

CHAPTER V

SAMPLING PROGRAMS AND METHODS

MINE DRAINAGE SAMPLING

SAMPLING POINTS

During the period October through December 1970, an intensive exploration was made of all streams in the watershed area above Cherry Tree to establish the locations of all sources of mine drainage in the study area. The exploration program resulted in the location and identification of 152 sources, both acid and alkaline, all of which were incorporated into the sampling program. These sources subdivided into the following groups:

Deep Mine Drainage	76 Sources
Strip Mine Drainage	59 Sources
Refuse Pile Area Drainage	12 Sources
In-Stream Samples	<u>5 Sources</u>
Total	152 Sources

FLOW MEASUREMENTS

Wherever possible, flow measurements were made by installing 90° V-notch or rectangular weirs at each source point. Three weir sizes were employed depending upon the flow range involved.

FIGURE V-1
WEIR SIZES FOR VARIOUS FLOW VOLUMES

FLOW RANGE GPM	WEIR TYPE	WEIR SIZE (inches)
Less than 50	90° V-Notch	6"
50 to 200	90° V-Notch	12"
greater than 200	Rectangular	36"

Flow rates were calculated from weir flow height measurements. Starting January 1971, flow measurements were made at all source points on a regular monthly basis (one measurement per month). Water samples

for chemical analysis were also taken at the same time at each source point.

CHEMICAL ANALYSES

All samples taken in this study were 500 or 1,000 ml samples. These were brought in from the field and analysed immediately or stored in a refrigerator overnight and analysed on the following day for the following components.

acidity	standard hot, peroxide method
alkalinity	standard method
total iron	standard method (including suspended solids)
sulfates	cation exchange - acid titration method ⁽¹²⁾
pH	laboratory pH meter

Special samples were analysed for calcium, magnesium, aluminum, and soluble ferrous and ferric iron.

DATA RECORDS

The monthly flow records and chemical analyses for all 152 sampling points are reported on the data forms in Appendix A. Average pollutant loadings calculated for the various sources are reported for each category in summary tables in Chapter VII.

STREAM SAMPLING

Stream sampling was not carried out on a regular schedule, but was timed for periods corresponding to those used in previous studies in an attempt to get some comparison with previously reported conditions. A definite objective in the stream sampling program was to establish pollutant loadings and distributions during periods of high flow, since these data would be critical in the selection of ultimate, effective abatement methods. High flow sampling was carried out during September, 1971 (monthly rainfall = 6.2") and during June 1972 during flood conditions resulting from tropical storm Agnes (monthly rainfall = 11.9"). Data obtained during high flow conditions proved to be the most valuable data collected during the study.

SAMPLING POINTS

During this study, the West Branch was sampled at 11 stations and water quality was determined in 31 West Branch tributaries. Locations of sampling points are shown in map Figures VI-3 through 7 in Chapter VI. A full description of sampling activities is also presented in the same chapter. Most samples of the West Branch were taken as dip grab samples from bridges. Samples of tributaries were taken as close to the juncture with the West Branch as possible.

FLOW MEASUREMENTS

Flow rates were usually large and evaluations had to be made by standard estimation techniques. High flow measurements in the lower West Branch were made with instruments and skilled personnel furnished by the U.S. Geological Survey.

CHEMICAL ANALYSES

Procedures and methods for stream samples were the same as those described above for mine drainage sources.

DATA RECORDS

Flow records and chemical analyses for all stream sample points are presented in Appendix B. Pollutant loadings for the various stream points are shown in tables in Chapter VI.

CONCLUSIONS

In attempting to correlate our sampling records with those of previous studies, the conclusion has been reached that previous pollutant loading data reported for the upper West Branch are sporadic, incomplete, and are misleading in that none indicate high flow conditions which are particularly critical. The data presented in this report should be considered as being the best representative pollutant information for the headwaters area. It is recommended, however, that additional sampling under high flow conditions be carried out to permit a more complete understanding of high flow acid slugging phenomena.