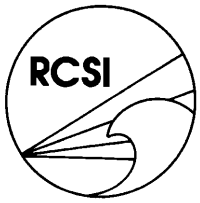

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Water Quality Trends in the Genesee River and Irondequoit Creek Drainage Basins

By: Herman S. Forest & Peter Hetzel
December 1975

THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION
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Rochester, New York 14627

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Water Quality Trends in the Genesee River and Irondequoit Creek Drainage Basins

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Summary

The Environmental Resource Center at SUNY Geneseo recently completed a study of water quality in the Genesee River and the Irondequoit Creek Drainage Basins. The Center's report covered ten years of measurements and indicated that some local waters are currently becoming cleaner.* In addition, the State itself has begun to publish information for the general public (1) and professional readers on its water quality trends. Quality in the State's principal receiving water either has been maintained or improved.

Background

New York State has committed funds from two large bond issues within ten years for water pollution abatement, and the federal government is funding 75 - 100% of costs in many projects for study, planning and abatement. Although the pace has seemed slow in individual cases, it has been intense on the state-wide scale. Only now has it been possible for the public to ask realistically, "What are the results of the effort?" Previously, results could be promised or predicted, but now enough of a record has accumulated so that initial judgement of performance is possible.

Sources of Information and Scope of the Report

The Department of Environmental Conservation (DEC) of New York State operates a Water Quality Surveillance Network, which will be described in a forthcoming RCSI bulletin. The Network sampled water at 41 locations in the Genesee River and Irondequoit Creek drainage basins.

The Monroe County Health Department does much of the sampling in Monroe County for the DEC. The Health Department also extensively samples streams that are not a part of the Surveillance Network. The most substantial improvement happens to have occurred in the areas monitored by the County itself, but not included in the State Network data pool. Thus, progress in the local area is considerably more than the Network data indicate.

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* The full report can be requested from the Environmental Resources Center, Bailey Science Bldg., SUNY College, Geneseo, N.Y. 14454. In addition to the areas indicated in the Bulletin title, scanty data are available on Black Creek, a direct tributary of Lake Ontario in northwestern Monroe County. This is not the tributary of the Genesee River by the same name.

Some of the data in the Network's accumulation were gathered more than ten years ago. During the course of sampling as many as 41 different environmental variables have been measured. However, only a few of these parameters have been used often enough and regularly enough to give definite information about water quality and historical trends or to establish geographic profiles of water quality in a given stream.

The Environmental Resource Center (ERC) used this collection of data to trace water quality trends in the two drainage basins, and to explain the results in layman's language.

This task was undertaken at the suggestion of Eric A. Seiffer, Regional Environmental Engineer of the N.Y.S. DEC. Data were provided through the cooperation of Ronald Maylath, of the Bureau of Monitoring and Surveillance, and both Regional and State offices have aided in the clarification of standards and practices. However, the handling of the data and the conclusions are those of the authors and not necessarily those of the contributing state agencies.

Results

The ERC selected three parameters for its study: dissolved oxygen, biochemical oxygen demand, and coliform organisms. These three are general indices to water quality and an adequately large amount of data is available for them.

Results of tests done for these parameters have been compared to criteria set by the U.S. Environmental Protection Agency (EPA) and by the N.Y.S. DEC.

The DEC standards governing dissolved oxygen concentrations are given in the table below.

	Trout Waters		Non-Trout Waters	
Stream Classification	Minimum Daily Average mg/l	Minimum Acceptable mg/l	Minimum Daily Average mg/l	Minimum Acceptable mg/l
AA, A, B, C	6.0	5.0	5.0	4.0
D	3.0	3.0	3.0	3.0

The EPA standards governing the amount of dissolved oxygen necessary for the protection of aquatic life are based upon seasonal temperatures and are presented below.

°C	Minimal Levels of DO Concentration
1.5 - 16.0	6.8 mg/l
16.0 - 21.0	6.5 mg/l
21.0 - 27.5	6.2 mg/l
27.5 - 36.0	5.8 mg/l

The New York State DEC does not have a law regulating BOD level. The State has, however, studied the causes and effects of high BOD and has recommended the following criteria for water quality:

Stream Classification	Maximum Acceptable Biochemical Oxygen Demand
AA	1.0 mg/l
A	1.5 mg/l
B	2.0 mg/l
C	5.0 mg/l
D	10.0 mg/l

The New York State Department of Environmental Conservation's standards for the number of coliforms present in water are given below.

Stream Classification	Maximum Monthly Median* Number of Coliforms/ml
AA	50
A	5,000
B	2,400
C	10,000

The maximum concentration of coliforms in raw water used for public water supplies acceptable to the U.S. EPA is 10,000/100 ml. The maximum acceptable concentration of fecal coliforms is 2,000/100 ml.

Conditions vary from season to season, and during wet and dry weather, thus irregular and infrequent data is not reliable to indicate short-range trends. In many of the areas studied, however, enough of a record exists to note long-term historical trends. Dissolved oxygen and biochemical oxygen demand levels were measured as often as 35 times a year at one station and coliform levels were checked as frequently as 13 times a year at another.

Network data include the results of sampling from the following streams: Irondequoit Creek (6 stations), Allen's Creek (4 stations), Thomas Creek (3 stations), Genesee River (13 stations), Barge Canal (2 stations), Black Creek (3 stations), Oatka Creek (3 stations), Honeoye Creek (4 stations), and Canaseraga (1 station). The ERC has prepared summary reports of test results from individual stations on these creeks. They are appended to the report and can be requested from ERC. The following representative results are exerpted from the ERC report (2). These results, taken from single testing locations, do not necessarily reflect the water quality of the entire stream. Only one of the three parameters for each station selected is included in the following table.

