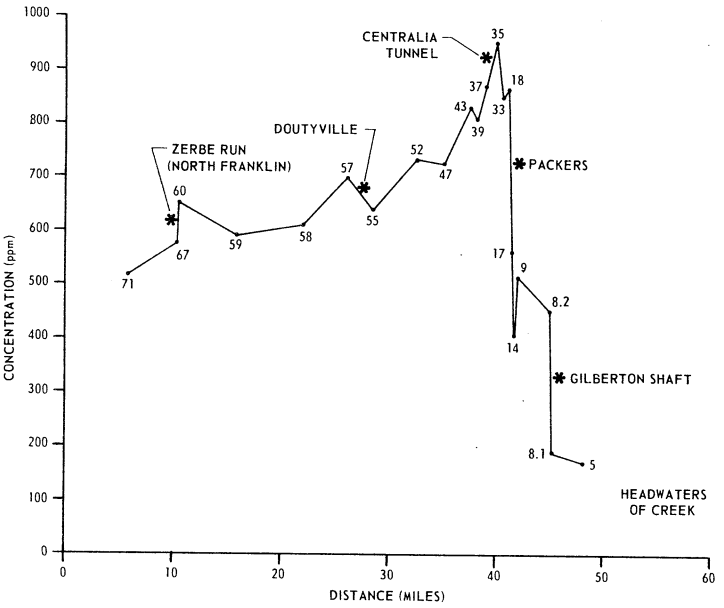
Mahanoy Creek downstream from Site 55, has a considerable influence on water quality of the stream; affecting sulfate, acidity and iron content. The severely polluted Zerbe Run also causes an abrupt change in water quality of Mahanoy Creek after the confluence of the two streams.

Variation of water quality in stream cross sections is a common occurrence in the watershed. This zonation is usually a result of mine discharges and other tributaries entering the streams. In certain cases, these variations have been severe enough to result in the relocation of sampling sites. Data collected at sample Site 67 in the first sampling period indicated a wide range of pH values existed in cross section profiles of Mahanoy Creek (see Figure 18, p. 95). This zonation occurs after the Zerbe Run and Mahanoy Creek confluence. The low pH and small flow of Zerbe Run when compared to the Mahanoy Creek as well as sand bars which delay mixing of the streams have caused the observed zonation. The sand bars tend to separate the currents so that water from Zerbe Run is contained on one side of the Mahanoy Creek preventing mixture of the two flows. Mahanoy Creek has a much higher velocity and volume which also tends to push the water from Zerbe Run to one side of the creek. After relocation 250 feet downstream this zonation was minimized. Although minor, the zonation does persist to the mouth of Mahanoy Creek.

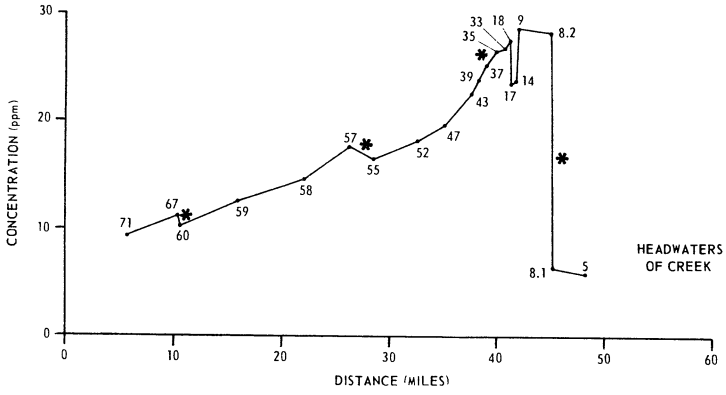
A cross section at the original site for sample Site 57 indicated a zonation existed in the stream. The site was located 75 feet downstream where pH values were consistent (pH = 6.1). The variation in water quality is a result of the Doutyville Tunnel Discharge. While not great, a zonation existed at sample Site 55 which was also relocated. This zonation may be accounted for by the Helfenstein Tunnel Discharge.



