

# COBB COUNTY'S STREAM ASSESSMENT PROGRAM

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## INTRODUCTION

During the 1970's Cobb County began a simple stream monitoring program to locate and correct overflowing manholes and to evaluate the performance of small treatment plants operated by the cities and industries located inside of it's borders. This initial program consisted of laboratory technicians sampling the various stream stations through out the county and reporting on fecal coliform populations and the biochemical oxygen demand. Since its inception, the stream monitoring program has progressed to include seventy-one monitoring stations on twenty streams. Improvements include a more in-depth analytical evaluation and the analysis of data including measurement of stream flow and the use of chemical and biotic indices. The background and developments of Cobb's local program are offered to provide information to other local governments wishing to establish stream monitoring programs of their own.

### Sampling Requirements

Sampling of the streams includes grab samples taken at bridges to ease transportation. Field analysis includes dissolved oxygen, (D.O.) and temperature. Samples are collected for laboratory analysis for pH, conductivity, turbidity, biochemical oxygen demand, phosphorus, nitrate-nitrite, ammonia, and chlorides. Microbiological testing includes filter membrane analysis for fecal coliform, and fecal streptococcus.

### Fecal Bacteria Ratios

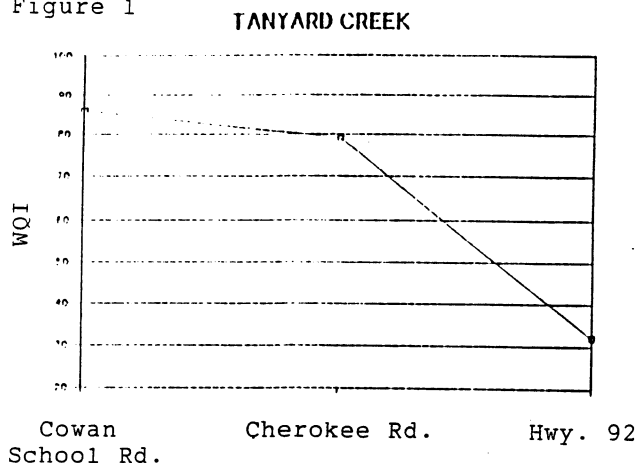
Because a large part of the county was still rural when the program began, most of the bacterial sampling included and still includes fecal coliform to

fecal streptococcus ratios in order to determine if the high fecal coliform populations are the result of a sewer leak or are from animal populations. Any ratio greater than one is considered to be of human origin while those ratios that are less than one are considered to be animal in origin.

### Water Quality Characterization

The analysis of sampling results has also progressed. In the early 1980's the National Sanitation Foundations Water Quality Index was included to provide a better understanding of a stream's quality to the general public (1). The index uses eight common water analysis parameters to produce a number that will fall between zero and one hundred. Index values over ninety shows the streams quality to be excellent, while values less than twenty-five are considered grossly polluted. Toxic materials that are present in quantities greater than State or Federal water quality standards rank an automatic zero. Although this index is not a scientific tool, it allows the public to quickly assess any of the stream's conditions on a level that can generally be well understood. An example of the index as applied to Tanyard Creek in Cobb County is demonstrated in figure 1. The figure shows values of 86 Cowan School Road and 79 for Cherokee Road the quality value suddenly drops down to 32 at Highway 92. This sudden drop in quality is the result of the discharge from an aged overloaded wastewater treatment plant that was located between the Cherokee Road station and the Highway 92 station. this aged treatment plant has since been taken out of operation.

Figure 1



In 1987, The water quality index values for the streams in Cobb County had an average of 80 for the entire county with a range of 67 to 86 for the individual streams. The sampling station values ranged from 32 to 87.

#### Biotic Analysis

Macroinvertebrate sampling has also been included since 1987 to record the types of insect species present in many of Cobb's streams and to assess the environmental conditions in the streams. Biological specimens are collected for a period of fifteen minutes at each stream station to assure a quantitative count. The specimens are returned to the R. L. Sutton Laboratory for taxonomic identification. Efforts are being made to evaluate the results of the insect identification using the Shannon-Weaver biotic index to determine the stream site's biological diversity based on the species and the populations of those species present (2). Stressed biological populations with high numbers, but low variety of species are indicative of pollution at the stream site.

#### Flow Monitoring

Flow monitoring was incorporated into the program in 1988 to provide flow data for mass balance equations. Actual stream flow measurements are made along with tape down measurements from local bridges at the stream stations in order to establish rating curves so that flow

measurement by tape down will allow for quick access of flow information. This information is still in the process of being collected. This data in turn can be applied to mathematical stream models to determine the zones of highest stress downstream from private and/or public wastewater treatment plants and dilution factors in situations where sewage or toxic spills reach the stream.

#### Data Evaluation

The ambient monitoring data are compared to the Environmental Protection Division's criteria for non-point source pollution to assess if the stream site exceeds the recommended technical limits for water quality in urban streams and the state's fishing criteria for Fecal Coliform and dissolved oxygen. More extensive stream sampling for pesticides and heavy metals may occur if the county suspects that toxic chemicals from some nearby industrial company may be finding it's way to the stream. These levels can then be compared to the state's criteria or the most recent edition of USEPA's "Quality Criteria for Water" (3) to determine if there is a need for any further investigation to locate the source. To assist in localizing the source the Brehrens - Fisher, Cockran approach to students "T" test is presently being incorporated into the program in order to determine whether the differences between two stations are the result of pollution or are merely a sampling and/or analytical variation (4). The normal ambient monitoring of the streams is performed on a semiannual basis to assess the current water quality levels and if elevated levels between two stations are detected a more in-depth survey of the creek takes place, i.e., walking the creek, to find the source. USEPA, has made several computer models available for assessing the impacts of toxic materials and oxygen demanding wastes on urban streams that are hoped to be useful for continued evaluation of water quality.

#### Enforcement

The inspection of streams around certain industrial parks is included in the program and non-point runoff, spills, and erosion from construction projects, and illegal discharges are located and assessed. State officials have often requested that Cobb County investigate

complaints to determine if a problem actually exists in certain instances, or provide a initial survey and contact. Company officials are first made aware of any problems and if no improvements are forthcoming, then some enforcement is pursued. This enforcement can either come under a new county ordinance that defines these illegal discharges as public nuisances or the State of Georgia Environmental Protection Division (EPD) is advised of the problem and asked to provide follow up and enforcement at the state level. If the stream or a length of the stream in question is located inside a local municipality, local officials are invited to work with the program and supervise the necessary enforcement action, if appropriate.

In 1986 and 1987 the Cobb County Water System published annual reports of the results of the ambient monitoring program. The problems that were found and the actions that had been taken to correct major problems were included in the report. Additional test information provided by the Georgia EPD on the Chattahoochee River area bordering Cobb County is included in the report. This report is made available to Cobb County and State officials and also made available to the Cobb County library system for use by the general public.

#### SUMMARY

Since the institution of this program by Cobb County it has been successful in locating and correcting several small industrial discharges, including one that was found to be discharging an acid waste to the head waters of Sope Creek in Marietta. An overall improvement has in County's streams been seen in the past five years as the result of the elimination of several small overloaded treatment plants located in and around the county.

As the result of recent findings of the ambient stream monitoring program during routine sampling. The County program is currently in the process of beginning two in-depth studies concerning runoff and groundwater seepage from land and lagoon disposed waste. One involves a County owned landfill, and the other concerns the remediation of a hazardous waste lagoon contaminated with copper and alkaline substances.

More information concerning the Cobb County stream monitoring program may be obtained by contacting the Cobb County Water System.

#### LITERATURE CITED

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