Selected Station Summaries, Monroe County

Black Creek - a station near Archer Rd. Bridge, Chili, 2.8 miles upstream from the Genesee River: Measured dissolved oxygen levels ranged from 3.0 to 12.2 mg/l between 1965 and 1972. Only 2% of those measured were below the minimum level accepted by the EPA and the DEC; 24% fell below the minimum level accepted by the EPA for the protection of aquatic life. Dissolved oxygen has increased in recent years at this location.

* The DEC requires a minimum of 5 samples in determining monthly median. Since this amount of data were not available, the Center compared these standards to yearly averages. The standard for Class C water is based on geometric mean.

Allen's Creek - a station at Linden Ave., Brighton, 2 miles upstream from Irondequoit Creek: Measured biochemical oxygen demand levels ranged from 1.1 to 7.6 mg/l between 1966 and 1973; 17% of the samples had a BOD level higher than the highest value recommended by DEC for class C water. No trend in BOD level is apparent at this location.

Genesee River - a station 0.75 miles upstream from the river mouth: Measured total coliform values ranged from 800 to 1,609,000 in 100 ml between 1966 and 1974; 83% of the coliform values were greater than 10,000/100 ml. Since 1970 there has been a definite decreasing trend in coliform value at this location.

Genesee River - a station near Clarissa St. Bridge, Rochester, 9 miles upstream from the river mouth: Measured dissolved oxygen levels ranged from 3.5 to 9.7 mg/l between 1965 and 1973; 14% of the samples had a dissolved oxygen level less than the level accepted by the EPA for the protection of aquatic life. Only one of the samples was less than 4.0 mg/l.

Honeoye Creek - a station off Sibley Rd. Bridge, Mendon, 12.4 miles upstream from the Genesee River: Biochemical oxygen demand levels ranged from 1.0 to 12.2 mg/l between 1965 and 1973. Only 3% of the samples were higher than the highest level recommended by the DEC. Tests showed maintenance of low BOD levels over a long period of time.

Thomas Creek - a station at Baird Rd. Bridge, Perinton, 0.6 miles upstream from Irondequoit Creek: Measured total coliform values ranged from 500 to 1,100,000 per 100 ml between 1965 and 1971; 54% of the samples had a value greater than 10,000/100 ml. A slightly decreasing trend exists at this station.

Barge Canal - a station near Scottsville Rd. Bridge, Rochester: Measured dissolved oxygen levels ranged from 4.0 to 14.7 mg/l between 1966 and 1973; 13% of the samples had a dissolved oxygen level below the minimum accepted by the EPA for the protection of aquatic life. None of the samples had a level below 4.0 mg/l. Dissolved oxygen levels have increased at this location.

Oatka Creek - a station near Rt. 383 Bridge, Wheatland, 7.9 miles upstream from the Genesee River: Measured total coliform values ranged from 200 to 17,000 per 100 ml between 1966 and 1973. Only 4% of the samples had a value greater than 10,000 and there has been a decreasing trend since 1968.

Irondequoit Creek - a station at Empire Blvd. Bridge, in the Town of Irondequoit, at the mouth of the creek: Measured biochemical oxygen demand levels ranged from 2.0 to 19.1 mg/l between 1968 and 1973; 97% of the samples had a BOD level higher than the DEC recommended maximum and no trend is apparent at this location.

Statewide and Local Trends in Water Quality

Currently, New York State is beginning official and semi-official releases of information on water quality trends drawn from the huge bank of monitoring data. The Pure Waters Division of the DEC released on April 15, 1975 a Water Quality Report to the Congress through the EPA. In order to provide more useful information, the Department is aiding its staff members, as individuals, to prepare summary reports for both technical journals and popular ones such as The Conservationist. Twelve State waters were selected for graphic presentation

over the period 1965 to 1974 in the recent article (1). Of these, the Mohawk River at Fonda showed the most decided trend of improvement: from "medium" to "good" (1969 to 1974). Most "good" and "medium" waters maintained their quality. Five of the State's 17 basins receive 85% of the total pollution discharge. Although the Genesee River is not among these five and was not discussed, a graph was included, identified as "below Eastman Kodak". This station (#04-0001) is located 2.6 miles upstream from the river mouth and 2 miles downstream from the Eastman Kodak Waste Treatment Plant discharge and 3 miles below several major Rochester sewer overflows. This is one of the 41 stations studied in the ERC report. The Water Quality Index had fallen from "medium" to "bad" in several periods of 1967 and 1970, but recovered to "medium" in 1971 and has remained at that level. The Water Quality Index is determined by a mathematical formula integrating nine selected parameter values. In the area covered by three of these nine parameters, the Environmental Resource Center found improvement in some areas and a maintenance of medium water quality in others.

References

(1) Mt. Pleasant, R.C. and H. Bagley, *"Towards Purer Waters"*, The Conservationist, Vol. 30, No. 2, Oct. - Nov. 1975

(2) Hetzel, Peter, *"Water Quality Trends in the Genesee River Basin and Lake Ontario Basin in Monroe County"*. Contribution #54 of the Environmental Resource Center, Geneseo, N.Y. July 1975