GRAPH A.
EFFECTS OF MINE DISCHARGES ON WATER QUALITY OF MAHANOY CREEK IN TERMS OF ACIDITY



GRAPH B.
EFFECTS OF MINE DISCHARGES ON WATER QUALITY OF MAHANOY CREEK IN TERMS OF SULFATE (SO_4^{2-})



GRAPH C.
EFFECTS OF MINE DISCHARGES ON WATER QUALITY OF MAHANOY CREEK IN TERMS OF TOTAL IRON

Figure 17. Effects of mine discharges on water quality of Mahanoy Creek in terms of acidity, total iron and sulfate

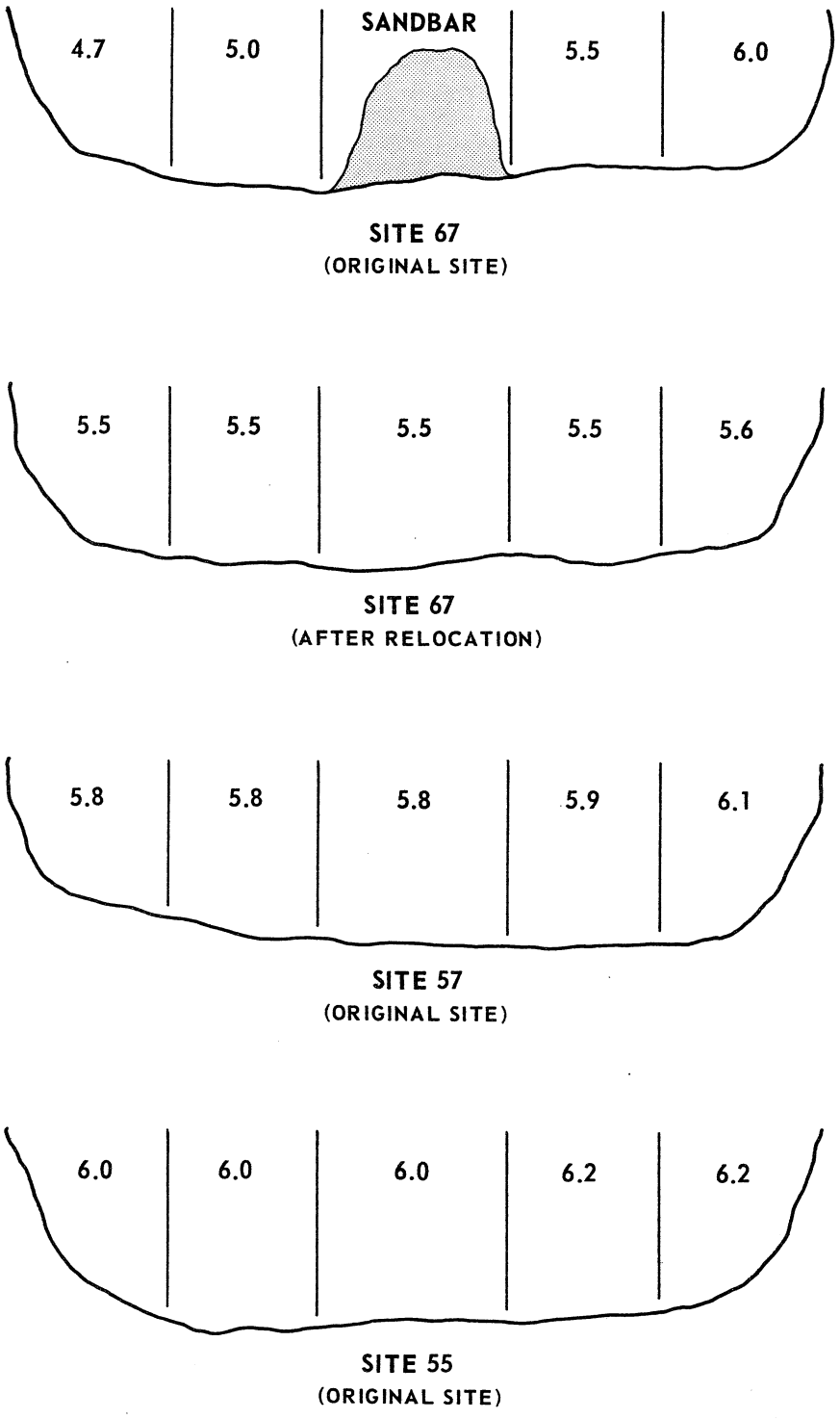


Figure 18. Zonation of water quality in the Mahanoy Creek